

THE YUKON ECONOMY
ITS POTENTIAL FOR GROWTH AND CONTINUITY

D. Wm. Carr & Associates Ltd.

Ottawa

August, 1968

THE YUKON ECONOMY
ITS POTENTIAL FOR GROWTH AND CONTINUITY

by

D. W. Carr
and
F. W. Anderson

A Report Prepared

by

D. WM. CARR & ASSOCIATES LTD.

for

THE DEPARTMENT OF INDIAN AFFAIRS
AND NORTHERN DEVELOPMENT

and

THE GOVERNMENT OF THE YUKON TERRITORY

Ottawa

September, 1968

TABLE OF CONTENTS

Preface

Introduction to the Summary

Summary of Conclusions and Recommendations 1

Part 1 - The New Environment for Economic Growth

Chapter 1 - The Yukon in National and Regional
Perspective 18

Introduction 18

The Yukon in its Regional Setting . . 22

The Yukon in the North 22

The Yukon in the Northwest
Region 29

Yukon Development History: An
Economic Perspective 32

The Early Stage: The Carnival
of Gold 33

The Middle Stage: The Contri-
bution of Defence 37

The Recent Stage: The New
Yukon 40

Chapter 2 - The Northwestern Economic Region
and the Yukon 48

Alaska 52

Northern British Columbia and
Alberta 62

The Northwest Territories 69

Chapter 3 - The New Philosophy of Northern
Development 79

Part 2 - The Economic Potential of the Yukon

Chapter 4 - Introduction	93
Chapter 5 - The Structure of the Yukon Economy . . .	97
Chapter 6 - The Physical Resource Environment . . .	101
Topography	103
Drainage	104
Climate	106
Source Regions of the Air Masses . . .	108
Temperatures	109
Sunshine	111
Precipitation	111
Geology and Soils	113
Vegetation and Animal Life	117
Wildlife	118
Chapter 7 - The Minerals Industry	120
Introduction and Present Development	120
Characteristics of the Industry . . .	126
The Indicated Resources	126
High Costs	131
The Federal Role	131
A New Stage	132
Progress of Exploration	133
The Physical Environment	134
High-Grading	135
Markets	136
Incentives	136
A Critical Stage in Development . . .	137
Potential for Mining	140
First Projection: Based on 1967-68 Conditions	141
Projection Based on Long-run Planning	143
Smelting	149
Conclusions	151
Recommendations	153
Contribution to the Yukon Economy . .	157

Chapter 8 - The Electrical Power Industry	158
Gas and Oil for Power	160
Nuclear Power	160
Coal for Power	161
Hydro-electric Resources	162
Systematic Transmission	164
Rate Structures in Power Supply	164
Advance Supply Planning	165
Conclusions and Recommendations	168
Contribution to the Yukon Economy	171
 Chapter 9 - The Forest Industries	 173
Forest Resource Inventory	175
Physical Influences on Growth Rates	177
Growth Potential	178
Demand for Forest Products	180
Sawmill Industry Potential	181
Preservative Treatment Plant Potential	183
Pulp Potential	183
Long Term Development	184
Considerations in Forest Industry Expansion	184
Contribution of the Forest Industry to the Yukon Economy by 1985	188
 Chapter 10 - The Agricultural Potential of the Yukon	 190
Physical Environment	193
The Impact of New Technology	195
The Farming Potential	196
Conclusions	201
Contribution to the Yukon Economy	202

Chapter 11 - Hunting, Trapping and Fishing	
in the Yukon	203
Introduction	203
Hunting	204
Hunting Resources	205
Demand for Hunting	206
Conclusions and Recommendations	206
Contribution to the Economy	207
Trapping	207
Outlook for Trapping	208
Potential Contribution to the Yukon Economy	208
Fisheries	209
Conclusions and Recommendations	210
Potential Contribution to the Economy	211
 Chapter 12 - The Tourist Industry	 213
Considerations in the Development of the Tourist Industry	214
Tourist Resources	214
Demand for Tourist Services	216
Tourist Services in the Yukon	218
The Care of the Tourist Resources	218
Highway Services	219
Accommodation and related services	220
Promotion	221
Conclusions	222
Summary of Recommendations	224
Potential Contribution to the Economy	228
 Chapter 13 - The Service Industries and Processing and Manufacturing	 229
The Service Industries	229
Current Development	229
Conclusions and Recommendations	232
Contribution to the Yukon Economy	233

Processing and Manufacturing	234
Present Contribution to the Yukon Economy	235
The Potential for Growth of Manufacturing	236
 Chapter 14 - Summary of Yukon Growth Potential: Output, Capital, Manpower and Population	239
Projection of Output, Capital and Manpower to 1985	239
Population Projection	241
 Chapter 15 - Basic Developmental Services: Power and Transportation	243
Introduction	243
Planning the Supply of Power to the Yukon	252
Transportation Planning in Yukon Development	255
Transport Facilities for Present and Expected Traffic	256
Interim Investment Policy	257
Rail	257
Road	258
Air	262
Regulatory Policy	262
Rail	262
Road	263
Air	265
Sustaining Exploration and Development	267
Airfield Policy	267
Access and Developmental Roads	268
Planning Transport for Long Term Development	269
The Pattern and Orientation of the Transport System	273
Rail Services to the Northwest	276

	Railway Policy Decision in the Northwest	281
	Global Cost Estimates of Basic Developmental Services	283
Chapter 16 - Supply of Capital and Manpower Including Native Workers		286
Capital		286
Demand for Capital		287
Supply of Capital		289
Manpower		291
Demand for Manpower		292
Supply of Manpower		295
Cost-of-living, Incomes and Housing		296
Contribution of the Native Population		300
Current Situation		301
Chapter 17 - The Economic Environment for Growth		307
The Heritage of Tradition		308
Effect of Technology on the Physical Environment		312
High Cost Environment		315
Structure of the Economy		316
Entrepreneurship		319
Influence of External Markets		319
Influence of Volatility of the Economy		321
Social Services, Housing, Townsite and Municipal Development, Cultural and Other Amenities		323
Economic Growth in Surrounding Areas		330
Economic Environment of Public Policy		331

Chapter 18 - The Potential Viability of the Economy	336
Strengths of the Yukon Economy	336
Weaknesses of the Yukon Economy	337
The Economic Outlook	339
Pre-planning Growth and Viability	342
Considerations Relative to an Industrial Development Authority	344

Appendices

- A - Acknowledgements
- B - List of Briefs
- C - Terms of Reference
- D - Reports Prepared as Part of the
 Yukon Economic Studies and
 Published as Reference Volumes

LIST OF TABLES

Table 1	- Long-Term Climatic Data, Selected Stations	110
Table 2	- Estimated Private Capital Expenditure, Yukon Territory, 1961-68	124
Table 3	- Forecast of Future Electrical Loads in the Yukon Territory	159
Table 4	- Value of Primary Forest Production, Yukon Territory, 1960-61 to 1966-67	174
Table 5	- Recommended Allowable Annual Cut	179
Table 6	- Forest Fire Losses, Yukon Territory, 1952-66	186
Table 7	- Number, Area and Use of Farm Land, Yukon Territory, Selected Years	191
Table 8	- Value of Farm Capital and Sales of Farm Products, Yukon Territory, 1961 and 1966	192
Table 9	- Projected Growth of the Yukon Economy to 1985: Output, Capital Requirements, Manpower Requirements	240
Table 10	- Estimated Labour Force By Industry, Yukon Territory, 1966	292
Table 11	- Labour Force by Occupation, Yukon Territory, 1961	293
Table 12	- Labour Force by Ethnic Groups, Yukon, 1961	301

LIST OF FIGURES

Figure 1	- Yukon Territory and Surrounding Areas, Physiographic Features	49
Figure 2	- The Pacific Northwest	64
Figure 3	- Mineral Exploration and Mining - Yukon and N.W.T.	73
Figure 4	- Geological Map of the Yukon	116
Figure 5	- Recorded Claims at end of 1967	123
Figure 6	- Key Map to Forest Areas, Yukon Territory	176

PREFACE

This is a study of the potential growth and viability of the Yukon economy. It has been undertaken under the joint auspices of the Department of Indian Affairs and Northern Development and the Government of the Yukon Territory.

The preparation of this Report, including the extensive background studies that preceded it, has been most challenging and stimulating. Not least remarkable was the enthusiasm shown in the interviews, discussions, briefs and meetings with special regional groups and the evidence that these seemed to serve as a catalyst to those concerned with Yukon development. We had an excellent response in all our discussions and interviews and in the course of the study saw several new steps in development undertaken.

The organization of the investigations has been guided by our belief that an overall understanding of the foundations of the potential of the Yukon economy is a necessary first step in its appraisal. Accordingly, our studies were directed first to providing a perspective on the new environment for economic growth in the Yukon and the northwest region. In the course of this investigation it was possible to analyze the Yukon in its regional and national perspective, in its historical setting in the northwest region and in the context of the new philosophy for northern development. These investigations are comprised in the first three chapters, that is, Part 1, of the Report.

The second stage in the study was to appraise the potential of the resources and industries of the Yukon and to indicate the objectives and measures to be undertaken for national development of such potential. This appraisal makes up the first eleven chapters of Part 2 of the Report. It was based not only on our own researches and interviews but also on comprehensive studies by associated and staff consultants and on several excellent briefs and presentations by Yukon business leaders and regional development groups (See list in Appendix B).

The third stage in the study was to examine the basic development services of transportation and power in terms of their contribution to the potential of the Yukon and of the region. This analysis is comprised in Chapter 15 and was one of the particular responsibilities of Professor F. W. Anderson, as was sections of Part 1. The fourth step was to assess the economic environment for growth and the potential strength and viability of the Yukon economy to 1985 and after. This assessment makes up the final three chapters. Throughout the Report objectives are recommended, where appropriate, for stimulating the development of the Yukon potential. A summary, including its major projections and objectives, is presented at the beginning of the Report.

Ottawa,
August, 1968

D. W. Carr

INTRODUCTION TO THE SUMMARY

This is the Report of a comprehensive economic study of the Yukon. The study was initiated and financed jointly by the Department of Indian Affairs and Northern Development and the Government of the Yukon Territory. The study project itself has comprehended some 14 background studies in addition to the special research involved in preparing this Report. Overall, these research studies have covered the economic history of the Yukon, the economic characteristics of the northwest region, the new philosophy of northern development, an appraisal of the industrial potential by individual industries, an analysis of the physical and economic environment for growth in the economy, an analysis of the potential viability and continuity of the prospective economy and a critical analysis of the objectives to be accomplished if the potential for growth and continuity is to be effectively attained. In an economic study of such all-embracing dimensions it was necessary to confine this Report to the summarized essence of the research to keep its volume to a reasonable

limit. For those wishing to have more information, the background studies are being published in a limited edition as reference papers and these are listed in Appendix D.

The studies were designed to appraise the growth potential of the Yukon economy. As such, they look ahead, not back. Their findings and recommended objectives are designed to guide decision-making for the longer-run future.

The considerations that lay behind the decision to have this study carried out are significant. The terms of reference agreed upon by the Department and the Territorial government in early December, 1966 (See Appendix C), indicate some of these considerations. Others have become evident in the course of the research. They are outlined here to provide a perspective for the reader.

A first consideration was the great need for more information including statistical data on the Yukon economy. Another was the rapid though limited economic growth that was clearly imminent in 1966 and the implications of this growth for the future of the Yukon economy. A third factor was the growth in the world demand, especially in Japan, for minerals that were available in the Yukon. A fourth consideration was the economic viability of the Yukon economy as an element in eventually evaluating

the economic foundation for constitutional and other changes. In this context, the uncertainties of mineral markets and mine depletion were an additional consideration. A sixth consideration was the future role of basic services such as power and transportation. A seventh consideration was Territorial tax revenues and their significance relative to Yukon and federal expenditures - this was later made a separate study by the Department and was completed in March, 1968.^{1/} An eighth consideration was the impact of public spending on the Yukon economy. A ninth consideration was the substantial assistance that had been provided by the federal government mainly in the 1960's for exploration and development in the mineral industry as well as for the expansion of roads and other services in the Yukon, and the indications that, while these measures had been effective in expanding the Yukon economic potential, they had also helped to bring the Territory to a new and critical stage in development for which additional broad measures might be appropriate and economically justified.

For all of these considerations it was useful and desirable to have a study of the economic potential

^{1/} See Yukon Territory Taxation Study 1968, by Touche, Ross, Bailey and Smart.

of the Yukon. For some of them (constitutional organization and electric power) the federal government had also indicated a "white paper" or new policy statement would eventually be prepared.

These considerations serve to indicate also the pressure of events in which the study was undertaken. Yet it became evident early in the analysis that the studies should be directed toward long-term rather than short-term objectives. The Yukon economy had been brought to a new plateau of economic development which now offered the potential for a major new economic advance. To develop this new economic potential in the Yukon most effectively will require rational long-term measures warranted by the economic opportunities available.

The outlook for the Yukon economy by itself and under existing conditions, indicated only a very moderate growth but a great deal of volatility and uncertainty unless measures to strengthen the economy could be undertaken. Moreover, the stage of development of the Yukon, the regional enthusiasm for economic progress and the recent federal contributions to new development had all combined to create a quite favourable climate for consideration of a major new economic advance in the Yukon. In these circumstances, it was necessary to appraise the economic values of the prospective long-run

economic growth in the Yukon in relation to the long-run costs of appropriate new public and private investments and their overall benefits to the economy of Canada. Although it was not possible to carry these cost-benefit appraisals into the detail that eventually will be desirable, the evidence appraised clearly indicated in our judgement that the benefits more than warranted the costs. The economic growth of the Yukon and the related investments were projected to 1985, and in some cases to 1995.

The central theme arising out of these studies of the Yukon economy has been that its potential for growth is many times greater than its current output and that its potential for stability and continuity can be increased. But to develop both of these potentials major new public and private investments will be necessary. Most of the potential for economic growth lies in mining and much of it can be made available only by the extension of the basic services such as transportation and power. Yet these alone are not sufficient to establish the economic stability and continuity necessary for permanence in the economy. In addition, a substantial improvement in the physical and cultural amenities of the Yukon will be necessary as well as effective planning and coordination of Yukon development with that of the northwest region as a whole. Put simply, there is a substantial

potential for growth and continuity in the Yukon economy if the economic development of the region is carefully planned for the long-run and rationally and systematically co-ordinated with development of the northwest region. If economic development is not carefully planned and rationally co-ordinated with the rest of the region, the potential for economic growth and continuity, and for permanence in the economy, will be significantly reduced.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

In the earlier years of the Canadian nation the public interest in economic development was concerned mainly with the region that lay close to Canada's southern boundary. Because of this, the Yukon remained relatively isolated and, until a decade or two ago, its economic potential did not hold a large place in Canada's development decisions.

During the past several decades, Canada's economy has been strengthened. Its infrastructure has moved significantly northward. Technology has opened new opportunities in the North. Significant new discoveries and developments have occurred in the Yukon and nearby areas. Continental defence installations have resulted in new services and facilities. New technologies in air, underwater and overland transportation have broken through the barriers of isolation that formerly protected Canada's barren North. National responsibilities for maintaining necessary authority and minimum services in the North

have been expanded. And public decisions have come more and more to concern economic progress in the northern Territories and in the adjacent northern parts of the provinces.

This progressive advance of the boundary of potential economic growth northward has been notable in the last two decades. By 1968, it was possible to see this new economic advance reaching north through northern British Columbia and Alberta and most of the Yukon and eastward through the Mackenzie District probably as far as the meridian of 110 degrees west longitude. The evidence indicates that it will be several decades at least before this new boundary of favourable potential will begin to move northward again. Canada's North has now reached a stage where it would be particularly beneficial to identify again the boundary between regions of favourable and unfavourable economic potential and to develop appropriate new philosophies of northern development for each of them.

In the past, dependence of the Yukon on sporadic and scattered exploitation of only the richest ore deposits had discouraged those longer-term investments in transportation and other basic services that were needed to open fully the economic potential of the North and link it to

the infrastructure of the rest of Canada thereby generating through the national economy the long-run benefits of such a major new economic advance.

Over recent decades, the opportunities for such a longer-term advance have improved. The strong and persuasive evidence emerging from the studies and analysis of this Report upon which its conclusions rest, is that there is in the Yukon a substantial resource potential which could expand the value of output from the Territory eight to ten times over present values if certain policy guidelines and recommendations in this Report are implemented. These projections are based on conservative estimates generally and could readily turn out to be 30 or 40 per cent below the eventual output. This estimated potential is largely found in the mineral resources. But potentials for renewable resource industries, such as forestry and tourism, though much smaller than for mining, now offer scope for substantial expansion also. On the other hand, while there was a substantial new growth in mineral production underway in 1968, there was little firm prospect for additional ventures, beyond those now in process, unless the economic environment could be improved. The climate to promote more consistent development is the social and economic climate which is amenable to change by public

policy. The recommendations of the Report bear on the goals needed to improve this climate of development.

The second broad conclusion arising from the analysis is that technology favours the prospects for the Yukon to achieve a major expansion of outputs. The range and impact of technological change which has increased the size of the whole Canadian mining industry more than fourfold in the past 20 years, can operate in the Yukon to overcome the climatic and locational limitations with greater advantage than elsewhere. These new technologies have made economies realizable in the use of the things which have been so expensive on the frontier including metallurgical techniques. New ventures can now begin farther from centres of activity on larger scale than before because of new and emerging technology. The spreading application of technology in the Yukon will continue to reduce the relative costs of climatic and locational limitations and enable industry to reach more deeply into known resources.

One handicap to growth in the Yukon has been tradition. In this, it is not the traditions related to technology or obsolete capital which are the hindrance but the tradition of attitudes and approaches. Perhaps the most adverse of these attitudes are those that view

the Yukon economy as a sporadic short-run phenomenon, and the Yukon as a place of pure plunder, a place to make a quick stake and leave, or a place of sacrifices to be borne while accumulating wealth. These attitudes have combined to create, in the past, a frontier atmosphere not conducive to long-term investment, long-range planning or permanent settlement. Services ancillary to output, including the whole range of social and administrative services, tended to be provided in minimal amounts after the need arose. Obviously, modern development requires that planning should anticipate demand, and provision of services should not lag behind, if the potential is to be effectively exploited. Development dependent upon the traditional frontier attitude of rugged individualism will not reach even close to the potential and will perpetuate impermanence and erratic swings in the Yukon economy. Moreover, these traditions extend to the view that frontier conditions must be accepted with their paucity of the amenities enjoyed by more settled and stable regions. If development is to be promoted on a more consistent pattern, the ruggedness of living conditions must be relieved. Improvement in services and facilities can be promoted by public and private concerns, but the development of a richer life in all of its social and cultural facets cannot be provided by big government and

big business. Increasing local concern and local leadership in a whole range of community activities must be generated. Good examples exist in some activities, but local participation and local pride has to be fostered. The genesis of these is a local responsibility. The paternalistic provision of social and cultural outlets traditionally provided by "the company", or "the government", are no substitute for participatory, voluntary activity in concerns of community interest.

Finally, there emerges from the study the conclusion that an economy so predominantly dependent upon non-renewable resources faces particular threats to stable growth which can only be lessened by the specific recognition in planning and policy of these dangers. Non-renewable resources demand a constantly moving frontier of development if rapid swings in investment, employment and income are to be dampened. The advance of technology will serve to extend the margin by permitting profitable extraction or better utilization of lower grade ores. This will be a built-in stabilizing influence and may well be a greater influence in the future than in the past. Yet technology apart, the developmental thrusts which sustain the rate of growth in terms of new investment, new employment and, hence, new incomes, come from new ventures. Public policy

must anticipate, promote and keep abreast of new prospects, in both old and new discoveries, with the provision of services and amenities necessary to getting these ventures over the threshold from potential to operational.

Nevertheless, non-renewable resources are depletable resources. As the need to promote the rate of growth extends the range of development, the rate of growth becomes more and more difficult and expensive to sustain. At some point in time there must come an eventual levelling off. Then output from the non-renewable resources stabilizes, new opportunities for investment fall off except as technology provides them, and economic problems of sustaining the infrastructure give rise to social and human problems. The problems of private investment, such as personal investment in housing for example, left behind when mining and its associated commercial activities move from a location, can be acute. Public and private planning must keep these eventualities in mind as part of the social costs of development.

One answer, though only partial because of its smaller potential, is to give weight to the development of industries based on renewable resources. In the Yukon these are, at this time, mainly forest industries and tourism. However, with the extension of service facilities such as power and transportation, new opportunities for

other types of more permanent industry may also be expected to develop.

These handicaps of attitudes and resources are real but not insurmountable. The recent major advances of the Yukon economy, together with the promise of similar advances in the rest of this northwest region, attest to the transition of this part of Canada's North to a new era of economic potential. Still shrouded by its heritage from the past, this new potential has been laid bare by the advance of new technology. For its realization this new economic potential in the northwest rests largely on the acceptance of a new role there for the public sector.

This new stage now opening offers an excellent opportunity to enlist private enterprise more fully in the development of the North. For the public sector, it involves a new philosophy of public participation in the North albeit no deeper public participation than has so frequently occurred elsewhere in the past prior to major economic advances. This public role is like the public role elsewhere in providing the basic structure of transport, power, etc., and the infrastructure of social and administrative services, necessary to give private enterprise the incentive to initiate productive activity in the region.

A new departure in public policy, comprehensive, positive, preceptively forward-looking and broadly based, is needed to round out and condition the economic environment for this new breakthrough in Yukon and northern development. This new philosophy will recognize that Yukon development is potentially more limited if it cannot be phased with development in the entire Canadian northwest. To give an administrative reality to regional policy of this kind, there must be a developmental authority as the agent of national policy. It should be emphasized also that it is not remedial measures but new creative measures that will be required here. Thus the task of planning and co-ordinating the progress toward the necessary objectives will be large and challenging. There are many compelling reasons that support a specialized development effort to carry through the initial planning and co-ordination and to develop the longer-run measures to maintain growth and stability in the Yukon.

For example, effective and rational economic development of the Yukon will involve extensive and complex interrelationships and will be concerned with co-ordination among several areas and jurisdictions. For these conditions, the importance of an intensive and specialized effort may be apparent.

There is a difference between this advance industrial planning and the administration of ongoing present programs including the day-to-day territorial housekeeping. Yet as the planning and development progresses, this task of departmental and territorial administration will be greatly expanded by taking up the administration of the long range development and its implementation. Because of the extent, importance and urgency of this growing day-to-day task of administration and policy implementation it would be desirable for the planning task to be separate and independent to a degree to prevent it from being submerged in the mass of day-to-day housekeeping and other priorities that arise.

Such an industrial development authority, if it is effective, may not be required beyond the next 10 to 15 years. By that time also the economic as well as the political outlook should be more clearly foreseen and the future of the development authority can be more readily apparent.

There are several alternative organizations that might be adopted for such a specialized development authority but the one that seems most suited to the task in hand would be a specialized development authority, responsible for planning, promotion and co-ordination of economic development in the northwestern region of Canada's northern Territories and reporting to the Minister of Northern Development.

Projections and Recommended Objectives

The evidence in this Report shows that the economic potential of the Yukon is relatively large. Much of this economic potential depends upon appropriate new steps in the public sector, designed to create a favourable economic environment for new private enterprise. The most significant public contribution to such an economic environment would be to establish the objective of a rational system of transport, power and other services for the Yukon, such as has been provided elsewhere in Canada.

The creation of this new climate for growth, the Report projects, will stimulate expansion of the gross output of the major industries of the Yukon to eight or ten times their present level or to an estimated \$470 million by 1985, with about half of this from growth in mining. This expansion in the economy has been estimated to require, between 1968 and 1985, additional investment of private and public capital of about \$1,400 million and additional manpower of nearly 17,000 workers. In these circumstances, the total Yukon population may be expected to rise to about 57,000 by 1985.

It may be evident that a systematic plan of long-run objectives in public investment would need to be established to create the environment necessary for such economic

growth in the Yukon. Recommendations for these long-run objectives have been set out in the Report in detail. Some of the most significant of these objectives (listed in the sequence found in the Report) are, briefly:

- A standard-gauge railway from the centres of originating traffic in the Yukon to connect with Canada's mainline railways. This objective should be attained by the period 1975 to 1978.
- Provision, in advance of requirements, of adequate electric power capacity and implementation by 1975 of a program of comprehensive generating facilities and an effective transmission grid in the Yukon.
- Provision of a Canadian tidewater port as near as possible to the Yukon by the time standard-gauge rail services are ready for use.
- Extension of the programs for development roads and airfields to provide a basic grid for each of them covering the whole of the Yukon Territory by about 1975.
- Completion of the geological survey and mapping of the Yukon Territory within the next 10 to 12 years.
- Continuation of the incentives now available for mining exploration and development but eventual

selective use of these where appropriate to moderate the variability of the growth pattern of the mining industry.

- A comprehensive feasibility study of the potential for a lead-zinc-silver smelter in the Yukon or its vicinity within the next five years.
- Strong support for a lead-zinc-silver smelter if such should prove feasible.
- Measures to stabilize the labour force and population of the Yukon Territory by incentives to support progressive improvements of the physical and social services and the amenities in urban centres in the Yukon, including housing, sanitation, recreation, cultural activities and others.
- Further steps by community and service agencies in the Yukon to stimulate the expansion of service industries, small processing industries, social and cultural activities, and other amenities.
- A further review in 1975 of the feasibility of development of iron ore mining in the Yukon in the light of new conditions then prevailing.
- An appraisal of coal reserves at Carmacks and of the costs of mining them and, if these prove favourable, a feasibility study of coal-fired thermal electric plants.

- The expansion of forest fire protection services sufficient to reduce the annual burn rate from 0.6 per cent of the productive forest land to 0.1 per cent, and thereby increase the projected future timber cut by more than 60 per cent.
- An expansion of the forest industries by 20 times by 1980 to 1985.
- Completion of the inventory of the Yukon forests.
- An effective testing of commercial greenhouse production of tomatoes and other vegetables.
- Completion of an inventory of wildlife resources within the next five years.
- Measures to control winter grazing of pack horses to remove them as a public hazard from the highways.
- Maintenance of the high quality of the tourist recreation resource environment including adequate provision for national parks and wilderness reserves.
- A threefold attack on the problem of dust and roughness on the Yukon highways by a crash research study of effective methods of inhibiting dust and binding the gravel; by temporary measures to reduce the dust until a suitable permanent binder can resolve the problem; and by a modest improvement program for the Northwest (Alaska) Highway System.

- A long-run improvement program for tourist facilities including: A revolving loan fund for the expansion of tourist accommodation and other facilities, and establishment of standards and supervision for such tourist services.
- Development of suitable facilities and services to encourage a longer tourist season.
- An expansion of tourist promotion activities.
- Effective long-run investment and regulatory policies for rail, road, air and pipeline transportation.
- An expansion of financing and financial services in the Yukon.
- Measures to assist northern housing.
- A concentrated effort to educate, train and bring into the regular labour force a greater proportion of the native population.
- Establishment of a new or modified power authority for the northwest region of the Territories, effectively authorized, organized, staffed, located and equipped to carry out fully the responsibilities as agent of the federal government, for planning, developing, co-ordinating and operating where necessary, the power services suitable for the effective economic development of the Yukon.

- Establishment of a specialized development authority to carry forward the work of this Study and to carry out overall planning and co-ordination for economic development of the Yukon and the northwest region.

PART 1

THE NEW ENVIRONMENT FOR ECONOMIC GROWTH

CHAPTER 1

THE YUKON IN NATIONAL AND REGIONAL PERSPECTIVE

Introduction

This is a study of the potential of the Yukon economy. Such a study has particular significance because it is the first to be concerned on a comprehensive basis, with growth in Canada's North. The economic potential of much of Canada's North has been altered substantially in recent decades by the impact of new technology, by more enlightened public policies and by the advance of economic development. The Yukon is part of a region of the North that has economic advantages over most of the northern Territories.

It seems only prudent in making a report on the prospects of economic development in such an underdeveloped region of a modern nation to postulate broadly the generally accepted purposes toward which economic development

should be aimed. First, it must contribute to national goals and aspirations by making a recognizable net addition to the gross national product. These pay-out terms should not be narrowly defined or too short-term. Within a national economy the returns are most often indirect and diffused but real nevertheless. Canada's own first experience with national policy should give confidence in this even without the assurance of more modern economic theory.

Second, new regional economic development must provide the basis for improving the standard of life in the region. Some would put this first, and no particular quarrel is made with that. However, it is possible to improve the regional basis for a better life without benefiting the whole country, through unwise social policy. It is likewise possible to pursue economic development for the benefit of the whole country at the expense of a region, at least relatively. Canada's experience attests also to that.

Third, new regional development has no particular justification if it is carried forward at the expense of another region. This is always the choice faced by a nation in periods of full employment, or when there are severe shortages of certain types of developmental

ingredients such as risk funds, or skilled personnel, which is another way to say much the same thing. Public policy can move to alleviate specific shortages but general full employment of capital and labour may cause real priorities in development to be set.

The analysis of this Report, following its terms of reference, does not presume to set priorities between regions. If full employment exists or, through inadequate public policy, shortages in funds and manpower appear to exist in the economy, full mobilization of the nation's potential is a process for national policy decisions.

This Report is concerned with new economic development in the Yukon region, not with readjustments of past development. This is not to be compared with many other types of current regional development schemes which are designed primarily to ameliorate regional disparities in income. Socially and nationally necessary as those policies may be (and beneficial as they may be to the national self-respect) their contribution to the gross national product is ordinarily, and properly, a secondary concern. In new regional development, like that of the Yukon, where people are few and poverty is seldom found, the net injection of public and private investment is,

first, to increase the nation's wealth and, second, to provide personal and corporate opportunities to benefit from the development effort.

In this, the new region must compete in priorities with other regions for these scarce developmental resources. There is a claim for priority which Canada's northern Territories can make but which, like all claims, must be rated by the national interest. Canada's hegemony in the north may require confirmation in the decades to come. Various and colourfully described as Canada's last frontier and Canada's destiny, the North's claim to attention in national policy may well be strengthened by current economic policies which pursue valid goals for sound development as opposed to pressures for purely political action to secure Canada's title.

It is the presumption of the analysis here that development policy for the North, particularly for its northwest region, must be firmly based and linked with Canada's present industrial and social infrastructure for a logical national extension of effort and interest toward the North. This is largely an extension of the pattern of northward development already in evidence. But in this case, the federal role is prominent because of the federal responsibilities in the North.

The Yukon in its Regional Setting

In its regional context, the Yukon Territory may be viewed in two settings. One of these is its setting as part of Canada's whole northern Territories, for which the federal government is responsible for administration and control whether there is any economic development or not. The other is the Yukon as part of a more compact northwest region with a dynamic for economic development and the resources, entrepreneurship and initiative to carry it forward. The interests of the federal government are somewhat different in each setting and accordingly differences in policies may apply in each. But these distinctions in interest and policy have not been clearly identified as yet, nor has the boundary that separates the barren Territories from those with significant economic potential.

The Yukon in the North

The Yukon Territory, as part of the overall northern Territories, is subject to Canada's interest in, and policy for, the North as a whole. In this context, federal policies for the Yukon tend to be qualified by federal policy for the North as a whole. The outlook for federal policy for the Yukon is, in turn, influenced by the nature

of Canada's interest in the future of the North as a whole. It is well to appraise this overall interest of Canada in the North in an objective way as a step toward understanding its implications for the Yukon.

Canada's interest in the North lies, first, in maintaining Canadian jurisdiction and authority over the territories concerned, in this case, the area of Canada that lies north of the 60th degree of north latitude. In the past, this authority could be maintained with a relatively small organization, mainly the Royal Canadian Mounted Police, but in those earlier years there were fewer people there, it was quite difficult for people from other countries to enter and become established and there was less interest and opportunity for the development of the resources of the North. With recent improvements in communications and transportation, especially in aircraft and submarines, more people are travelling through, over or under these northern regions, more resources have been located and the task of maintaining adequate control has increased greatly. At the same time, Canada's progress in economic development of the North has itself helped to establish her de facto authority more effectively than was evident in the past.^{1/}

^{1/} The Trans-Siberian railway in the USSR was built many years before it became economically sound or "feasible" but it was undoubtedly a key element from the beginning in maintaining control of that vast isolated northern region for Russia.

It may be expected that as it progresses further, economic development will assist in establishing Canada's authority quite firmly, will provide nodes of settlement and services that will facilitate exercising such control in the Territories and will generally support and assist in maintaining possession and authority. It may be noted in this context, however, that such future economic development seems likely to be mainly concentrated in the western and more southerly parts of the Territories in the beginning because of the cumulative climatic and transportation handicaps as one moves farther north and east. Thus the task of maintaining a preponderance of authority farther north will remain difficult.

Canada's interest in the North lies in her particular responsibilities there. Canada must assume these special responsibilities for the development of the North because both the Yukon and Northwest Territories are under particular federal jurisdiction. With the federal government retaining control of the natural resources in the Territories, it has signified its intention of continuing to maintain such control. In these circumstances, it may be expected that the initiative for development would be supported by the federal government and this has been the case.

Canada's interest in the North lies in supporting measures to expand the whole Canadian economy and the

development of her northern frontier can be a means of doing this. Public investment in such northern development may give a more widespread stimulus to the rest of the economy than the same investment elsewhere. Such a frontier can usually provide a greater long-run potential than may ordinarily be found in older established regions. Every dollar spent in the rest of Canada for northern development has a multiplier effect. Whether this multiplier effect of northern investment also tends to expand the whole economy of Canada more than would the same funds invested elsewhere in Canada is a question for practical consideration, but the multiplier may be expected to increase the impact of the initial investment by two to three times.

Canada's interest in the North, in the past, has lain in measures concerned with the defence of Canada and of the northern hemisphere. In the 1950's, for example, the joint Canada-United States distant early warning system of electronic stations across the Territories resulted in modest economic development and, more significant, in the establishment of new transportation and communication facilities for servicing the North. By the late 1960's, this defence interest had lessened as a contribution to northern development. As the emphasis shifts to more productive interests, it may be expected there will be increasing demands

for more effective ground transportation facilities to service such development as there is at lower costs than the high-cost air freight used so extensively in the past.

Canada's interest lies in exploring and testing the resource potential in the North as a means of determining the potential for future development of the region. But it may be evident that such interest does not extend to supporting discoveries where exploitation would be uneconomic. The economic development of the Yukon has been advancing significantly in resource exploration in recent years.

Canada's interest lies in adapting her northern development policies to the new conditions and opportunities that have been arising as technology, settlement and resource exploitation continues to advance northward. Substantial adaptations of such development policies have been made, especially as a result of the growth in the economic potential of parts of the North since the early 1940's. By the late 1960's, the new policy questions that were arising related to big, new and costly steps in economic development that must soon be decided. These new policy questions involved the measures necessary to encourage and provide a broader foundation of economic services and facilities than were now available and provision for more adequate transportation was one of these.

Canada's interest in 1968 lay in the recognition that the pace of economic growth particularly in the North would continue to quicken; that the traditional governmental administrative organization for development, already in process of change, would need to be further equipped and streamlined to handle major enterprise developments; that provision would likely need to be made for moving more of these development activities outside the political sector of government;^{1/} that new steps may be needed in adapting political boundaries and regional organization to the new economic environment and outlook; that the proven volume of exploitable resources was already substantial and that the prospective volume sufficiently larger to warrant planning now for the first stages of a more effective and rational system of supporting services, especially in transportation but also in financing, secondary industries, and the service industries. There could be little doubt that satisfactory solutions to all of these questions would, under the circumstances, require thoughtful policies.

In the years since the formation of the first Northern Affairs Department in the Canadian government in 1953, remarkable changes have occurred in Canada's northland and in the public development policies for the North. Yet the

^{1/} As has been done with such crown corporations as the proprietary Northern Transportation Company Limited.

lack of a clear distinction between the two major regions of the North has handicapped the development of specialized policies to serve each of them. There can be no doubt that development policy is now approaching a hiatus because, on the one hand, the potential for northern economic development is multiplying rapidly while, on the other hand, there is increasing need for specific long-run development policies to serve the new potential.

In recent years, this question of long-run policy for the North has been quietly considered but the dual nature of such policy has not been effectively identified heretofore. Long run policy must deal effectively and distinctively with both the North that has little economic potential and the North that has much economic potential. The economic potential for the North is approaching a level where such dual long run policies can be both economically rational and politically appealing.^{1/} There can be little doubt that

^{1/} The importance of its economic rationality as a means of making it politically appealing cannot be overemphasized. Governments are unlikely to take the positive and massive action needed, e.g. in transportation, unless it is likely to be successful. But the outlook is not as pessimistic as it was a few years ago. See, for example, Journal of Canadian Studies, Vol. 2, No. 1, February 1967, p.1, "the Canadian north has once more slipped out of the public consciousness into limbo. While increasing scholarly attention is being given to northern studies, especially in the prairie universities, and while the professional administrators of northern affairs continue to apply themselves with skill and commitment to northern problems, the politicians and the public of southern Canada have turned to other things. Except as an object of romantic vision, the north does not yet command much prolonged attention from the urban and prosperous south. The voters of the Northwest Territories cannot influence federal elections; the poverty of the north is distant and unseen; there are very few informed spokesmen in the south for our arctic citizens."

as time passes the justification for such policies will increase.^{1/} Such justification may lie less in Canada's search for identity and less in the local political pressures suggested by some writers, than in the growth of an economic potential in a major region of the North that is substantial, sound and demanding although, for the time being, it can not be effectively exploited.

The Yukon in the Northwest Region

The Yukon Territory lies in the approximate centre of the large region in northwestern Canada that has developed a substantial economic potential. Yet the Yukon's boundaries, like those of other Canadian administrative and constitutional entities, were set by past considerations which paid little attention to economic factors. No economic analysis can be valid which limits its considerations to boundaries set for purely administrative purposes, except possibly national boundaries which cut off any feasible jurisdictional extension of control over development.

The economic region in which the Yukon is centred, extends from Alaska eastward at least to the height of land east of the Mackenzie River system (including the large tributary lakes) and south through a considerable portion of

^{1/} See also "The Coming Crisis in the North", by R. G. Robertson, Journal of Canadian Studies, Vol. 2, No. 1, February 1967, p.3, et seq.

northern Alberta and British Columbia. Precisely where the limits are set is not so important as the considerations which lead to a termination of one region and the beginning of another. Generally, it is the complementarity of resources, the roughly equal stage of their development, the intangible but real frontier optimism which prevails, plus the great scarcity of that social and industrial capital which contributes so much to the infrastructure of a society, which identifies this region.^{1/} It is because the public and private investment in economic and social activity is spread so thinly in relation to the resource potential, and more thinly as one proceeds north and east from the Yukon, that this northwestern region can be identified, analyzed and policies for its development recommended.

The whole range of problems identified in the terms of reference for this Report apply throughout this region and recommendations for action may be more consistent and beneficial if they are not confined within the artificial boundaries of the Yukon Territory. In fact, most of them could not be applied if the locus of action on them had to be reserved to the Yukon alone. In short, to do justice to the responsibility placed upon this Study, policy recommendations for developing the Yukon must, to

^{1/} Yet there is little difficulty in clearly distinguishing it from the frozen and snow-covered eastern and Arctic region of the Territories.

be most effective both for the Yukon and for Canada, embrace the region in which the Yukon has been placed.

Viewing this proposition from another aspect, if it is true that Canadian hegemony demands tangible evidence of Canada's claim to the North and if the resource potential of the North requires developmental policies, then it is submitted that the Northwest region has sufficiently homogeneous characteristics and is in a present stage of development demanding a set of developmental priorities and policies and an agency to carry them out which are different from the eastern and Arctic territory. In contrast, the eastern and Arctic region is settled and developed well below the level of the northwest and is not likely to warrant the same quantity of investment and attention to administration of policies for some time to come.

It appears, in contrast between the two at present, that the northwest is well on the way to the beginnings of industrial and social structures needed for dynamic economic growth, while the eastern and Arctic region is yet very much a dependent territory. If the potential of the eastern and Arctic region is to become more fully appreciated the policies to encourage it may have to be different, even unique. When development does come there the pattern of administration, the orientation of transportation and communication,

the sources of its supply and the processing of its production may well be quite particular and quite independent of the northwest. An approximate delineation of these two regions of the North is provided in the following chapter on the northwest economic region.

Yukon Development History:
An Economic Perspective

The foregoing has provided a broad identification of the region of economic significance in which the Yukon lies. The next perspective relates to the economic history of the Yukon.

In attempting to come to grips with the causes and directions of development, the analysis of historic experience is more fruitful than its chronology. In any review of the history of Yukon development the attempt to answer the simple and basic question of why development took place will yield insights which can illuminate the future for purposes of development decisions.

There have been three distinct developmental periods in modern Yukon experience although none of them involved much by way of objective planning for development. In the Yukon, as elsewhere, many of the attitudes and institutions of previous periods have been retained in greater

or lesser degree with greater or lesser success, and often with great inhibitory effects on the next period. An analysis of these attitudes and institutions can contribute greatly to an understanding of the economic conditions surrounding the third and present stage which is now just getting underway. The present phase is substantially different from its forerunners and demands positive institutions and attitudes from both the public and private sectors. Unlike the first two, it is much more deliberately and soundly developmental. The early stages were only incidentally developmental in the modern understanding of the term. Even though they brought great changes with them, they were of such a character that the changes were tailored to specific requirements regardless of any broader developmental purposes.

The Early Stage: The Carnival of Gold

Stage one, as can be surmised, was the Great Gold Rush. The extent to which this climactic occurrence has entered into the folklore of North America as the final chapter of the great dream of instant wealth on the rugged frontier is an amazing phenomenon. Even after all this time, it sits in the imagination of North America - and even Europe - as proof that the harshness of an abundant nature can be made to yield to rugged individualism. If

it is part of the folklore of the continental ethic, it is much closer to nostalgic reality in the Yukon itself.

In economic terms, it was a period of short-lived boom and of rapid decline. The Yukon population dropped from 27,219 in 1901 (it was over 30,000 at the height of the gold rush) to 8,512 by 1911 and to 4,157 by 1921.

The economic bequest of the gold rush to the Yukon's long-run development was not great. Development, in this early gold rush period, consisted only in providing the necessary services for an itinerant population interested in getting three things: getting in, getting gold, and getting out. Under circumstances like these, the nation's responsibilities were minimal, about equal to the national benefit from the carnival.

In the Yukon gold rush, and through its lingering decline, most of the ancilliary services and social amenities were provided by private enterprise over a broader range of offerings than would be openly tolerated today. Regardless of the nature of the service provided, the objective was the same: to devote effort and energy as talent permitted to getting a share of the wealth. The public sector was expected to fill the service and administrative gaps where prospect of quick return was negligible. But only in the rawest sense was it regulatory. The effective infrastructure of servicing the community was largely private.

The heritage for the future came mainly from the private entrepreneurial activities associated with providing good and regular transportation of people and supplies. No large national purpose was expected from the basic skeleton of public services, other than extending accepted Canadian standards of law and order. As a result there was little attempt to structure these public services for a long-run contribution to Canadian development.

With the subsidence of individualistic placer mining, a few larger corporate structures came into view. The orientation of their investment had kept them in the Yukon. These corporate entities had been created to provide transportation and merchandising services, with each structured to accommodate a community much larger than the diminishing demand required. The disappearance of the mining population left them beached on the tailings of the placer mines. What also became evident, and is still evident, was the paternalistic caretaker responsibility of these corporate entities for what was left, combined with the determination to hold on until fortune again smiled on the Territory. These attitudes were essentially colonial, albeit benign.^{1/} In this period it was to these entities,

^{1/} They would concur with Joan Robinson, the noted Cambridge economist who, writing on colonialism and its effects, has said that there is only one fate worse than having been subjected to colonialism, and that is not to have been subjected to it.

or any others which might be induced to come in to invest in the Territory, that the community was expected to look for development. These firms provided much of the limited but basic infrastructure of the Territory until the advent of the Second World War, ranging from transportation and merchandising to power and housing and, in some instances, certain aspects of civic government such as responsibility for employment services, indigent welfare, medical care, and even schooling, limited though they were.

It is unlikely that these corporations in the Territory wanted or welcomed these responsibilities. They were provided as necessary ancillaries to corporate pursuits and ordinarily only under very depressed conditions. Only slowly did the public sector accept responsibility. Local, territorial and federal administration slowly grew in importance, influenced by the benign presence of the establishments who were already bearing much of the costs of the non-commercial services. No adequate programs were instituted during these decades of decline to shift the responsibility to the public sector and improve the level of public service. It was not really until the nature of the colonial governmental structures was recognized as fictional, explicitly by the removal of the seat of Territorial government from the decaying Dawson City to Whitehorse, that the public sector began to enter the 20th century. Only after the second, or middle, stage of development, however, was the change in attitudes marked.

The Middle Stage: The Contribution of Defence

By 1941, the Yukon population had risen only slightly, to 4,914, and economic advance in the previous 20 years had been negligible. But 1941 found the Yukon in the path of great wartime events that were eventually, though without economic design, to contribute to the potential of her economy.

The Yukon was on the path of the transportation routes that were established, during the 1939-45 war, to link the northern United States with Alaska. Construction of the Northwest Staging Route, a joint Canada-United States defence project, in 1941 provided a chain of modern airports from Edmonton to Alaska. In 1942-43, the Alaska Highway from Dawson Creek, British Columbia, to Fairbanks, Alaska, was completed along this Staging Route, crossing into the Yukon near Watson Lake, passing through Whitehorse and entering Alaska near Snag. This was the Yukon's first direct surface transportation connection with the rest of the world. Its effect on the Yukon economy has been remarkable.

In 1944, the Canol pipeline bringing crude oil from Norman Wells, Northwest Territories, was completed to Whitehorse, together with the road to service it. A refinery to process the oil was also constructed at Whitehorse at that time.^{1/} This Canol road crossed from Norman

^{1/} Operations of the pipeline and refinery were suspended in 1945.

Wells southwestward through the Mackenzie and Selwyn Mountains to Ross River village and from there south to join the Alaska Highway east of Whitehorse. This road also opened a large area for later mineral exploration and, with other such roads, initiated the discovery of new mineral potential in the Yukon.

In the cold war tensions of the late 1940's and early 1950's, the distant early warning line of electronic facilities across northern Canada again contributed to the build-up of transportation and communication services for development, again without economic design.

The incidental location of Yukon between the rest of North America and the nearest military threats to this continent in this century, gave to the Yukon a developmental push, and left to it a development legacy far more important than the gold rush. The most obvious legacy was in transportation and communication. Less obvious in this but of real importance was the contribution given to the Territory in the new directional orientation of the direct and indirect investment of these supporting activities. The relaxing of the tensions of the cold war and the change in military technology have since reduced this influence of the military establishment in the Yukon. Its gradual withdrawal was almost complete in 1968.

These roads, airstrips and electronic war ng stations in the north were all constructed for the immediacy

of the military threats, to a scale previously unknown. This process of investment under the strong stimulus of defence demonstrated to the North and to the nation that whatever is technologically possible is physically and financially feasible. It has broadened the conception of development potential for those living in the North. It clearly demonstrated that it is not mainly the funds which are spent which gives positive development, but the creation of capital equipment in roads, airfields, oil refineries, houses and buildings and the creation of suitable commercial organizations to service the community. It also further demonstrated, as had the gold rush period, that it is only in the expansionary phase of development that new wealth and new opportunities arise.

In some respects, the construction work had all of the fever and fervor of the gold rush days. Most of the private entrepreneurs engaged in it realized that opportunities beyond the defense phase were limited and no permanent private commitment of capital was made or intended. Thus, like the gold seekers of the Klondike days, the construction companies and workers disappeared southward after the height of the rush. What remained was the existence of physical facilities, a much more pervasive and sophisticated administrative structure and, most important, the acceptance of the public sector as the proper locus for

developmental services. Now, as in the rest of the nation, it is widely recognized and accepted that, without public participation in the social and economic infrastructure, development will lag.

Without positive policies of inducement, comparable in the Yukon circumstances to those provided elsewhere by the public sector, development will continue to be restricted to those high-grading ventures which can, as in the past, support financially the total business investment costs and the service sector which they require.

The Recent Stage: The New Yukon

In its more recent years, the late 1950's and early 1960's, the Yukon economy has moved forward, under the stimulus of government assistance for mineral exploration and development and for a major extension of roads, to the stage where a new approach to public investment warrants consideration. An increasing pressure for a new philosophy of development is found inherent in the results of these public investments in the Yukon economy.

From the basis of the Alaska Highway and the reconstructed Whitehorse-Mayo-Dawson road, the system of highways and development roads in the Yukon was extended at an accelerating rate during the late 1950's and the 1960's. The roads-to-resources program was a major contributor to this extension of highway facilities. The announcement by the Minister of Indian Affairs and Northern Development in 1966

that \$100 million would be spent in the next decade on road construction in the North promised that this high rate of road building would be maintained if not expanded. Two problems were arising, however. One was that the new road construction, aside from main highways, was not systematic but on an ad hoc basis, initiated in the main only on the demand of new enterprises which warranted their construction. The other problem was that, while highway transportation may contribute much to the exploration and initial development of mineral resources in thus building up a potential traffic volume, it leads directly to the demand for a transportation system that is more efficient in carrying bulk low-valued ore concentrates than highway transportation can be.

Moreover, along with these road extensions, the federal government had instituted several incentive programs in the mid-1960's to promote the exploration and development of new mineral deposits. There were other limited programs of assistance. The overall result was a substantial expansion of claim staking, drilling, testing, measuring and developing of ore deposits in the Yukon.

Altogether, there was much progress in Yukon economic development in the 1950's and 1960's. Yet much of it has tended to be based on short-run and ad hoc considerations directed, in effect, toward facilitating the high-grading of the few rich ore bodies that might be

discovered from time to time. Less rich ore reserves could warrant exploitation only if they were in areas where transportation and other services already existed.

The advent of four or five new mining operations may seem a narrow base on which to attempt to rest an economic analysis of the present period. Yet since 1960, the exploration and developmental activity ancillary to the establishment of these mines plus the other exploration activity for which the results are not yet so concrete, has added to the Yukon a measure of economic activity so much greater than was previously there, that the results have a qualitative as well as a quantitative effect. By whatever yardstick one chooses to measure economic activity, this is true. Advances such as have occurred carry the probability of more activity more surely to follow. For the first time the Territory may look forward with reasonable assurance to a sustained and rising tempo of investment, employment, growth and development in all phases of life - economic, social and cultural. It is no longer a question of if, but when.

The activity to date has been the result of a number of influences. A growing world demand and price for the ores found in the Yukon, the longer-run view of sources of mineral supply taken by major mining enterprises and the increased willingness to expand exploratory horizons

as ores are dug out of more and more remote regions of the globe, are the wider influences at work. More concretely, the advance of technology is reducing the real costs of cold, darkness and exposure on both men and machines. Transportation and communication are being improved and cheapened in real terms so that time and distance from head office to the field are not so significant. Additionally in the Yukon, the legacy of the defense period has given a more reasonable base from which to move. An experimental decade of deliberately developmental incentives from government has bridged that critical gap between discovery of a potential ore body and proving it up for production.

The foregoing analysis may mislead. It may appear from it that, now that the first two stages with their false starts are past, Yukon development now requires only more of these recent policies to move forward toward its full development potential.

The hard reality is that the Yukon has only begun its advance toward stable and rising production and has hardly progressed at all on the course of securing from that production both the conditions which will encourage more and the conditions which make it worthwhile in regional and national terms. It is almost true to say that the developments now under way would have come if policy in the public sector had done nothing more than in the past to encourage

them. Even without positive developmental policies there are always rich ore bodies to be exploited, ore bodies rich enough to cover the cost of minimal service structures constructed to meet the immediate ends of the private venture for the length of time the high grade ore will last. Yet the extent to which private ventures will accept overhead burdens for support services is limited because the range of private interest and expertise is limited by the particular commercial goals each has. The time span for recouping the private investment must be shorter than the nature of the investment ordinarily requires. Transportation is a good example of this. Hydro-electric power is another.

The costs of facilities in a community, whether it be a system of streets or a road to a mine, must obviously be borne. In some instances the costs are specific and borne by specific taxpayers who are presumed to gain most of the benefit. When it comes to the provision of more specific service, the funding necessity in the public sector is analogous in essence to the funding for the private sector. But the mining enterprise which has to fund the cost of a road (or any number of other facilities which like postal services are socially useful just because they are there) has no way of recapturing the benefits which go to the wider community. The public sector on the other hand, identified

with the general advances in the economy, has its responsibility to see that the whole economy benefits. It can spread the capital cost and levy such user charges as seem appropriate. Every instance of this sort of public investment makes the private capital requirements of new enterprise lower, permits exploitation of less rich resources and hastens the buildup of developmental activity. Each buildup increases the total of activity in the region and the nation, stimulates further activity, and incidentally broadens the base upon which the public sector recoups in taxes its capital expenditures. But as long as the public regards the public sector's contributory activities in the narrow accounting sense, as long as public servants must, like private entrepreneurs, justify investment on a project pay-out basis, the intelligence and training of competent public servants is denied, their vision dimmed, and their imagination stifled. One would have thought that the Canadian experience with the multiple benefits of developmental public investment since 1867 would long since have placed the balance sheet ethic appropriate to the private sector well down in the list of guidelines for public policy. What seems lacking is a realization, based on experience before theory, that developmental expenditures are limited only by the availability of human and technological resources and by priorities for public investment. If it is a deliberate policy to put upon new

private development many of the costs which are publicly financed in more mature parts of the nation, the present modest pace and chance direction of Yukon development will continue. Later, it may be possible to turn to less high-grade development and a wider range of secondary and supporting activities because many services had been initially funded from early exploitation of the richer resources. There are examples in Yukon which illustrate. For instance it is doubtful whether New Imperial Mines would have come into production if its ore body had been located beyond the reach of the whole complex of services, facilities, and amenities provided by Whitehorse. By the same token, if the ore bodies in the Vangorda area had been located at Whitehorse or if the White Pass and Yukon railway reached as far as Vangorda, Anvil Mines or another enterprise might well have come into production long ago.

This is only an indirect way of saying that economic history has demonstrated that economic development is much less a function of resources and technology than it is of institutions and attitudes. Resource potential may be a necessary condition for development but it is by no means a sufficient condition to ensure it. Public policy must do much more to identify the resource potential and much more to provide sufficient conditions for its exploitation.

Its role is not one of selective paternalism toward particular enterprises nor is it a partnership with them. It is a serious recognition that the benefits from development are not regional but national and that the public sector is the agent responsible for the location and nature of development. Its priorities ought to be based more closely on the widespread multiplier effects on employment and income than on the short term project pay-out.

The Yukon and most of the northwest region of Canada have reached a critical plateau in their economic progress, where the potential for economic growth seems to warrant a new departure from the philosophy of development that has dominated the region over so much of the past 60 years. It is a departure not unlike that which brought the great plains of Canada into the national economy.



FIGURE 1

CHAPTER 2

THE NORTHWESTERN ECONOMIC REGION AND THE YUKON

Because the Yukon is so physically isolated, optimum development of its economic potential will depend also on developments in areas beyond the Yukon. Yukon economic growth depends on the progress of pertinent developments in the whole region in which the Yukon lies.

The Yukon Territory, lying at the centre of this northwestern economic region, is barred from its markets and supplies by mountains, valleys, political boundaries and distance (Figure 1).^{1/} Because of this,

^{1/} A major handicap to public appreciation of the character of Canada's North is the notable lack of maps showing its physical features including the relief, drainage, vegetative regions and such. Through the good offices of the Department of Indian Affairs and Northern Development and the very commendable work of the mapmakers in the Department of Energy, Mines and Resources, the excellent map following (Figure 1) has been prepared especially for this Report. This has been a most valuable contribution. It may be noted, however, that it is a quite generalized representation rather than a direct presentation of the physical features of the region. It is highly recommended that a comprehensive mapping of the physical features of the northern Territories be established as an objective for early completion. If economic planning is to be effective these kinds of data will be essential.

Yukon development must be integrated with that of areas surrounding it if it is to advance most effectively.

For example, for optimum economic development in the Yukon, such activities as transportation, power, ore processing, and tourist services may require a measure of joint contribution and support from all parts of the region. Moreover, the resources and industrial potential of the other parts of the region tend to complement those of the Yukon.

The Yukon Territory is surrounded by land areas except for a few miles of coast on the Beaufort Sea to the north. This economic region of which the Yukon forms the centre comprises, on the west, the State of Alaska; on the South, the northern part of the Provinces of British Columbia and Alberta, and on the east a portion of the Northwest Territories. The Yukon Territory thus lies in the heart of this frontier region and in many respects it has the features of a heartland. For example, the parts of the State of Alaska that have the greatest economic potential are the parts generally lying fairly close to the Yukon, mainly in the Panhandle and the "Railbelt". Similarly, the part of the Northwest Territories with the greatest economic potential seems to be in the area roughly comprised by the Mackenzie River

Basin lying against the Yukon's eastern border. To the south, in the northern third of the provinces of British Columbia and Alberta the economic development that marks the rest of those provinces is moving northward to join that of the Yukon and the District of Mackenzie.

Overall, this northwestern region, with the Yukon at its centre, comprises an area in which the economic potential lies mainly close to that of the Yukon Territory. In 1968, the region appeared to have a substantial new potential for economic growth. A sharp upward surge in the economy of the Yukon in that year indicated the regional pattern that might be generated throughout the region if conditions were favourable.

Some of these surrounding areas offer more scope for co-ordinated development than others. There is, for example, less possibility for co-ordinating the economic development of Alaska with that of the rest of the region because two countries are involved and a multitude of jurisdictions. Except for these political facts, the physical proximity and other considerations could favour a continuing economic linkage between Alaska and northwestern Canada. Yet to recognize reality, to hang future development on Alaska-Yukon co-operation alone would leave the Region exposed to elements of uncertainty that would seriously handicap progress.

Within Canada, on the other hand, the scope for co-ordinated development of the region is quite extensive. Much can be accomplished by each of the five governments concerned. Much more could be accomplished by all five Canadian governments working together through a developmental authority to plan for the region.

This potential for mutual benefits from economic co-ordination lies in several fields. One of these is in its contribution to the expansion of the local market. Another is in the co-ordination of transportation developments. Another is in the mutual exchange of energy such as hydro-electric power, oil, gas and coal. These are some of the matters that are examined in appraising the possibilities for joint economic development of this northern region comprising Alaska, the Yukon Territory, the Northwest Territories and northern British Columbia and Alberta.

Alaska

A substantial portion of Alaskan economic development is confined to a relatively small part of the State. Most of it is in the south central and interior part, fairly close to the southwestern boundaries of the Yukon. Most of the population, nearly two-thirds of it

in 1967,^{1/} live in the "Railbelt" (between Fairbanks and Anchorage) separated by two mountain ranges, and about 150 to 200 miles, from the Yukon border. The other main area of development is in southeast Alaska, the Panhandle. The population of the Panhandle has declined relatively in recent decades, from 35 per cent of Alaska's total population of 74,000 in 1940 to 16 per cent of its population of 226,167 in 1960.^{2/} In 1967, Alaska's total population was estimated at 275,000.^{3/}

Of the 586,400 square miles of Alaska's area, almost two-thirds show very little economic development. Except for a few river valleys, the State is generally rough and mountainous with most of the northern part quite barren and cold.

The physical environment and the nature of the Alaskan economy make the possibilities for trade in consumer goods between Alaska and the Yukon quite limited. Alaska imports rather than exports and her economy depends mainly on government expenditures.^{4/} There is virtually

^{1/} Fitch, Edwin M., The Alaska Railroad, New York, 1967, p. 298.

^{2/} U.S. Census, 1960.

^{3/} Fitch, Edwin M., op.cit. p. 298.

^{4/} See, Transport Requirements for the Growth of Northwest North America, Volume 2, Battelle Memorial Institute, Washington, 1961, p. I-1, "Alaska's economy is based heavily on government expenditures - for both military and civilian purposes."

no industrial base within Alaska^{1/} and only limited resource exploitation. A survey of the Alaskan economy in 1961 showed that its rapid growth from 1950 to 1960 arose mainly from an increase in government expenditures.^{2/} A review of conditions in 1967 and 1968, in the course of this Study, showed that it was still largely dependent on government expenditures, mostly expenditures for the military services stationed there and for the support industries needed to service the military. For the resource industries the outlook varied. The potential for oil and gas exploitation had improved as a result of the Kenai Peninsula oil finds in recent years and the major oil strike in northern Alaska in July, 1968; the outlook for the fisheries (the major industry in the past) had deteriorated; mineral production (mostly sand and gravel) had declined sharply, from \$23.4 million in 1956 to \$10.0 million in 1966; agriculture was in difficulties; but the forest outlook continued to improve.

Alaskan prices in 1968, especially those in the cost of living, were very high, even higher than in the Yukon. In the main, Alaska produced primary products similar to those produced in the Yukon and the possibilities for trade were small. Possibilities for co-ordinated economic action lay mainly in tourism, transportation and power.

^{1/} See, Transport Requirements for the Growth of Northwest North America, Volume 2, Battelle Memorial Institute, Washington, 1961, p. IV-14.

^{2/} Ibid.

Tourists in Alaska and the Yukon are virtually a joint resource. A major part of the tourists visiting this northwestern region live in the continental United States but they pass through the Yukon on their way to Alaska or pass through Alaska on their way to the Klondike, or include both "frontier" areas while they are in the vicinity. The Yukon tourist people have acted to coordinate their tourist publicity where appropriate with Alaska's but there is scope for additional joint action in promoting the tourist potential in the region.

Transportation offers several opportunities for mutual development benefits, mainly in tourist roads and rail transport. The major benefits to Alaska would be through three avenues - through new and improved highways through the Yukon and British Columbia to link with tourist highways planned in Alaska; through the existing narrow-gauge rail transportation and pipeline services of the White Pass and Yukon Route, between Skagway and Whitehorse which has had the effect of developing the Yukon as a hinterland to southern Alaska;^{1/} and an overland railway service between mainland United States and Alaska.^{2/}

^{1/} In discussions of the Study Group with Alaska's Secretary of State, Mr. Keith Miller, in April, 1968, he presented the view that southeast Alaska (the Panhandle) has no hinterland itself and looked to the Yukon to provide this hinterland.

^{2/} See, for example, the several plans for this service outlined in Transport Requirements for the Growth of Northwest North America, Volume 2, Battelle Memorial Institute, Washington, 1961, p. IV-14.

Already there are three highways linking the Yukon and Alaska - the highway from Haines Junction to the port of Haines, Alaska; the Northwest (Alaska) Highway from Watson Lake to Fairbanks, Alaska; and the highway from Dawson City to a junction with the Northwest Highway in Alaska.^{1/}

Among Yukon people, the extension of services to other tidewater ports of the Panhandle remains popular. Perhaps this is due partly to the apparent nearness of these tidewater ports, as the crow flies; partly to the evidence that Canada's interests seemed so badly served in the Alaskan boundary settlement of 1903; and partly to their dissatisfaction with the existing services. Whatever the origin, the basis for this belief, fortunately now declining, that the future of the Yukon lies only through the Alaska Panhandle, appears quite ill-founded. The advantages to the Yukon of "nearby" tidewater ports may be more apparent than real. The disadvantages are also quite notable.

^{1/} Alaska is also served by other transport facilities - the marine highway system (a system of ferry services to connect the various highways on the islands and the mainland with Canada and continental United States); the rail-barges that link the rail services from Prince Rupert, B.C. with Whittier, Alaska, and from Seattle and San Francisco with Anchorage; and the air services which provide scheduled passenger and some freight service between Alaska and the Yukon and between Alaska and Seattle and the air charter service throughout the region. None of these provide a substantial volume of service to the Yukon or northern British Columbia.

The nearness of tidewater to the Yukon is relative. The physical barriers imposed by the towering Coastal Range mountains and a series of river valleys and other mountains that lie directly athwart the transport path from the Yukon to tidewater are very great obstacles, requiring extremely excessive grades or costly tunnels most of which are in the Panhandle.^{1/} Moreover, the closest tidewater port, at Skagway, has very limited space for harbour facilities and wharfage. Expansion beyond present plans is likely to be excessively costly in Skagway.

Not only are these barriers of mountains and valleys difficult to surmount, but the tidewater inlets in the Panhandle are not well suited or readily adapted as ports for larger vessels. Moreover, the harbour facilities and services required for Yukon traffic tend to be

^{1/} The present road bed of the White Pass and Yukon railway is much steeper in grade in the vicinity of White Pass than is normally acceptable for effective freight transportation. A recent study showed that for large volume movements it would be necessary to tunnel through the Coastal Range to reach tidewater on a satisfactory gradient.

costly at Skagway and they are outside the control of Canada or of Canadian shippers.^{1/} It is not surprising under these circumstances that such facilities and services are not built in anticipation of their being required but only after their requirement has become urgent and guaranteed.^{2/} It may be evident that this approach has yielded, and will yield, less than optimum advance services for the Yukon.

There are, of course, numerous other disadvantages to Yukon traffic moving through Panhandle ports - customs clearance is ordinarily minimized but it remains a hazard and an added risk; there are numerous additional and costly handlings required in moving freight by highway,

^{1/} One exception to this might be a port at Tulsequah at the mouth of the Taku River. It is sometimes suggested that tidewater ports other than Skagway - Haines, Tarr Inlet, Tulsequah, etc. - would be more suitable for purposes of Yukon transportation. Yet each of these has substantial weaknesses also. The port of Haines can be reached only indirectly as far as most of the Yukon traffic is concerned; it can serve only the southwest Yukon in the main; and the cost of building a suitable roadbed through the Pass would be high. Tarr Inlet can be reached only through the Coastal and St. Elias Mountains and through extensive icefields, the construction of facilities is reported to be quite costly, and their use would be uncertain because the icefields make a poor roadbed, the port shifts with the glacial movement and icebergs are frequent in the Inlet. Tulsequah may offer good prospects eventually, but in the meantime would be an excessively massive undertaking relative to its benefits to the Yukon alone and would require much dredging in the channel passing through the Panhandle.

^{2/} The vehicle for co-ordinating such operations has been the White Pass and Yukon railway.

train and boat (often with storage between each pair of handlings);^{1/} extra time is required to move by water;^{2/} there is a tendency toward monopoly control of Yukon transportation by the carrier; the obstacles to getting regulatory redress are substantial, with five governments and several political boundaries standing between the Yukon shipper and the hearing of his grievance; and the lack of advance investments in harbour facilities that are ordinarily provided by government in both countries for their own shippers.

It is frequently stated that sea transport from these tidewater ports is lower in cost than transport by alternative modes but when all of these additional costs and economic handicaps are added in, it may be evident that sea transport by the methods used can be quite costly transportation indeed.^{3/}

^{1/} Mineral products, for example, such as asbestos from Clinton Creek, are loaded in bales on the trucks at Clinton, unloaded in Whitehorse; loaded into containers in the Whitehorse freight sheds; the containers are loaded on rail flatcars at Whitehorse; containers are unloaded on to the wharf at Skagway; loaded on the ship at Skagway; unloaded from the ship at Vancouver; and moved into storage in Vancouver - a total of eight handlings.

^{2/} The container ship, M.V. Frank Brown, operated by the White Pass and Yukon Route is reported to take 65 hours to unload and load at Skagway and 65 hours to travel between Vancouver and Skagway. See also Annual Report, White Pass and Yukon Railway, 1967, and the film, "The Frontier Busters". In the Spring of 1968, this vessel was reported by railway officials to be making the round trip in 12 days on the average.

^{3/} In this case, it is too frequently presumed that this movement by water and in containers can be taken as ensuring low-cost transport (because they often do) when in fact the additional handlings and all the other disadvantages to the shipper can be expected to make the overall costs to the shipper relatively high.

Looking backward, when traffic was small and shippers were reconciled to the fact that slow and limited services were all they could expect, the use of tidewater ports and numerous handlings was possibly acceptable. Looking ahead, it has become evident that with the increased potential volume of Yukon traffic, while a continuing role can be seen for the tidewater ports, there is a growing demand for more effective and less costly alternatives. Such an improvement of transportation services is essential if Yukon potential is to be developed soundly. Moreover, once the question of alternative routes is opened for consideration a whole broad new range of attractive opportunities unfolds. Thus, much of the rounding out of the transportation system for the Yukon is likely to take place outside Alaska unless there are some special new initiatives or formulas developed that can effectively improve tidewater transportation for the benefit of the Yukon. Based on the record, it seems unlikely that such special new initiatives will be taken soon.^{1/}

^{1/} A recent study completed in Alaska seems to confirm this. It shows that Alaska and United States concern is with what the Yukon and Canada should be doing for Alaska rather than with what Alaska might do to promote more traffic through the Panhandle. See Alaska-Northwest Canada Economic Activities, Part II, by George W. Rogers and Douglas N. Jones, Anchorage, 1968.

On power, the situation is almost the reverse. The major water resources for industrial hydro-electric power in the vicinity of Alaska are located almost wholly in the Yukon and British Columbia. Since the Rampart project on the Alaska section of the Yukon River was abandoned^{1/} new proposals for further study of the Yukon-Taiya project have been initiated by the United States Department of State. This project would divert the Yukon River source waters from Canada for power production in Alaska near Skagway.^{2/} It is estimated that the Yukon-Taiya plan will provide up to 3,200 megawatts of power at tidewater at on-site rates of 2.5 to 4 mills per kilowatt-hour.^{3/} It would presumably be used in power-intensive industries at tidewater based upon use of imported ~~materials~~ and for the export of surplus power to continental United States, such as Washington and Oregon.^{4/}

^{1/} See Alaska Natural Resources and the Rampart Project, United States Department of the Interior, June, 1967.

^{2/} Ibid. p. 28.

^{3/} Ibid. In this report on Rampart power it is estimated that a nuclear power plant of 1,000 megawatts in the Washington-Oregon area could be started now (1967) for operation in six or seven years and provide power at 2.6 mills per kilowatt-hour, p. 44. The attraction of remote sites for large-scale hydro-electric power production may be ending.

^{4/} Ibid.

Such a project as the Yukon-Taiya plan would require an agreement with Canada before it could be built. But Canada, if it favours any such scheme, seems more likely to favour the alternative Yukon-Taku project because, while it would use the same Canadian waters, the power in the Yukon-Taku plan would be generated entirely in Canada. The Taku river also offers a possible Canadian tidewater port at Tulsequah, provided there could be dependable dredging as necessary in the Alaskan part of the channel. Perhaps a long-term arrangement could be worked out whereby the quid pro quo for guaranteeing freer passage to the Pacific would be the guarantee of a substantial block of Yukon-Taku power at a reasonable cost. This might be an excellent first step toward co-ordination in regional development.

Northern British Columbia and Alberta

A most significant part of this northwestern economic region that is centered by the Yukon is the northern part of Canada's two most westerly provinces. Northern British Columbia and Alberta are important because through them pass the airline and highway links and the potential railway links with the rest of Canada. They are significant for their own economic potential which should supplement the

potential of the Yukon. They are significant because their resources provide an economic and transportation bridge that can help link Yukon resources to markets in the rest of Canada.

Northern British Columbia is here designated as comprising census division 9 and parts of 8 and 10, an area of about 126,000 square miles. The population of this whole area was only 9,300 in 1966, but the potential resources were substantial. Timber and pulpwood resources are quite extensive in the area, with only those on the southern fringe beginning to be exploited. Gas and oil production in the Peace and Liard River areas has been expanding steadily and indicated reserves are quite large. Evidence of major mineral deposits are found in the vicinity of Stewart, Granduc, Stikine River, Cassiar and Atlin with several major proven reserves now being brought into production and many other deposits awaiting more favourable transportation services. Indications now are that, within the next decade, resource potentials in northern British Columbia will warrant the extension of present rail lines northward toward the Yukon with some of them reaching reasonably close to the Yukon border. A basic highway to link the major centres from Stewart to Cassiar is already well advanced in northern British Columbia (Figure 2).^{1/}

^{1/} Because adequate maps of the region are not available this sketch map from the Mineral Industry Study 1968 has been used to show the highway concerned and some other features of the region.

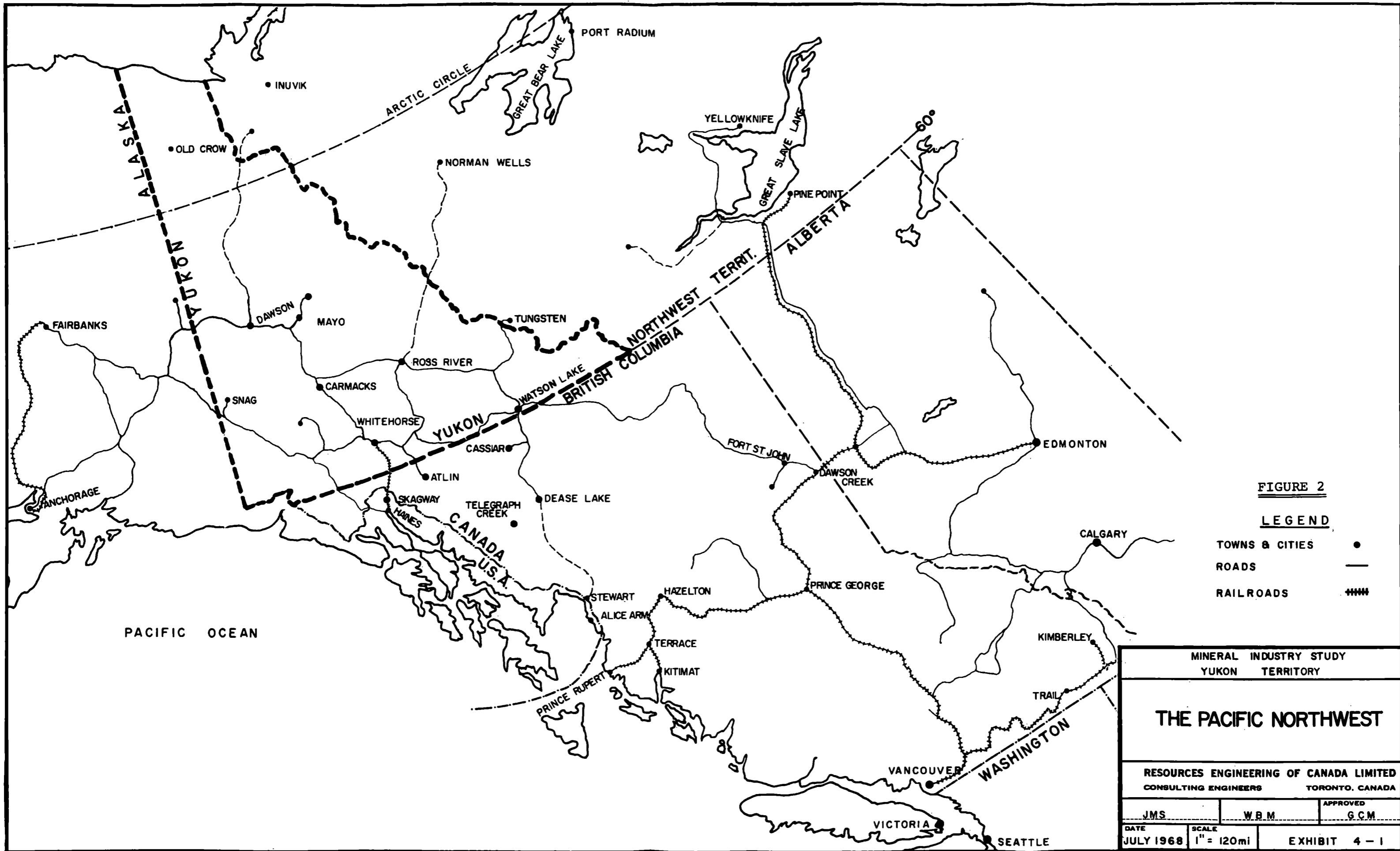


FIGURE 2

LEGEND

- TOWNS & CITIES ●
- ROADS —
- RAILROADS + + + +

MINERAL INDUSTRY STUDY YUKON TERRITORY		
THE PACIFIC NORTHWEST		
RESOURCES ENGINEERING OF CANADA LIMITED CONSULTING ENGINEERS TORONTO, CANADA		
JMS	W.B.M.	APPROVED G.C.M.
DATE JULY 1968	SCALE 1" = 120mi	EXHIBIT 4 - 1

The Pacific Great Eastern railway has already reached northward on the east side of northern British Columbia as far as Fort St. John and has begun to push north through Prince George and beyond Fort St. James in the centre of the province.^{1/} The main British Columbia highway system is linked with the Northwest (Alaska) Highway System at Dawson Creek and this provides a route for freight and tourists from Vancouver to the Yukon that is second only to the route from Edmonton in volume of freight traffic.

Most of the passenger services to the Yukon are provided by Canadian Pacific Airlines which link both Vancouver and Edmonton to northern British Columbia, northern Alberta, the Yukon and the western Northwest Territories with daily air service including some air freight. Water transportation from British Columbia to the Yukon is provided by several tourist vessels including the Canadian National cruise services from Vancouver to Skagway (S.S. Prince George) and by the Seattle ferry services to Alaskan ports. Freight

^{1/} In an interview by the Study Team with Premier W.A.C. Bennett in May, 1968, the Premier, who is also President of the Pacific Great Eastern (PGE) railway, indicated that the PGE would continue to be extended northward in northern British Columbia both on the east side of the province from Fort St. John to Fort Nelson and on the west side from Fort St. James to Takla Lake and northward. He stated also that with federal assistance to help finance it the province would extend one of these branches into the Yukon as necessary.

services by water are confined to the White Pass and Yukon Route, using the container ship, M.V. Frank H. Brown, to ply between Vancouver and Skagway.

Extensive energy resources are available in this northern area of British Columbia. The Peace River hydroelectric project, now in operation, and the proposed Liard project offer more low-cost power than can readily be utilized at present in that area. On the west, the Yukon-Taku and other rivers offer virtually unlimited electrical energy. In addition, the Liard River region of northeastern British Columbia is rich in gas and oil production. Substantial deposits of coking coal have been identified in the Groundhog deposits in northern British Columbia. Altogether northern British Columbia provides a most favourable southern area to round out the economic region surrounding the Yukon.

Northern Alberta is an area of great rivers and forests with broad tracts of open prairie. It is linked with the Mackenzie River system through the Athabaska, Peace and Hay Rivers.

In northern Alberta, economic development is further advanced and has reached farther north than in British Columbia. Northern Alberta is defined here as

roughly the northern third of the province, lying north of a line running roughly east and west through Lesser Slave Lake and meeting the British Columbia boundary about 20 miles south of Dawson Creek, an area of about 100,000 square miles.

The population of northern Alberta, as defined, was about 38,200 in 1966. Resources in the area are rich and extensive, comprising some excellent farm land; substantial forest resources, particularly pulpwood; some evidence of metallic minerals; great resources of coking coal, petroleum, natural gas and tar sands; and considerable water-power. Many of these latter energy resources are in northeastern Alberta where extensive joint use with the Territories is conceivable. Like northern British Columbia, northern Alberta offers a strong bridge of exploitable resource potentials to support the extension of transportation and other services northward toward the Yukon and the Northwest Territories.

These resources have already supported strong transportation links to both Territories. The Great Slave Railway, completed in 1964, was built to carry the Pine Point lead-zinc minerals to smelters in the south.^{1/} The Northern

^{1/} Built on the strength of a guarantee of 215,000 tons of mineral traffic a year, it carried 1,045,685 tons in 1967. About 45 per cent of this rail traffic was forest and farm products, apparently developed because rail transportation had become available. See 32nd Annual Report, 1967, Alberta and Northwest Chamber of Mines and Resources, Edmonton, 1967, p. 28. This remarkable growth of traffic illustrates the additional traffic potential that may be expected if similar rail services were extended through northern British Columbia to the Yukon.

Alberta Railway, operated jointly by the CNR and CPR, serves the area from Edmonton to Grande Prairie, Dawson Creek and Peace River, and from Edmonton to Fort McMurray and Waterways, connecting at Waterways with the water-borne services of the crown-owned Northern Transportation Company operating through the Great Slave and Mackenzie River systems.

CPA from Edmonton provides scheduled air services to the Yukon and Pacific Western Airlines to the Northwest Territories. Other Edmonton services, including CPA, operate in the far North and provide charter services throughout the whole northwestern region of Canada.

Several highways in northern Alberta serve this northern region. A highway connecting Edmonton to Dawson Creek, British Columbia, and the Northwest (Alaska) Highway System, provides a major artery for freight trucks, bus services and private autos travelling to the Yukon and other northern areas. The Mackenzie Highway from Grimshaw reaches into the Northwest Territories along the same path as the Great Slave Railway and extends along the Mackenzie River to provide a major commercial and tourist route to the growing economy in the western part of the Mackenzie District. Farther east, other roads connect with Fort Smith.

Like Vancouver, the city of Edmonton has already become established as a centre for northern development, but these channels for development may be expected to move toward the north as economic progress advances.

The Northwest Territories

It would be misleading to consider the whole of the Northwest Territories as linked with the economic potential of the Yukon. Most of it is too distant, cold and barren to make any economic contribution to the Yukon. The part of the Northwest Territories that has economic significance for the Yukon lies close to the Yukon's eastern boundary. Moreover, in view of the economic conditions that prevail today, it would seem that boundaries were both hastily and arbitrarily set in the past. Yet this may be a favourable opportunity to correct partly these past inadvertences in definition of boundaries, if only by permitting more co-ordination of development between the two parts of the small area of the Territories that now offers substantial economic potential.

The boundary history of the Northwest Territories, except in the case of the Yukon, has in general been one of progressive separation of those parts that offered the

greatest potential for independent viability. In the case of the Yukon, it was separated as a territory from the Northwest Territories in 1898, to provide for a local administration in the region where the Klondike gold rush occurred.^{1/} Later, in 1905, two new provinces, Saskatchewan and Alberta, were also carved out, with their northern boundaries fixed at the 60th parallel of latitude, like British Columbia. In 1912, the provinces of Manitoba, Ontario and Quebec were extended to, respectively, the 60th parallel, Hudson's Bay and the northern tip of the Ungava Peninsula. In 1918, the boundaries of the three present districts of the Northwest Territories were defined: The District of Franklin to comprise mainly the Arctic Islands; the District of Keewatin to comprise mainly the mainland area from the

^{1/} This decision to separate the Yukon from the Northwest Territories by a line following the watershed summit between the Mackenzie River basin and the Yukon River watershed, was arbitrary and based on the immediate and temporary need to maintain law and order in the territory of the Klondike gold rush. This was undoubtedly one of those hastily conceived decisions that has prompted historian W.L. Morton to write, in discussing Canada's administration of her vast northern Territories, "How rash a thing it is to attempt to govern half a continent on a shoestring; something is bound to be left undone." p. 66, The Canadian Identity, by W.L. Morton, Toronto, 1961. What was overlooked in this early Yukon boundary decision was that in Canada's whole vast Territories north of the 60th parallel of latitude, only a small portion on the west had much economic potential and this Yukon boundary decision split that small portion into two smaller parts. Attached to the easterly part was a vast area of tundra and barrens, frozen, desolate and forbidding the year round.

meridian of 102 degrees west longitude eastward to Hudson's Bay as well as the islands of Hudson's Bay; and the District of Mackenzie to comprise the mainland area from 102 degrees west longitude to the Yukon boundary. These District boundaries appear to have had little, if any, economic or political foundation and appear ordinarily to be ignored in statistical surveys and administrative decisions.

Moreover, it seems unquestionable that because of economic and political pressures now arising the Northwest Territories as defined in 1968 will within the next decade or so be divided into two parts. One part will comprise the frozen barrens of Keewatin, Franklin and the eastern part of Mackenzie Districts in a region that may be expected to remain under the responsibility of the federal government for the foreseeable future. The other will comprise the rest of the Mackenzie District, an area where both economic and political growth can be foreseen. If, for example, a line were drawn along the meridian at 110 degrees west longitude,^{1/} the 400,000 square-mile area of Mackenzie District west of that line would include 65 per cent of the 1966 population of the whole Northwest Territories. Only 85 people lived in the other 125,000 square miles of Mackenzie District and only 10,053 people lived in the other 777,400 square miles comprised in Keewatin and Franklin Districts.

^{1/} This is also the eastern boundary of Alberta.

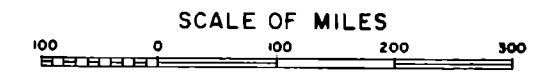
Moreover, the 110th meridian identifies generally the present limits of minerals potential and development with virtually all of the mines in production and most of the potential mineral reserves lying to the west of the 110th meridian (Figure 3).^{1/} Overall, in resources, transportation, power, other services, administration, population and economic potential, this western part of the Mackenzie District encompasses almost all of the present economic development and almost all of the economic potential of the whole Northwest Territories. This economic potential may of course, be changed in future by new mineral discoveries, advances in technology or other changes in conditions.

In 1967, mineral production in the Northwest Territories was valued at over \$114.3 million,^{2/} virtually all of this from west of the 110th meridian (Figure 3). Of this mineral output, over \$95 million arose from the lead-zinc ore shipped from Pine Point. Commercial fishing was valued at \$1.2 million in 1964, virtually all from west of

^{1/} A minerals map of the Northwest Territories published in 1968 by the Department of Indian Affairs and Northern Development.

^{2/} It is notable that the outlook for mineral production in the Northwest Territories has changed so greatly since 1965. In that year, a projection of mineral production placed the Northwest Territories mineral output at \$50 million by 1968. See The Northwest Territories Today, Queen's Printer, Ottawa, 1965, p. 32. The more rapid growth to \$114 million reflects both the potential of the Northwest Territories and the effects of completion of the Great Slave Railway in 1964.

MINERAL EXPLORATION AND MINING - YUKON & N.W.T.



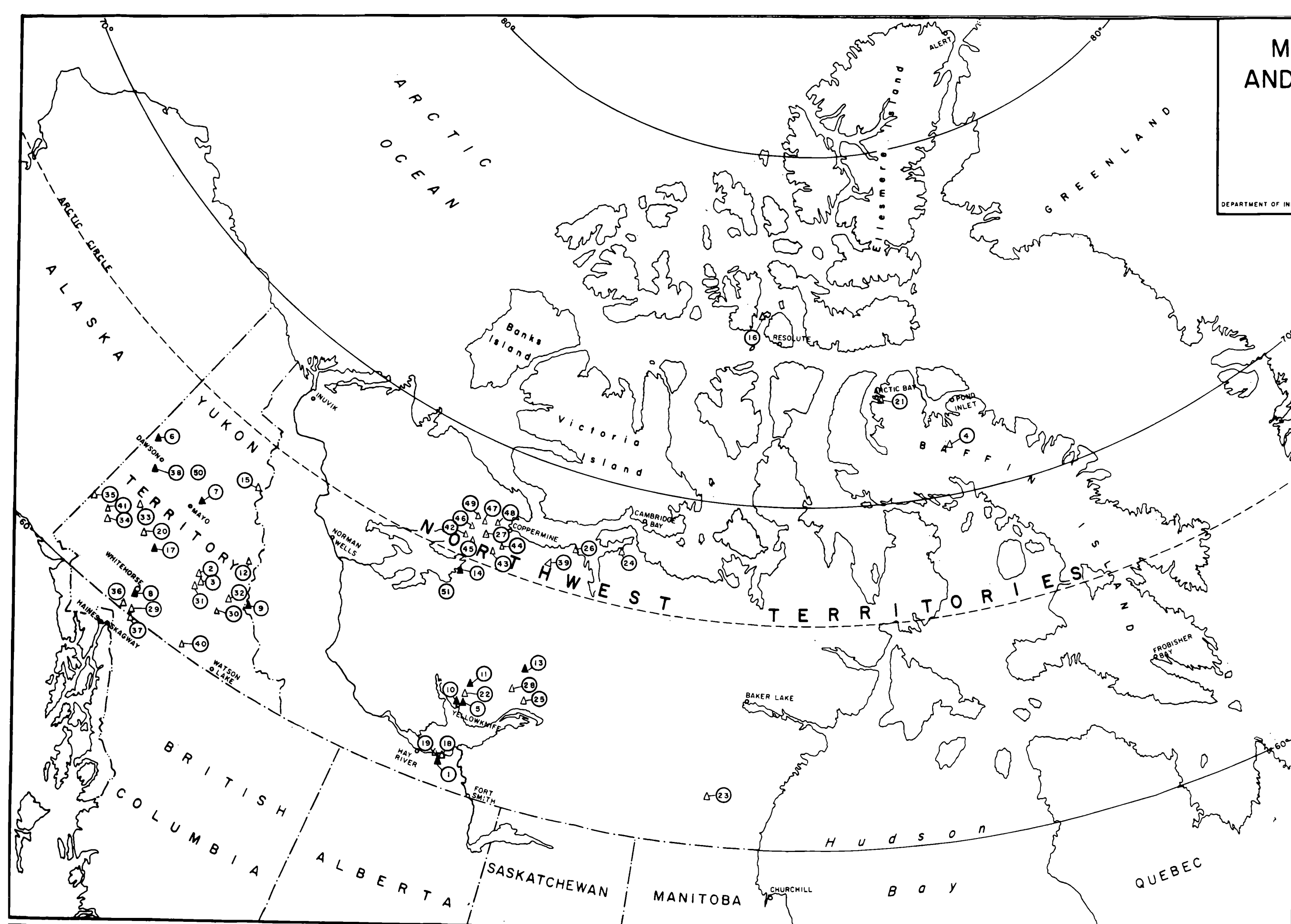
Legend
 ▲ Producing Mine
 △ Mining Prospect

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT RESOURCE MANAGEMENT DIVISION

TABLE OF COMPANIES

- 1 PINE POINT MINES LTD. (LEAD-ZINC)
- 2 ANVIL MINING CORPORATION LTD. (LEAD-ZINC-SILVER)
- 3 KERR-ADDISON MINES LTD. (LEAD-ZINC-SILVER)
- 4 BAFFINLAND IRON MINES LTD. (IRON)
- 5 GIANT YELLOWKNIFE MINES LTD. (GOLD)
- 6 CASSIAR ASBESTOS CORP. LTD. (ASBESTOS)
- 7 UNITED KENO HILL MINES LTD. (LEAD-ZINC-SILVER-CADMIUM)
- 8 NEW IMPERIAL MINES LTD. (COPPER)
- 9 CANADA TUNGSTEN MINING CORP. LTD. (TUNGSTEN-COPPER)
- 10 CON-RYCON MINE (GOLD)
- 11 DISCOVERY MINES LTD. (GOLD)
- 12 HUDSON BAY MINING & SMELTING (LEAD-ZINC)
- 13 TUNDRA GOLD MINES LTD. (GOLD)
- 14 ECHO BAY MINES (SILVER-COPPER)
- 15 CREST EXPLORATION LTD. (IRON)
- 16 COMINCO-BANKENO (LEAD-ZINC)
- 17 YUKON COAL CO. LTD. (COAL)
- 18 CORONET MINES LTD. (LEAD-ZINC)
- 19 CONWEST EXPLORATION LTD. (LEAD-ZINC)
- 20 MOUNT NANSEN MINES LTD. (GOLD)
- 21 TEXAS GULF SULPHUR CO. INC. (ZINC)
- 22 SUPERCREST MINES LTD. (GOLD)
- 23 SELCO EXPLORATION CO. LTD. (GOLD)
- 24 HOPE BAY SYNDICATE. (GOLD-SILVER)
- 25 INTERNATIONAL MINES SERVICES LTD. (LEAD-ZINC)
- 26 GALENA HOLDING LTD. (LEAD)
- 27 PCE EXPLORATION LTD. (COPPER)
- 28 ANGLO UNITED DEVELOPMENT CO. LTD. (GOLD)
- 29 ARCTIC MINING AND EXPLORATION LTD. (GOLD)
- 30 SPARTAN EXPLORATION (MOLLY COPPER)
- 31 SILVER KEY MINE LTD. (SILVER)
- 32 ATLAS EXPLORATION LTD. (COPPER)
- 33 CASINO SILVER MINES LTD. (SILVER)
- 34 HUDSON BAY MINING & SMELTING CO. LTD. (NICKEL)
- 35 DISCOVERY MINING LTD. (COPPER)
- 36 YUKON ANTIMONY CORPORATION LTD. (ANTIMONY)
- 37 VENUS MINES LTD. (SILVER-GOLD)
- 38 BALLARAT MINES LTD. (GOLD)
- 39 KENARCTIC EXPLORATIONS LTD. (COPPER)
- 40 PURE SILVER (SILVER-LEAD)
- 41 SILVER CITY MINES (COPPER)
- 42 COPPER MINE RIVER LTD. (COPPER)
- 43 PICKLE CROW GOLD MINES LTD. (COPPER)
- 44 HIGHLAND BELL LTD. (COPPER)
- 45 QUADRATE EXPLORATIONS LTD (COPPER)
- 46 PYRAMID MINING CO LTD. (COPPER)
- 47 PROPRIETARY MINES LTD. (COPPER)
- 48 HEARNE COPPERMINE LTD (COPPER)
- 49 CONWEST EXPLORATIONS LTD. (COPPER)
- 50 HART RIVER MINES
- 51 CAMSELL RIVER AREA

FIGURE 3



the 110th meridian, almost wholly from Great Slave Lake. Forest resources of the Northwest Territories (estimated at 336,000 square miles of productive forest land and 161,000 square miles of non-productive forest land) are largely confined to the Mackenzie River basin and in 1964 forest production was valued at about \$400,000. There are a few other resources for which the potential is only now being appraised. One of the most notable of these is the recently staked copper deposits at Coppermine which, in 1968, were undergoing extensive proving of reserves for development. They also lie west of the 110th meridian. Viewing the Northwest Territories overall, a major contribution to its economic development at this time would be to have a more thorough study made of its economic potential, with a view to intensifying economic development in those regions where it is warranted.

In contrast to the Mackenzie District west of the 110th meridian, the remarkable feature of the rest of the Northwest Territories is that they appear to offer so little economic potential at this time. In this northeastern remainder, that is, the part east of the 110th meridian plus the Arctic Islands, the land is mostly tundra and barrens; the surface is permanently frozen; the economic resources appear extremely limited; distances to markets

are very great; the prospects of much settlement beyond a few key administrative centres seem quite poor;^{1/} the output and the revenues arising in the region are too low to contribute significantly to its economic viability; and the present outlook would indicate that unless there are major changes in technology or in other conditions this whole region is likely to continue under the permanent support and responsibility of the federal government. Finally, the trade routes and outlook for this region would suggest a different orientation of economic and political development than might be applicable in the western part of the District of Mackenzie. In this context, and looking to the future, the evidence suggests that if both regions of the Northwest Territories were to be developed under the same policies and programs, the economic advance of both of them would suffer and both would be handicapped in their cultural and economic opportunities. In short, if the benefits of their particular potentials are to be fully enjoyed it seems essential that, on the one hand, the vast northeastern

^{1/} Almost half of the 10,053 people in the Districts of Keewatin and Franklin in 1966 lived in the eight largest centres of Igloolik (328), Pangnirtung (376), Cambridge Bay (511), Frobisher Bay (1,631), Cape Dorset (357), Eskimo Point (464), Baker Lake (596), and Rankin Inlet (429).

region of barrens, tundra, sea and islands must have those special policies and measures warranted by its particular characteristics; and on the other hand, the western part of the Mackenzie District must have a development environment more suited to its economic potential and special planning and co-ordination of its economic development with nearby areas in northwestern Canada where possibilities of greater viability and economic growth exist.

The western part of the Mackenzie District has already become a most significant component in the development of the economic region that surrounds the Yukon. It has excellent transportation links with Northern Alberta. Transport links (road, air and water) with the Yukon are beginning to build up. Highway transportation links with the Yukon include the old Canol road now in process of being rebuilt; the highway between Tungsten and Watson Lake and the projected highway from central Yukon to Fort MacPherson. Scheduled and chartered air services out of the Yukon connect with Inuvik, Yellowknife and other centres in the Mackenzie District. The Liard River system offers a water transport route connecting southeastern Yukon, northeastern British Columbia, and northwestern Alberta with the extensive barge services of the Northern Transportation Company on the

Mackenzie River and its tributary lakes and rivers. With some further development this waterborne transport service could provide a low-cost seasonal service to a major part of this whole economic region.^{1/} It is a relatively slow service and its season is short, usually about three months except in the south.

On electric power, like the Yukon, the District of Mackenzie may need to look south for the large blocks of power it will require in the future. In the meantime, local power requirements are being met by small hydro, diesel or steam plants.

Like the Yukon, the western part of the Mackenzie District has developed only limited petroleum^{2/} and gas resources. Yet for both Territories the Liard River area gives some promise of substantial reserves eventually. In the meantime, both oil and gas are available in volume in nearby northern British Columbia and Alberta, as are also coking coals, tar sands and other resources suitable for mineral and metallurgical development.

^{1/} In 1967, Northern Transportation Limited hauled 167,000 tons of freight, of which 100,000 tons was fuel oil from Norman Wells.

^{2/} The Norman Wells field had largely reached the limit of its capacity by 1968.

Tourist development, especially in co-ordination with the other parts of this northwestern frontier region, seems to offer significant opportunities for this part of the Northwest Territories.

Development of the western Mackenzie District will depend greatly on the expansion of transportation, power and other supporting services. Such economic development can reach farthest if it can be planned in co-ordination with developments in the surrounding areas of this northwestern economic region. This aspect warrants further examination.

CHAPTER 3

THE NEW PHILOSOPHY OF NORTHERN DEVELOPMENT

The northwestern region of Canada just outlined illustrates the transition of the North to a new era of economic potential. Still shrouded by its heritage from the past, this new potential has been laid bare by the advance of new technology. For its realization, this new economic potential in the North rests largely on the acceptance of a new role by the public sector. Such a new role has only become possible because of the new opportunities opened by the advance of technology and the public investments in new mineral explorations.

This new stage of development potential differs from those that went before. It is unlike the first historic stage, the Klondike gold rush, in which the public contribution was mainly confined by the current philosophy of the North to providing minimal services only where the private sector would not or could not provide them. This new stage is unlike the second stage where the demands of continental defence imposed the total initiative for improvements on the public sector. Nor does it rest on the third and more recent stage where the demands for

paternalistic welfare, on one hand, and for ad hoc improvements, on the other, have resulted in some advance but little certainty for the future. This new stage rests rather upon private enterprise operating securely within a framework of services adequate to give economic prospects reasonably comparable to the rewards for investment elsewhere. The public role is not unlike the public role elsewhere. The new philosophy of northern development, if it is to be most effective in exploiting the economic potential, must recognize the role of the public sector in providing the basic structure of transport, power and communications and the infrastructure of administrative and social services, necessary to give private enterprise the incentive to initiate productive activity in the northwest. This new philosophy may be perceived to follow logically on the heels of recently established public assistance programs for exploring and building up the knowledge of mineral deposits in the North. In fact, without significant public investment in city management, roads, schools, drains, hospitals, and the regulation of the use of such facilities, and wider provision of power, highways, railways, and communications to say nothing of regulation of commerce, private development could hardly occur anywhere in the modern scene.

Moreover, such investment is not a "subsidy" in the sense of supplying "something for nothing". It is on the broad back of such development that the expansion of public revenues depend, and depend more surely since the public investment and expenditure was a necessary antecedent to the expansion of development.

The new stage now opening offers an excellent opportunity to enlist private enterprise more fully in the development of the North. Nor should it be presumed that this involves any deeper public participation than has so frequently occurred elsewhere prior to major economic advances in the past.^{1/}

Obviously there are limits upon the size and nature of public investment in any region, even supposing the decision to pursue its development has been made. Careful arrangements need to be made about the size, nature and timing of investment in order to optimize the funds to be assigned. Careful weight needs to be given to the funds which will be expended from which only the most nebulous

^{1/} Colourful disparagement of proposals to involve the public sector often do two things, and contain errors in both. First, by appeals to the ethic of "free private enterprise" the fact of the significant, growing, and necessary involvement of the public sector in many industries and many regions for a long time is conveniently overlooked. Second, the participation by the public sector in the process of development has, more often than not in provinces and regions of various political stripe, made development in the private sector possible and profitable.

returns will directly flow, such as civic expenditures, education, training for labour mobility, and such prosaic things as health, recreation and other amenities. Other priorities in size and time need to be established for services such as power and transportation, both basic to industrial activity and from which it is more reasonable to expect some direct returns. Then there is also the requirement for priorities in fiscal or other devices^{1/} which may be necessary to induce private investment into regions where the public provision of services is below the national average, or where conditions of cold, darkness or distance, lends disenchantment in southern boardrooms and southern labour exchanges. All of these, and more, need the careful co-ordinated consideration by public authority whose responsibilities are regional. Canada has in recent years had excellent experience with such regional authority.

Unless the responsibility for public developmental incentives is co-ordinated in a responsible agency, the fragmenting effects of several federal and provincial and territorial departments and authorities will lead to excessive compromise in the establishment

^{1/} These are already effectively established for mining.

of priorities, will perpetuate the narrowly oriented benefit-cost analyses of specific projects springing up from ad hoc situations, and will neither initiate enthusiasm for attaining the potential of the region nor dampen the pressures for immediate action on inadequate projects.

The primary task of any authority charged with developmental responsibility is to set these priorities for public investment in its several categories. Many questions exist which cannot be settled except on policy grounds, and on some of these policies this Report will make recommendations. But except in the broadest terms, real and specific priorities must be set on the basis of specific objectives and these will require particular studies. Without some broadly drawn objectives for development in a given region, in direction, timing and extent, the planning of services in the public sector is without purpose. All too often, our so-called economic development remains unexamined in its goals both in relation to national purpose and national priorities.

Even before development of a region can begin to be planned some, even rough, idea of the potential of the parts of the region and the costs of achieving that potential must be gathered. Once these are approximated,

then some national priority for that region can be set. Only by such means can a policy for development be worked out, sanctioned and announced so private enterprise will have some idea of the rate and pattern of public investment within which their activities must be adapted over the several years ahead. The program for building development roads in the North is an example of how this type of policy works out. But, unlike that policy, a developmental authority ought to have responsibility for planning a comprehensive system of roads, to be built eventually. It should have this responsibility not only for roads but for a whole range of specifics ranging right through the spectrum of public services which are the tangible expressions of regional developmental policy.

Fortunately, there is a basic structure of such services now and there is little need for a big crash program to provide the additional expansion of services that will be required. But plans and policies must be established for the progressive improvement and expansion of these services over the next decade or more if they are to be most effective in the economic development of northwestern Canada.

Within the past decade or more the storehouse of resources in this northwestern region has come to the

attention of world users. Within the next decade, in view of the growing world demand for minerals and their depletion elsewhere, it may be expected that these resources will become particularly attractive to private enterprise. This attraction will be earlier and greater if Canada undertakes to establish suitable development objectives that can guide this private enterprise planning.

A new departure in public policy, comprehensive, positive, perceptively forward-looking and broadly based, is needed to round out and condition the economic environment for this new breakthrough in northern development.

The pattern of advance is already evident in the progressive northward push of private and public development toward the 60th parallel in northern British Columbia and Alberta. In the course of the next decade it may be expected that public services and facilities will be extended well toward the 60th parallel under the initiative of these provinces. In the same period, under an effective policy for development of the Canadian northwest, adequate provision could be made for progressive investment in, and co-ordination of, the services and development of the Territories north of the 60th parallel and west of the 110th meridian, with those of the provinces and thus into an integrated regional progression.

This is not to say that everything must be held in abeyance until a plan is ready and the time is right. Not at all. The time for such policies is now. With early decisions on broad objectives the gradual extension of services will be in keeping with and in anticipation of the growing demands for them. Moreover the positive influence of advance public policy plans on private initiative can be notably effective. It is by these intangibles as much as by the tangibles that development is stimulated. Policies for education and locations of schools, policies on townsites and their location and operation; policies on health and welfare, manpower location and training; policies on the supply of housing, credit and other consumer facilities, recreation, adult education, cultural stimulation geared to the North, etc. are all going to be required if the region is to attain effective economic growth and stability and the nation is to enjoy the satisfaction of accomplishing an estimable economic outcome.

Many of the facets of northern development which have elsewhere been traditionally the prerogative of local or individual incentive will require somewhat greater support from the public sector. Those Canadians who reside in the south and are the heirs to a compre-

hensive foundation of facilities supplied by past generations, forget the public legacy within which we move on our private expressions of personality in sports, recreation and culture; arenas, parks, libraries, concert halls, pubs, highways and such, have been supplied for the most part by an earlier age. It is seldom recognized that the magnitude of the task of reproducing these cultural amenities in a new region, devoid of all but the most sparing examples of the same amenities, is an excessive load in the short run. Add to this the factors of higher costs, distance, climate and winter darkness, and the difficulties of the private sector attempting to create normal Canadian living conditions become a very great burden indeed. This is not to say that initiative for these things needs always to arise in the public sector. Preferably the stimulus should stem from local initiative.

If we as a nation want sound development in the Canadian northwest, these and more tangible developmental services must be included, not as a charitable gesture, but as part of the real cost of development. Done well, the returns to the nation through increased employment and output will be adequate.

The new philosophy of development can find its most adequate expression in the recognition that develop-

ment in the Yukon is potentially more limited if it does not take place in phase with development in the entire Canadian northwest. It is almost impossible to visualize and devise developmental plans which will be anything more than marginal extensions of present processes unless the northern portions of the provinces of British Columbia and Alberta and the western part of the Northwest Territories are all taken into consideration. There is, in this area, a homogeneity of the resource types and of the matrices within which resources are found that lend themselves to common policies. The geological nature of mineral expectations is similar, the topography lends itself to an integrated approach, and the slow push of development from south to north will be aided by common policies of encouragement and inducement to the whole region. The northern reaches of the two provinces lie between the Territories and the rest of Canada. An overall regional developmental policy, seeking roots in the established infrastructure of Canada but needing a particular approach to the problems of human living and industrial operations in the north, needs to consider the entire region from the Alaska border east to the 110th meridian of longitude and south at least to 55 north latitude.

To give an administrative reality to regional policy of this kind, there must be a developmental authority as the agent of national policy. At least five governmental entities are involved, and the necessary degree of responsibility for the overall planning must come from one agency whose prime interest is northwestern development. Armed with federal responsibilities, with adequate regional experience represented, rational staging of development can be begun. The promise of a known capital sum for developmental purposes after acceptance of a set of plans will be inducement enough to carry it forward.

This may be an appropriate point to re-emphasize that this should be a new and flexible approach to development. Most regional development programs in the past have been pointed toward reduction of poverty in the area. It is a different challenge in northwestern Canada. It is not remedial measures but new creative measures that are required here. The need is rather for a positive and considered developmental program that will create a favourable economic and social milieu and encourage rational and stable industrial and social growth.

Federal responsibility for development in the northwestern Territories is primary. Development there

must be linked with the northward spread of services from the two most western provinces if it is going to be anything more than a simple low intensity extractive economy in the future. Federal and provincial policies co-ordinated to stimulate development in the region will advance the possibility of mutually supporting services most rapidly, and of a scale most appropriate to the potentials, and of a level and range of service most suitable to the conditions of the north.

There is one final consideration in support of a Canadian northwest development authority which has broad implications for Canadian national policy. For several years the national government has been faced with the necessity to develop some criteria to guide it in developing national policies for positive promotion of regional or industrial sectors consistent with the requirement that national policy shall be nationally applicable. Fiscal and monetary measures which have been the cornerstones of national economic policy - indeed have almost been the totality of it - have unequal regional and industrial effects. They have been designed for and are most effective in sectors and regions where the responses are most sensitive. Yet there remains the need to develop, in specific and concrete examples, the tech-

niques of economic policy which will have desired effects in one region or sector without aggravating conditions in another. A well conceived, properly staffed, and research oriented developmental authority for the Canadian northwest could provide a suitable laboratory for developing new technology for national policy which could, at best, serve to increase the knowledge of effects, and, at worst, provide grounds for caution. The northwest region is sufficiently different and isolated as yet for such thoughtful and imaginative developmental projects to be particularly illuminating.

PART 2

THE ECONOMIC POTENTIAL OF THE YUKON

CHAPTER 4

INTRODUCTION

The central objective of this study is to appraise the potential for economic growth of the Yukon Territory. In Part I, the setting of the present Yukon economy and the broad policy environment for northern development were examined. With this foundation, Part 2 examines the Yukon economy itself, its physical environment, its economic structure, the economic potential of the major sectors of the economy, the expected contribution to be made by improved services including transportation, the problems of labour and capital, the potential contribution of the native population, the economic environment and the potential strength and viability of the Yukon economy.

Altogether, this encompasses a most comprehensive analysis of the economic potential and it requires projections, where appropriate, to indicate the probable pattern

of the Yukon economy in the future. In the analysis, the economic pattern has been projected mainly to 1985 although for some purposes the period was extended beyond this. Such projections also must assume a particular growth pattern of transportation and other public services. For this purpose, particularly for mining, two alternative patterns of services have been assumed in the projections - one based on services as they were in 1968 with continued maintenance but minimum improvement and the other based on the carrying forward of such substantive improvements as seem reasonably justified by the economic potential of the Yukon and its region. Other general assumptions may be noted relative to these projections. One is that public decisions relative to development measures will be made with reasonable or ordinary dispatch after the evidence is in. Another is that public policy relative to the Yukon's economic development will be designed to contribute also to the development of northwestern Canada as well as to Canada as a whole. Another is that, with the Yukon so dependent on traffic movements through surrounding political entities, there will be imposed no obstacles to Yukon development and such obstacles as already exist may be overcome more effectively if they are within Canada than if they are outside. In short, it is assumed that the development

of the Yukon cannot be considered as an isolated and independent process but that there will be no impediments to co-ordination of its development within the northwestern region of Canada. These are the broad assumptions. Particular assumptions are also made where appropriate for particular projections.

The organization of our investigations in Part 2 has been based on the belief that a clear understanding of the particular nature of the Yukon economy and its problems is an essential first step in its appraisal. Accordingly, our studies were directed first toward a preliminary appraisal of the structure of the Yukon economy, followed by a comprehensive analysis of its physical, industrial and institutional environment relative to its economic growth potential. In the course of this basic analysis it has been possible to assess the major elements that influence economic growth in the Yukon, to appraise the resources available for development and to examine the obstacles that appear to have held back its economic expansion.

The second step was to assess the growth considerations related to the potential for expansion of the Yukon economy. Thus the problems of transportation, power, and other services and facilities are examined. Other

critical elements including capital, manpower, native peoples, and others, are investigated.

A third step was to draw all of this analysis together to analyze and draw conclusions concerning the economic environment for growth and the potential strength and viability of the Yukon economy. Finally, the whole report is summarized with its conclusions and recommendations drawn together at the beginning of the Report.

CHAPTER 5

THE STRUCTURE OF THE YUKON ECONOMY

The structure of an economy provides insights into the pattern, the rate and the dependability of its growth. The structure of the Yukon economy indicates its probable volatility and unevenness of growth.

Through most of its history, the Yukon economy has experienced more decline than growth. From 1898, when the federal Yukon Act created the Yukon Territory as a separate entity, to the present 1968 there has probably been more years of economic decline than years of growth. The remarkable economic expansion after the Klondike gold strike of 1896 was maintained for only a few years. From 1901 to 1931, economic decline was almost continuous. For a time in the 1930's the increase in the price of gold to \$35 an ounce along with some influx of unemployed from southern Canada, gave a temporary stimulus to the economy. This was followed by the 1939-45 war which brought another wave of temporary economic growth by the construction of

airfields, highways, pipelines and other wartime facilities. Eventually these brought the first promise of some continuing future potential. After 1942, following almost 40 years of decline, the economy turned upward again but its growth was not remarkable until after the late 1950's.

By the early 1960's, the Yukon economy had made progress in expanding its structure of basic services including roads, power, and services related to mineral exploration. By 1968 a significant expansion of its minerals industry was underway. A broad perspective of the structure of the Yukon economy in this period can be provided by the estimated 1961-66 output of the major industries:^{1/}

<u>Goods Producing Industries</u>	Estimated Average Annual Gross Output or Receipts, 1961-66 (million dollars)
Construction	11.8
Mining	11.6
Electric Power	2.0
Manufacturing	0.6
Logging	0.6
Trapping	0.1
Commercial Fishing	<u>2/</u>
Agriculture	<u>2/</u>
 <u>Service Producing Industries</u>	
Retail Trade	19.3
Transportation	16.8
Service Trades	5.3

^{1/} See Table 69, Analysis of Statistics and Statistical Needs of the Yukon Territory, by Joan Gherson, a background study prepared as part of these Yukon Economic Studies, Ottawa, July, 1968, and hereafter referred to as the Yukon Statistical Report 1968.

^{2/} Less than \$100,000.

These estimates are necessarily approximations^{1/} but they show that production of goods and services in the Yukon economy is comprised chiefly of construction, mining, retail trade and transportation. These four industries contributed more than 85 per cent of the Yukon's economic activity in the period 1961-66. Construction, retail trade and transportation are, of course, heavily dependent on the level of mining activities.

These estimates probably show the economy as less dependent on the mining industry than it has become since that time. They cover only the averages for the six years ending 1966. They do not cover the expansion of the economy that occurred in 1967 and 1968, especially the development of new mines including New Imperial Mines at Whitehorse, Cassiar Asbestos at Clinton Creek and Anvil Mines near Ross River. These new mines are expected to add more than \$70 million to the value of minerals production in the Yukon when they reach full capacity operations by the mid-1970's. This illustrates the volatility and unevenness of the growth of the economy.

By 1966, it had become evident that a critical stage was being approached in the economic growth of the Yukon economy. There was evidence that the Yukon economy would continue to grow and, with appropriate public investment,

^{1/} Reference to the Yukon Statistics Report will show the deficiencies in statistics for the Yukon that prevented a more precise and complete estimate of these outputs.

that it might grow perhaps even faster than it had in these recent years. There was also evidence that some major obstacles stood in the path of this potential economic growth, although the nature of these obstacles and the priorities in dealing with them were still not subject to widespread agreement. By 1968, some of these problems relative to the economic growth potential of the Yukon had become acute. Their solution depended upon new approaches and new measures if the obstacles to progress were to be removed and the economic potential more fully realized. To establish the basis for such new approaches it became necessary to make this comprehensive appraisal of the new and prospective conditions that influence and comprise the economic potential of the Yukon.

CHAPTER 6

THE PHYSICAL RESOURCE ENVIRONMENT

It is said that the growth potential of an economy depends upon the natural quality of the people, the original quality of the physical environment (that is, the resource base), the heritage of accumulated improvement, and the good judgement with which the efforts of the people are guided and regulated.^{1/} All of these must be considered in this study of the economic potential of the Yukon Territory. At this point, we are concerned with the physical environment as a basis for the special appraisals of the resources and industries of the Yukon and their potential for growth.

The Yukon Territory is the most westerly part of Canada. Located north of the 60th parallel of latitude and east of the 141st meridian, the Yukon is 207,706 square miles in area, including the islands lying within 20 miles of its northern coast on the Beaufort Sea.

^{1/} Cannan, Edwin, Wealth, London, 1930, Ch. 1.

The Yukon Territory is a land of great natural beauty, a land of great rolling hills and high mountains; of abundant wildlife including mountain sheep and goats, great bears, caribou, moose, fish and game birds; of swift streams and broad valleys cut by great rivers; and of numerous varieties of delightful wild flowers growing in summer abundance. Great snow-capped mountain ranges rise out of the forested valleys and in the far north the open tundra extends to the Arctic Ocean. Its unspoiled beauty is a delight to the tourist; its high, fresh spaciousness an almost unbelievable refuge from the frustrations and mass-hysteria of his southern cities. Its angling and hunting lure the connoisseur.

The physical environment of the Yukon Territory includes those features related to its spatial location and isolation, on the one hand, and its more specific physical characteristics, on the other. The environment related to its location and isolation includes its northerly latitude, its relatively high altitudes and its barriers of mountains and valleys. The more specific physical characteristics may be described in terms of its topography and drainage, climate, geology and soils, vegetation and animal life. These specific characteristics are examined next.

Topography describes the physical features of an area, especially the configurations of the land surface, that is, its relief, the extent and location of mountain ranges, plateaus, drainage systems and such. In the economic potential of the Yukon Territory, topography may be an important consideration because of the degree of isolation it imposes, its adverse effects on transportation routes and costs and its adverse effects on the potential for agricultural cropping and grazing where soil is available.^{1/}

The topography of the Yukon Territory is featured by ranges of mountains that virtually surround most of the Territory and by a ridging of mountain ranges and river valleys that tends to run generally northwest-southeast and thus, lying almost at right angles to the present direction of the traffic flow, forms a sequence of major barriers to transportation (Figure 1). Broadly, the Yukon Territory is divided by the Ogilvie Mountains into two major plateau regions. North of the Ogilvies is a substantial plateau region made up of the Porcupine Plains, Porcupine Plateau and the Peel Plateau. This northern plateau region lies largely within the Arctic Circle. In the south-central part of the Territory lies the major Yukon plateau region,

^{1/} The lack of sufficiently detailed maps showing these topographical features is a major reason for the lack of understanding of the potentials and handicaps of the Yukon.

comprised mainly of five plateaus (the Klondike, MacMillan, Lewes, Pelly and Kluane Plateaus) and extending to the southeast into the Hyland and Liard Plateaus in the Liard River region. The southern Yukon plateau region lies mainly between the 60th and 65th parallels of latitude. Its topography is hilly to mountainous throughout most of its component plateaus. Such land as is reasonably level lies primarily in the river valleys. The major topographic barriers to direct transportation in the Yukon are notable (Figure 1). Prominent among them are the Coast Range and St. Elias Mountains that present the major obstacles in reaching the Pacific Ocean through the Alaska Panhandle, the Ogilvie Mountains obstructing the path to the North and the Selwyn and Richardson Ranges which impede movement eastward toward the Mackenzie River basin.

The drainage system of a region affects its hydroelectric potential, the supply of water for industrial, residential, transportation and recreation uses and the supply of land for farming and of water for irrigation. The Yukon River and its major tributaries, the Klondike, Stewart and Pelly Rivers comprise the major drainage system for the southern plateau region. It ensures an extensive potential of hydro-electric energy and a supply of industrial-residential water for an extensive development area. In the north, the

Porcupine, Peel and Rat Rivers with their tributaries also provide reasonably extensive resources for electric energy and water uses, although winter potentials are greatly reduced by the Arctic cold. In the southwest, the Liard River system offers extensive power resources. Yet the relatively light precipitation in the Yukon limits the flow of these drainage systems and the volume of water available for these industrial uses. Considering the great expanse of the drainage basin of the Yukon River and its tributaries there are only a few sites where large volumes of hydro-electric power can be made available at reasonably low cost for Yukon industries. The Yukon River was extensively used in the past for transportation purposes but since the extension of highways to reach the major centres, river boat transport has proven too slow, uncertain and, thus, too costly for effective use. It may be expected that river transport will continue to decline. If the rivers flowed in the same direction as the potential freight traffic needed to move, no doubt they would have been maintained longer in operation.

Because precipitation is limited, the flow of water in streams and rivers tends to be relatively light, lakes are not as extensive as might be expected and tourist and recreation use of water may be expected to require an abnormal proportion of the total volume.

Climate can be a significant influence in economic development. Climate can affect the costs of winter heating, shelter and clothing. Urban sewer and water systems may be quite costly to install because of extra costs due to permafrost and winter cold. Climate may limit some outdoor industrial operations although new technology has overcome most of its disadvantages. It is a factor in the comfort and pleasures of the people. It can be a significant factor in the costs of winter transportation although, in the Yukon Territory, snow removal costs are relatively low because the snowfall tends to be light. Climate is a major determinant of the potential for farming.

The suitability of the climate of the Yukon Territory for economic activities is influenced by its latitude, its altitude, the mountains which surround it and its position relative to nearby bodies of land and water that serve as source regions for the air masses which, in moving over the Territory, influence its climate. These several factors of location and height above sea level provide a first approximation to the climatic environment of a region like the Yukon. This climatic environment can also be more precisely measured in terms of its influence on the economy by its temperatures, precipitation, sunshine, humidity, wind and such.

The Yukon lies between 60 and 70 degrees north latitude and in such latitudes the temperatures tend to be low. About one-third of the Territory's latitudinal length lies within the Arctic Circle (at 66 degrees, 33 minutes north latitude) and in consequence of the greater cold this northern part is mainly barren tundra.

Altitude has a major influence on the Yukon climate. Most of the Territory is high and consequently relatively cold. The plateau regions, comprising about two-thirds of the total area of the Territory, range between 2,000 and 5,000 feet above sea level; the mountain ranges comprise most of the remainder (Figure 1) and these range mainly between 5,000 and 8,000 feet in altitude, with the St. Elias Mountains rising well above this (Mount Logan is 19,850 feet) and some parts of the Selwyn Mountains rising to almost 10,000 feet. The altitudes below 2,000 feet are confined to the lower valleys of the Yukon, Porcupine and Peel Rivers and to parts of the north where the land drops toward the coast of the Beaufort Sea. Altitude is a significant factor in the climate and affects the economic potential of some resources in the Yukon. Combined with the northern latitude these high altitudes impose a coldness on most of the Yukon region that, with the lack of precipitation, virtually prohibits ordinary agricultural activities and substantially limits the rate of forest growth.

The climate of the Yukon Territory is influenced greatly by the direction and source regions of the air masses that move over it. These air masses move generally from the northwest to the southeast and thus the source region may be any one of three - the Pacific Ocean with its warm, moist air masses, the continental region of Alaska with its relatively cold dry air; and the cold Arctic Ocean with its cold dry air. Even the warm, moist air masses from the Pacific tend to be dry and cool by the time they have passed over the Coast or St. Elias Mountains to reach the Yukon. As they rise over the mountains they are cooled and precipitate their moisture on the western slopes, arriving dry and cool in the Yukon. The colder air masses from continental Alaska and the Arctic ensure cold temperatures, particularly in the northern part of the Territory.^{1/}

All of these influences combine to give a Yukon climate that is marked, from an economic viewpoint, by winters of extended coldness, long nights, and little sunshine; by limited precipitation with most of it falling,

^{1/} It may be noted here that the Yukon Territory does not enjoy the temperate climate of similar latitudes in the Scandinavian countries or northern Russia. These countries are washed by the warm Gulf Stream flowing northeastward from the Gulf of Mexico. The Yukon climate tends to be dominated by the colder source regions more like that of the easterly part of Siberia.

fortunately, from June to October; by the shortness of the frost-free season; and by the coolness of the growing season (Table 1).

Thus temperatures influence the economic potential of the Yukon in several ways. The short frost-free season, ranging from 45 to 80 days^{1/} south of the Ogilvie Mountains (except for Watson Lake) against, for example, 100 days at Edmonton (Table 1), reduces forest growth and virtually excludes most agricultural grain crops, for which the shortest season is ordinarily at least 90 days. The cool temperatures during the growing season tend to reduce the abundance of growth. This relative coolness may be best indicated by comparison of the heating factors, using the day-degrees below 65 degrees Fahrenheit during the June to August growing season for comparison. Thus, the meteorological records show, for example, that the June to August degree-days below 65 degrees for Dawson City average 748; Whitehorse, 901; and Watson Lake, 812; against 476 for Edmonton, 381 for Lethbridge^{2/} and 150 for London, Ontario. The growing season is clearly much cooler in the Yukon.

^{1/} Altitude influences the frost-free period. Whitehorse with an altitude of 2,289 feet above sea level has an average frost-free season of 78 days while Yellowknife at 682 feet averages 113 days.

^{2/} See Heating Degree-Day Normals, CDS No. 5-64, Climatology Division, Meteorology Branch, Toronto, 1964, for Lethbridge data.

TABLE 1
LONG-TERM CLIMATIC DATA, SELECTED STATIONS^{1/}

	Height above mean sea level	Precipi- tation average annual	Average frost- free period	Days with mean temper- ature above 42°F. ^{2/}	Average July temper- ature	June- August heating factor (below 65°F.) ^{3/}	October- April heating factor (below 65°F.) ^{3/}	Average date of last spring frost	Wind chill, January ^{4/}
	(feet)	(inches)	(days)	(degrees F.)	(degrees F.)	(day-degrees)	(date)	(degrees F.)	
Dawson, Y.T.	1,062 ^{5/}	12.67 ^{5/}	90 ^{2/}	136	59.8 ^{5/}	748	13,104	May 28 ^{2/}	n.a.
Watson Lake, Y.T.	2,248 ^{5/}	16.98 ^{5/}	101 ^{2/}	144	59.1 ^{5/}	812	11,775	May 28 ^{2/}	n.a.
Whitehorse, Y.T.	2,289	10.67	78	143	56.2	901	10,408	June 10	-8
Haines Junction, Y.T.	2,030 ^{5/}	10.94 ^{5/}	53 ^{2/}	122	53.8 ^{5/}	1,219	11,419	June 21 ^{2/}	n.a.
Yellowknife, N.W.T.	682	8.45	113	125	60.9	797	13,437	May 31	+1
Prince George, B.C.	2,218	22.16	68	166	59.6	766	8,077	June 17	+1
Edmonton, Alta.	2,219	17.63	100	n.a.	62.9	476	8,981	May 29	-7
Calgary, Alta.	3,540	17.47	91	155	62.4	550	8,100	June 3	+4
Saskatoon (A), Sask.	1,690	14.40	111	n.a.	66.4	350	9,752	May 24	-18
Churchill, Man.	115	15.01	63	95	54.7	1,410	13,484	June 28	-44
Winnipeg, Man.	786	19.72	110	176	68.4	259	9,696	May 27	-20
London, Ont.	912	38.24	137	205	69.6	150	6,750	May 16	+9
Knob Lake, Que.	1,681	27.55	70	103	55.1	1,223	12,040	June 21	-4

^{1/} Data from Dominion Bureau of Statistics, Canada Year Book, 1960, and W. G. Kendrew and D. Kerr, The Climate of British Columbia and the Yukon Territory, Ottawa, Queen's Printer, 1955, unless otherwise noted.

^{2/} Boughner, C.C., The Distribution of Growing Degree-Days in Canada, Canadian Meteorological Memoir No. 17, Department of Transport, Toronto, 1964.

^{3/} Department of Transport, Climatology Division, CDS No. 5-64, 1964, Toronto.

^{4/} Calculated on average January temperature and windspeed. See also Department of Transport, Ottawa, AMS Bulletin, Volume 29, December 1948, for formula.

^{5/} Department of Transport, Climatology Division, CDS No. 1-62, 1962, Toronto.

To expect an abundant growth of farm or forest crops the average temperature in the month of July should ordinarily exceed 60 degrees Fahrenheit. None of the meteorological stations in the Yukon report a July average above 60 degrees. Dawson had the highest average July temperature with 59.8 degrees.

This degree-day heating factor also indicates the level and continuity of the cold in winter, or, in other words, the amount of oil required to heat a home. In the Yukon, the winter heating factor is relatively high. The October to April heating factor averaged 13,104 degree-days at Dawson, 11,775 at Watson Lake, and 10,408 at Whitehorse; against 7,542 at Lethbridge,^{1/} 9,752 at Saskatoon, 10,361 at Hornepayne, Ontario^{1/} and 12,040 at Knob Lake, Quebec, (Table 1).

The hours of sunshine in the summer in the Yukon are quite favourable relatively, both for plant growth and for maximizing the attractions of the Territory for tourists. No doubt, to the tourists, the cool summer temperatures combined with the abundant sunshine prove quite exhilarating.

Precipitation is light in the Yukon, averaging 10.7 inches at Whitehorse and 12.7 inches at Dawson against 17.6 at Edmonton, 14.4 at Saskatoon and 38.2 at London,

^{1/} See Heating Degree-Day Normals, CDS No. 5-64.

Ontario (Table 1). Twelve inches of precipitation is not enough for effective crop production, considering the shortness and coolness of the season. Deficiencies of precipitation are also a major limitation in the productivity of the forest lands in the Yukon.

It may be significant that the climate in the vicinity of Dawson City seems to have considerable advantages in terms of summer growing conditions relative to more southerly areas. The average summer temperature is higher in Dawson than in Whitehorse, as demonstrated by the smaller heating factor for the June to August period. The average July temperature is higher at 59.8 degrees Fahrenheit in Dawson, against 56.2 degrees Fahrenheit in Whitehorse and 59.1 degrees Fahrenheit at Watson Lake (Table 1). The average rainfall is slightly higher at Dawson than at Whitehorse.

Yet these climatic advantages at Dawson are far from adequate to produce suitable conditions for profitable crop production. For reasonably consistent hay or cereal grain cropping, a frost-free season of more than 100 days is virtually essential. Rainfall at Dawson tends to be too light for dependably abundant crop yields and costly irrigation would probably be necessary. More particularly, higher average summer temperatures are needed for abundant growth because, if growth is not abundant, its costs per

unit of output are thereby increased in inverse proportion. Under the new technology in which farming in Canada's major agricultural regions now operates, the tendency has been for farming to gravitate to those regions where conditions of soil, climate and scale of farming are most favourable and to ship the farm products from these specialized regions to the areas or centres where conditions are less favourable. Among the most productive agricultural regions in Canada, under the new technology, are the irrigated areas of southern Alberta, where climatic conditions are particularly favourable. It is mainly these farms, in the area of Lethbridge and Taber, with which farming in the Yukon would have to compete.

Geology and soils describe the ages, structures, composition and other physical characteristics of the surface and underlying rocks and soil deposits. In this sense, the geology of a region determines the nature and topography of the land surface and is a major influence on the character of the soil overlying the rock. An understanding of the geology of a region is essential to the effective appraisal of its suitability for mining, petroleum production, forestry, agriculture and recreation.

The Yukon Territory lies at the northern end of the Canadian Cordilleran Region, the most westerly of Canada's

five geological regions (Figure 1). The Canadian Cordilleran Region is a northwesterly-trending belt about 500 miles wide composed of high mountains and lower plateaus and valleys. It comprises southwestern Alberta, all of British Columbia, except its northeastern corner, almost all of the Yukon Territory and the southwestern part of the Northwest Territories.^{1/}

The Cordillera in the Yukon, as elsewhere in Canada, are divisible into three distinct parallel zones all trending northwesterly, called the Western, Interior and Eastern Systems. The Western System is composed of the high rugged Coast Mountains and the St. Elias Mountains, with its westerly boundary running roughly from Carcross to Snag. The Central Interior System comprises the Yukon Plateau and the interior mountains, with its westerly boundary lying roughly along the Tintina Fault and running from Watson Lake to Clinton Creek. The Eastern System is composed mainly of the Northern Ranges (Richardson, Mackenzie and Franklin Mountains) an extension of the Rocky Mountains, but separated from British Columbia by the Liard Plateau.

Although glaciation was widespread in the Cordillera, much of the Yukon Territory escaped glaciation because the high St. Elias Mountains precipitated the rainfall before

^{1/} See Canada Year Book, 1965, p. 1-14.

it reached central Yukon and ice did not form despite the greater coldness of that period. To this lack of glacial formation and action, may be attributed the preservation near the surface of the Klondike gold placers and for other characteristics of mineral deposits in the area.

The Cordillera are on the site of a great downward flexure of the earth's crust (a geosyncline) and are noted for the range and frequency of their mineral deposits and mineral-bearing rocks. The Yukon Territory shows evidence of containing a great diversity of mineral deposits (Figure 4). Nearly all of the known mineral showings occur in the southern Yukon (south of the Ogilvie Mountains) where some granitic rocks are present. Relatively undisturbed sedimentary rocks, such as those in northern Yukon tend to be barren where they are found throughout North America, with the exception of lead-zinc deposits like those at Pine Point in the Northwest Territories.

The development of soils has not advanced far in the Yukon. Soil development depends on the weathering (freezing, thawing, eroding, etc.) of the rocks and mineral particles and the growth and decomposition of plant life. Because of the general coolness in the Yukon, plant growth has not ordinarily been abundant. Rainfall has been light. Much of the Yukon is in the permafrost zone. In consequence,

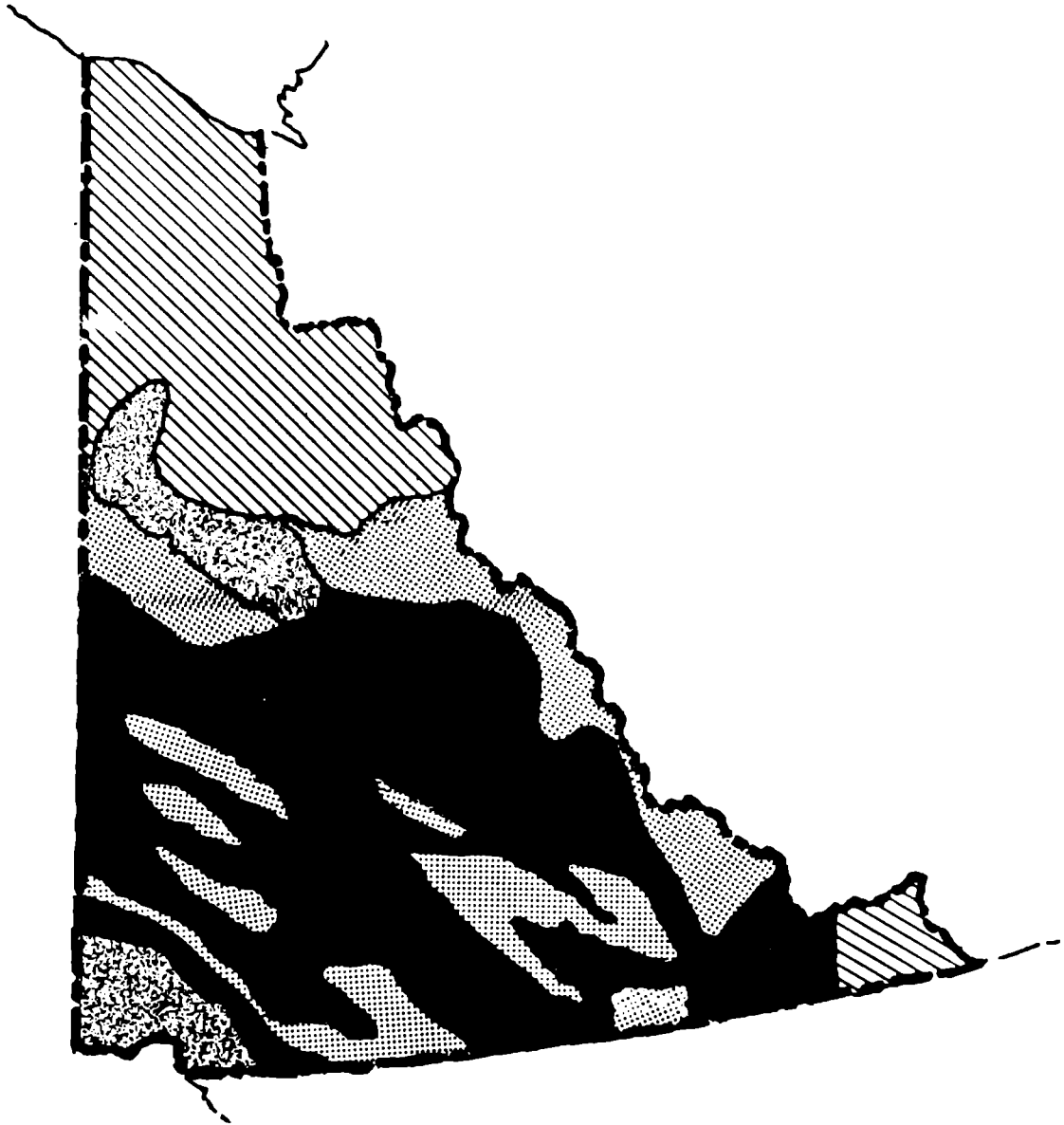
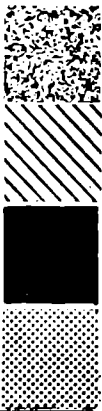


FIGURE 4

LEGEND



- Sedimentary, mountains may contain some intrusives
- Sedimentary, Intermontane plains valleys, foothills and plateaus
- Intrusives, plateaus, rocks ranging in age from Precambrian to Recent.
- Intrusives, mountains may contain minor amounts of sedimentary rocks.

MINERAL INDUSTRY STUDY
YUKON TERRITORY

**GEOLOGICAL MAP
OF THE YUKON**

RESOURCES ENGINEERING OF CANADA LIMITED
CONSULTING ENGINEERS TORONTO, CANADA

J.M.S.		W.B.M.		APPROVED G.C.M.	
DATE JULY 1968	SCALE 1" = 120 mi	EXHIBIT 6-1			

the weathering of the rocks and mineral soils has not advanced as far as in warmer and moister climates. Probably because there was little glaciation, there has been little formation of fine-textured alluvial soils. In the few areas where natural sedimentary deposits are finely enough divided to sustain plant growth and in the alluvial deposits of the river valleys, are to be found the major soil resources of the Yukon. The alluvial deposits are most suitable for plant growth but all of the Yukon soils tend to be podzolized, acidic and low in fertility.

Vegetation and animal life in a region are a reflection of climatic and other influences. Climatic conditions are not favourable to an abundant growth of vegetation in the Yukon. North of the Ogilvie Mountains there is little vegetation - some of the river valleys are lightly forested but most of the area is barren. South of the Ogilvies, the Yukon Plateau is only sparsely forested. The forest stands are open and generally broken by areas of grassy slopes, swamps and muskeg. The most heavily forested areas are in the Hyland and Liard Plateaus in southeast Yukon.

The timber line varies between 3,500 and 4,500 feet above sea level south of the Ogilvie Mountains but drops below this in the north. There is little forest

beyond 65 degrees north latitude. Even south of this, large areas provide only scrub timber. The limit of merchantable forest is at least 1,500 feet below the upper timber line and trees of merchantable size are found mainly in narrow belts along the river valleys.

The principal species of trees are spruce, balsam, fir, lodgepole pine, aspen poplar and black poplar. The major shrubs include several species of willow, alder and dwarf birch. Wild fruits, such as cranberry, foxberry and blueberry, are plentiful. A great variety of wild flowers and flowering plants grow almost everywhere in the region in the summer and in great profusion.

Uncontrolled forest fires have caused great havoc by their destruction of large tracts of vegetative cover. Forest regeneration is ordinarily slow because of the lack of rainfall, the coolness of the growing season, the generally high altitudes and the deficiency of fertile soils. In consequence, once destroyed by fire, the forests are replenished quite slowly. Much of the forest potential has already been lost by past fires. With care and time, it may be replaced.

Wildlife in the Yukon includes many species seldom found elsewhere. Fish, big game animals, game birds and fur-bearing animals all contribute to these natural resources.

Game fish species include mainly lake trout and whitefish with some rainbow trout, grayling and northern pike. Game animals include mountain sheep, mountain goat, moose, caribou and bear. The common birds are grouse, ptarmigan, ducks and geese.

This survey of the overall physical environment provides the background for the intensive appraisal of the resource industries that follows. In the Yukon Territory, the most significant resource industries for consideration are minerals, tourism, electrical power, forests, agriculture, trapping and fishing. Each of these will be examined in terms of their current contribution to the economy, their potential for growth, and other considerations in their expansion including their potential contribution to the economy in terms of output, manpower and capital investment.

CHAPTER 7

THE MINERALS INDUSTRY^{1/}

Introduction and Present Development

Although mining activities were first reported in the Yukon as early as the 1870's the mining development of almost a century later retained little evidence of the past. By the early 1940's there were few remnants of the Klondike gold mining operations except some dredging. Most of the 1968 mining development had its origins after about 1940. It is true that many institutions and traditional ways of doing things had been carried forward from the Klondike days, much work of the

^{1/} The minerals industry has been the subject of a particularly intensive and comprehensive appraisal as a key element in this analysis of the potential of the Yukon economy. In addition to the extensive researches of the authors, we have had the benefit of a special background report Mineral Industry Study, Yukon Territory, prepared by W. B. Magyar and Dr. G.C. Monture of Resources Engineering of Canada, and made available as part of this overall study of the Yukon economy. It will be referred to hereafter as Mineral Industry Study, 1968.

Geological Survey had also been carried out before 1940, the White Pass and Yukon Route continued the service between Skagway and Whitehorse begun in 1899 and there were numerous relics and monuments to those stirring early days.

Yet the minerals industry of the late 1960's was being built on a stronger and more dependable foundation than any previous development in the Yukon. It seemed likely that it would grow less rapidly than the Klondike boom, but still quite fast, and that it would be maintained over a longer period this time. Nevertheless, the mining industry was still the major part of the Yukon economy and still subject to all the volatile change and the uncertainty that is common to this depleting resource.

The roads and airfields built during the 1939-45 war to support the United States defence effort in Alaska, though not designed for mineral development, opened the Yukon to a postwar wave of exploration. Prospecting was extended along the new roads. Later installation of the DEW line and other defence placements continued the expansion of transportation and communications facilities into the 1950's. After 1953, with the establishment of the Department of Northern Development, development in the north became established as a federal policy and development programs began to grow. Highways, roads to resources,

tote roads, air strips and power services were gradually expanded in the Yukon. Their growth was not particularly rapid or systematic but it progressed. These developments are examined elsewhere in this Report. Their contribution to the exploration and proving of mineral deposits in the Yukon was very great. There were many discoveries of mineralized zones as well as good indications of gas and oil potential. In the mid-1960's the federal government instituted an incentive program to assist miners in prospecting, exploration, mining services, roads and air-strips, and the search and proving of mineral deposits continued to expand. Mineral claims recorded for the Yukon Territory increased from an average of 3,000 claims a year before 1964 to 7,613 in 1965, 17,938 in 1966 and 7,415 in 1967. The claims staked have been widely distributed but their pattern follows closely the pattern of roads and main rivers in the Yukon (Figure 5).

Private investment in the staking, drilling, testing and proving of mineral deposits in the Yukon expanded remarkably after 1960, with assistance from public incentive programs, and this was followed in a few years by an expansion of private investment in new mining production. The estimated private capital expenditure, from 1961 to 1968, illustrates this notable growth (Table 2).

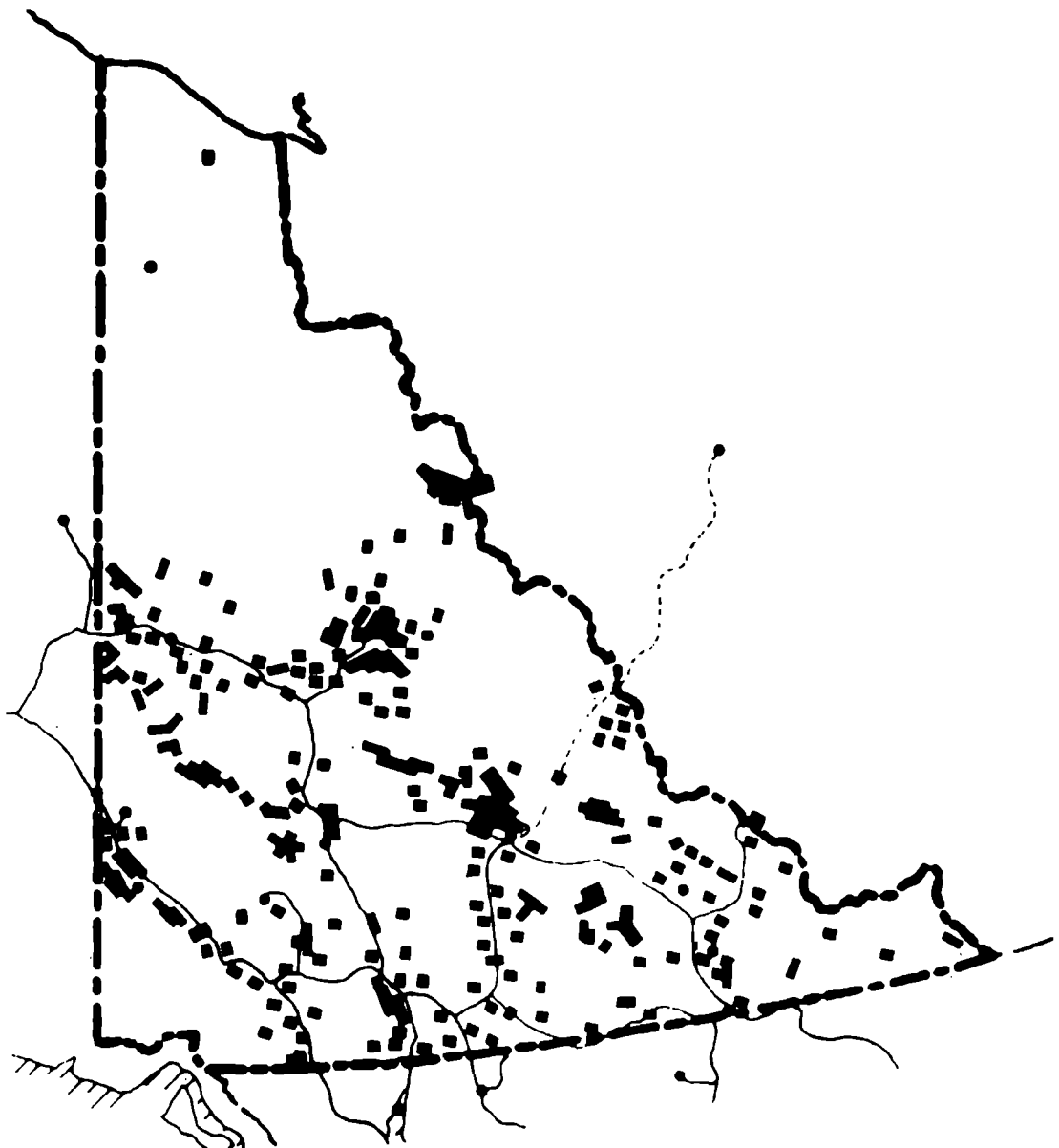


FIGURE 5

LEGEND

CLAIM LOCATION



ROADS



MINERAL INDUSTRY STUDY
YUKON TERRITORY

**RECORDED CLAIMS
AT END OF 1967**

RESOURCES ENGINEERING OF CANADA LIMITED
CONSULTING ENGINEERS TORONTO, CANADA

JMS

WBM

APPROVED

GCM

DATE

JUL 7 1968

SCALE

1" = 120 mi

EXHIBIT

7 - 2

The rapid increase in mining investment in 1966 and 1967 represents the construction of the facilities of the New Imperial Mines at Whitehorse and of Cassiar Asbestos at Clinton Creek. Much of the \$52 million

TABLE 2

ESTIMATED PRIVATE CAPITAL EXPENDITURE

YUKON TERRITORY, 1961-68^{1/}

Year	Mineral Exploration and Development	Mining	Oil & Gas Exploration
(million dollars)			
1961	1.0	n.a.	1.6
1962	2.0	n.a.	3.2
1963	3.0	n.a.	8.2
1964	4.0	0.3	8.3
1965	5.0	1.5	5.3
1966	6.0	10.0	1.9
1967	5.0	22.0	n.a.
1968	5.0	52.0	n.a.

invested in 1968 represents the construction of the facilities of Anvil mining near Ross River.

^{1/} Adapted from the Yukon Statistics Report, 1968, see Table 29, "Estimated Private Capital Expenditure, Yukon Territory, 1961-68".

Output of mineral products, which had ranged from a value of \$9 million in 1950 to \$16.6 million in 1954, had fallen again to \$11.9 million in 1966. In 1967 there was an increase of mining output to \$14.7 million. This increase occurred in spite of the cessation of gold dredging in 1966 which reduced 1967 gold output by almost \$1,000,000. But the reduction in gold was more than offset by the initial operations of the two new mines. These two new mines of Cassiar (Clinton Creek) and New Imperial (Whitehorse) together with the new facilities under construction for Anvil Mines at Ross River are expected to add more than \$70 million to the value of mineral production in the Yukon when they reach full capacity in the mid-1970's.

In 1967, almost two-thirds of the Yukon's mineral output of \$14.7 million had come from the Mayo area. The composition of the Yukon mineral output in that year was as follows:

	<u>Volume</u>	<u>Value</u> (thousand dollars)
Silver (thousand oz.)	3,770	6,468
Lead (thousand lbs.)	14,801	2,092
Zinc (thousand lbs.)	8,825	1,299
Gold (thousand oz.)	17	660
Cadmium (thousand lbs.)	54	150
Coal (tons)	3,000	21
Copper (thousand lbs.)	7,350	3,496
Asbestos (tons)	3,000	513
		<hr/>
Total value		14,699

This illustrates the structure of output of the mining industry in 1967 and 1968. To appraise the potential of the industry it is desirable also to examine its particular characteristics and the critical stage of the industry's development at present. These considerations are taken up next.

Characteristics of the Industry

The Indicated Resources

The most significant characteristic of the Yukon minerals industry is the extent of its endowment with a variety of minerals having an economic potential. The Yukon offers more potentially fruitful prospecting areas than are to be found in most other areas of equivalent size in North America.^{1/} The evidence of a large mineralized area of lead-zinc-silver has been established in southeastern Yukon extending from Watson Lake northward to Ross River and Mayo. This mineralized area is about 400 miles long and 150 miles wide. It was in the centre of this area that the Anvil mine near Ross River, with reserves of over 60,000 tons was being developed to go into production in 1969. The evidence would indicate that several other similarly large deposits can be expected to be found in this mineralized area.

^{1/} See Mineral Industry Study, 1968, Ch. 7, p. 18.

A promising copper-gold belt is centered in Whitehorse and extends nearly 350 miles northeasterly, about 75 miles wide, from Wolf Lake to Beaver Creek. New Imperial Mines began operations based on some of these reserves near Whitehorse in 1967. There is evidence of a strong zinc component on the eastern end of this broad zone and nickel showings are frequent at the western end. Much additional exploration work will be required to assess the economic potential of this whole area. Several prospects are now under active development by Arctic Mining, Hudson Bay Explorations and Peso Carmacks and several others are expected to be explored for development in the near future.

Evidence of asbestos, now becoming scarce in world markets, occurs within a narrow area stretching 150 miles northwest from Carmacks to Clinton Creek along the strike of the Tintina Fault. The Clinton Creek mine, at the northern end came into production in late 1967. With ore reserves estimated at over 25 million tons, that mine is expected to have enough ore now for at least 20 years of operations.

Outcroppings of coal are widespread throughout the Yukon but they have been explored only to a limited extent. Coal may offer good possibilities as a source of

thermal power, especially in its central location at Carmacks, and as a metallurgical reductant although there is little evidence yet of a coking quality in the coal deposits identified thus far.

Large deposits of iron ore have been located near Dawson and on the Crest holdings on the Snake River. The current world prices for iron ore, the quality of these ores, as well as the distance and lack of transportation to an ocean port indicate that these deposits cannot compete at the present time.

Explorations for oil and natural gas have been made in the Beaver River area in southeastern Yukon and on the Peel Plateau and Eagle Plain in northern Yukon. There are about 43,000 square miles of such sedimentary areas in the Yukon. Some discoveries have been made but little evidence of commercial volumes has yet been found. The recent discovery of evidence of very large accumulations of oil and gas on the Arctic slope of northern Alaska indicates that more intensive exploration may be expected in nearby areas of northern Yukon.

An overall view of the location of mineral potential in the Yukon would place the major areas of expected development at about 12 to 16 main centres. The most significant mineral development areas for the

future, especially if transport and other services are effectively extended, are those in the vicinity of the following centres:

<u>Area</u>	<u>Mineral output or showings</u>
Anvil-Ross River	- Lead, zinc, silver, copper, molybdenum, asbestos, nickel, gold.
Sheldon Lake- MacMillan Pass	- Copper, lead, zinc, tungsten, barite, nickel.
Clinton Creek	- Asbestos, gold, silver, lead, zinc, coal.
Mayo	- Silver, lead, zinc, copper, gold.
Carmacks	- Silver, gold, coal, lead, tin, molybdenum.
Whitehorse-Carcross	+ Copper, silver, gold, lead, asbestos, gold, coal.
Frances-MacPherson Lakes	- Copper, lead, zinc, silver, tin.
Burwash Landing	- Copper, nickel, molybdenum, tungsten, native copper, gold, asbestos, gypsum, coal.
Wolf Lake	- Silver, lead, zinc, copper, molybdenum.
Watson Lake	- Zinc, copper, lead, silver, tungsten, natural gas, coal.
Dawson	- Silver, lead, antimony, gold, coal, copper, zinc, asbestos.
Snake River	- Iron, copper, cobalt.
Shell Creek	- Iron, coal.
Eagle Plain-Peel Plateau	- Oil, natural gas, coal, lead, zinc.
Blow River (northern Yukon)	- Gold, tungsten, coal.

Most of the above areas were under active exploration or development in 1968.^{1/} The areas with the most potential, as far as mineral traffic for rail transport was concerned, would probably be the areas of Anvil-Ross River, Sheldon Lake-MacMillan Pass and Frances-MacPherson Lakes where evidence of major deposits of lead-zinc-copper have been indicated. Clinton Creek and Mayo areas are expected to continue as major shippers and also to expand. The major volume of future mineral traffic may be expected to arise along, or north of, the Tintina Fault (running from about Watson Lake directly northwest through Dawson and Clinton Creek). Already this mining pattern is well developed. When Anvil mining operations are underway in 1970, the location of production will be approximately as follows, in value terms:

Anvil-Ross River	\$20,000,000
Clinton Creek	10,000,000
Mayo	9,000,000
Whitehorse	8,000,000
Others	3,000,000

In brief at least three-quarters of the value, and more than that in volume, of the Yukon mineral production will be along or north of the Tintina Valley.

^{1/} Much additional detailed information on specific locations and potential volumes and values of ore deposits was compiled in the course of these studies of the minerals of the Yukon but it was not considered advisable to publish more than this because of the risks of its being used improperly for promotional purposes. Such data is, however, available in the working papers which have been retained on file and some of such data is set out in the background report on mineral potentials.

High Costs

A second feature of the Yukon mining industry, in addition to this evidence of an abundance of mineral resources, is its relatively high costs. Its costs are relatively high for exploration and development, for construction, for operating expenses, for tied-up working capital and for transportation and other services. These cost disadvantages relative to other mining areas have been estimated at an aggregate of at least \$30 a ton on all mine products.^{1/} Yet it should be noted that some of these disparities in costs were being reduced and others were expected to decline to a degree as new services and new technology were extended in the Yukon. These cost disparities were unlikely to be ever wholly eliminated but prospects were that effective improvements in services and technology would eliminate the extremes in cost disparities.

The Federal Role

A third characteristic to be recognized is that the federal government is still not only responsible for the mineral and other resources of the Yukon but is already deeply involved in exploration and development.

^{1/} See Mineral Industry Study, 1968, Ch. 1, p. 5.

With mining the dominant industry in the Yukon, it is not surprising that it has been used as an instrument of public policy to assist in carrying out the broader objectives of northern development which were examined in Part 1. It may be expected that mining will remain an instrument of federal policy so long as it serves these policy objectives. These objectives might be briefly summarized as economic and political stability, continuity of economic growth combined with ensuring that Canada's interests in the North are protected and enhanced. Thus an appraisal of the potential of the Yukon economy needs to recognize that the economic development of the Yukon mining industry must be related to these overall policies for economic and political improvement in the north.

A New Stage

A fourth feature of the Yukon mining industry is the new era of economic development into which it has entered in the 1960's. This new era offers significant new opportunities to the Yukon - to throw off

the handicaps of traditional philosophies of Yukon mining;^{1/} to build more growth, stability, continuity and profitability into the industry; to develop the conditions that would attract a more stable and experienced labour force; to build a mining industry that will contribute most to the Yukon economy and its people. In this context, the net economic opportunities of the industry must be measured in terms of both private and public costs and private and public benefits.

Progress of Exploration

Fifth, Yukon mineral resources are characterized by being relatively well known. They have been extensively explored. Because of the special federal incentives and assistance for prospecting, exploration and development, these resources are probably as thoroughly explored as those in most areas of Canada. In consequence, substantial volumes of mineral deposits are

^{1/} Two traditional views of mining in the Yukon have been designated as the "grab-and-git" and "placer" approaches. Both seem to have their origins in the Klondike gold rush. The first represented the bold buccaneer. The second represented the miner who was prepared to undergo great hardship, sacrifice and effort to amass his "stake" of placer gold to take outside to retire on. There was still some evidence of both of these traditional views in the Yukon in the 1960's. Both of them were obstacles to the development of a more stable, continuing and profitable mining industry in the Yukon, because they discouraged permanent settlement and the building up of the social and cultural amenities that encouraged permanence in the population and labour force.

already identified and many are proven. These known reserves offer a rate of industry growth that could be both massive and uneven and probably a decline (as resources are depleted) that is equally volatile unless such development can be modified by effective planning. Such smoothing may be essential for the stability of an economy so dominated by mining as that of the Yukon. The major mines going into production in 1967 and 1969 are indicated to have reserves sufficient for 12 to 20 years of operations. Additional deposits for operating mines can commonly be located in their vicinity and these should extend this minimum period of operations. But it may be reasonable to expect that with exploration and development continuing at their present rate, it may be necessary to have careful planning of new mining development to avoid the prospect of volatile changes several decades hence as mines are depleted and abandoned.

The Physical Environment

Sixth, the Yukon mining industry has been featured by adverse physical conditions but these are being gradually overcome. Adverse effects of cold and darkness during the winter are being moderated as electric power and oil heating provides light and heat to create indoor comfort and outdoor lighting. Heated cabs in

mining trucks and other machines enable operations to continue in reasonable comfort throughout the winter. Technological advances will continue to improve the conditions of living and working in the Yukon and may be expected to reduce the disparity between the Yukon's high costs of services and such costs elsewhere.

High-Grading

Seventh, Yukon mining is characterized by long distances and costly transportation to market whether the market is at Vancouver or at a smelter in Canada, the United States or Japan. In consequence, Yukon mining has been featured by high-grading, that is, the mining of only those grades of ore that are sufficiently rich to cover transport costs and leave a profit. But such high-grading has been adapting over time, reaching more deeply into the lower quality ores as transportation services improve. With the extensive highway grid available by 1968, the expansion of prospecting and exploration was multiplying the mineral deposits known to be available. At the same time, it became evident that while highways were excellent for exploring minerals, they were an excessively costly method of transportation if there was sufficient volume of traffic to warrant lower cost methods. The expansion of highways had made it economical to mine

a somewhat wider range of deposits than before but, in turn, this had opened wider the possibility for the next step in improved transportation. There was evidence that, when the traffic warranted railway service being provided to the major traffic volumes, the costs of transport would be sufficiently reduced to permit a much deeper exploitation of known deposits and probably a further expansion of exploration.

Markets

Eighth, the Yukon mining industry is characterized by relatively stable markets. This is because most mines have fairly long term contracts for their output and, by exploiting the higher grade ores, can absorb most fluctuations in prices. In addition, prices have been particularly strong for some products like asbestos and silver. Thus, external market forces were favourable in 1968 and prospects were that they would remain reasonably favourable.

Incentives

Ninth, the Yukon mining industry was characterized in the 1960's by special federal incentives for exploration and development. The taxation and depletion allowances for mining firms were the same in the Yukon as

elsewhere in Canada. The incentive program had ensured an extensive and deeper prospecting and exploration of potential resources and, if continued, should result in a rapid expansion of proven reserves. Such a backlog of proven reserves can provide an excellent foundation for future growth of the industry. But the rate at which they are translated from reserves to output will be a function of the rate of expansion of transportation and other basic services.

A Critical Stage in Development

The Yukon mining industry has reached a critical point in its development. It has reached a stage where major new decisions need to be made on transportation, power development and general economic policy for the Yukon. All of these are related primarily to mining.

The Yukon mining industry has reached a stage where transportation facilities are becoming critically inadequate to carry the prospective output of ore and concentrates; where the volume of mineral traffic is building rapidly toward the break-even point for rail haulage; where railway service to the major centres of mineral potential could open up a much wider scope for mining expansion; and where the indications are that additional rail services will become adequately

remunerative to the carrier in the long run.

On the other hand, the Yukon mining industry has reached the critical stage where transportation services on existing terms are neither satisfactory nor acceptable. Only under the frontier conditions and limited economic development of the past might one expect to encounter the degree of unregulated monopoly found in transportation, especially in rail, pipeline and trucking services, in the Yukon in 1968. Among the development problems presented to us by business leaders, especially those in mining, these problems of transportation were clearly primary and the most distressing. Yet the economy had reached a new stage of economic potential, with public funds being used so extensively to stimulate and support such new development, that grave risks of collision between public and private objectives might be expected unless changes could be made soon.

It was evident that the present critical problems of transportation must be resolved and that such public decisions will have a profound effect on the rate and pattern of mining development. More competition in transportation services would solve some of these problems but such competition would require some alternative services.^{1/}

^{1/} Providing shippers with an effective alternative in transportation is perhaps the soundest way of ensuring satisfactory services. It was no doubt on this basis that the federal government took no action in 1967 on the request by the White Pass and Yukon Route for \$50 million to finance an extension of that rail line to Anvil Mine.

Yet the White Pass and Yukon Route has provided an essential service in the Yukon and will undoubtedly continue to do so in the area it serves. Perhaps eventually in the best interest of the Yukon economy it may be necessary to bring it under greater regulation and control. There may eventually be a stage when its railway and pipeline operations should be taken over by a crown company of some kind to co-ordinate them more effectively with other public services in the interest of economic development.^{1/}

In power development, also, the mining industry has reached a critical stage where major new steps in producing and transmitting power should be considered. These are examined in the following chapter.

Finally, the Yukon has reached the critical stage where more effective development planning must be carried out for mining and other industries if the whole economy is to experience the growth, stability and continuity that is most desirable. The decisions that are to be made on mining development now will have a profound influence on the future of the whole economy.

^{1/} One crown corporation, the Northern Transportation Company, has provided versatile and quite excellent transportation services, including some trucking services, in another part of the North, namely, on the Mackenzie River and its tributaries.

For example, a critical stage is evident in the urgent need for a decision on whether federal policy should be designed to stabilize the Yukon economic expansion or whether it should leave this to be determined by the market. In short, the federal government may need to devote more effort to planning the pattern of its investments and incentives for the Yukon economy so the net benefits of the growth of mining and other industries may be maximized. In the case of the mining industry part of this planning could be devoted to reducing the lumpiness of its growth and, thereby, preventing its decline.^{1/} The means of doing this are examined in later chapters.

Potential for Mining

Our investigations have shown that the mining industry of the Yukon has a substantial potential for economic growth. Its potential to 1975 is already assured by developments now under way or accomplished.

^{1/} See, for example, the brief presented July 31, 1968, by the Association of Northern Ontario Mining Municipalities to Ontario's Select Legislative Committee on the Ontario Taxation Report, which examines these problems of rapid growth and depletion in mining. It suggests, "A structuring and controlling of mine production would make it much easier for mining municipalities The rate of extraction can and does have profound and sometimes disastrous effects on the economy of a community". Globe and Mail, August 1, 1968, p. B2.

Its potential beyond 1975 can be illustrated by two projections. The first of these projections is made on the assumption that conditions will remain much as they were in 1967-68, with such ad hoc improvements being made in services as may seem warranted by each new mineral development. The second projection is made on the assumption that conditions and services will be improved under a systematic program of development, both within the Yukon and in the northwest region of Canada.

First Projection: Based on 1967-68 Conditions

Under these conditions of the first projection, costs of transportation, power and other services will remain high. High-grading will continue, with only the richest ores being mined. The lumpiness, instability and uncertainty of the economy will remain high. It assumes that some new discoveries of minable ores will be made in the future.

Under these assumptions, the value of mineral production will rise from about \$15 million in 1967 to about \$50 million in 1970 and to about \$85 million in 1975 based mainly on established production plus the new mines now coming into production (New Imperial, Clinton Creek and Anvil). There will be a small quantity of

placer gold produced and the silver output will be increased over United Keno Hill production by the output of new mines including some from New Imperial, Anvil, Arctic and Mount Nansen. The composition, volume and value of the mineral output in 1975 would be estimated, under these circumstances, to be as follows:

<u>Mine Output</u>	<u>Volume</u>	<u>Value</u>
Lead concentrates	135,000 tons	\$26.0 million
Zinc concentrates	240,000 tons	36.0 "
Asbestos bales	60,000 tons	10.0 "
Copper concentrates	25,000 tons	6.2 "
Gold	20,000 oz.	0.8 "
Silver	3,000,000 oz.	6.0 "
		<hr/>
		\$85.0 million

Beyond 1975, production might be expected to rise by about 50 per cent by 1985 (an average rate of about four per cent a year), and at this same rate to 1995, partly from the expansion of existing mines and partly from the development of new high-grade ore discoveries. In consequence, the value of production of the Yukon mining industry would be expected to increase unevenly to about \$125 million by 1985 and to about \$185 million by 1995.

It is estimated that by 1970 these Yukon mining operations would require approximately 2,250 employees. Capital requirements for the above expansion of mining out-

put to 1970 were already virtually all committed in 1968, but from 1970 to 1985 it may be estimated that an additional \$40 million of new capital would be needed under these limited growth conditions.

Projection Based on Long-run Planning

The second projection is based on the growth rate that may be expected if a moderately adequate program of expansion of services were undertaken. This program of improvement would be expected to be both rational and logical and one that might ordinarily be justified by the economic outlook and the development potential of the Yukon. Accordingly, the following assumptions are made for this projection:

1. It is assumed that standard gauge railway services will be provided by 1975 to 1978^{1/} to the major centres of mineral traffic with satisfactory access to an ocean port and to smelter facilities if appropriate.

The feasibility of providing such rail services will not be taken up here. It will be sufficient here to show that there are good prospects for a substantial volume of mineral traffic in

^{1/} A Department of Transport press release on July 25, 1968, announced a study of alternative rail routes from central British Columbia to the Yukon, to start immediately.

the Yukon such as might warrant the construction of such rail facilities if their costs prove satisfactory. By 1975, based on our first projection above, that is, without additional rail services, a traffic volume of 460,000 tons could be expected. This would be more than twice the volume of traffic guaranteed as the basis for building the Great Slave Railway. Yet it would be only a modest part of the volume that may be expected in the future, given effective rail services.^{1/}

Moreover, if such a rail line passed through the mineralized and forested areas of northern British Columbia to reach the Yukon, it could be expected to accumulate enough traffic thereby to carry the overhead and fixed maintenance on that part of the line. In addition, while such a railway should be a standard gauge rail line, it may also be a low-cost development-type railway until such time as the traffic warrants its improvement. These two

^{1/} Summary data provided by the CN railway on similar new development branch lines built within the past decade or two, show that traffic projections invariably underestimate the eventual traffic forthcoming. On four such new rail lines the actual traffic averaged two to 3.5 times the projected traffic within the first four or five years.

features, development of traffic in northern British Columbia and low-cost construction, may be the means of keeping rail rates for such new rail facilities at a highly competitive level and keeping the break-even point in traffic volume quite low.

2. It is assumed that a planned expansion of electric power production with an effective transmission grid will be well advanced by 1975. It is expected that this will eliminate the uncertainty about the availability of power and will result in some economies in power costs for mining.
3. It is assumed that a systematic regional plan will be undertaken for the development of the Yukon in co-ordination with the rest of the north-west region. It may be expected that with this co-ordinated development under way, good progress will be possible in expanding the other industries that make up the Yukon's industrial infrastructure as well as the facilities, amenities and other services that are needed to encourage permanency and stability in the Yukon labour force and the population.

4. It is assumed that with the support of these improvements in facilities and services it will not only be possible to reach deeper into the lower grade ores in presently known deposits but it will be possible to explore and exploit more new discoveries.
5. It is assumed that current federal incentive programs for exploration will be maintained at least until 1980, although it may be expected that their use will be more selective after that time.

Under these assumptions it is not expected that the values of immediate mineral production (estimated above at \$50 million by 1970 and \$85 million by 1975) will be much changed from the previous projection. This is because the new transportation, power and other services are unlikely to be in service before 1975, but may be expected fairly soon thereafter. With preliminary decisions on these several transportation improvements possible within the next two to three years (say by 1970 or 1971), the mining industry will be able to move ahead in the meantime in preparation for expanding new production as soon as the additional services are ready for use. It may be expected, for example, that a backlog of potential output will have been built up by the end of the next seven to ten years, say 1977, on the basis

that rail transportation would become available about that time, and to enable maximum benefit from the first three years of income tax exemption to be gained.

With this more favourable prospect before it, the mining industry may be expected to expand quite rapidly over the decade 1975 to 1985 and at a somewhat lesser rate from 1985 to 1995. It is projected to grow at a rate of 11 per cent a year from 1975 to 1985, thus expanding the value of output in that decade from \$85 million to \$240 million.^{1/} Mining output is projected to grow at a rate of five per cent a year from 1985 to 1995, an expansion of its value from \$240 million to \$390 million in the decade. It is probable that these projections are conservative, and may underestimate the potential substantially.^{2/}

^{1/} Ore traffic on the Great Slave Railway forecast at 215,000 tons (the guaranteed traffic on which construction was initiated) rose to over one million tons or almost five times the initial estimate in the first three years of its operation. On this basis, our estimates for a 2.8-fold growth from 1975 to 1985 for Yukon mineral traffic are probably quite conservative. Experienced judgment would suggest the increase should be nearer sixfold in the ten-year period.

^{2/} These projections over the two decades 1975 to 1995 combine to give an annual average rate of growth of just under eight per cent. This is less than the Canadian overall rate in the past. Dominion Bureau of Statistics data show that Canada's average rate of growth in the value of producers' shipments of minerals was almost nine per cent a year for the 17-year period 1950 to 1967 - the overall increase in that period was more than fourfold. See Yukon Statistical Report 1968, Table 33, and General Review of the Mining Industry, Cat. No. 26-201, Dominion Bureau of Statistics, Ottawa.

The composition of the mineral output by 1985, under these assumptions, is projected in current metal prices to be approximately as follows:

<u>Mine Output</u>	<u>Volume</u>	<u>Value</u>
Lead concentrates	330,000 tons	\$65.0 million
Zinc concentrates	600,000 "	90.0 "
Asbestos bales	140,000 "	24.0 "
Copper concentrates	60,000 "	15.0 "
Molybdenum concentrates	5,500 "	10.0 "
Copper-Nickel concentrates	21,000 "	7.0 "
Tungsten concentrates	6,000 "	5.0 "
Gold concentrates	50,000 oz.	2.0 "
Silver concentrates	7,500,000 "	15.0 "
Coal concentrates	1,400,000 "	7.0 "
	Total	\$240.0 million

These estimates, it may be noted, include no projection for iron ore output. There may be a possibility that by 1985 or 1990 an iron ore operation could be under way. If it was, it would add to the above output about 12 million tons of pelletized iron ore concentrates valued at about \$180 million a year. At the present time these possibilities are quite uncertain^{1/} and eliminating them from the projection emphasizes the moderate nature of the estimate. This output of iron ore would, if forthcoming, make the potential rail traffic doubly attractive.

^{1/} Letter received by D. W. Carr from H. G. Nicholson, President, Crest Explorations Ltd. on March 15, 1968, states, "Our investigations have shown that under the current world market situation, that of over supply and depressed prices, conventional concentrate or oxide pellets from the Snake River deposit cannot compete".

Smelting

The possibilities for establishing an effective smelting operation particularly for lead, zinc and silver, depends on the availability of suitable carbonaceous reductants (coking coal, etc.), low cost electric power, reasonable freight costs and a reliable long term source of concentrates. None of these are suitably available in the Yukon at present although there are some possibilities for all of them to become available. Provision is made in the federal government's contract with Anvil Mining Corporation for that firm to make a feasibility study for a smelter to smelt Anvil lead, zinc and silver. It may be expected that a larger volume of concentrates than this will be needed for efficient and profitable smelting operations. The prospective world demand for additional lead-zinc capacity is expected to warrant constructing a new smelting complex within the next decade.

Preliminary prospects for fulfilling the above requirements for a smelter in the Yukon would seem to indicate that southeastern Yukon might provide a favourable location, probably on the Liard River where coking coal is available in large volume from nearby northern British Columbia and Alberta, low cost electric power is available from the Peace River development, oil and gas is available from the Liard Plateau and the two southern provinces, a

railway might provide reasonable freight costs and the lead-zinc-silver concentrates of the Yukon might be supplemented by the lead-zinc from Pine Point^{1/} and, eventually perhaps, by copper concentrates from Coppermine. Considering the Yukon alone a feasibility study might be expected to show that the most suitable location for such a smelter was near Watson Lake or Anvil but from the regional development viewpoint it may well be found that a location near Fort Nelson, British Columbia, might be quite favourable. This is because the latter point is nearer to suitable coking coal (Smoky River, Groundhog, etc.), oil and gas resources, and low-cost power. It is also, like Watson Lake, connected with Pine Point via the Liard River and, in addition, can be expected soon to have rail connections to central British Columbia and Alberta as well as to Pine Point.

^{1/} A recently completed study of the feasibility of a lead-zinc smelter at Pine Point showed it was likely to be uneconomic. Profits were reported to be unfavourably influenced by high power costs, freight costs on coal shipped in and acid shipped out, and the freight differential compared with Trail on metals delivered to market. All of these costs could be reduced by locating the smelter closer to the sources of these various supplies - the ore or its concentrates would be moving toward market in either case. See Final Report, Feasibility Study, Lead-Zinc Smelter, Pine Point, N.W.T., Canadian Bechtel Limited, June, 1967, p. 1-6 and Supplementary Report, January, 1968.

All of these considerations should be taken into account in the economic feasibility appraisal of smelting potential. It should also consider that it might be of significant importance to the success of such a custom smelter that it be linked with established metal distribution agencies. In this context, it may be desirable to have both the suppliers of concentrates, like Anvil, Pine Point and others and the marketers of metal, like Cominco or others, all participate in the financing and development of such a smelter.

Conclusions

It is concluded that the Yukon mining industry has a significant potential for growth on the basis of development operations under way in 1968 and a modest growth rate thereafter if no major investments in supporting services are made. In this case, the potential value of production is projected as \$85 million by 1975, \$125 million by 1985, and \$185 million by 1995.

It is concluded that with measures taken to improve transportation, port facilities, power generation and transmission and other services and amenities, the long-run growth potential for the mining industry could be more than doubled and might be expected to rise to

\$240 million by 1985 and \$390 million by 1995. This does not include any potential for iron ore mining.

It is concluded that the potential traffic volume (projected at about 460,000 tons by 1975) is great enough to warrant investigating the feasibility of providing alternative rail freight services to the major centres of mineral output. This is examined more fully in the chapter on transportation.

It is concluded that the potential volume of lead-zinc-silver concentrates to be produced in the Yukon warrants making a feasibility study of a smelter in the Yukon or in its near vicinity. It is concluded that such a feasibility study should not be confined to the output of the Anvil Mine alone but should comprehend all suitable concentrates available whether in the Yukon or in this whole northwestern region.

It can be concluded that the Yukon mining industry has reached that critical stage in its growth where establishment of a systematic plan of long-run public objectives is essential for the rational and economic growth of the industry and its potential.

Recommendations

1. It is recommended that these long-run objectives should include:
 - (i) A standard-gauge railway from the originating traffic centres in the Yukon to connect with Canada's mainline railways. This objective should be attained by the period 1975 to 1978.
 - (ii) Provision in advance of requirements of adequate electric power capacity and implementation by 1975 of a program of comprehensive generating facilities and an effective transmission grid in the Yukon.
 - (iii) Provision of a Canadian tidewater port as near as possible to the Yukon, capable eventually of berthing large ore carriers, and ready for use by 1975 or as soon as the standard gauge rail services are ready for use.
 - (iv) The completion of the geological survey and mapping of the Yukon Territory within the next 10 to 12 years.
 - (v) The extension of the programs for development roads and airfield construction to provide a basic grid of such transportation facilities to cover the whole of the Yukon Territory by about 1975. It is estimated that this would require about six airfields and almost 2,000

miles of development roads.

- (vi) The continuation of the incentives now available for mining exploration and development in the Yukon but eventually using these selectively where appropriate as a means of reducing the variability of the growth pattern of the industry. In this context, special incentives and assistance might be warranted for the development of a smelter. It may even be that as the economic conditions for iron ore production improve, the stability such a massive long-run operation would inject into the Yukon mining industry and the value of extending rail services northward might eventually warrant some special incentives to launch such operations.
- (vii) The strong support of a lead-zinc-silver smelter if such should prove feasible.
- (viii) Measures to stabilize the labour force and the population of the Yukon Territory by incentives for the progressive improvement of the physical and social services and amenities in urban settlements in the Yukon, including housing, sanitation, recreation, cultural activities, and others.

(ix) Steps to stimulate the active support by community and service agencies in the Yukon and by others of the expansion of the service and processing industries in the Yukon that could effectively serve the needs of the mining industry..

2. Measures recommended for immediate implementation in the near future include the following:

- (i) To undertake comprehensive route surveys and feasibility studies for the proposed standard-gauge railway into the Yukon. Possible routes could be northward extensions from Terrace or Hazelton to Telegraph Creek, Dease Lake, Cassiar, Watson Lake, Ross River and perhaps Mayo; or from Fort St. John to Fort Nelson, Watson Lake, etc. These are examined in the chapter on transportation.
- (ii) To undertake comprehensive feasibility studies and site appraisals for the proposed tidewater port - Kitimat or Prince Rupert are possibilities.
- (iii) To undertake the exploration, testing and appraisal of the Yukon coal resources to identify their extent, quality and economic availability; their suitability for coking and metallurgical uses. Carmacks might

be a possible site for a centrally located thermal plant.

- (iv) To prepare a program for the proposed completion of the comprehensive geological survey of the Yukon Territory and to compile and maintain a bibliography of both published and confidential reports on the geology and mineral developments of the Territory.
- (v) To continue and expand the construction of development roads, bridges and small airfields to provide a basic grid.
- (vi) To initiate a comprehensive feasibility study of the potential of a smelter complex located in the Yukon or its near vicinity, and situated where it can most economically utilize the mineral products of northwestern Canada and the supplies of power, oil, gas, coal and other materials available in the region. The objective should be to have an effective smelter complex, if feasible, in operation by the late 1970's.
- (vii) To inaugurate a comprehensive long-run planning for the Yukon and the northwestern region of Canada, by establishing a specialized development planning agency to follow up and carry forward the work of this Study and, as the need arises, to recommend

new plans to meet changes in conditions in the future.

3. It is recommended that the feasibility of the development of iron ore mining in the Yukon be reviewed again by 1975 in the light of the new conditions which then prevail.

Contribution to the Yukon Economy

Mining can be expected to make a major contribution to the Yukon economy in the future. In value of output, this contribution is projected to be \$85 million a year by 1975, \$240 million by 1985 and \$390 million by 1995.

The mining industry is expected to require more than a threefold increase in its labour force from 1968 to 1985. The labour force employed in mining over the next 17 years is projected to be:

1968	-	1,900 workers
1980	-	5,100 workers
1985	-	6,600 workers

Capital requirements for mining development to 1985 are estimated at about \$1,000 million. This amount includes \$300 million of private capital for mining development, \$500 million of public capital investment in transportation, and \$200 million of public investment for town-sites and other facilities and amenities.

CHAPTER 8

THE ELECTRICAL POWER INDUSTRY

The supplying of electrical power has become a major industry in modern economies. In isolated economies, like the Yukon, low-cost power has become an essential for effective economic growth. In the Yukon, electric power resources are extensive but they are widely scattered and most of them could only provide a relatively small supply of fairly high-cost power. There has been a great deal of broad investigation of hydro-electric power sources in the Yukon but while much is known of the potentials for hydro power, there is much still to be learned of the details of sites and sub-surface conditions. Demand for electrical power has tended to be widely scattered but prospects now are that the load concentration will soon be great enough to warrant construction of the larger capacity facilities necessary to enable power to be produced at reasonably low costs.

Thus far, the economic development of the Yukon has generally been on an ad hoc basis and the development of power has ordinarily fitted into this pattern also. Our consultants have projected the growth in demand for power to increase from 30.5 megawatts in 1968 to 330 megawatts in 1980 (Table 3).^{1/} This potential increase in

TABLE 3
FORECAST OF FUTURE ELECTRICAL LOADS
IN THE YUKON TERRITORY^{2/}

Centre	Present Capacity	Projected 1980 Load	Possible Capacity After 1980
Beaver Creek	310 KW	5 MW	
Burwash Landing	500 KW	7 MW	
Haines Junction	400 KW	5 MW	
Whitehorse, incl. Carcross	13.6 MW	32 MW	
Teslin, incl. Wolf Lake	450 KW	28.5 MW	
Rancheria	-	5 MW	
Watson Lake	1,700 KW	10 MW	
Frances Lake	nil	7 MW	
Canada Tungsten	1,500 KW	3 MW	
Ross River	200 Assumed	5 MW	
Vangorda Creek (Anvil)	-	112 MW	
Carmacks	200 Assumed	40 MW	52 MW (1983)
Mayo	5.1 MW	15 MW	
Dawson	750 KW	8.5 MW	
Clinton Creek	5,600 KW	32 MW	112 MW (1990)
Crest	-		140 MW (1985)
Macmillan Pass	-	15 MW	
Total Load	(1968) 30.5 MW	(1980) 330 MW	562 MW (1990)

^{1/} See Yukon Power Survey, by C.B.A. Engineering, Vancouver, 1968, a background study prepared as part of these overall economic studies of the Yukon and hereafter referred to as the Yukon Power Study, 1968.

^{2/} Adapted from the Yukon Power Study, 1968. p. 20.

output offers opportunities for larger scale facilities and for the consolidation of isolated demands by extension of transmission lines to form a grid. The major loads projected are indicated to be in the Ross River to Sheldon Lake and Carmacks area.

Gas and Oil for Power

Local gas and oil supplies are still too limited in the Yukon to offer much potential as a source of power at present. If and when larger supplies become available this source of power may be considered where appropriate.

Nuclear Power

Nuclear power costs have been declining in recent years as a result of changing technology. Already nuclear costs have fallen to the point where they are competitive with hydro and other sources of power for large outputs of energy, especially for blocks of 500 megawatts or more.^{1/} Such blocks of power will be required soon in the Yukon, only if there is a rapid expansion of smelting, processing, and other operations that are heavy users of power. Nevertheless, indications are that nuclear power costs will

^{1/} See Alaska Natural Resources and the Rampart Project, U.S. Department of the Interior, June 1967, p. 30.

continue to decline relative to other sources and within a decade or two such plants are expected to become favoured producers of low-cost electricity for areas like the Yukon.^{1/}

Coal for Power

Coal as a source of electrical energy for the Yukon has been much discussed but never adequately appraised. The availability of coal deposits at such a central location as Carmacks seems ideally suited to the economic production and distribution of power. Yet the installation of such a plant at Carmacks has never been undertaken. The Carmacks coal was trucked for some years to Mayo and used there in a steam generation plant until 1967. The data on the potential for coal-fired thermal electric plants has been carefully reviewed in this study. This review has revealed several uncertainties that have probably delayed the development of such plants. One uncertainty is the extent of the available coal reserves. A second is the cost of coal delivered at the pithead, since the seams tend to be relatively thin and may be unsuitable for surface mining. A third uncertainty is the long-run unit costs for a coal-fired thermal power operation which tends to be a heavy

^{1/} Ibid.

user of labour in comparison with the long-run costs of hydro, nuclear or gas- and oil-fired power plants. Yet because of their potential for low-cost power now, the need for such standby power now, their low initial investment, their contribution to local development and the ready availability of coal in a central location, the possibilities for coal-fired thermal plants in the Yukon look quite attractive. The evidence indicates that steps should be taken now to remove these uncertainties and to appraise effectively their potential.

The first step in this would be to prove the volume and suitability of the coal reserves at Carmacks or other suitable site. The second would be to investigate the comparative economic benefits of using coal-fired thermal plants for a power supply in the Yukon. If the reserves are suitable for the purpose and the economic appraisal is then favourable, the third step would be to build a coal-fired thermal plant large enough to cover the immediate shortfall of power now in prospect (50 to 100 megawatts should be adequate to meet imminent needs) with such provision for extension as may prove reasonable.

Hydro-electric Resources

The resources for hydro-electric potential should be more fully established. The most favourable hydro-electric

sites should be investigated again, but more fully, as a means of providing more detailed, precise and up-to-date cost information for comparison of alternative hydro sites and for comparison with other sources of power. Where costs are favourable, hydro sites should be scheduled for progressive development as warranted. For the benefit of the Yukon Territory it is recommended that, other things being equal, the study of the Yukon-Taku proposal for utilizing the waters of the Yukon River for power be given priority over the Yukon-Taiya scheme currently being supported by the Alaska Power Administration because the former would retain the low-cost power for use in Canada while the latter would export most of it to Alaskan tidewater. Moreover, the disposition of both the power resources and water resource of the Yukon River^{1/} should be reserved until the requirements of the Yukon and northern British Columbia have been more thoroughly established.

^{1/} In late June, 1968, representations were made by the Alaska Power Administration to a United States Congressional Committee for an early "exchange of notes with Canada for a joint United States-Canada study of the Yukon-Taiya (power) project and related resources". Congressman J. J. Rhodes of Arizona, wanted it understood that the Yukon River water was needed for watershed states like his, referring to the Nawapta (North American Water and Power Alliance) plan for diverting such waters southward via the Rocky Mountain trench. See Ottawa Citizen, July 2, 1968, p. 11.

Systematic Transmission

The widespread and growing demand for power in the Yukon as well as the orderly development of suitable power facilities there require that an extension of the transmission grid be undertaken. It is recognized that this involves sizeable capital investment in the near future and a continuing program of expenditure. However, past experience elsewhere in Canada, and indeed in the world, shows that the availability of power is an effective agent in producing power demands and a well planned transmission and distribution network is an integral part of a developing power supply.

Rate Structures in Power Supply

With the rapid growth of power requirements in recent years and the outlook for more rapid expansion in the future, the Yukon has reached a stage where rate structures should be adapted to development needs as well as to the liquidating of operating and investment costs. The system in vogue of setting power rates on an ad hoc basis is discouraging to new commercial undertakings, that is, the rates tend to be high during the difficult early stages of the undertaking and lower after the enterprise has become established. An integrated power system with reasonably

uniform rates should provide a more favourable climate for the growth of commercial enterprises in the Yukon.^{1/} Moreover, although power costs may have been a fairly small part of total costs for many Yukon mining companies in 1968, if smelting and other processing industries are to be developed in future to give a needed stability to the Yukon economy, the production of much larger amounts of lower-cost power will be essential. The contribution of a well-planned and systematic development of electric power supply in the Yukon to make these lower-cost power resources readily and assuredly available, can be substantial.

Advance Supply Planning

Until recent years there was probably little opportunity for planning power development in advance of requirements. The recent growth in demand for power and the tenfold demand increase projected indicate the Yukon has now reached a stage where advance planning is necessary if economic growth is not to be obstructed. Instead of the ad hoc small-unit power development of the past, the increasing demand for larger blocks of power warrants more forward planning. Such planning will be facilitated by the projections

^{1/} See also Yukon Power Study 1968, p. 47.

of future demand and its locations as indicated in this Report (Table 3). Such advance planning should comprehend future demands, alternative power sources and trends in their comparative costs, transmission grids, rate structures and such. It will also require, to be effective, more on-the-spot administration and supervision and greater adaptation to the particular needs and conditions of economic development in the North.

In this context, the problems that seemed to surround the provision of power in the Yukon in 1967 and early 1968 could be remedied with a few timely and well-considered steps. One step would be to extend the organization and role of the Northern Canada Power Commission or to establish a new organization with suitable authority for the northwest Territorial region. In either case, the eventual conditions should be the same. The authority should fulfill a role in the Territories similar to that played by power commissions in the provinces. The power agency should have its headquarters in the Yukon with a branch office in Ottawa; it should be competently and adequately staffed with people experienced in the development and distribution of power; and it should be equipped to plan, develop, utilize and operate an effective system of power supply, suitably designed to support the economic development of the Yukon. The Northern Canada

Power Commission Act should be amended, if this course is taken, to provide for the necessary changes and, in addition, to permit more flexibility in setting rates and wider initiative in planning and promotion of self-liquidating power developments. The Yukon Territory is at a suitable stage, in terms of economic potential, to have a power agency with a role similar to those in most provinces and similarly subject to the final authority of the federal government. It is an appropriate time also for such a power authority to be made responsible, as an agent of the federal government, for developing and co-ordinating power services for the northwestern region of the Territories.

In the course of our investigations, several representations were made, in briefs and personal presentations to us, to the effect that consideration should be given to widening the role of private power in the Yukon. The main reasons given for these were stated to be that private power was more efficient, got things done and charged lower rates than public power in the Yukon. It is our belief that most of these problems will be effectively remedied if the above recommendations are implemented. Moreover, so long as the federal government assumes responsibility for such a large financial contribution to economic development in the northern territories it may be reasonable

to expect the federal government will feel obliged also to ensure the supply of power is adequate. In addition, the economic region of which the Yukon is the centre has reached an economic stage where power development can now be effectively used as an instrument of national policy for stimulating economic growth. Since the benefits of such economic growth may be expected to accrue to the Canadian economy as a whole and such regional development requires the benefit of federal co-ordination, it is appropriate that power development be retained as an instrument of public policy.

This growing importance of the public sector in the supply of development power is examined more fully in the chapter, "Basic Developmental Services: Power and Transportation". To avoid repetition, however, all of the conclusions and recommendations relative to the supply of electrical power are set out here.

Conclusions and Recommendations

It can be concluded that the potential growth in demand for electric power in the Yukon offers opportunities for effective planning and further development of power resources and for a greater consolidation of isolated demands by a transmission grid.

Local gas and oil supplies offer little potential for power at present, though possibilities for future discoveries may change this outlook. Nuclear power may be expected to become an attractive source of power within a decade or two. The possibilities for coal-fired thermal power plants in the Yukon are attractive and steps should be taken to prove the coal reserves, to appraise the economic benefits of such plants and, if these are favourable, to build a first generating unit large enough to supply the immediate shortfall of power in prospect. The resources of hydro-electric power for the Yukon warrant further selective investigation to establish their potential.

Yukon economic development has reached a stage where rate structures should be adapted to longer-run development needs rather than being designed only to liquidate local investment and operating costs.

The proposed smelter would be particularly dependent on the production of large amounts of lower-cost power.

A well-planned and regionally systematized power development program would provide a major contribution toward making such low-cost power resources readily and assuredly available. Such advance planning would comprehend future demands, alternative power sources including trends in their comparative costs, transmission grids, rate policies and such.

At this stage of the Yukon's development, such a task of planning and co-ordination, together with the operational task of providing power and other services, would call for an expansion of the role of the public power authority. The Yukon Territory and the northwest region of the Territories are at a stage where a power agency with a role similar to those in most provinces, and similarly subject to federal control at this time, may be the most effective means of getting these problems of power solved.

Accordingly, it is recommended that a new power authority be established for the northwest region of the Territories; that such an authority be created either by extending the role and organization of the Northern Canada Power Commission or by establishing a new agency responsible for power in the northwest region of the Territories; that it be effectively authorized, organized, staffed, located, and equipped to carry out fully the responsibilities as agent of the federal government, for planning, developing, co-ordinating, and operating, where necessary, the power services suitable for the effective economic development of the Yukon and the rest of the northwest region of the Territories.

It is recommended that the following objectives be established for the new power authority:

1. effective advance planning for future power demands, alternative power sources, including comparative costs and projected sequence of development, transmission grids, development rate structures, and such;
2. appraisal of the coal reserves at Carmacks and the cost of mining them; and if these are favourable, a feasibility study of the generation of power from Carmacks coal deposits;
3. more thorough engineering investigation of the most favourable hydro-electric sites in the Yukon to provide more reliable cost estimates;
4. a continuing review of new developments in oil and gas supplies and in nuclear power to fit these into the power development program as conditions become favourable.

Contribution to the Yukon Economy

It is estimated that the capital investment required for new generating capacity to meet the electrical load of 330 megawatts by 1980, will range between \$100 and \$300 million.

Adjusted to 1985, this new capital requirement is estimated to be \$180 million. The value of output of electrical energy sold is projected to rise from an estimated \$2.1 million in 1965 to about \$30 million a year by 1985. Employment in the electric power industry is estimated to increase from about 90 workers in 1968 to between 500 and 600 by 1985.

CHAPTER 9

THE FOREST INDUSTRIES

Primary forest production in the Yukon Territory is small relative to its economic potential. Forest production is small partly because of the physical environment which limits its abundance of growth, partly because of excessive losses from forest fires, partly because inadequate resources have been devoted to the planning, development and management of the Yukon forests, partly because the growth of the industry has, with mining, been spasmodic and partly because its development has not been soundly organized.

The value of primary forest production averaged less than \$700,000 a year for the five fiscal years 1962-63 to 1966-67 (Table 4). Most of this output was from the production of lumber.^{1/}

^{1/} See also Table 43, p. 94, Yukon Statistics Report 1968.

In 1967, there were ten sawmills in the Yukon with a combined capacity of seven million board feet per year. These were mostly small operations but they were

TABLE 4
VALUE OF PRIMARY FOREST PRODUCTION
YUKON TERRITORY, 1960-61 TO 1966-67^{1/}

Year	Lumber ^{2/}	Cordwood ^{3/}	Round Timber ^{4/}	Other ^{5/}	Total
	(dollars)				
1960-61	222,065	49,992	91,899	850	364,806
1961-62	210,183	39,480	19,672	250	269,585
1962-63	445,295	55,136	210,337	550	711,318
1963-64	539,942	70,824	272,346	450	883,562
1964-65	393,462	104,124	230,875	450	728,911
1965-66	185,783	108,768	119,773	450	414,774
1966-67	364,972	134,576	162,630	n.a.	662,178

the only forest operations beyond the cutting of fuelwood and mining timbers. Less than three per cent of the total

^{1/} Adapted from Tables 43 and 44, Yukon Statistics Report 1968.

^{2/} Estimated at the following values per thousand board feet: \$55 to 1962-63, \$60 in 1963-64 and 1964-65 and \$70 in 1965-66 and 1966-67.

^{3/} Estimated at the following prices per cord: Eight dollars to 1962-63, \$12 in 1963-64 and 1964-65 and \$16 in 1965-66 and 1966-67.

^{4/} Estimated at 10 cents per linear foot.

^{5/} Christmas trees and, in 1960-61 only, hewn ties.

annual sustainable cut of timber has been utilized in recent years.^{1/}

Forest Resource Inventory

The special survey undertaken in the fall of 1967 for this economic study included an inventory of the Yukon's forest resources. This inventory shows that the portion of the Yukon south of the Ogilvie and Selwyn Mountains, an area of about 82 million acres (of which about 12 million, or 14.4 per cent, is in productive forest) includes 90 per cent of the merchantable timber in the Yukon. In this southern area (Figure 6)^{2/} there was a total volume of about 75 million cunits^{3/} of softwood timber (white and black spruce, lodgepole pine, balsam and tamarack) of which 77 per cent was in small trees four to nine inches in diameter and 23 per cent was in trees ten inches and larger. Hardwoods (black poplar, aspen and white beach) comprise only about one per cent of the productive forest area. The timber is mainly concentrated

^{1/} See, p. 3, Forest Resource Study, 1967, by C. H. Gairns, Prince George, a background paper prepared for D. Wm. Carr and Associates Ltd., as part of this economic study of the Yukon, and hereinafter referred to as the Yukon Forest Resource Study 1967.

^{2/} Ibid. p. 1.

^{3/} The cunit, used as a general unit of measuring wood volume, equals 100 cubic feet of solid wood.

YUKON TERRITORY

KEY MAP TO FOREST AREAS

SCALE : 100 miles to 1 inch

 AREA COVERED BY DETAILED INVESTIGATION

FIGURE 6



in the valleys along the major river systems and sixty per cent of the total forest resource is in the basin of the Liard River in southeastern Yukon.

Physical Influences on Growth Rates

The physical conditions for forest growth greatly influence the potential volume of production in the Yukon. The climate is a major factor in this growth pattern. High altitudes and northern latitudes influence the climate and thus reduce the rate of tree growth. In southern Yukon, trees seldom grow above altitudes of 5,000 feet, while in central Yukon there is little growth above altitudes of 3,000 feet. The merchantable timber is usually found below these levels, ordinarily 1,000 feet or more below this "tree line". Thus, it may be evident that the low wide valleys of the southern rivers of the Yukon supply most of the productive forest land.

Other elements of climate that affect tree growth are hours of sunshine, temperatures, precipitation and length of the frost-free or growing season. The Yukon generally has comparable hours of summer sunshine relative to other forested regions; growing period temperatures tend to be cooler in the Yukon; summer precipitation is

relatively low (about five to six inches); and the growing season (in terms of heat units) is relatively short (see Table 1).

Soils in the Yukon also tend to be a limiting factor, relatively, in the forest growth. Most of the soils are of recent glacial origin and, with little precipitation and little weathering, most of these soils are immature in development and tend to be acidic, infertile, and inadequate to support an abundant tree growth. The alluvial soils in river valley bottoms are the most fertile and productive and in these the heaviest forest stands are found. Permanently frozen soils limit tree growth. In southern Yukon only scattered areas of permafrost are to be found but in central and northern Yukon this permafrost is virtually continuous.

Growth Potential

These physical limitations reduce the rate of forest growth in the Yukon. For example, the cycle of years for forest replenishment has been estimated as about 40 per cent longer in the Liard area in the Yukon (probably the area with the shortest cycle) than it is in Prince George, B.C.^{1/} Yet the rate of growth in the Liard area

^{1/} See Yukon Forest Resource Study 1967, Table 4, p. 11.

is sufficient to add an estimated 16.6 cubic feet per acre per year of pulpwood to the forest stands and 7.8 cubic feet in the Teslin area. This average rate of growth would permit a total annual cut of 1,094,000 cunits (Table 5) or, in products, an annual lumber production of over 52 million board feet together with an annual pulp production of 550,000 tons of bleached sulphate pulp or 1,100,000 tons of newsprint. Thus, it is estimated that the forest potential of the Yukon could be about 15 to 20 times the current output in the short run and about 100 times in the long run.

TABLE 5
RECOMMENDED ALLOWABLE ANNUAL CUT^{1/}

Area ^{2/}	<u>Softwood Allowable Annual Cut (in cunits)</u>	
	Sawtimber (10"+) in Alluvial Forests	Total Cut (4"+)
Klondike Unit	8,500	30,000
Alsek Unit	1,300	9,000
Teslin Unit	10,400	195,000
Pelly Unit	19,300	150,000
Liard Unit	56,100	710,000
Total All Units	95,600	1,094,000

Yet if the current burn rate (0.6 per cent of the productive forest land per year) is deducted from this

^{1/} Adapted from Table 7, p. 14, Yukon Forest Resource Study 1967.

^{2/} See Figure 6.

allowable annual cut the latter would be reduced by more than 40 per cent. With a moderate improvement in fire protection this burn rate should be reduced to 0.1 per cent and, with this, the allowable annual cut would be reduced by only seven per cent.

Demand for Forest Products

The demand for lumber in the Yukon has been increasing quite rapidly. Current lumber consumption is estimated at 10 million board feet per year or about 600 board feet per capita (against a national average of 200 board feet per capita). Much of this is supplied from outside the Yukon. The demand for lumber will continue to increase with the expansion of mining construction and the rapid growth in population.

Fuelwood demand has declined due to substitution of oil for heating. The demand for mining timbers, arising mainly at United Keno Hill Mines, varies with the volume of ore mined and was expected to fall with the reduction in the level of Mayo mining operations in 1967. There is a large demand for plywood, pressboard and other wall boards but these have virtually all been supplied from outside the Yukon. The only demand for exports from the Yukon would be pulp and paper products.

Sawmill Industry Potential

The inventory of forest resources indicates that a relatively large forest industry could be sustained in the future. The sawmilling industry could grow to a total production of 50 million board feet per year from its present five million board feet.

Any large-scale sawmilling operations would, in the beginning, have to be established in the Nisutlin (100 million board feet now accessible), Liard (600 million accessible) and MacMillan (500 million board feet accessible) River areas. The most accessible large volume areas that could be logged for pulpwood are along the Teslin and Nisutlin Rivers in the Teslin area (about 5 million cunits are now available and along the Liard and Frances Rivers in the Liard area (about 10 million cunits are now available).

Accessibility has been a handicap in developing a sawmilling industry on these rivers because some of the best stands of sawtimber have been inaccessible by road. Mineral developments have extended these road facilities, and these stands are increasingly accessible.

A current freight cost of \$50 per thousand board feet on imported lumber,^{1/} equivalent to 80 per cent of the value of lumber in most British Columbia mills, provides a measure of current protection for sawmilling in the Yukon.

^{1/} Freight Tariff, White Pass and Yukon Route. See Yukon Forest Resource Study 1967, p. 22.

The sawmilling industry is projected to expand to a production of 33 million board feet a year by 1983, valued at about \$3 million with production distributed as follows:^{1/}

1. Twenty million board feet will be produced annually in the Liard River area north of Watson Lake by one or two sawmills (one mill is operating in the area at present and a second larger operation is planned).
2. Five to eight million board feet will be produced annually in the MacMillan and Pelly River area by one or two mills.
3. Two to three million board feet will be produced annually in the Nisutlin River area by one mill.
4. Three to five million board feet will be produced annually by up to 10 small sawmills scattered over the rest of the Territory (although the best timber stands appear to be in the MacMillan, Pelly, Liard, and Nisutlin River valleys, mills will be able to operate on small blocks of poorer timber where they can find them close to areas where the demand develops).

^{1/} Ibid. p. 24.

Preservative Treatment Plant Potential

A timber treatment plant will be in operation by 1983 and its production together with other production of mining timbers and fuelwood will add a total value to production of nearly one million dollars annually.

Pulp Potential

A review of the world demand for pulp indicates a growing demand for such wood products in Japan. A survey of the advantages and disadvantages of pulp production in the Yukon in comparison with competing areas, and a comparison of five possible pulp operations, suggest that the most profitable of these operations in the next 15 years is likely to be a refiner groundwood plant for production of dry baled pulp for the Japanese market. Such a development would be located near Carmacks or Watson Lake to benefit most from natural waterways for log transport.

Such a mill could contribute 100,000 to 150,000 tons of freight traffic annually with a gross product value of about \$9 million. It would not likely begin production before 1980, starting then with about 300 tons a day output with eventual provision for 500 to 600 tons per day.

Long Term Development

Local sawmills should continue to meet the demand for construction lumber until demand exceeds 50 million board feet annually.

Eventually two pulpmill sites may be developed. Whether Carmacks or Watson Lake comes first will depend largely on the location of future improvements in transportation from the Yukon.

A small plywood plant might be warranted by about 1990 as plywood demand increases. It would be integrated with a pulpmill or sawmill to obtain logs of the necessary size and quality.

The demand for roundwood products will be mainly for those treated with preservatives. The most suitable source of supply of such roundwood is in the Watson Lake area and only one such preservative plant would appear warranted in the Yukon.

Considerations in Forest Industry Expansion

This economic growth in the forest industry will not occur automatically. The major considerations and recommendations that must be taken into account if

development is to proceed most effectively would be the following:

1. An expansion of fire protection services is essential to permit the expansion projected for the industry. More fire protection will be necessary to save the most valuable stands now remaining. Better protection will be necessary before funds for pulpmill development will be risked by private enterprise in the Yukon. In the 10 years 1958 to 1967, the number of fires averaged 65 per season and the average burn-out was 4,000 acres (Table 6). Most of these fires were man-made; only about 30 per cent were caused by lightning. Thus most fires are also accessible to protection but summers tend to be dry and such fires burn and spread rapidly.

While it may not be possible to provide adequate fire protection to the whole of the Yukon the present method of designating "protected" and "unprotected" zones might be improved by protecting all areas in the vicinity of the main concentration of timber stands. Protection in other areas could be provided where possible or when communities were threatened. On the other hand, a continuing fire prevention program should be extended over the whole

Territory. But costly fire fighting would be devoted mainly to the areas where it will yield the most economic benefits. It is recommended that a substantial increase in the fire protection operations should be initiated immediately and these should be gradually expanded as the value of the resultant forest reserves accumulates.

TABLE 6
FOREST FIRE LOSSES, YUKON TERRITORY, 1952-66^{1/}

Year	Fires	Area Burned	Fire Fighting Cost and Damage
	(number)	(acres)	(dollars)
1952	23	31,631	28,210
1953	44	77,557	97,103
1954	55	7,109	27,627
1955	75	41,329	30,996
1956	55	2,700	29,000
1957	88	116,200	71,000
1958	96	1,554,402	1,692,355
1959	60	42,196	42,240
1960	61	235,766	286,321
1961	50	95,276	753,428
1962	46	19,855	29,619
1963	44	11,679	55,615
1964	25	480	4,019
1965	75	18,674	142,000
1966	103	393,000	877,000
Average 1952-66	60	176,523	277,768

^{1/} Canada Year Book, Dominion Bureau of Statistics, Ottawa, and Annual Reports of the Commissioner of the Yukon Territory.

2. Action should be taken to initiate co-ordination in development particularly for those forest resources lying adjacent in the Yukon and northern British Columbia in the Teslin River and Liard River areas.
3. Consideration should be given to minimizing the extent of flooding of forest resources in conjunction with hydro-electric power developments in northern British Columbia, Alaska and the Yukon.
4. Administration of forest resources, including leasing, control of cutting and other regulations, should be kept as simple and convenient as possible, consistent with effective control.
5. Consideration may need to be given to special incentives and assistance to induce companies to undertake the first pulpmill operations. There are numerous examples of provincial experience from which to draw in this respect.
6. If the Yukon forest industry is to develop effectively it will be necessary to extend the studies initiated for this Report.
 - (a) One such study would be to complete the inventory of Yukon forests, partially completed a decade ago, in order to attract private industry to particular opportunities and locations.

- (b) A careful study of the economics of increased fire protection should be undertaken to determine more precisely the extent of protection that may be justified by forest yields. Yet because forests are a renewable resource, in the Yukon a greater degree of protection than this may be warranted.
- (c) Growth studies should be extended to provide more precise information on rates of growth in the various Yukon forests.
- (d) Studies should be initiated now to determine the kind and cost of effluent disposal required for the lakes and rivers adjacent to probable pulp mill sites.

Contribution of the Forest Industry to the
Yukon Economy by 1985

By 1985, it is anticipated that the forest industry's contribution to the Yukon economy will be greatly expanded. Sawmilling may be expected to contribute nearly \$3 million a year; a preservative treatment plant together with production elsewhere of mining timbers and fuelwood

should add nearly one million dollars a year; and a small pulpmill may be in operation by 1985 producing about 100,000 tons of pulp valued at about \$9 million annually.

To provide this total output of \$13 million employment in the forest industry is projected to rise to about 550 employees by 1985 with employee earnings estimated at \$4.6 million.

Capital requirements for forest industry development to 1985 are estimated to be almost \$17 million.

CHAPTER 10

THE AGRICULTURAL POTENTIAL OF THE YUKON

Farming in the Yukon will probably never be as significant again as it was in the period of the Klondike gold rush. Evidence still remains of the farms, long since abandoned, where potatoes and other garden produce were raised, milk and beef were produced and hay and other crops were tilled. The farms were small, but at the prices paid in the isolated, gold-rich Dawson City, even a small farm might yield an adequate net return.

Those early Klondike conditions did not survive, nor has much of the farming. By 1931, 41 farms still remained in the Yukon and many of these have since been abandoned (Table 7). There was a small temporary revival in the 1950's and early 1960's when farming was again encouraged and acreage was expanded for a time. By 1966,

TABLE 7

NUMBER, AREA AND USE OF FARM LAND, YUKON TERRITORY, SELECTED YEARS^{1/}

Item	Unit	1931	1941	1956	1961	1966
Number of farms	Number	41	26	16	15	9
Number of commercial farms ^{2/}	"	n.a.	n.a.	4	2	2
Total area of farms	Acres	5,197	2,781	3,997	8,072	3,680
Improved land	"	778	511	634	954	463
Unimproved land	"	4,419	2,270	3,363	7,118	3,217
Crops - Wheat	"	8	-	23	42	-
- Oats	"	63	27	52	77	20
- Barley	"	n.a.	n.a.	15	4	-
- Hay	"	558	392	88 ^{3/}	104	108
- Potatoes	"	69	47	17	12	4
- Vegetables	"	5	1	9	5	2
Livestock - Horses	Number	62	90	172	230	17
- Cattle	"	72	52	104	206	98
- Milk cows	"	n.a.	n.a.	7	16	9
- Hens & chickens	"	224	138	296	358	635

^{1/} Adapted from Table 52, Yukon Statistics Report 1968 and based on unpublished data from the Census of Agriculture provided by the Dominion Bureau of Statistics, Ottawa. No data were available from the 1951 Census.

^{2/} Commercial farms include all farms reporting \$1,200 or more (\$2,500 or more in 1966) sales of agricultural products.

^{3/} Includes seven acres of other fodder crops.

another decline had occurred and only nine farms were reported in the Census of the Yukon in that year (Table 7). Only two of these nine were commercial farms (those reporting sales of farm products of \$2,500 or more in 1966). These nine farms had a total investment of only \$121,300 in 1966 and total sales of only \$22,480 (Table 8), in both instances totalling somewhat below the level of one ordinary full-scale farm in the major farming areas of Canada.

TABLE 8

VALUE OF FARM CAPITAL AND SALES OF FARM PRODUCTS

YUKON TERRITORY, 1961 AND 1966^{1/}

	1961	1966
	(dollars)	
Land and buildings value	198,600	47,300
Machinery value	113,900	56,100
Livestock and poultry value	59,900	17,900
Total capital	372,400	121,300
Total sales of farm products	15,610	22,480

^{1/} See Table 53, Yukon Statistics Report 1968, based on unpublished data from the Census of Agriculture, provided by the Dominion Bureau of Statistics, Ottawa.

In recent decades, the interest and support of agricultural settlement in the Yukon has risen periodically. Yet it is obvious to most people that the physical environment imposes substantial handicaps on Yukon agriculture. Nevertheless, farming in a frontier region like the Yukon appeals strongly to many people. To the leaders on the frontier farming is an effective way of populating and developing the rural areas and they would thus encourage it. To the frustrated city dweller it provides an escape from modern society. To the jaded farmer elsewhere it may appear as a new opportunity to pioneer. Too frequently the net profitability of Yukon farming is overlooked in these enthusiasms.

Physical Environment

The physical environment is the most significant factor in the unprofitability of agriculture in the Yukon. These physical considerations are examined in detail in the background study on farming.^{1/} For this report they are summarized here.

^{1/} See The Agricultural Potential of the Yukon, 1968, by D.W. Carr, prepared as a background study for this Report, p. 4.

The physical environment in the Yukon does not favour ordinary farming operations because the topography of much of the suitable soil areas is too rough and uneven for large-scale machine operations; the soil is podzolized, infertile and low in productivity; the climate tends to be adverse in its short, cool growing season, its drought, its soil permafrost, and its long cold winters; and the locational disadvantages of Yukon farming are costly. In brief, most field crops cannot be ripened or matured and are too frequently damaged by frost; native grasses are widespread but do not grow abundantly because of the short, cool summer and the shortage of precipitation; the costs of producing cattle or sheep are excessive because the grazing season is short and the season when they must be sheltered and fed indoors tends to be relatively quite long; and while garden crops can be produced their output is quite uncertain relative to competing areas where climate is less extreme.

These adverse physical conditions are reflected in the economic results of farming. Thus the low productivity of the land is reflected in high costs and low profits. In addition, because of the high costs of in-bound transportation, the costs of inputs of supplies and materials (fertilizers, repairs, etc.) tend to be higher

than in the major farming areas. These higher costs of inputs more than offset the higher prices received.

The Impact of New Technology

Yet, in terms of profitability, one of the greatest disabilities of farming in the Yukon would be its unsuitability for the large-scale, specialized new technology that has now taken over most of agricultural production in Canada. The Yukon lacks both the large areas of level, well-drained stone-free land that has now become essential for large-scale specialized, mechanized and profitable production of field crops. For effective livestock production the Yukon lacks the climate for abundant growth and the large areas of highly productive grazing lands necessary for profitable operations.

With the great changes in Canada's farm technology since the war of 1939-45, and the opportunities for higher incomes in other employment, the old small-scale low-capitalized, and unspecialized farm enterprises can no longer compete with the new specialized large-scale enterprises. In consequence, these small-scale farms are being abandoned throughout Canada - in the Interlake region in Manitoba, in northern Ontario, in the Gaspé and in the Maritimes. From 1941 to 1966, the number of farms in

Canada dropped from 677,500 to 430,503 and the number of people in the farm labour force fell from 1,186,000 in 1946 to 544,000 in 1966. In the face of this decline in farming in areas with greater agricultural potential, it is not surprising that farming in the Yukon should be unprofitable and not widely taken up.

This then is the important thing to recognize, that ordinary farming, as practiced in the rest of Canada, is not likely to be profitable in the Yukon under present conditions.^{1/}

The Farming Potential

This does not mean that there should be no farming in the Yukon. The next step is to explore those farming activities that can have a place in the Yukon environment. Part-time or hobby gardening will continue to have an important place in the Yukon for those who enjoy growing and eating the freshest vegetables, and measures should be taken to support this with appropriate research, advisory and reference services. It should not

^{1/} This was also the conclusion of the Committee on the Possibilities and Development of Agriculture in the Yukon Territory. See the Report of this Committee dated June 15, 1962, where it states, p. 13, "Farming on a successful full-time commercial basis has limited possibilities at the present time and settlement on this basis should be discouraged if not prevented".

be expected that this vegetable production can compete in price with the imported supplies^{1/} even when surplus production occurs but it provides a useful recreation and an attractive source of food. It usually requires creating the micro-climate or soil conditions necessary to ensure dependable growth and this is where the additional costs arise.

Similarly, with livestock production, it is frequently possible to use convenient grazing areas and haylands for producing cattle suitable for beef and perhaps dairy products on a part-time basis. This may be particularly attractive when the operator is mainly engaged in some other occupation, such as tourism or guiding, in the summer and values the livestock as an occupation for winter. Yet if he values his time at ordinary wage rates, the livestock operation will generally be found not profitable.

A third type of farmer may in future seek to settle in the Yukon. This will be the family that already has some income and seeks an opportunity to enjoy

^{1/} "It may be argued, of course, that there is no point in growing plants under extreme difficulties and when costs are excessive. On the other hand, the returns may be something more than money saved and may be measured in terms of achievement and sheer satisfaction". P. 5, A Handbook for Northern Gardeners, by Frank S. Nowasad, Publication 1081, Canada Department of Agriculture, Ottawa, 1964.

the rural peace and dignity of dwelling in a frontier land of hope and promise. These can perhaps be enjoyed most in the rural atmosphere of part-time farming, fishing and hunting, even though their monetary yield may be small. In terms of the new technology, this family may seem to be misplaced but present civilization may spin off a lot of these in the next decade or two. Already they are moving from the United States into the sanctuary of the interior valleys of British Columbia.

For all three of these farming and gardening enterprise types there should be at least a minimum of appropriate public services provided. For the last two types of farming adequate provision should be made in Yukon land policy. In this context, there should also be a policy for controlling the winter grazing of pack horses and particularly for removing them from the vicinity of the highways.

A fourth type of agriculture holds promise that it may be both satisfying and profitable in the Yukon. This is the full-scale greenhouse enterprise. With the progress made in recent years in greenhouse construction and operations, the evidence shows possibilities for profitable production of tomatoes, cucumbers and other vegetables. There are good indications that such an enterprise might now be operated profitably where the market is

adequate, such as the market that might be found in Whitehorse.

Such a greenhouse operation should be regarded as experimental for the initial period and on this basis should warrant some public financial support in the beginning. It might be tested by an initial greenhouse operation of about 30,000 square feet, with careful recording and analyses of techniques, costs, revenues, and markets over several years. Its objective should be commercial profitability as soon as possible.^{1/} To indicate the possibilities elsewhere a summary budget for a one-acre (45,000 square feet) greenhouse in Nova Scotia is attached as an Appendix to the background study.^{2/}

There has been a sharp growth in greenhouse production of vegetables in Canada and the northeastern United States since the late 1950's. This expansion of production in northeastern United States has been

^{1/} The present management of the federal Experimental Farm at Haines Junction could probably supervise and advise such a trial greenhouse operation very well.

^{2/} See Maritime Agriculture: A Comparative Regional Analysis, a report prepared by D. Wm. Carr & Associates Ltd. for the Atlantic Development Board, Ottawa, 1967, Volume 2, The Enterprise Analysis, by B. H. Sonntag, p. 430-1.

attributed to the use of the lower-cost plastic greenhouses, new varieties and hybrids, and more efficient methods of production.^{1/} In Essex County in Ontario, from 1959 to 1965, greenhouse acreage was tripled, with about one-quarter of the total area of 300 acres under plastic cover.^{2/} The reasons given for this Ontario expansion are: more energetic selling of the greenhouse vegetables; a large importation of fresh tomatoes, except in July and August, offered much scope for competitive expansion; more efficient production enabled prices of greenhouse tomatoes to be reduced to compete with imports; an increase in available credit through the Farm Credit Corporation and other public agencies; and larger scale and more efficient operations were made possible by these new conditions.

Consideration of the comparable conditions in the Yukon would indicate that such operations might be

^{1/} See "Economic Factors in Greenhouse Tomato Production", in Proceedings, Northeast Greenhouse Vegetable Conference, New Jersey, October, 1966. p. 3.

^{2/} Ibid. "The Ontario Greenhouse Industry", by James R. Rainforth, Harrow, Ont., p. 45-50.

profitable where an adequate market existed, probably for Whitehorse and in the larger mining camps.^{1/}

With these considerations in view, it is recommended that an experiment in commercial greenhouse production of tomatoes and other suitable vegetables be undertaken near Whitehorse. The objective should not be to ascertain whether tomatoes and such can be grown under greenhouse conditions in the Yukon but to examine whether they can be grown profitably under commercial conditions there.

Conclusions

In summary, ordinary farming may be possible in the Yukon but it is unlikely to be profitable. There is virtually no potential in the Yukon for the old agriculture as practiced in the Klondike gold rush days because this type of farming is being abandoned wherever it existed in Canada. There is virtually no potential in

^{1/} It should be noted that the recent problems and unprofitability of the large-scale trial greenhouse operations at Soldatna on the Kenai Peninsula in Alaska should not be taken as a measure of their effective success. The Soldatna experiment has only been in operation a few years, was probably on too large a scale in the beginning, management tended to be inexperienced and a number of mistakes were made which might have been avoided, according to our interviews with scientific staff of the University of Alaska and the Research Station at Palmer, Alaska.

the Yukon for the new large-scale, highly-mechanized farming now dominating agriculture in the rest of Canada because the physical environment is not suitable for it in the Yukon.

There should be some potential in part-time farming but it should not be expected to be commercially profitable. There may be a significant potential in greenhouse operations and special measures are recommended to test and develop such operations in or near Whitehorse. It is recommended that a special appraisal of long run land policy should be undertaken.

Contribution to the Yukon Economy

It is not expected that agriculture will make a significant contribution to the Yukon economy except for the contribution of the greenhouse operations. As far as farm enterprises generally are concerned it may be expected that the decline of existing enterprises will offset any increase due to new enterprises. The contribution of the greenhouse enterprise to the economy will not be very great; by 1985 it is estimated it will add about \$50,000 to \$100,000 to the output of the Yukon, will require a capital investment of about \$75,000 and will add about six to ten workers to the labour force.

CHAPTER 11

HUNTING, TRAPPING AND FISHING IN THE YUKON

Introduction

Wildlife (mammals, birds and fish) provide both income and recreation in the Yukon economy. Traditionally, the contribution of wildlife resources has been to the income of the native population - in the hunting of game for food, in trapping for furs, in fishing for food and in income from guiding. More recently, their economic contribution has been channelled increasingly through recreation, mainly sport fishing and hunting. In 1968, exploitation of these wildlife resources continued to be an important part of some native incomes but such incomes tended to be excessively low and there were indications that other, more attractive, job opportunities would draw the native

people toward higher incomes. Accordingly, the contribution of hunting, trapping and fishing to the Yukon economy may be expected to decline, both relatively and absolutely, in future.

Overall, it is estimated that trapping and fishing together accounted for a gross output of about \$120,000 in 1967. To indicate the decline in these, it may be noted that in 1946 the value of trapping (fur pelts sold) in the Yukon was alone over \$677,000. The present and potential contribution to the economy of each of the three activities indicates the changing economic pattern.

Hunting

Hunting was an important part of the Yukon economy when it provided a major source of the meat supplies for the residents. Today it is relatively much less important even though it now attracts some additional income as a sport and recreation activity. In the Yukon, three types of hunting can be identified. Those native people who continue to live mainly off the land hunt to provide an important part of their meat supply; other residents hunt for recreation and to a lesser extent for meat; and non-residents come to the Yukon to hunt for recreation, sport and the prestige of the big game trophy. The out-

look for each of these is different. As the education and incomes of the native people continue to improve, they will depend less and less on hunting and fishing to provide their meat requirements. The second group, the residents who hunt for recreation, may be expected to expand rapidly as the economy and leisure time grows. The third group, those who come to the Yukon especially for the hunting, may be expected to decline as the game becomes more scarce, resident use increases and conservation measures are put into effect. At present, a number of outfitters, each with an exclusive territory, are devoted to providing hunting services (guides, pack-trains, etc.) for these non-resident hunters.

Hunting Resources

The Yukon enjoys an extensive and attractive range of game resources. The mountainous nature of much of the Territory, the extensive valleys to provide food and shelter, and the sparsity of human population, have all combined to make the Yukon a major refuge, especially for big game, like bear, caribou, moose, mountain sheep and goats, wolf and others. Grouse and ptarmigan are plentiful.

Demand for Hunting

Most of the 3,000-odd hunting licences issued in the Yukon go to residents, with only 285 going to non-residents in 1966-67.^{1/} Yet almost three-quarters of the \$37,523 in licence revenue of the Game Branch that year came from the higher non-resident fees. Most of the non-resident hunters are from the United States. Big game outfitters had an estimated revenue of \$325,000 in 1967, an estimated investment of \$400,000 and a labour force of about 150 persons, mostly guides.

Conclusions and Recommendations

Hunting is likely to become more a tourist and resident sport than it has been in the past, with less emphasis on hunting for meat requirements and on large scale big game hunting by non-residents.

Conservation of the wildlife, especially the big game resources, is likely to require more positive controls within a few years. These resources should be preserved as part of the attraction for tourists and other visitors. It is recommended that the need for conservation be appraised within the next five years by

^{1/} See Hunting, Trapping and Fishing in the Yukon, 1968, by D. W. Carr, prepared as a background study for this Report.

completing an inventory of wildlife resources in the Yukon. Consideration should also be given to the extension of game reserve areas.

Contribution to the Economy

It is not expected that hunting will make an additional contribution to the Yukon economy beyond its expanding contribution to the tourist industry.

Trapping

In the Yukon, trapping is a major source of cash income for only a few, mainly native, people. It combines well with their hunting and fishing for food. The principal furs taken are beaver, muskrat and squirrel. But trapping is being increasingly viewed as a relatively harsh employment that yields a low income relative to the work involved. In addition, fur prices have tended to decline. The result has been a decline in the number of trappers (from 491 in 1964-65 to 395 in 1965-66) and a decline in the number of pelts sold. In 1946, Yukon fur production was valued at \$677,500. By 1966 and 1967 the annual fur output had fallen below \$100,000, a gross of only about \$250 per trapper.

Outlook for Trapping

These generally low incomes plus the relative hardships of running a winter trapline, indicate that the number of trappers will decline as other more attractive employment opportunities increase in the Yukon and as the older trappers retire from active operations. The uncertainties of the fur yield each year and the variability of their prices make trapping a risky enterprise at best. It may be expected that the number of native trappers will continue at a fairly high but declining level for the next decade at least. Under these circumstances, the decline of fur purchasing services in the Yukon is likely to result in lower prices and a significant weakening of this source of native incomes. Support for a fur auction or for other forms of marketing services is recommended for a few years, as the trapping industry declines, and until alternative employment for these people may be available.

Potential Contribution to the Yukon Economy

It is expected that the trapping industry will continue to decline in the Yukon so the contribution to the economy will tend to be negative but the change will be relatively slow and since the industry is already small, the overall effect on the economy will be small.

Fisheries

Fishing in the Yukon Territory is limited by the waters available. With only a few inland lakes and no fishing in the Beaufort Sea the potential for commercial fishing is quite restricted at best. Yet with an extensive network of brooks, streams and rivers linking the dozen or more lakes, the opportunities for sport fishing are excellent. The major fish species are salmon (spring and chum), lake trout, whitefish and some arctic grayling. Fishing in the Yukon is of three types - commercial, for home use and sport fishing.

The commercial fisheries are relatively small in the Yukon (84,700 pounds in 1966) and may be expected to decline further as fish resources decline and the demand for tourist and sport fishing expands. Fishing for home use on a regular basis is mainly carried out by the native people. In 1965, their catch for home use was estimated at about 130,000 pounds. Sport fishing in the Yukon has increased remarkably in recent years, especially among non-residents, whose licences almost doubled from 1960 (3,721) to 1967 (6,969). This growth has been closely associated with the growth of the tourist industry. In 1967, there were 19 lodges catering to sport

fishermen in the Yukon. The construction of new roads in the Yukon has opened many previously inaccessible waters for such fishing. Yet with the rapid growth of the tourist industry, prospects were that fish resources might become depleted in the most frequented lakes, especially if the commercial fisheries continued operating at present levels. The contribution of the tourist-fisherman to the economy is rapidly increasing - if he spent only an additional five dollars each for sport fishing, his contribution would gross more than that of the commercial fisherman.

Conclusions and Recommendations

Commercial fisheries in the Yukon should be expected to contract rather than expand. The sport fishery may be expected to expand substantially in future. This expansion will be associated partly with the increase in resident anglers as a result of population increases in the Yukon but it will be associated mainly with the increase in non-resident anglers as the tourist industry expands. This latter potential is examined more fully in the study of the tourist industry.

The commercial fishery should be expected to cater primarily to the tourist industry because the regular demand for fish products can ordinarily be most

effectively supplied by imported products.

It is recommended that the Fisheries Research Board be requested to carry out a survey of the present and potential fish resources of the Yukon.

It is recommended that the growth of the Yukon economy be supported, where appropriate, by giving priority to the sport fisherman and the tourist industry over the commercial fishery and that prohibition of the commercial fishery should be applied, as appropriate, for this purpose.

It is recommended that special provision be made by the Department of Fisheries to maintain adequate fish resources to meet the requirements of the native fishermen who wish to supplement their meat supplies with fish.

It is recommended that a program be instituted for developing additional fishing lodges and camps particularly in fishing areas newly opened by highways.

Potential Contribution to the Economy

The commercial fisheries were making little contribution to the Yukon economy in 1968 and even this contribution was expected to gradually decline. A more significant contribution was being made by the native fishery for home use but this was not expected to expand.

The major economic contribution could be expected from the sport fishery, especially if the competition of commercial fishing was eliminated where it had adverse effects on the economy. The sport fishery is closely associated with the tourist industry and its contribution will enhance that of the tourist industry.

CHAPTER 12

THE TOURIST INDUSTRY

Several attributes of the tourist industry may make it particularly significant in the economic potential of the Yukon. The tourist industry, though still seasonal, tends to be a balancing element in an economy dominated by the volatile and uneven growth of the mining industry. Secondly, the tourist industry has been making a steadily increasing contribution to the economic growth of the Yukon. Thirdly, at this stage in the progress of civilization in North America, the Yukon seems to 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.

Growth of the Yukon tourist industry has been recent, mostly since 1955. By 1967, its contribution was estimated at almost \$7 million a year^{1/} and it thus ranked

^{1/} Sessional Papers 13 and 28, Yukon Territorial Council, Second Session, 1967.

next to mining in its value of output. Tourist activity was still quite seasonal in 1968 but good progress had been made in extending the season and a further lengthening seemed likely in future. A major contribution to the tourist industry has been the road expansion and improvement program over the past decade. The dust and roughness of these gravelled road surfaces had become an increasing handicap to tourist development by 1968, however.

Considerations in the Development
of the Tourist Industry

The potential of the tourist industry in the Yukon depends upon the availability of attractive tourist resources, the numbers of people who can be induced to invest their leisure and income in the enjoyment of these attractions and the effectiveness with which tourist services are provided for these people. In essence, these comprehend the basic components of the supply of tourist services and the demand for them. These elements of supply and demand can be examined in three main groups - the resources for tourists, the demand for tourist services and the supply of services in the Yukon.

Tourist Resources

The supply of tourist resources in much of North America is no longer adequate to meet the demand. The

rapid rise in the leisure and incomes of the people of North America especially in the late 1950's and the 1960's has increased greatly the volume of use of traditional recreation areas. This crowding, in turn, has reduced the quality of the recreational experience for many people and there has been a constant and increasing search for areas where nature continues to dominate. Moreover, an increasing number of people have become interested in reaching out again, or for the first time, to places having a frontier environment (except in their dining rooms and beds) and more of these people have the leisure and income to spend on it. The inability of the supply of tourist resources elsewhere to meet this demand adequately has made the Yukon's resources increasingly attractive in spite of their distance.

In tourist resources, the Yukon has a remarkably attractive combination, no less remarkable because the whole combination seems to add to something greater than the sum of the parts. The altitude and dryness seem to add a stimulant to the Yukon atmosphere and people soon walk with a lilt of enthusiasm. The great rings of mountains that surround the central plateau seem everywhere to add a snow-capped majesty to the distant landscape. The rugged hills within the central plateau seem

to suggest a haven only for the hardy. The miles of the blue-lined Yukon and its tributary rivers and brooks, the great calm lakes invariably reflecting the hills behind, the wide forested valleys, provide always a scene to ponder and enjoy. Even the wildlife seem less disturbed and so, gentler than the ordinary. Add to these the extensive streams and lakes where the fish are still enthusiastic; the mountains and the valleys where big game are ready at hand, the quiet places a few yards from the highways where it seems no man has been before; and those who enjoy outdoor recreation have a range of attractions that are seldom encountered and always remembered. This, then, is what nature has given to the Yukon. Man needs only to help pass it on.

In addition to these resources of nature, the relics of the Klondike gold rush and Dawson City remain a major attraction to tourists, especially to those whose kinfolk travelled the "Trail of '98", and to those who "nearly joined" the goldseekers then, and the children of both these groups who had heard the stirring tales first hand.

Demand for Tourist Services

Tourist demand for Yukon recreation resources has been increasing rapidly since 1962. By 1964, the average

annual rate of growth of incoming tourists was estimated at 11.9 per cent.^{1/} By 1966, it had risen to 17 per cent.^{2/} There was a normal reduction in 1967 due to the Centennial celebrations in Canada but prospects for 1968 indicated tourism had returned to its former rapid rate of growth.

Over 80 per cent of the tourists visiting the Yukon came from the United States, with California, Washington, Alaska and Michigan, the largest contributors. Most of the tourists, more than 95 per cent, come to the Yukon by automobile, the rest come by aircraft and bus. ⁶¹ Most of the tourists come in July and August, usually about 60 per cent in those months. But where, a few years ago, tourists confined their visits to the June to August period almost entirely, the season now extends from May through October. As accommodation improves, it will extend further.

Tourists are spending more time and more money in the Yukon. Surveys of tourists in 1962 and 1966 showed that the average length of stay per party increased from 4.7 days in 1962 to 7.2 days in 1966. Expenditures per day remained nearly as high in 1966 as in 1962, resulting

^{1/} Improvement Program for the Alaska Highway, Study prepared for the Department of Northern Affairs and National Resources, 1966, p. B-11.

^{2/} Yukon Territorial Council, 2nd Session, 1967, Sessional Papers No. 13 and 28.

in a substantial increase in total expenditures. If the total value of tourist expenditures was \$7 million in 1966, as has been estimated, it may be expected that, on this basis, it will rise in 1968 to close to \$10 million.

Tourist Services in the Yukon

The considerations relative to providing effective tourist services are numerous and often complex. At this stage in the development of tourism in the Yukon a great many improvements in these services appear to be needed. Some of these are not costly and can be carried out soon without difficulty; some are essential now to maintain the progress of the industry; and others will be warranted only by the potential expansion of the industry.

A first major service relates to the care of the tourist resources. If the quality of the recreation experience is to be maintained the resources themselves should be suitably maintained and improved. Provision thus needs to be made to prevent and repair damage, including fire damage; to maintain the cleanliness of natural areas used for camping; and to lay out trails or other areas so nature can be seen, enjoyed and not injured. So far this has not been a big task in the Yukon and what was done has been remarkably well done.

Yet the preservation of this natural wilderness cannot be accomplished without adopting some special measures. Because such recreation resources are becoming increasingly scarce in the rest of North America, its economic value to the Yukon may be expected to grow quite large in the future. Because the tourist industry can, through this channel, make a major contribution to the long-run stability and output of the Yukon economy, it is recommended that early action be taken to reserve suitable areas for development as national parks and other conservation areas.

Highway services are a significant handicap to the tourist industry in the Yukon. The road building program has been advancing rapidly, designed primarily to serve the mining industry to be sure, but nevertheless serving the tourist industry very well. Moreover, it may be expected that the mining needs will continue to provide the initiative for most new road construction for some years to come. It can be expected that most of these new roads will also serve tourism's needs.

The key problem for tourism is the dust and roughness imposed on auto traffic by the loosely gravelled surfaces of virtually all the Yukon roads. Both dust and roughness cause damage and create excessive risks for auto

traffic. The dust is most hazardous. It can rapidly discredit Yukon travel unless it can be remedied. These risks will be multiplied when the incessant ore-truck traffic between Anvil and Whitehorse begins in September, 1969. Paving such roads may still be too costly at present but dust inhibitors, or binding mixes, are becoming essential and may even be an economy. There is good evidence that the annual savings in the cost of replacing lost gravel from loose-gravel surfaces may more than compensate for the annual cost of dust inhibiting binders for such highways. It is recommended that a crash research program be undertaken to appraise comparative overall costs and benefits of such dust inhibitors. In the meantime, a minimum program for dust control is recommended to reduce the serious hazards now developing from the increasing dust. It is also recommended that a modest rebuilding program for the Northwest Highway System be undertaken to remedy its greatest long-run defects.

Accommodation and related services have been a major handicap in the expansion of the Yukon tourist industry. In recent years, there has almost always been a severe shortage of good hotel accommodation during the peak of the tourist season. The shortage of good restaurants, especially outside Whitehorse, has been even more critical.

The deficiencies in these facilities have hampered the growth of the burgeoning bus tours initiated in recent years.

It should be emphasized that the 24 camping sites maintained by the Department of Forestry have been particularly well prepared and supervised.

The quality of the hotel and restaurant services needs to be improved in many cases and the quantity needs to be expanded. Suitable licencing and standards should be instituted to raise the quality of service where necessary.

Promotion of tourism has made excellent progress since it started on an organized basis a few years ago. Promotion expenditures are small in proportion to tourist revenue relative to all the provinces, but indications are that it has been effective.

Much of the recent promotion has been coordinated closely with that of Alaska and it is recommended that this should continue. Yet increasing attention should now be given also to the unique attractions to be found in the Yukon environment and history.

Conclusions

The tourist industry, though still highly seasonal, tends to be relatively stable while growing rapidly. Its stabilizing influence will have a favourable effect on the Yukon economy as a whole by moderating and softening the effects of the uneven changes that occur in the mining industry. In addition, the economic potential of the tourist industry is itself substantial.

The tourist industry in the Yukon has made remarkable progress since the early 1960's. Although there was little growth in 1967, during Canada's Centennial year, the average annual growth rate from 1962 to 1966 was about 17 per cent. This rapid growth can be attributed to the great increase in leisure and incomes that has expanded the demand for tourism and recreation so greatly. It is related to the increasing attractiveness of wilderness areas like those of the Yukon as such attractions become overrun elsewhere. It is related to the opening of previously inaccessible recreational areas by the extension of roads for mining. It is related to the improvement of camping and motel facilities in the Yukon. It is related to the special

joint attractions in the Yukon and Alaska for tourists in recent years.

The rapid growth rate of 17 per cent a year from 1962-66 is unlikely to be maintained in future but an average annual rate of 10 to 12 per cent appears quite possible provided a few handicaps to growth can be removed.

The most immediate of these obstacles limiting growth are the dust and other road hazards; the deficiencies in availability and quality of accommodation, meal services and related services; and inadequate funds for promotion and development.

If these obstacles can be adequately removed, and the recreation resources can be preserved in their attractiveness, the Yukon tourist industry is projected to expand five to sixfold by 1985. It will expand more rapidly if adequate provision is made for national park recreation. The number of tourists can be expected to increase from an estimated 100,000 in 1967 to 300,000 or 400,000 by 1985. As accommodations expand and other services improve it may be expected that daily tourist expenditures will also increase. Length of stay may be expected to increase also. Overall, where the average tourist party in 1966 was estimated to have spent almost \$30 per day in the Yukon, it may be expected that daily

expenditures will rise to \$50 or \$60 per party per day with the extension of facilities and services by 1985. Thus, where the value of tourism was estimated at nearly \$7 million in the 1967-68 fiscal year, by 1985 it may be expected to rise at least to \$50 or \$60 million a year. If the season can be effectively extended it will rise more than that.

Summary of Recommendations

To make possible this growth of the tourist industry, certain measures are recommended.

It is recommended that the present high quality of the tourist resource environment be maintained, in part by maintaining the present high level of care of resources as the use of them by tourists expands, in part by providing adequately for wilderness reserves by strategic and economic selection of areas for national parks and in part by expanding the development of campsites, nature trails and such.

It is recommended that immediate steps be taken to eliminate the dust and roughness imposed by the loose-gravel surfaces of Yukon roads. Dust creates most offensive and hazardous problems for tourists. Paving may still be too costly as a remedy for the dust problem

but the evidence indicates that other low-cost methods may take care of it satisfactorily. A threefold attack on the problem can be recommended. It is recommended that an effective study be undertaken as soon as possible based on technical testing and research, as well as cost-benefit analysis, on methods of inhibiting dust and binding the gravel on the highways of the Yukon. It is recommended that \$2 million to \$3 million be devoted to such a study on a crash program basis to appraise the most effective method of inhibiting dust, taking account of the savings in road maintenance, in gravel replacement, in accidents, etc., as well as the increased revenues from tourist and other highway traffic. The objective would be to approve and apply the most favourable method as soon as possible.

A second step recommended is to provide a temporary program of dust control for the year or so required before the above special study can provide a more permanent solution. Perhaps it may be sufficient to institute a simple method of sprinkling the highways with water or oil from a tank truck where the dust problem is most severe. Something of this nature will be essential when the movement of ore from Anvil to Whitehorse begins in the fall of 1969 but in this case the user cost may be attributable mainly to the carrier.

A third step recommended is the inauguration of a modest annual program of progressive rebuilding (and relocation where desirable) of those parts of the Northwest (Alaska) Highway System that are most in need of such rebuilding to bring these weakest links, including bridges, up to a satisfactory standard of road-bed that can eventually be paved with confidence where warranted by the growth of traffic.

To stimulate the expansion of these services it is recommended that specific objectives be undertaken now for the long-run development required. These objectives should include early provision for long term planning for tourist industry development; establishing standards and supervision for facilities and services; measures to provide or facilitate the financing, where necessary, of additional facilities; and otherwise administering and promoting the improvement of the structure of tourist services. It is recommended that a special revolving fund of \$500,000 to \$1 million be established to provide credit for such new facilities. It is also recommended, to avoid having the regulatory activities conflict with promotion, that the agency handling this facility development program be closely associated with, but not part of, the tourist promotion agency.

It is recommended that part of this facility expansion program be directed toward facilities suitable for attracting tourists during the whole year as an initial step toward expanding the tourist season into the winter months. The opportunities for such winter recreation for Yukon residents as well as tourists from outside the Yukon have been increasing as population and incomes grow.

It is recommended that the Department of Forestry extend its excellent campsite development program.

It is recommended that the promotion of Yukon tourism and recreation be increased to a level more in harmony with the immediate opportunities and tasks before it. The promotional activities themselves should be increased but at this time it would be desirable also to have a thoughtful appraisal of the special tourist attractions available in the Yukon Territory - not the standard, canned huckster-type of appraisal but one that explores the unique and intrinsic features that can attract tourists to the Yukon environment in particular. Such a study should be fitted in with the long-run development plan for the Yukon tourist industry outlined above. It is recommended that, as conditions and information permit, the promotion of the intrinsic attractions of the Yukon Territory be given more emphasis.

It is recommended that the excellent coordination of Yukon promotion with that of Alaska be continued and expanded as warranted.

Potential Contribution to the Economy

It may be expected that the tourist industry will continue to expand at a relatively high rate. If the above recommendations are implemented, its growth rate will be higher. With warranted improvements, it is projected that by 1985 the number of tourists visiting the Yukon will have reached close to 400,000 a year. The output or value of the tourist industry by 1985 (based on its estimated value of \$7 million in 1967) will rise to \$50 to \$60 million. Additional private and public capital investment to meet the warranted expansion requirements of the tourist industry in the Yukon is projected at \$20 million for facilities including campsites. Employment in tourist accommodation and related services is projected to rise from an estimated 270 year-round workers to 1,500 year-round employees.

CHAPTER 13

THE SERVICE INDUSTRIES AND PROCESSING AND MANUFACTURING

The Service Industries

Current Development

The service industries are defined here to include trade services, construction, general services (professional, business, community and personal services), transportation and other utilities insofar as their contribution in employment and output are concerned, and the public services. These service industries provide an estimated 74 per cent of the employment in the Yukon Territory.^{1/} The resource industries plus manufacturing provide the other 26 per cent of employment. The service industries tend to provide a more stable level of employment month-to-month than the resource or manufacturing industries^{2/} even though they depend largely on the mining industry as the central source of their operations.

^{1/} See Table 10, Yukon Statistics Report 1968.

^{2/} Ibid., Tables 14 and 15.

Much more needs to be done in gathering, compiling and publishing data on the service industries in the Yukon before they can be adequately appraised in terms of their current and potential contribution to the Yukon economy. The data available in 1968 was quite limited.^{1/}

A general appraisal of the service industries in the Yukon indicates that they are weak in many places but may be approaching a stage of expansion and greater specialization. Overall, the service industries tended to provide only a minimum of activities. Retail services were well developed in the four largest centres but there were very few wholesale services. There were few specialty shops but good to excellent department store services. Professional services (lawyers, doctors, accountants, etc.) were well represented although their distribution outside Whitehorse was not extensive. Newspaper and television services are handicapped by the small market but are in process of improvement. Service

^{1/} Ibid. p. 28, et seq. The difficulties of assessing the potential of the service industries of the Yukon were multiplied by the inadequacies of the available statistics. The lack of Dominion Bureau of Statistics data on construction in the Yukon was one major weakness. Separate data were not available on retail and wholesale merchandising or on the service trades (except for Whitehorse). In the course of this study special efforts to remedy these deficiencies have been made by the Dominion Bureau of Statistics and it is anticipated that much more separate Yukon data will be available in future years. In the meantime, it was possible to make estimates that could indicate the basic structure of these industries.

trades such as for repairs, machinists, etc., are mainly provided by the large mining or transportation companies themselves with others sending out for services to Vancouver or Edmonton.

Yet in spite of these deficiencies in the service industries there were indications that the Yukon was now reaching a stage in growth where some of these weaknesses would be remedied in the near future. Past deficiencies in services were related to the smallness of the Yukon economy and the limited demand for them. With the Yukon's economic growth since 1966 and its expected continued expansion, there will be an increased demand for services that should stimulate both an expansion and a widening of their range. This growth of services may be quite rapid for a time as the economy expands. It may be expected also that the relative costs of some of these services will decline as their expansion proceeds because of the competition and new technology that will thereby be brought in. Moreover, new roads, availability of electric power and other improvements in the Yukon can be expected to help reduce the costs of these services in future. In construction, for example, where it has been estimated that capital costs of mining facilities or such have been about 50 per

cent higher than costs in other major mining areas in Canada,^{1/} it may be expected that such margins in future will be substantially reduced. Such cost reductions will be a major stimulus to further economic growth in the Yukon.

Some support and selection in the encouragement for expansion of these services would be desirable and this task could well be taken up by bodies such as the Research and Development Institute, the Yukon Chamber of Mines and the Whitehorse Chamber of Commerce.

Conclusions and Recommendations

Information on the service industries needs to be improved. Yet there is enough to indicate that they employ a major part of the Yukon labour force, though their activities are supported mainly by the mining industry. There is need for expansion and rounding out of the service industries in the Yukon. Part of this may develop spontaneously but the importance of these industries to the future of the Yukon indicates that some of the improvements will require the support and guidance of those concerned with the growth of the economy. The potential of the Yukon economy depends on an effective

^{1/} See Mineral Industry Study 1968, Ch. 1, p. 4.

expansion and improvement of these services in the Yukon and on a reduction in their costs. To bring about the required improvements, selective support and guidance is likely to be needed both from those people who will use the services and from those who are concerned with the growth of the Yukon economy. It is recommended that the community development agencies in the Yukon take up this task.

Contribution to the Yukon Economy

The rate of growth of the service industries depends mainly on the rate of growth of population and of other industries. Much of it will depend on the mining and tourist industries growth. Information is not adequate to make precise projections of output, employment and capital requirements of the service industries by 1985 but it has been possible to make some estimates. These estimates are based mainly on projections of mining employment and population and on past relationships of service industry employment to mining and population. In 1961, employment in the service industries was 2.5 times the employment in mining. In 1985, it is estimated that this multiple will have fallen to about 2.0. On this basis, it is estimated

that employment in the service industries will rise from an estimated 3,454 workers in 1966^{1/} to 13,500 workers in 1985,^{2/} an increase of 10,000 workers.

The output of the service industries in 1966 can be estimated at roughly \$35 million in terms of value-added.^{3/} On this basis, it is estimated that output will be multiplied about fourfold in value-added terms, or to about \$140 million by 1985.

Capital requirements for the service industries are here designated to include only the additional capital needed for retail and wholesale trade, personal and professional service activities, and such. For the 17-year period 1968 to 1985 these private capital requirements are projected to be about \$100 million.

Processing and Manufacturing

Processing and manufacturing operations are quite limited in the Yukon Territory. This may be explained largely by the smallness of the market, competition from processors elsewhere, lack of low-cost power, and other

^{1/} Comprised of construction, 1,171; transportation, etc., 747; and trade and services, 1,536; but not including government service. See Table 10, p. 58, Yukon Statistics Report 1968.

^{2/} Mining employment in 1985 has been estimated at 6,600 workers.

^{3/} See Table 69, Yukon Statistics Report 1968.

high costs of operation. There are already a few small manufacturing operations in the Yukon, there are a few others that might be developed but it should not be expected that a wide range of such processing can be developed in the Yukon.

Present Contribution to the Yukon Economy

Data on manufacturing for the Yukon has not been published separately but it was possible to develop estimates of the main operations. Gross output of Yukon manufacturing was estimated to average about \$600,000 a year in the period 1961-66.^{1/}

Manufacturing in the Yukon was reported in the 1961 Census to employ 95 workers or 1.5 per cent of the labour force.^{2/} By 1966, estimated employment had decreased to 65 workers, and was 0.9 per cent of the labour force.^{3/}

There were 13 manufacturing establishments reported for the Yukon and Northwest Territories by the Dominion Bureau of Statistics in the 1964 census of manufacturers - food and beverage industries had four

^{1/} Table 69, p. 120, Yukon Statistics Report 1968.

^{2/} Labour Force, Census of Canada, 1961, Dominion Bureau of Statistics Catalogue No. 94-518.

^{3/} Table 10, p. 58, Yukon Statistics Report 1968.

plants; wood (sawmill) industries, five; printing, publishing and allied industries, three; and petroleum, one. Evidence in addition to this 1964 census information indicates that two of the food and beverage plants, four of the sawmills and two of the printing plants were located in the Yukon. There is also some home industry in the Yukon - in arts and crafts, native craft in clothing, etc., and some local handicraft work in jewelry and tourist items. These handicraft operations are primarily offseason occupations or work carried out by native women in their spare time. They should be viewed as likely to have little economic significance but rather as leisure occupations in the main.

The Potential for Growth of Manufacturing

Most processing and manufacturing plants require a fairly large urban market before they can operate profitably. As the population of the Yukon continues to grow, more of these plants may become feasible, especially in the food and beverage, woodworking, metal fabricating and such industries.

Even now there are a few processing and manufacturing operations which show promise of being feasible and warrant careful appraisal. A recommendation has

already been made for a feasibility study of the potential for a lead-zinc-silver smelter in the Yukon or nearby. Such an enterprise might be expected to require an investment of \$40 to \$50 million and have an output value of about \$25 million.^{1/}

Good opportunities have been indicated in the expansion of the processing of forest products. There are, for example, adequate timber resources for two sawmills and a wood preservative treatment plant in the Watson Lake district (one sawmill is now in operation and another is being planned); for one or two sawmills in the MacMillan and Pelly River area; for one mill in the Nisutlin River area; and for up to ten other sawmills scattered through other parts of the forested Yukon. A sash or woodworking plant should soon be operating in the Yukon, probably in Whitehorse. By 1980, it is expected that a refiner groundwood plant for producing dry baled pulp probably located near Carmacks will be feasible and eventually another pulpmill on the Liard River. A plywood plant may be warranted when the population is multiplied several times.

^{1/} Feasibility Study, Supplementary Report, Lead-Zinc Smelter, Pine Point, Northwest Territories, Canadian Bechtel Ltd., January, 1968, Table 1-1.

The contribution of these specific manufacturing opportunities to the Yukon economy has already been included under the specific resource industries. Beyond these, there is only a limited scope for processing and manufacturing. As population grows and as lower-cost power and other local services become available, it may be expected that small secondary manufacturing plants will begin to multiply. But except for the processing of minerals and forest products, it is not expected that secondary manufacturing will make a very significant contribution to the Yukon economy.

CHAPTER 14

SUMMARY OF YUKON GROWTH POTENTIAL: OUTPUT, CAPITAL, MANPOWER AND POPULATION

Projection of Output, Capital and Manpower to 1985

At this point it is desirable to draw together in brief summary the projected contribution to the Yukon economy of each of the foregoing industrial sectors. For this purpose the period 1968 to 1985 has been used for the projection and all industry estimates have been adjusted to that period in these calculations (Table 9). Total gross output of all industries in the Yukon is projected to rise to about \$470 million by 1985, about an eightfold increase. Capital requirements for this increase in output are initially fairly high, estimated at over \$1,300 million,^{1/} including both public and

^{1/} Additional capital requirements for social services and housing are not included in this total. These would be expected to require an additional \$100 million of capital by 1985.

TABLE 9

PROJECTED GROWTH OF THE YUKON ECONOMY TO 1985:
OUTPUT, CAPITAL REQUIREMENTS, MANPOWER REQUIREMENTS

Industry	Annual Output 1985	Additional Capital Requirements 1968-1985	Additional Manpower Requirements 1968-1985	Total Industrial Manpower 1985
	(thousand dollars)	(thousand dollars)	(number of workers)	
Minerals ^{1/}	240,000	1,000,000 ^{2/}	4,700	6,600
Electric Power	30,000	180,000	500	600
Forest	13,000	17,000	500	550
Agriculture	50	75	10	20
Trapping, fishing, etc.	l.c. ^{3/}	l.c.	l.c.	70
Tourism	50,000	20,000	1,200	1,500
Service, including transportation, construction, retailing, etc.	140,000	100,000	10,000	13,500
Processing and Manufacturing ^{1/ 4/}	l.c.	l.c.	l.c.	100
Projected Total All Industries	473,050 ^{5/}	1,317,075 ^{6/}	16,910	22,940

- ^{1/} No projection is included here for the output or capital and labour requirements for the smelter proposed for a feasibility study.
- ^{2/} Includes \$300 million private capital for mining development, \$500 million public capital investment for transportation (estimated as follows: additional rail services, \$200 million; new roads, \$100 million; Northwest Highway System improvements, \$100 million; upgrading other highways, \$50 million; airfields, \$25 million; other transportation services, \$25 million) and \$200 million public capital for townsites and other facilities and amenities.
- ^{3/} Little change from 1968.
- ^{4/} Prospects for expansion of processing and manufacturing are small unless a smelter is found eventually to be feasible.
- ^{5/} This total should not be taken to represent the net territorial product (e.g., comparable to the GNP for Canada) because it would include considerable double counting.
- ^{6/} For social services and housing an additional \$100 million of capital requirements has been estimated.

private investment, for this 17-year period. Additions to the labour force in mining operations are estimated at 4,700 workers. Additions to the total industrial labour force in this period are estimated at about 16,900 workers. With the initial labour force in 1968 estimated at about 6,000 (excluding government and defence), this results in the total industrial labour force, rising to an estimated 23,000 workers (including 6,600 mine workers), by 1985.

These manpower estimates do not include government service or defence employees which in 1968 were estimated at about 1,300 persons. It is estimated that government and defence employment will rise to about 1,500 by 1985, giving a total labour force in the Yukon Territory in that year of about 24,500.

Population Projection

An estimate of the population of the Yukon in 1985 may be made from these projections of the labour force. An approximation of the population growth can be calculated on the basis of the established ratio of the labour force to the population. The proportion of the population made up by the Yukon labour force is provided

by the census data. The most recent labour force data on this was gathered in the 1961 census. In that year the Yukon labour force comprised 43 per cent of the Yukon population. This was a higher proportion than for Canada as a whole where the proportion was 35 per cent and higher than for Ontario, the province with the highest proportion (38 per cent). The higher proportion of labour force in the Yukon population may be explained mainly by the large proportion of single workers in the population. It may be expected that this ratio of labour force to population will continue in the Yukon over the period to 1985 because it will be necessary to bring in most of the additional labour requirements. On this basis, the population of the Yukon Territory may be projected to increase by a corresponding multiple of the projected 1985 labour force of 24,500. This would estimate the total population of the Yukon at about 57,000 people by 1985.

CHAPTER 15

BASIC DEVELOPMENTAL SERVICES: POWER AND TRANSPORTATION

Introduction

The growth potential of any economy, it has been noted, depends not only on the physical resources and the numbers of people but also on the accumulation of capital resources and the good judgement with which the efforts of the people are guided. Basic services like power and transportation measure most clearly the degree of success that an economy enjoys in this accumulation of capital resources and the good judgement with which the people are guided.

The effectiveness of these services are a major determinant of the growth potential of any economy. It follows that the approach or "good judgement" with which these services are developed can be a major influence on how rapidly the economy moves forward.

In the past, because the long-run outlook held relatively little promise, each new demand for power tended to be considered in terms of discrete additions to capacity, a new generating plant or a new road, each subject to the lowest capital cost which would satisfy each new demand without much thought of anticipating future demand. In the lexicon of development, the approach up to the present has been largely ad hoc and often ex post. Ex ante planning for anticipating or stimulating new demand has so far been fairly limited, confined mainly to parts of the road program.

This approach has no doubt been quite appropriate to the past stages of development of the Yukon. What has been provided is minimally sufficient to supply the needs of current production and immediately anticipated production by those enterprises now committed to development of a particular resource. With only a limited economic potential in prospect, they had to fall short of offering the planned reserves of services that can provide the incentive for effective economic expansion in the Yukon. This is not to say that Yukon industries could not continue to make some progress on the old basis in the future. They could but it would be less than was warranted.

The single enterprise calculus which made New Imperial, or Anvil, or Clinton Creek production feasible can continue to operate for probable new developments for an interim period of another decade or so. Each of the

present new activities, and in particular Anvil and Clinton Creek, has caused additions to be made to the highway system which will make subsequent similar developments at least no less possible and perhaps even more probable.

As with social and financial services, power and transportation are inputs for industry which can be either publicly or privately provided. Canada has examples of both, in pure form and mixed. The private provision of power is giving way to public on pragmatic, not ideological, grounds everywhere. There are no special circumstances in Canada's northwest which would keep this trend away from it, at least not for much longer if development is to be fostered relative to its potential. One would be hard put to make a case on economic grounds for private provision of electric power once development reaches the stage requiring a general community utility and the beginnings of a grid system.

Moreover as long as power is locationally demanded in relatively small amounts with moderate peaking of loads by mine sites in isolation, the diesel generating plant may be as close to an optimally economic unit as is practicable. Ownership of it might as well be not only private but privately owned by the main user. The question of ownership is also relatively unimportant in isolated towns

where loads are such that diesel power units with their lower capital costs and shorter life are involved. Arguments based on the relative efficiency of private versus public ownership and distribution under these conditions may have weight at times on either side in terms of their operating or administrative efficiency. Many small communities in Canada have taken over the generation and distribution facilities from private owners in order to improve the reliability and efficiency of operation or to capture the profits.

In transportation, the public sector is becoming increasingly involved, again on pragmatic, not ideological, grounds. No one, least of all the operators of trucks, cars, ships and airplanes, advocate strictly private involvement. In the provision of the vehicles, private ownership is still the norm but in the provision of every other facility (roads, harbours, airports, etc.) the public sector is expected to provide, and to do it promptly and adequately. A great deal of heat could be converted to light if the criteria accepted as normal for the involvement of the public sector in road, water and air transportation facilities could be applied to a number of other facilities, especially power, which are equally necessary inputs to the economic process.

In the Yukon the urgency of need for basic developmental services stems only partly from realization that

present facilities are inadequate to support a sustained developmental thrust which seems already to be in its nascent stages. In part, the present pressure in the Yukon for better facilities arises from past experience of high-cost transportation. Intuitively the Yukon realizes it needs larger facilities and from experience it knows it needs lower-cost services. Beyond this, the complaints about the high costs of power and transport are universal.

The recommendations which flow from the analysis and conclusions of this Report concerning power and transportation have very little to do with short term ameliorative steps for the immediate future. This is not to say that our studies have not made us aware of the excessively high charges for power in the domestic and industrial scene, nor that it is not desirable that something might be done to alleviate them in the north where the winter hours of darkness demand so much artificial light and heat. But the causes of high power costs lie in the transportation sector at present - as the cost of heat does, since the governing price of fuel oil sets both prices - and it is not obvious that prices of heating oil and diesel fuel are as low as they might reasonably be even under the present monopolistic transportation environment. It is agreed that the existence of high prices, due either to high costs

or to a measure of exploitation, or both, is no argument for extensive public investment in power facilities or in transport facilities to remedy them. There are other, better ways available to the public authorities either by regulation of public utilities and transport to overcome any element of exploitation or by outright subsidy to alleviate some of the high costs due to climate, distance and darkness. It can be argued, after all, that the climate, distance and latitude are Canada's, since she claims the territory, and not the property or the responsibility of the local residents.

Any argument put forth in this Report for better power and transport facilities must be based on an analysis of developmental necessity, not on an amelioration of present plights. If, as a byproduct, the improved facilities succeed in lowering prices to residents, that is, after all, one of the main incentives that residents have for wishing to see development take place. They want it in order to see their lot improved by creating more real income in the region in the form of better prices, better jobs, and better amenities. These are quite justifiable motives - the same as lie behind the drive for development of any kind.

Moreover, the argument for developmental policies in the basic services of power and transport need not rest

on a possible reduction of the prices of these for the present community, urgent as that may appear. If there was little or no prospect for an expansion of development much greater than now exists, or if the geology of the region was such that mineral production could be expected only from widely scattered large rich ore bodies, much less emphasis might be placed on a reorientation of power and transport and more could be placed on the provision of basic social and financial services to reduce prices and accomplish optimum but limited development. After all, it is fairly obvious that a good deal of incentive can be created by skillful use of administrative devices which require very little public capital funding. But where a greater physical production potential exists, the use of public funding for capital works creates the ability to supply services at reasonable prices, stimulates profitable activity both in the region and well beyond it from which the whole nation, including the revenues of the public sector, benefits perpetually. And in the course of this, it achieves incidentally on the humanitarian side many of the desirable results which an expansion of social and fiscal services can produce while having little impact on economic expansion.

Some additional emphasis should be given to public participation in the provision of power and transport in the

Yukon. In any new region, development can only occur with large-scale importation to that region of economic inputs. Labour and capital are in short supply. New regions in development require that capital, in the form of machinery, equipment and technology be brought in to be applied to the exploitation of local natural resources. Managerial, administrative and labour skills must also largely be imported.

Since so few of the initial requirements are generated within the region, it is normal to expect that most of the outputs must find a market outside the region. This pattern applies not only when specific imports are brought in for particular new mines, but also to the whole commercial and business environment which services the new natural resource activity. In all activities for which skills, goods and services are imported, the revenues from the enterprises in the regions must go outside to pay off the funded debt, pay the profits to the entrepreneurs who ventured, and the necessary taxes, royalties and other charges to the public sector. The new activity creates outside employment and income in both the capital goods industries and consumer goods industries that sell products and services to the new enterprises. Hence the benefits from development in a region are diverse and distant

from the focal point of the activity. Much of these benefits are in the private sector. The public sector reaps revenues from all this widespread associated activity through collection of private and corporate income tax, sales taxes, etc. from the whole economy that has benefited.

It is impossible to measure fully the total effect upon both private and public sectors. Narrow cost-benefit studies cannot reasonably be expected to encompass the totality of the multiple effects of such a developmental policy. Useful as such studies may be in specific instances to assist in setting priorities for investments in the public sector, it is erroneous to use the sum of them as the sum total of beneficial effects. The whole, in this as in so many cases, is not the sum of the parts. It is greater. There falls into the interstices between specific cost-benefit studies, benefits which cannot be ascribed to any one of them but which occur nevertheless.

These substantial and unmeasurable benefits arise particularly where there is a systematic provision of power and transport facilities. It is because of these far-reaching economic benefits that can arise from the exploitation of the economic potential of the region and the nation, that proposals for the public provision of power and transport facilities can be put forward on a sound

economic basis. The possibilities that they may also help fulfill Canada's destiny in the North, may reduce the current high costs of power and transport in the Yukon, and may smooth the unevenness and volatility of economic growth in the northwest region, are benefits still to be added in.

Planning the Supply of Power to the Yukon^{1/}

The demand for power is normally considered to be a derived demand, derived from the demand for the end products it helps to produce. In the Yukon these primary end products are largely mineral concentrates. They depend upon world markets where prices are set beyond the influence of Yukon producers. Thus, the mineral resources of the Yukon will only meet world prices if Yukon production costs, including power costs, are low enough to leave an adequate prospect of profit to the Yukon enterprise.

To date, the cost of self-generated or purchased power, high as it is, has been met by mining only the higher grade and larger ore bodies. But the minerals of the Yukon do not all fall into the category of high grade ores. The

^{1/} Electric power resources and the industry potential are examined in Chapter 8. Here the role of the public and private investment in provision of systematic power services is taken up.

extensive known mineralization could be much more intensively exploited if power, amongst other things, could be assured at a reasonable cost. This is not to suggest that power for these mining enterprises need be sold at "subsidized" prices. In order to get adequate amounts of power at prices prevailing elsewhere there needs only to be established larger generating sources with a growing power grid.

The availability of adequate sources of reserve power from larger hydro-electric or coal sources reduces the capital cost per unit of power output over smaller autonomous power plants designed to provide only enough capacity for the initial users. With adequate reserve sources, system economies can be gained in providing normal requirements, in spreading peaking requirements and in adding sufficient reserves to meet new demands. Capital costs are spread over both time and distance to give leeway for a rational pricing system in keeping with the twin policy goals of recovering costs and encouraging utilization.

Without public power this is not likely to occur. For example, for the private user supplying his own service or the franchise operator supplying a settlement, the return and the pay-out period for the capital invested must be comparable to those that he could expect in an alternative investment. On these terms, it should not be expected that

private investors will commit large blocks of capital, as sunk costs, for long-term investment in anticipation of future large power demand in new regions such as the Yukon. Even faced with the large projected growth of power demand to 1985 and beyond, private capital is unlikely to respond to the challenge because of the long pay-out period and the low and uncertain rate of return. The provision for reserves of power in comparatively large blocks at something approaching predictable and reasonably uniform rates falls clearly within the ambit of the public sector. The anticipated growth of demand for power to 1985 and beyond is based on the expectation that it will be available under these conditions. Much of the demand will not be there if the supply cannot be assured. This is not a demand which is necessarily self-fulfilling. While it is true that in many types of mining activity the cost of power, however provided, is not a very significant cost factor, it is equally true that when it is available, the decision to proceed with the enterprise can be much surer. In addition, the processing and smelting of the ores in the Canadian northwest depends greatly upon the presence of large amounts of power at rates comparable to competing areas in Canada.

Provision of power from the public sector is not in any sense a free gift. All it does is remove from

the private to the public sector the burden of funding large investments which can only be recuperated over a long time. What it also does is offer as largess to the public sector the economies which come from the larger scale of operations. Thus, the public sector, dropping the narrower benefit-cost ratios by which private enterprise must reckon to survive, can recoup its expenses both over a longer time period and through many indirect channels. For example, the added employment earnings which fulfilling the demand for power will help create, plus the corporate earnings of the users, generates many types of tax imposts which would otherwise not arise or which would arise with less leverage in other regions under the assumptions postulated for this analysis. Yet even the generation of tax revenues by this type of public expenditure, while satisfying to the balance-sheet requirements of government, is secondary to the benefits of the increase in real output which the provision of power can produce.

Transportation Planning in Yukon Development

Transportation planning in the Yukon, to 1985 and beyond, has three distinct roles to fulfill. The first is to continue to provide facilities competent to serve the

present economy, with its expected intermittent growth during the planning and development period. The necessary concentration upon the future must not permit deterioration of present facilities in the interests of the longer term. The second role is to provide adequate facilities to stimulate exploration of the mineral potential of the region. It is vitally necessary to gain increased knowledge of resource potential for the whole range of developmental planning necessary for a new region. The third role is to create a total transportation system using present and new facilities in all modes, adequate to serve the region's potential at rates comparable to rates in other developmental regions.

Transport Facilities for Present and Expected Traffic

Present transport facilities, in all modes, are essentially Whitehorse based. The southeastern extremity of the Territory has been developed more apart from a Whitehorse orientation by the presence of the Alaska Highway overland connection to the national highway grid and railroad at Fort St. John and Dawson Creek but the major proportion of tonnage transported in the Yukon still uses Whitehorse as its destination or staging point. The direct rail connection to tidewater ends at Whitehorse, and the main pattern of Territorial roads reaches out into the

hinterland from Whitehorse. It is, from the accident of its historical location, the centre of commerce, administration, population, and amenities for the Territory. Transport planning for the next period of time must recognize that fact. Because of the development of Whitehorse and the pattern of rail, roads and air services developed from it, new commercial and industrial activities in this interim period will inevitably arise within the orbit of Whitehorse, and be oriented toward the southwest.

Transport facilities in the meantime will continue to be improved along their present patterns. Improvements needed are of two types, one involving public investment and the other involving regulation of existing services.

Interim Investment Policy. Rail. No public investment in rail services need be made to supplement or complement the present rail facilities. The private owners have brought the railway and its ancillary water and road services to the optimum efficiency practicable, given the limitations of the plant and the monopolistic nature of the facility. There is no evidence that public investment is needed or desired. Since the long term role of the present railway is, in relative terms, undoubtedly a diminishing one, no good purpose is served by crystallizing the

present Yukon tidewater orientation by public investment in the route.

Road. The road system which supports the present commerce of the Yukon is essentially the Territorial trunk highways system, the Alaska Highway, and such development roads as now exist, or are being built, which will, in the interim period to 1985, become a regular part of the Territorial system. All of these roads need to be maintained, and upgraded.

With the increase in traffic density occasioned by new mineral production being hauled to railhead and the growing number of automobiles and trucks on the roads in the ordinary pursuit of business, the present road system will become a growing source of frustration and consternation. Add to these uses the seasonal peaks in traffic from a rapidly expanding tourist industry, and whole sections of the road system will rapidly reach the tolerable limits of safety. Increasing hazards of dust, tire damage, vehicle breakdown, and accidents will incite the public temper to the point where economic argument becomes irrelevant. Apart from the social need to improve driving conditions, traffic increases will increase the costs of maintenance, without any net improvement in the roads.

Prudent public policy must begin now to carry out extensive and intensive experimentation on dust control;

not to find whether it is practicable but to find the best way to accomplish it. There is no alternative to action, if the standard of highway service is not to deteriorate sharply in the next few years.

Dust control is not the only improvement expenditure required. Both the Territorial trunk highway system, as it grows, and the Alaska Highway will require some relocating, re-routing and rebuilding, to reduce maintenance and to improve safety and time in traverse. The Territorial roads will require substantially less of this treatment than the Alaska Highway because they have been better planned and built more recently to better standards. And only some of them will be major tourist routes. Nevertheless, maintenance expenditures on some Territorial roads, such as the Ross River-Whitehorse road, will rise with the heavy and sustained movement of ore transport, and such traffic may well require the road to be rebuilt in places from time to time.

The Alaska Highway, on the other hand, is no longer able to sustain under the increasing traffic, the level of service it has rendered to date. Its route is circuitous. Its foundation is weakening. The rebuilding and paving of its whole length was apparently not justified

for the foreseeable future according to a report by the Stanford Research Institute.^{1/} Nevertheless, the roadbed conditions which now exist and can be expected to intensify as traffic continues to increase, require that some policy beyond the present levels of maintenance be started soon. Apart from the cost and benefit analyses which may be cited, the simple fact is that the Highway, with all its limitations, is there. It is serving a public as well as an economic purpose, and growing in such uses. It is inconceivable that it can continue as it is for many years. The questions of how much to improve it, how best to improve it, how fast to improve it, and when to start, are all debatable. What is rapidly passing beyond the stage of debate is the question of whether to improve it. Pressures will continue to mount for an improvement program. Sooner or later the pressures will be yielded to. The rational policy is to step up an effective dust control experimental program, applied in the most useful places - near towns and camping grounds - and to begin a modest but consistent program of rebuilding and relocating the worst sections. The objective of the policy should be to have a road reasonably ready to carry a paved surface by 1980. Actual paving

^{1/} Improvement Program for the Alaska Highway, Queen's Printer, Ottawa, 1966.

should be confined to periodic extensions of the present paved sections, plus the portions near and through major settlements, and sections where local traffic is highest in density.

Analysis of present traffic patterns supports this policy. Analysis of data from the Stanford study^{1/} reveals that commercial traffic density tends to peak at the eastern end of the Highway is middling strong through the mid-section from Watson Lake to Whitehorse but falls off west of Whitehorse to about 40 per cent of the peak.

The highly seasonal tourist traffic, on the other hand, shows a more consistent density, with the peaking probably in the western reaches of the Highway where it serves as part of the "circle tour" with Alaska.^{2/}

The interim policy recommended here would enable the Alaska Highway to continue to serve the expected normal increases in traffic and to provide a gradually improved level of service at the same time. The dust, tire breakdown and accident hazards would be reduced by the application of selective dust control, some paving and the elimination of the worst grades and curves.

^{1/} Op cit., Chapter 5.

^{2/} See the study Economic Implications of Developing Selected Alternative Highway Routes to Tidewater from the Yukon Territory, prepared by Travacon Research Ltd., Calgary, for the Department of Indian Affairs and Northern Development, Ottawa, 1968.

Air. Until 1985 the public investment program in air facilities to support present commercial and administrative activities calls for steady but unspectacular improvement in the facilities already in existence and the creation of additional ones as traffic demands. There are good reasons why the criteria applicable for airport and navigational improvements in the rest of the country should now also be used in the Yukon. The actual expenditure for air facilities to serve normal growth will be determined as much by regional air policy as by any predictions about regional growth of traffic. Public air investment policy is much more intimately tied to the provision of facilities for exploration and development, and treatment of that subject is found later in this section.

Regulatory Policy. Rail. Because of the various jurisdictions under which the present railway falls, almost no effective rail regulation, particularly rate surveillance, is applied. Since the passage of the National Transportation Act in 1967 any jurisdictional doubts have been dispelled. The broad powers vested in the Canadian Transport Commission give adequate scope for review and decision about general and specific rail rates applicable to the Yukon. The reasonableness of the rate structure must be thoroughly

examined by the exercise of the Commission's powers. The review is overdue. As part of the review the whole structure of contracts or conditions, explicit or implicit, which tie traffic to the White Pass and Yukon system, rail and highway, in both directions, and the possible implications of arrangements which may be in restraint of trade need a thorough examination. The smallness of the total traffic in relation to the size of other Canadian rail systems is no reason for ignoring the practices in the Yukon. The importance of the present rail oriented facilities to the Yukon, and the absence of effective competition make the situation ripe for review. Such a review of the oil pipeline services between Whitehorse and Skagway should also be carried out as expeditiously as possible by the National Energy Board.

Road. Commercial trucking in the Yukon is not yet regulated very much. Entry of firms can be controlled through restricting licenses but in effect, the restrictions are rarely applied, so far as is evident. Licenses may be issued for public service vehicles for general common carriage or for restricted service vehicles which are in effect for contract work. Rates are supposed to be filed but it is not apparent that the files are current.

Common carriage most often involves interprovincial transport. Hence the policies in Alberta and British

Columbia are important. Neither province is concerned with interprovincial rates, although control of entry is practiced in British Columbia. For contract carriage licenses, it is not required that the terms of the contract for interprovincial movements be disclosed.

Other types of regulation affect the movement of goods by road. One of these is licence reciprocity and in 1968 the Yukon had none. Prompt efforts to establish reciprocity between the Yukon and the Provinces, particularly Alberta and British Columbia, should be made.

Another type of regulation concerns weight limits. In the Yukon, with the present road system, weight limits are much higher than in the Provinces. With the commencement of the improvements recommended for Yukon highways, it will be necessary to place limits on gross vehicle weights and announcement of the limits should be made well in advance of their application. Reciprocity should be easier to achieve with a weight limit common to the neighbouring provinces.

A further, but perhaps minor regulatory improvement is a change in vehicle fuel tax from the present tax on fuel purchases to a tax on fuel consumption as in British Columbia. As long as higher fuel prices exist in the Yukon, the change should increase the revenue to the Yukon without burdening the trucker.

Air. Regulation of air services now falls under the jurisdiction of the Air Transport Committee of the Canadian Transport Commission. The Commission's policies concerning scheduled carriers have a distinct bearing on Yukon services. To date insufficient attention has been paid to the rates charged and to the monopoly implications of reserving scheduled service uncritically to one carrier.

Until recently, the scheduled air route into Whitehorse had many of the characteristics of a high cost service. The stage links were short through central and northern British Columbia, since the demand in the Yukon did not warrant a through service. But the route has revealed increasingly attractive prospects in terms of passenger load factor, air express, freight, and mail contracts.^{1/} Depreciation charges on the aircraft now in use cannot have been a significant cost for some time. The data necessary for a thorough review of the route are not generally available, but the regulatory authority certainly has access to them. Even without access, observation of several sorts give rise to questions about the efficiency of regulation in achieving appropriate service and fares to the Yukon.

^{1/} For example, group fares, a commercial device to utilize excess capacity, are not applicable to the Yukon.

For instance, if it is a high-cost, that is, low-profit, route why has the carrier been interested in securing a second, direct flight via Prince Rupert from Vancouver? If it wished to secure that additional route to improve its average profitability was it necessary also to permit the blanket 10 per cent increase of fares in April, 1968, to apply without examination of the circumstances? The standard fares were already higher than economy class fares for comparable distances elsewhere. Public responsibility by the regulatory authorities requires some explanation of the recent circumstances. For a region so distant from other centres where business and recreational contacts must be made, regional air policy and its regulation must watch more carefully than in the past the provision and cost of service, and do all that is necessary to optimize the service.

The policy for non-scheduled and charter services is also important in the Yukon and the northwest. There seems to be no specific dissatisfaction with present policy and its administration. Yet in this case also, regional developmental requirements must constantly be before the regulatory authorities to ensure that air services are as economically available as regulatory powers can ensure.

Sustaining Exploration and Development

The second role that planning for transport services must fulfill is that of ensuring the progressive exploration and initial development of resources. This will be ensured by policies expanding air and road facilities.

Airfield Policy. Present programs for public assistance for new airstrips point in the right direction. They need only to be applied more vigorously and extended.^{1/} In a survey such as this, it is not possible to suggest precise priorities between specific locations. Such priorities arise from a systematic and efficient program of assistance for construction and provision of appropriate airport facilities. These are reasonable and necessary expenditures to increase the sum of knowledge about the resources of the region, even though there is no direct return to the public sector. Private participants in such development airstrips

^{1/} Both the Department of Transport and the Department of Indian Affairs and Northern Development have airfield development policies. Apparently the Department of Transport has not constructed an airport in the Yukon since 1956, and the Department of Indian Affairs and Northern Development has not succeeded in assisting airports even to the extent of its own modest goal of averaging \$50,000 per year. Delays in processing applications are viewed seriously in the Yukon.

receive no direct return either. Airstrips of this nature are a risk venture in which the public sector has a major responsibility. The terms of public assistance could well be more liberal, particularly in ventures just beginning. For instance, serious interest by private enterprise in a venture as evidenced by its commitment to an exploratory program in the first stages, could well call for the creation of suitable airstrips totally at public expense. The expense is not great, and the increase in knowledge well worth the cost.

Access and Developmental Roads. The present programs for assistance to private enterprise in the construction of roads of various kinds to gain access to potential mine sites has been a most auspicious indication of new public interest in northern development. The original concept has been strengthened and realized by the improvements made as the program has progressed. The programs must be sustained and further strengthened to maintain the level of development interest and activity. One area where the program can be improved is in its administration. Decisions about specific roads which are to be constructed have often seemed to take inordinately long, especially considering the relatively modest amounts of money involved. Discussions with persons in the private sector who have been involved

with participation in the roads program have indicated considerable resentment at the delays and the fact that decisions were taken far from the scene. It was stressed again and again that the shortness of the season in the Yukon, the unavailability of road equipment on short notice, and the expense of holding the necessary core of labour, equipment and supplies makes early decision and implementation of programs quite essential. It was stated explicitly that proposed costs on roads to be built would be substantially reduced as well as the whole operation simplified and speeded up if tenders were called in the late summer of the year before actual construction was due to start.

Yet, these administrative frictions aside, the present programs of assistance to build resource access roads are proper in conception and would induce even greater exploratory and developmental efforts if the size and range of them were enlarged.

Planning Transport for Long Term Development

Accepting the steps necessary to keep service levels up to acceptable standards and to promote exploration of resources are tasks of transport planning of the first magnitude. Yet these are not the whole of transport planning for the northwest. They fall short of providing

the overall system of transport without which steady development is impossible. Without a system concept of transportation, fortuitous bursts of developmental activity will be the normal pattern. Sporadic ad hoc investment in transport facilities made to accommodate them will place additional strain on the capacity of the northwest economy during each new period of development. The subsidence of investment activity which follows each new development will aggravate the problems of readjustment and welfare which ordinarily attend these booms and relapses. The steadying and supporting effects of systematic provision of transport facilities has social as well as economic advantages.

A transportation "system" consists of various proportions of different modes of transport depending upon the mix of goods and people to be moved. Each mode has some distinctive service characteristics and each mode's optimum ability to carry overlaps other modes to a degree. But there are distinguishing characteristics of costs, capital costs as well as operating, which dictate the spectrum of services each mode can perform in competition with others. To some modes, speed is relatively more expensive; for others, it is the short versus the long distance between origin and destination which is a deciding factor; in others,

it is the expense of changing the route; and in others, the size of the shipment. Some, such as highway transport, are most economic because they operate smaller mobile units, others do better with larger units and fewer stops (railways), and still others (pipelines) offer economies for large uniform throughputs at modest speed. Air transport, where technology has been quite rapidly changing, may soon experience breakthroughs which will change its traditional pattern of relatively low capacity per dollar of investment which has made longer and faster operations most economic. On the fringes of the transportation mix are the untried modes, such as those employing the air cushion principle. Much more testing and experience will be necessary to determine the viability of these as part of a northwest transport system and for the development period under consideration, the established modes will have to be counted upon to carry the burden of traffic.

No transportation system can ever be quite ideal. The reasons are two. First, every system inherits a pattern of transport investment which has to be incorporated into the overall development. Second, even if the system was being constructed de novo, the nature and size of the transport function would soon err because new types of demand arise which force pragmatic changes in the system.

The nearest to an ideal system is one in which the extant portions can be fitted into the projected texture of development, and the future changes in demand are likely to be quantitative rather than qualitative. The Canadian northwest is a reasonably favourable region in which planning can approximate an effective, if not ideal, transport system for some time to come.

Given the limited range and types of resources in the northwest, the core of the future transportation system, as technology of transport now exists, must be a railway. It has the characteristics which permit the movement of large shipments of primary products over considerable distances at lower costs than other overland modes. Based on some suitable volume of movement, it has the means of carrying increased amounts of other shipments at very low incremental costs.^{1/}

A railway, of course, comprises only part of the entire system. Trucks, with their lower unit private capital costs, share roadways built for social as well as economic reasons with buses and private automobiles. The provision of fast specialized services and feeder services

^{1/} This statement does not mean that the basic commodities must necessarily defray all but their incremental costs. Many costs are joint, and the sharing of them is more commonly a matter of rate technique than of economic policy.

by road is a logical supplement to the rail system. Air transport, with its passenger and fast freight capability cares for a sector of the market which a railway in the northwest could not attempt to meet. Trucks and cars will supplement air services as well as increasingly (and properly) competing with them over certain routes. Road and air transport share the responsibility of servicing the exploration and initial development of new resources.

The Pattern and Orientation of the Transport System. The historic pattern and orientation of transport in the Yukon has been based on Whitehorse. The settlement was founded at the confluence of the southward limit of river navigation and the northward limit of rail from tidewater. The site has preserved its importance beyond the survival of the technology of river transport which created it. Subsequent road and air patterns, building out from the location, have bent present habits of thought, arteries of commerce, lines of administration and the spread of development to follow early traditional patterns. The result has been a consistent, if forced, insularity. Canada has been placed "outside". The Yukon, in habit of thought, channels of commerce, administrative posture, and deployment of development is still oriented toward tidewater through Whitehorse.

This centripetal influence has concentrated activities unduly in the southwesterly quadrant of the Territory.

If development in the Yukon is ever to become more than extractive, if the Yukon resources are to play a part in regional development and to benefit more fully its own development as well as that of the regional and national economies, the orientation needs to be changed. The road pattern has gradually been forecasting the change. Air services are in a pattern to participate, and have had an influence in breaking insular patterns of administration, commerce, and attitudes. A policy decision respecting rail transport is required to enable future development to be balanced with its resource orientation and its continental integration.

The mix of resources available for potential industrial development in the whole northwest region is truly impressive. In addition to the realized and potential mineral output from the Yukon, discussed elsewhere in the Report,^{1/} there is the presently increasing output of ore concentrates from Pine Point. In northern Alberta and British Columbia are large known reserves of oil and gas. The Peace River power projects have begun operations

^{1/} See Chapter 7, The Minerals Industry, in this Report.

and the Liard River power project is firmly on the agenda of future development in British Columbia. Power potentials of great size exist in the waters of the upper Yukon River.

Good coking coal is known in both Alberta's Smoky River district, where a railway is already under construction, and in the Groundhog area of northwestern British Columbia. Timber stands able to support viable industry abound throughout northern British Columbia and in the Watson Lake, Liard and Mackenzie districts of the Territories. Viewed regionally the resources potential in the Canadian northwest is large and diverse. Considerable investment in developing them is already underway for the continental and overseas markets.

Somewhere in the world in the next decade, according to the mineral study prepared as a background report for this Report, there is potential for another base metal smelter. It also shows that concentrates are carried great distance to existing smelters. Yet, given the necessary commercial connection to a world-wide metal marketing consortium, given the fortuitous location of a smelter close to sources of ores, fuels, power and reductants, the economies of production can be indicated. That "somewhere in the world" for a smelter could, with imaginative foresight,

be in Canada's northwest. Without such an industrial nexus the prospects for integrated development of the northwest are much less promising and remote. A rationalized transportation system can be the necessary first step and such a system inevitably means the addition of railway services.

Rail Services to the Northwest. Several possibilities exist for a rail route into the northwest. One route can be rejected on the evidence on hand. The firm choice between another two cannot be determined without detailed route studies and some fundamental policy decisions at the national level. In the light of announced plans by the federal Department of Transport,^{1/} with the Canadian National Railways, to study the feasibility of routes, the economic considerations set out here, can, at this stage, be mainly indicative.

A first economic consideration is that on the evidence it would clearly be a mistake to consider another rail route through Whitehorse. The present road and rail services there are sufficient to provide transportation with marginal amounts of new investment to improve capacity. A developmental railway will be most effective if it is

^{1/} Department of Transport, Press Release, July 25, 1968.

focussed on the major development potential of the Yukon. The major potentials for mineral traffic are now in central Yukon. The mineral reserves in southwestern Yukon contain valuable ore bodies but are likely to be smaller scale operations of relatively shorter duration. Public funds for rail transportation are better allocated elsewhere.

A major consideration is that the main body of potential ore traffic can be expected to lie close to, or north of, the Tintina Fault which runs from the southeast through Watson Lake and thence northwesterly past Francis Lake, Ross River, Carmacks, Mayo and the Dawson-Clinton Creek areas.^{1/} This path traverses a region where coal and forest resources are known to exist in substantial amounts, and interest in developing resources is already high. Moreover, a roadbed along this route will provide significant savings in construction costs. The weight of economic evidence suggests this should be the path of the new rail services entering the Yukon probably near Watson Lake and proceeding northwestward. The distance it should reach northwestward along this path warrants careful economic appraisal.

In this context, the recent announcement of huge oil reserves on Alaska's Arctic slope will enhance the

^{1/} Supplementary data prepared in the course of the Mineral Industry Study 1968 would indicate that the volume of traffic in this belt might be expected to rise to 1.0 to 1.5 million tons within the first 10 years after rail services were initiated.

potential traffic demand in Alaska. The extension of a Canadian northwest railway to link with the Alaska Railroad at the border somewhere between Beaver Creek and west of Dawson may soon be approaching realization and the servicing of this Railbelt area of Alaska could alone add substantially to potential traffic.^{1/} The long history of American interest in an overland link could be reawakened at the prospect and interesting, even fruitful, discussions might well be started as soon as plans for Canada's northwestern railway are firm.

Two alternative considerations may be concerned with the possible routes through northern British Columbia to enter the Yukon through Watson Lake. Broadly there are two approaches. One is to build the line across northeastern British Columbia between Watson Lake and railhead at Fort St. John through the Fort Nelson-Liard River district, This will be referred to as the "eastern approach".

The second possibility is to construct a line in a more north-south direction between Watson Lake and near Hazelton through the Cassiar Range and roughly paralleling the Skeena Mountains. This will be referred to here as the "western approach".

^{1/} In 1961, this continental traffic was estimated by W.B. Saunders & Company at 150,000 tons a year. See Transport Requirements for the Growth of Northwest North America, Volume 1, Washington, 1961, attachment p. 23.

The comparative lengths and costs of construction of the two routes will undoubtedly have a bearing on the choice. It appears that the western route would be the shorter in terms of miles of line to be built but how the total construction costs will compare cannot be known until route studies are complete. The more rugged terrain on the western route, with less easy access to the right of way, could inflate costs considerably. Engineering considerations aside, certain economic considerations must be evaluated in determining policy.

The first question is to determine what the railway is intended to do. If the objective is to gain access by the most direct route to a Canadian seaport at Prince Rupert or Kitimat, and to open up rich mineral and timber potential destined for export, the western route has merit. The possibly higher construction costs could be over weighted by the shorter haul to tidewater. If public policy opts for the development of hydro-electric potential close to the western route in the near future, additional weight can be given to the western route because of the possibility of industrial processing in its vicinity.

There are also non-economic policy considerations attached to the western route. The Pacific Great Eastern is already building north from Fort St. James toward Takla

Lake and has plans to continue northward.^{1/} It may be found that the traffic potential in northwestern British Columbia combined with its rough topography warrants more than one rail line running northward eventually. If this proves to be the case, there need not be any unnecessary and uneconomic duplication of investment.

The eastern route also gives rise to engineering, administrative, economic and political considerations. The probable route from Fort St. John to Watson Lake has reasonable access from the Alaska Highway. The terrain is much less mountainous, even flat for some distance. The Pacific Great Eastern (PGE) has publicized its plans to build to Fort Nelson. If it is concluded that an extension of the PGE services can be most effective for Yukon development then steps should be taken to negotiate an arrangement with the Province of British Columbia whereby satisfactory services will be assured in return for the necessary financial investment from the federal government.

The economic considerations to be weighed relate to the objectives of transport policy within national policy. If the objective is to facilitate the eventual development of complementary resources of the region, the northeastern

^{1/} Interview with Premier W.A.C. Bennett, President, and Mr. J. Broadbent, General Manager, Pacific Great Eastern Railway, Victoria, May 1, 1968.

corner of British Columbia and the contiguous area in Alberta is a strong contender. The prospects for a smelter as the core of a metallurgical complex in this location have already been outlined. Presently, linked to the south by transportation arteries, this area seems to have greatest prospects for early industrial development in the northwest. Until that development occurs, the eastern rail route into the northwest could serve as the link for ore concentrates to continental and export markets and could facilitate the northward haul of fuel oil and consumer and producer goods more expeditiously than present routes and modes.

Railway Policy Decision in the Northwest

Once again, Canada is to be faced with the necessity to make a policy decision concerning transportation which depends in the final analysis upon national developmental policy. As with earlier decisions about the route of the Intercolonial and transcontinental railways, the Alaska Highway, the Trans-Canada Highway, the Hudson's Bay Railway, and the St. Lawrence Seaway, larger national purpose may transcend strictly economic factors. The considerations which must be weighed in the Canada Northwest Railway may not seem as significant as those concerned with some of those transportation decisions of the past.

Here they involve broadly an extension, of a somewhat different and greater order of magnitude, of the policy decisions which have provided a number of transport routes into northern resource areas in recent years. Decisions about the Quebec and North Shore railway, the Chibougamau extension in Quebec, the Thompson and Lynn Lake extensions in Manitoba, and the Pine Point railway into the Northwest Territories, for example, were all made on practical commercial grounds. In each case known traffic guarantees stood behind the decisions. It is of some interest to note that the actual traffic carried on them has ranged from twice to three and a half times the projected tonnage within five or six years of opening.^{1/} These extensions, while beneficially developmental in effect, cannot be classified as primarily developmental railways in terms of national policy. The only sizable railway extensions built since the war without firm traffic guarantees are those which have been made on the Pacific Great Eastern system, in British Columbia. The traffic buildup on these PGE extensions has also tended to increase far beyond initial projections.

Thus, from all the examples available, the nation can take confidence in post war experience in railway building

^{1/} Carriers have provided detailed data but since only a few commercial establishments are concerned, the data are here presented as averages or general statements only.

to resources. The confidence could well be extended, once detailed engineering studies are made, to a decision to proceed with the public investment necessary to extend the Canadian railway system into the great northwest. In conjunction with the recommended expenditures to 1985 on other parts of a northwestern transportation system, and the adequate provision of power in the Yukon, developmental benefits could begin to flow substantially to the whole economy. If the recent experience in other parts of the nation is repeated even in part, the returns could begin earlier.

Global Cost Estimates of Basic Developmental Services

The estimated capital costs required to provide an adequate system of transport to 1985 may be reviewed in summary.

New roads to provide for increases in traffic and a continual and intensifying program of exploration to 1985 are estimated to require an additional 2,000 miles of roads at an average cost of \$50,000 per mile, or a total of \$100 million.

For upgrading, maintaining, selective paving and extending dust control on the expanding Territorial trunk highway system, is estimated to require the expenditure of \$50 million to 1985.

The program necessary to prepare the Alaska Highway for the increases in traffic from tourism and resource development, and to render it reasonably safe envisages a program of minor relocation and rebuilding, partial paving and dust control totalling about \$6 million a year, or a total to 1985 of \$100 million, in addition to its maintenance costs.

To upgrade airfield facilities in the transport network as required and to extend them, a capital investment of \$25 million will be needed. Over the 17 years intervening to 1985, this would call for allocations of about one and a half million dollars a year.

Capital requirements for new rail services are based on the shortest distance to projected continental rail services. The Pacific Great Eastern railway is to be extended to Fort Nelson.^{1/} Assuming the construction from Fort Nelson to Carmacks would require 660 miles of reasonably low standard track, plus necessary rolling stock, motive power and minimal off-track facilities, a total capital sum of about \$200 million can be projected. At \$200,000 per mile average, which is not far from the experience of recent railway extension in comparable

^{1/} This has been confirmed to us by Premier W.A.C. Bennett although the date for its extension was not firm. The possibility for its extension to the Yukon with federal financing would undoubtedly hasten the extension data.

conditions where rights of way were free, plus 10 per cent for contingency, the total building cost would be \$145 million for finished roadbed track, signals, buildings and shops. Motive power requirements and rolling stock for early train movements would require the balance of \$55 million. In total, roadbed equipment and power at about \$200 million overall, averages about \$300,000 per mile, which is below the range of such costs reported for the Quebec and North Shore Railway.

In addition to these major costs of developing a transportation system for the Yukon and the northwestern region, provision should be made for a host of lesser items - townsite streets, navigational aids, etc. Such items are projected to require an additional \$25 million of capital investment to 1985.

Altogether for transportation development over the next 17 years to 1985, a total of \$500 million is the estimated requirement if the nation wishes to prepare the necessary conditions for a development close to the potential of the region insofar as the mineral resources of the Yukon can be foreseen.

CHAPTER 16

SUPPLY OF CAPITAL AND MANPOWER INCLUDING NATIVE WORKERS

Major increases in the capital and manpower requirements of the Yukon are expected by 1985. Special measures will be required in many cases to ensure these requirements are adequately supplied.

Capital

The availability and cost of capital can accelerate or retard the pace of growth in the Yukon economy. The distance of the Yukon from financial centres with the attendant barriers of costs and communications are accentuated by the rudimentary development of her local financing services. Development of resource enterprises in the Yukon usually requires relatively large amounts of initial private capital. It is a disadvantage that more of the supply of such capital is not available in the Yukon.

Demand for Capital

In the Yukon, in recent years, mining has been the largest user of private capital, while public investment in roads and other construction have been consistently quite large. Transportation and mining are expected to provide most of the new capital requirements to 1985. Details of both private and public capital requirements projections for the period 1968 to 1985 are as follows:

Capital Requirements

(millions of dollars)

Transportation

Rail services	200
New roads	100
Northwest Highway	100
Upgrading existing roads	50
Airfields	25
Other transportation	25

Total Transportation 500

Mining development	300
Townsite and urban developments	200
Electric Power	180
Service Industries	100
Forestry, tourism, and others	40

Total Industrial Capital \$1,320

Social services (schools, hospitals, etc.)	80
Housing	20

Total Capital Requirements \$1,420

The foundation for these estimates has been set out in the pertinent preceding chapters, except for social services and housing. Social services are examined in a later chapter but housing should be considered here.

The capital required for housing was particularly scarce and costly in the Yukon in 1968. With the labour force and population expanding so rapidly in that year and expected to continue this rapid expansion in future, the outlook indicated the scarcity of housing would become a seriously retarding element in the permanent industrial development of the Yukon. Special measures would be needed to overcome the handicaps and permit the backlog of housing demand to be filled. Public housing programs have been undertaken in the Yukon by the Central Mortgage and Housing Corporation (CMHC), the Territorial Department of Administration Services and the Indian Affairs Branch but the number of housing units they have financed has only met part of the requirements. Under the CMHC program 104 units were built from 1961 to 1967, and these loans totalled \$240,100. The Territorial program for low-cost housing had made 25 loans from its inception in 1963 to 1967, and loaned \$140,000. The Indian Affairs loans totalled \$78,203 in 1965-66 covering 26 houses.

It should be recognized that special financing is likely to be required for housing in the Yukon until the population becomes more permanent or the economy becomes less dependent on mining. In towns serving particular mines, this special financing may be partly provided by the mining company guaranteeing the housing loans as is now being done in some urban settlements in the Yukon. More than this is required, however, because most workers in the Yukon are not mine employees and they ordinarily require some special financing for housing also. It will be a serious brake on the stability and permanence of economic growth if the financing for housing cannot be substantially improved.

Supply of Capital

The expanding capital investments in the Yukon, necessary to meet the overall requirements outlined above, will call for additional financing from all sources and a considerable expansion of services from the limited financial community now in the Yukon. In many respects, the supplying of financing and financial services in the Yukon was just beginning to rise out of its frontier stage of development by 1968. The economic growth projected for the Yukon will be promoted by a

major further expansion of these services, from banks, finance companies and other lenders. Where these traditional financial channels fail to provide for sound borrowing needs, public bodies will need to stand ready to provide funds for viable enterprises.

As the Yukon economy grows, it will be necessary for the financial machinery to adapt and grow to meet its changing financial needs. The nature of these capital demands in the future may be indicated. There will be an increasing need for equity capital on the part of small and medium-sized firms - to be raised by investment houses or, if necessary, by specialized services. There will be a growing need for provision of medium and long-term debt capital for new and expanding enterprises - to be raised through expanded services from the chartered banks, insurance and finance companies, etc. There will be a growing role for residual lenders such as the Industrial Development Bank and for new specialized lending agencies to meet the particular demands of Yukon industry. The location of an agency of the Industrial Development Bank in Whitehorse should be warranted within the next few years. It should be a special goal of the business and community development organizations of the Yukon to promote this expansion of the sources and services for financing in the Territory.

Supplementary sources of capital are likely to be needed in the Yukon partly because financing services are expected to be particularly sparse but mainly because such supplementary sources are needed under the best of conditions. Most provinces have a development loan fund especially adapted to assist industrial expansion where other sources are not available or suitable. It would be desirable to have such a development fund for the Yukon. It could well be a part of the planning for development initiated by a development authority.

In addition to these requirements for capital and for financing services there is also a need for more information and statistics on capital and financing in the Yukon economy. If the important role of capital in the economy is to be understood and its demanding requirements are to be met, provision of such information is essential.

Manpower

A major expansion of the labour force in the Yukon will be required to meet the demands of the projected economic expansion. Most of these requirements for additional workers will need to be met from outside the Territory and the task of obtaining an adequately skilled labour force will require special attention.

Demand for Manpower

The current structure of the Yukon labour force provides a first approximation to the nature of the demand for the additional workers. Except for the mining industry most of the estimated 6,983 workers in the Yukon labour force in 1966 were concerned with the service industries (Table 10). Mining workers comprised

TABLE 10

ESTIMATED LABOUR FORCE BY INDUSTRY, YUKON TERRITORY, 1966^{1/}

Industry	Labour Force	
	(number)	(per cent)
Agriculture	34	0.5
Fishing and trapping	77	1.1
Forestry	42	0.6
Mines, quarries, oil wells	1,356	19.4
Manufacturing	65	0.9
Construction	1,171	16.8
Transportation, communication and other utilities	847	12.1
Trade	713	10.2
Services	823	11.8
Education, health and welfare	576	8.2
Public administration and defence	1,023	14.7
Industry unspecified or undefined	256	3.7
Total	6,983	100.0

^{1/} Adapted from Yukon Statistics Report 1968, Table 10. Estimates for 1966 were based on projections from 1961 data using also the Census of Canada, Cat. No. 94-518, Dominion Bureau of Statistics, Ottawa, 1961; Yukon Territory Workmen's Compensation Administration Annual Report, Workmen's Compensation Board, Edmonton; Government Activities in the North, Department of Indian Affairs and Northern Development, Advisory Committee on Northern Development, Ottawa; and Provincial Government Employment, Cat. No. 72-007, Dominion Bureau of Statistics, Ottawa.

19.4 per cent of the total but service industry workers, including construction, transportation and utilities, trade, service, social services and public services, were estimated to make up 73.8 per cent of the labour force in 1966. The labour force structure by occupation for 1961, indicates the pattern of skills that may be required (Table 11).

TABLE 11
LABOUR FORCE BY OCCUPATION, YUKON TERRITORY, 1961^{1/}

Occupation	Indian and Eskimo	Other Ethnic Groups	Total Labour Force
Managerial	3	498	501
Professional and Technical	4	497	501
Clerical	-	626	626
Sales	3	158	161
Service and Recreation	94	1,059	1,153
Transport and Communication	21	640	661
Farmers and Farm Workers	10	23	33
Loggers and related workers	13	29	42
Fishermen, Trappers and Hunters	66	9	75
Miners, quarrymen and related workers	12	560	572
Craftsmen, production process and related workers	51	1,269	1,320
Labourers, not stated above	118	223	341
Occupation not stated	31	225	256
Total all occupations	426	5,816	6,242

^{1/} Adapted from Yukon Statistics Report 1968, p. 56, Table 8, based on unpublished tabulation from Census of Population, 1961, Dominion Bureau of Statistics, Ottawa.

Unfortunately, there is little other information available on the Yukon labour force. Data on its nature and characteristics are quite inadequate. More of it should be available. Some progress was made by Dominion Bureau of Statistics, during the course of this Study, in initiating steps to improve manpower data for the Yukon. Continued efforts should be made to have this data-gathering upgraded, refined and extended, if an adequate understanding of this part of the economy is to be attained.

Additional manpower requirements from 1968 to 1985 may be expected to follow the above patterns in general. With information on the labour force so limited, it is not possible to say much more than this. Our estimates of the labour force in 1968 and additional requirements to 1985, by industry, are as follows:

<u>Industry</u>	<u>1968</u>	<u>Additional Requirements to 1985</u>
Minerals	1,900	4,700
Electric Power	100	500
Forest	50	500
Agriculture	10	10
Trapping, Fishing, etc.	70	none
Tourism	300	1,200
Service	3,500	10,000
Processing & Manufacturing	100	none
Government Services	<u>1,300</u>	<u>200</u>
Total	7,330	17,110

Supply of Manpower

Only a small part of the additional manpower requirements will become available from the existing population. Most of the new workers will have to be drawn in from outside. Many will need to be skilled. Some will have to be trained after they come to the Yukon. Many of the native people can be trained for better jobs. Plans to expand the vocational training facilities to meet this new demand should be initiated soon to minimize the adverse effects on the economy of inadequately skilled workers. Such a plan should comprehend bringing many more native workers into the growing labour force and the opportunities in this respect are examined in the special appraisal below of the potential contribution of the native population to the Yukon's economic growth.

Particular care, in developing the manpower program, should be given to the stability of employment. Over the next decade or two it may be possible to moderate the unevenness in new construction particularly, and to reduce its marked seasonal slump in employment by developing appropriate measures from the beginning to combat them. One of the costs of maintaining a more permanent population and labour force will be this cost of providing such measures.

Cost-of-living, Incomes and Housing

One other problem that warrants examination in connection with manpower is the higher cost-of-living in the Yukon. This higher cost-of-living was frequently linked in the briefs and discussions presented to the Study Group with the special advantages enjoyed by federal employees who were provided with housing as part of their employment. There was evidence also that several industrial employers assisted their employees with a special northern grant or bonus toward housing accommodation.

The cost-of-living for the Yukon is significantly higher than for Canada. A recent study based on 1966 data estimates the cost-of-living in the Yukon to be 18 to 22 per cent higher than in Canada generally.^{1/} Our own study based on February, 1968, data shows that the disparity in the costs of food were slightly higher than this, with Yukon food prices at that time running between 25 and 30 per cent higher than those for Canada.^{2/} Housing costs also were higher in the Yukon and the North, not only because of climatic considerations and high transport costs but also because of the transient nature of the labour force and the volatility of the mining industry. Thus, housing can be expected to be particularly scarce

^{1/} Yukon Territory Taxation Study, 1968, by Touche, Ross, Bailey and Smart, p. 17 and Table 7.

^{2/} Yukon Statistics Report 1968, Table 79, p. 132.

and high in cost in the Yukon because lenders, seeming to fear excessive risks of loss, are hesitant to finance new homes. Under these circumstances, it is not surprising that the federal government has had to build homes for its employees. In fact, special measures to compensate for housing disadvantages may be more readily supportable than special measures to compensate for cost-of-living disparities.

More specifically, the higher cost-of-living in the Yukon (estimated at 18 to 22 per cent above Canada) is partly offset by the higher level of incomes in the Yukon (estimated at 10 to 20 per cent above Canada.^{1/} Moreover, this type of cost-income inequality is not confined to the Yukon, but is found throughout Canada. It is related to the profitability of industry generally in the particular area or region. The example of the Atlantic Provinces has been cited where the cost of food is almost the same as the Canadian average but income levels are about 30 per cent below the Canadian average.^{2/} In these circumstances, special measures to compensate for cost-income disparities in the Yukon cannot be reasonably justified on the basis that unique conditions

^{1/} Taxation Study, p. 21. The higher rate of income tax imposed by these higher incomes reduces the compensating effect of the higher Yukon incomes to some extent.

^{2/} Ibid. p. 22.

exist in the Yukon or in the North. Moreover, it may be expected that as the Yukon economy expands and services and technology improves, these disparities in costs will be reduced. It should be expected that wages and salaries in the Yukon will remain higher to attract workers from areas where living conditions may be more favourable.

With housing, the circumstances are different. Not only are the high costs and difficulties of financing particularly adverse in the Yukon but they are unlikely to be eliminated or very much improved over time. These housing difficulties are related not to the stage of development of the Yukon but to its environment. They are related to the sparsity of population that may, with some improvement, be expected to continue in the North.^{1/} They are related to the unevenness of economic growth and the impermanence of residence that is found in the North, especially where the economy is dominated by mining operations. The special requirements in housing to meet the climatic conditions in the North are also worthy of consideration. When all these considerations are brought together, they suggest that there is a sound case for

^{1/} A population of just over 14,000 in 1966 in an area of over 200,000 square miles indicates that the provision of housing may be a particularly difficult and costly service.

special measures for housing in the North. Such special measures for housing may be particularly necessary to encourage greater permanency of residence among the workers who come into the Yukon and should be designed to prevent discrimination among residents. There may be several ways of doing these things, and several different measures may need to be combined to meet all these housing disadvantages adequately. One such measure might be a special federal grant (of, say, 10 to 15 per cent of the value of the home) for new housing that, like the early Veteran's Land Act farm loans, would be comprehended in the housing loan arrangements but could be applied to reduce the mortgage if necessary. Other measures may be designed to provide and extend such special housing assistance as may be appropriate to eliminate disadvantage and discrimination. It is not intended here to carry out the comprehensive analysis that would be needed to develop a well-rounded housing development program but rather to suggest the path and recommend that it be included in the planning studies recommended for the Yukon. Moreover, it should be noted that such housing development should take account of the changing pattern of settlement in the Yukon and be adapted where necessary to the long-run outlook. This is particularly pertinent with respect to the native

population, because the native people have tended in recent years to move from their isolated villages to the centres of employment opportunities. Public housing programs should be designed to facilitate this relocation.

Contribution of the Native Population

The remarkable growth in labour requirements projected for the Yukon to 1985 offers special opportunities to remedy the handicaps suffered by the native population and thereby to benefit greatly the Yukon economy. The Yukon industrial economy suffers from a lack of performance in its labour force and from the tendency of its workers to accumulate a stake and go outside to spend it. The native workers tend to remain and, if more of them can be employed, a larger share of their income tends to be spent in the Yukon.

Already considerable progress has been made in the Yukon in making it possible for more of the native people to equip themselves to fit into the industrial society. Yet the next few years offers a unique opportunity for a special short-term effort that can bring a great advance in the adjustment of the native people to the new environment they seek to enjoy, and can also smooth greatly the path for those who follow in the future. By

the end of the next decade the Yukon should be enabled to offer to native peoples the same scope for employment that others enjoy.

Current Situation

The native people of the Yukon, 90 per cent were of Indian descent and 10 per cent were Eskimo in 1961, comprised about 15 per cent of the population in that year. But only a third of those over 15 years old were in the labour force against more than two-thirds for the rest of the population (Table 12).

TABLE 12

LABOUR FORCE BY ETHNIC GROUPS, YUKON, 1961^{1/}

	Indian and Eskimo	All Others ^{2/}	Total
Total Population	2,207	12,421	14,628
Population, 15 years and over	1,253	8,090	9,343
Experienced Labour Force	426	5,816	6,242
Wage earners	348	5,038	5,386

^{1/} Census of Canada, 1961.

^{2/} There is some indication that there is a decline in the use of the word "white" to describe the potpourri of non-native peoples. When this word is completely eliminated from official and unofficial language we may assume that good progress has also been made in removing the discrimination against native peoples in the North.

Of the 426 native people in the Yukon labour force in 1961, 78 were women, mostly employed in service occupations. Of the 348 men, about two-thirds were labourers, fishermen, trappers, or service workers (Table 11). Their occupations indicated they were generally ill-trained for industrial employment. Yet as the opportunities in trapping, fishing, hunting, and such grow increasingly unfavourable while industrial opportunities continue to improve, it may be expected that native people will turn more and more away from their traditional pursuits. Training can remove much of the harshness from this transition.

The training of the native people has been vastly improved in the Yukon in recent years but much remains to be done. These education and training programs must take a different form from the ordinary for those native people who wish to shift from the old culture to the new. This transition cannot be effectively accomplished in segregated schools and for this reason they should be encouraged to attend the Territorial Public schools rather than the segregated denominational schools at Carcross and Lower Post, British Columbia. Moreover, the residences for Indian children in Whitehorse should be opened to others and such joint residences expanded to provide for the in-

creased enrolment that may be expected.^{1/} Yet the number of native children in Territory schools has increased notably, from 79 in 1957-58 to 475 in 1965-66.^{2/} Most of this remarkable increase can be attributed to the increase in native children enrolling in regular school classes. But part can be attributed to special classes and programs such as those provided at the vocational and Technical Training School and those designed to bring the children into school at an early age when they can more readily adapt to the new environment. Another is the special pre-kindergarten classes for native children to acquaint them with the ways, things and words used in the schools and homes of their classmates-to-be.

We concur with the statement made to us in the brief of the Yukon Research and Development Institute that, "A concentrated effort in the education of Indians is the right course to follow and will, over a period of time, result in the raising of the standard of the Indian population to make them fully integrated and a productive, permanent labour force in the Yukon".^{3/}

^{1/} The building of schools and hostels for Indians only and of houses in isolated Indian villages by Department of Indian Affairs may be one of the best ways of preventing the native people from enjoying the economic opportunities around them.

^{2/} See Yukon Territorial Department of Education reports.

^{3/} Op. cit. p.1.

The next few years provide an excellent opportunity for such a concentrated effort to progress. Such a program should provide for several particularly competent and understanding people to guide and support the program through the Territorial School System. It should be made as easy, convenient and prestigious as possible for the native children to get into and to stay in school. It should provide for the extension of the present excellent pre-kindergarten training for the younger children that enables them to feel at ease in school from the beginning. It should provide similarly, for older children and grown-ups who wish to attend public or technical schools, the kind of pre-school orientation and familiarization necessary for them to fit more smoothly into the new environment they are choosing. This orientation and familiarization is equally important for native people seeking industrial employment but to be effective it must be provided by understanding and sympathetic people.

Throughout the schooling period, special counselling, guidance and assistance should be available from competent people. The program will require homes and home care for the young; adequate accommodation in well-supervised hostels open to young girls of all ethnic

groups, and with similar accommodation for young boys. Especially there is a need for YWCA-type hostels where young working native girls could live comfortably with others. This also applies to the young men. Whitehorse is where these are needed now. Community organizations should support their development but most of the funds for their construction should be available from the federal Indian Affairs Department.

Mining companies should undertake similar familiarization and training programs for their native workers and develop also some opportunities for them to enjoy their own culture and their own friends during this lonely period of adjustment.^{1/}

This kind of a program cannot be handled with harsh discipline or lack of sympathy. It must be a program that gives to those native people who want it an understanding, gentle, and progressive familiarization with the kind of life they seek to enter. It must recognize that the habits and traditions of these native

^{1/} It may be possible to extend to native workers a special program similar to the kind of training and adaptation program offered to its general mine workers by Cassiar Asbestos at Cassiar, British Columbia. Such a program would need to be more specialized to the unique requirements of the natives than the general training program indicated at Cassiar. See Northern Manpower Needs: Brawn and Brains, by John D. Christian, President of Cassiar Asbestos Corporation Ltd., in the report of Fourth National Northern Development Conference, November, 1967, Edmonton, p. 60.

people are different from the habits and traditions of an industrial society, and for them to change established habits or beliefs takes time and patience on both sides. These, if combined with a special employment service for a time for the native people, with improved health services and with good housing in or near centres of employment, would do much to remedy their disadvantages. If such a "concentrated effort" of this kind can be maintained for even five or ten years, it may be expected that remarkable progress will result.

CHAPTER 17

THE ECONOMIC ENVIRONMENT FOR GROWTH

The growth potential of the Yukon economy will be influenced by the economic environment and the progress in removing such handicaps as it presents. The economic environment here refers to the conditions under which man in the Yukon seeks to produce and acquire wealth. In other words, particular characteristics of the Yukon economy influence the productivity and the profitability of man's economic activities there. For the Yukon, the most significant of these characteristics relate to its economic heritage, its physical environment, its relatively high costs, the structure of the prospective economy, entrepreneurship, external market influences, its volatility, the institutional and social organization, the cultural and other amenities, the development of the surrounding region and the good judgement of those responsible for policy decisions. The nature of the prospective influence of each of these is examined.

The Heritage of Tradition

The institutions and traditional ways of doing things have been a significant influence in shaping the economic environment of the Yukon. The most notable of these have been the frontier strategy of monopoly, the traditional attitudes toward the outlook for the Yukon and the persistent devotion of Yukoners to solving the insoluble problem of free access to nearby tidewater ports.

The strategy of monopoly (effectively used in the Yukon in the past in rail transport, in fur trading, in retailing, in gold dredging, etc.) can be a positive and respectable technique for initial frontier development but as the economy grows it frequently becomes an obstacle to progress. In several cases this tradition of monopoly has persisted unduly. By 1968 the Yukon economy had reached the stage where its growth would be stimulated by positive support for competition and the evidence indicated that the prospective demand for services warranted such increased competition. This is a problem in the Yukon that will require a continuing effort in identifying adverse monopoly and in instituting steps to obviate its adverse effects.^{1/}

^{1/} It should not be presumed that regulation will resolve these problems of competition. Initiative for improved services or lower prices can be stimulated in the main only by ensuring the customer has an effective alternative service.

The traditional attitudes about the future of the Yukon that have had the greatest influence on the path of the Yukon development are probably those inherited from the Klondike gold era and from other mining operations. Perhaps the most adverse of these attitudes are those that view the present Yukon economy as a short-run phenomenon, a place of pure plunder, a place to make a quick stake and get out, a place of hardships and sacrifices to be undergone until one accumulates enough to live satisfactorily elsewhere. This philosophy remains deeply entrenched in the attitudes of many of the people of the Yukon and is readily accepted by the newcomers seeking a quick stake. It has the disadvantage that it discourages the growth of those permanent and attractive amenities and institutions needed for dependable long-run growth. In consequence, it tends to prevent or postpone those improvements in cultural, living and working conditions that would make permanent residence in the Yukon more attractive and acceptable to newcomers. In other pioneer areas of Canada it has taken a half century to build up the necessary backlog of social, cultural and recreational amenities, the kinds of improvements in the economic environment of the Yukon that make permanent residence reasonably attractive and satisfactory. Only a few modern workers seem prepared to wait

that long in the Yukon. Yet only if these permanent improvements are made can the Yukon economy be expected to reach its optimum potential in stability and continuity of output. Unless the people of the Yukon can have faith enough in the long-run development potential of the Yukon to invest some of their own time and money in making these permanent improvements, the prospects of continuity and permanence in the population or the economy are small. Unless the attitude of individuals swings away from the traditional view in this respect, these prospects are not favourable regardless of the efforts of government to make such improvements possible.

The traditional devotion to solving the problem of suitable tidewater port services has been notably persistent. The traditional view in the Yukon that the arbitrary decision on the Alaska-British Columbia boundary in 1903 was illogical and can somehow be circumvented, has diverted much effort from more fruitful directions of Territorial development. Concern with diverse schemes to overcome the barrier imposed by the Panhandle between the Yukon and controllable tidewater ports, has consumed much time and consideration. These views have failed to recognize that the use of Alaska ports imposes mainly a raw-material economy on the Yukon while the long-run potential

may offer much more than this. They fail to recognize that the most effective way to ensure improved service through Panhandle ports is to establish effective alternative outlets. They fail to recognize that the future progress of the Yukon must be based on transportation outlets that are more controllable in, and more particularly adapted to, the special interests of the Yukon and of Canada. The prospects for Panhandle ports becoming so adapted are quite doubtful under present conditions. Yet there may be some potential for improving the present conditions. Current indications that Alaskan officials would favour improved measures, such as a free port, to encourage the movement of Yukon traffic through the Panhandle,^{1/} were a far cry from an agreement on such matters by Washington and Ottawa. Yet the advantages to Alaska were great enough at this time to warrant further exploration of these possibilities for long run improvement. In all this, the important consideration was that development of the Yukon along other channels should not be postponed in the meantime.

^{1/} See correspondence from Governor Walter J. Hickel to Commissioner James Smith, July 3, 1968, indicating that the subject of a free port merited further investigation.

Effect of Technology on the Physical Environment

The economic effects of the physical environment arise primarily through climate, topography, physical isolation including distance, and such. Yet claims that these are major handicaps to economic development in the Yukon may be exaggerated. Their major impact in the past has been largely in increasing the costs of mining operations, transportation, other outdoor operations, and facilities.

Climate in the Yukon may affect costs there more than in other areas because of the more extended low winter temperatures, because of longer nights in winter, because of permafrost and such. Yet most of these additional costs tend to arise only where services are inadequate, where technology has not been fully adapted to local conditions or where the benefits of new technology have not been fully applied. Where transportation facilities are slow and costly, where electric power is scarce and costly, where operations are too small in scale to warrant large efficient and comfortable equipment, then it may be expected that the extended periods of cold and darkness in the Yukon will be both costly and uncomfortable. Yet when scale of operations permits these conditions of services and technology to be remedied, the disadvantages of the Yukon climate are much less severe. Moreover, in mining activities, for example, as experience

is gained in operation and maintenance of equipment under cold-weather conditions the need for cold-weather protective devices is ordinarily reduced greatly.^{1/} Tire life is extended during the winter because tires remain cool. Effective lubrication of equipment becomes more difficult as temperatures fall but good progress is being made in adapting oils and greases to suit these conditions. Experience in northern Quebec^{2/} and at Pine Point suggest that experienced operators have solved most problems of cold-weather operation of equipment and that eventually operating costs are little higher than in other mining locations. To facilitate this, machine manufacturers now produce equipment that is specially adapted for such cold weather operations.^{3/}

Permafrost creates problems of construction and insulation that add to costs of mining, road-making and sewer and water facilities. Experience in reducing these costs is still limited and methods tend to be clumsy, mainly because the resources of technology have not been fully applied to the problem.

^{1/} See also, "Sub-Zero-Weather Operations in Canadian Mines", Canadian Mining and Metallurgical Bulletin for December, 1966, p. 1429-1443.

^{2/} Winters in northern Quebec, in Knob Lake for example, tend to be colder in terms of degree-days below 65 degrees Fahrenheit, than they are in the main centres in the Yukon. See Table 1.

^{3/} Op cit., Canadian Mining and Metallurgical Bulletin for December, 1966, p. 1429-1443.

As far as living conditions are concerned, the cold and darkness of the long winters have been a major handicap because housing is frequently inadequate and ill-equipped and the cost of fuel oil for heat and of electricity for light are uncommonly high. As more new homes are built, and with lower costs of fuel oil and power likely in the future, it may be expected that these disadvantages of residential living will moderate also.^{1/} Moreover, some researchers indicate that man needs the spur of a continual stimulus from his environment such as those of the northern Territories to reach his full capacity.^{2/}

Similarly, the physical isolation imposed by distance and topography in the past has already been greatly moderated in the Yukon by the rapid extension of highways and air services and by the more recent extension of tote roads and development highways into hitherto isolated areas. These improvements have, of course, reduced the cost of transport and in many cases have made overland transport possible for the first time.

^{1/} Man can not only create a satisfactory micro-climate to live comfortably under winter conditions in the Yukon but he can over time become quite acclimatized to the cold if exposed to it. See Dr. G. Malcolm Brown, "Man in the North", in Canadian Population and Northern Colonization, Royal Society of Canada Symposium, Toronto, 1962, p. 136.

^{2/} Ibid. p. 147.

These costs of distance are likely to be reduced further as transportation continues to be improved, as rail services are extended and as new techniques of transportation are adapted to the particular conditions found in the Yukon.

Overall, with the expected expansion of the economy in the future, and with the growth of industries, the extension of services and the improvement of technology that is comprised in such economic expansion, it may be expected that the cost disadvantages of the physical environment will continue to be modified in the Yukon. They may be expected to be no greater eventually than in other similar northern mining areas. This leads into the broader question of costs generally in the Yukon.

High Cost Environment

The substantially higher costs of many other goods and services in the Yukon relative to competing regions have been frequently noted. Complaints of high costs in 1968 were particularly common relative to transportation, wages, cost-of-living and construction services. The special appraisal of mining in the Yukon, undertaken as a part of this Study, indicates that such extra costs in exploration, development, operations and marketing

would, in 1968, add to a total of at least \$30 a ton on all mine products.^{1/} Other estimates indicate that mining costs generally are much higher than in competing areas. It is our conclusion that such costs will decline substantially as development proceeds and services expand. These high costs are part of the frontier environment. As these frontier conditions are pushed aside, as railways, roads and settlements expand, competition will also increase, technology will improve and costs will tend to fall. It may be expected that as these changes occur the disparity in costs generally will be reduced by about half in comparison with competing regions.

Structure of the Economy

The nature of the Yukon economy influences its potential. In this respect, the most striking feature of the economy is its major dependence on mining, its limited potential for diversification, and the characteristics arising out of this dependence on mining, mainly its uneven growth, its depletability and long-run instability. These are the feast and famine features common to a mineral-based economy. When mines are being developed and the mine facilities being built, the incomes, capital investments and

^{1/} Mineral Industry Study, Yukon Territory, Chapter 1, p. 5.

employment are all high. When the mine begins operations, the expenditures and employment moderate. When the ore deposit is depleted the operations, employment and incomes come to an end. Thus the impact of mining exploitation tends to be uneven. When several mines are brought into production closely together, as has been the case recently and will likely occur in future, the lumpiness of growth is accentuated and employment fluctuates violently up and down.^{1/}

This excessive variability of the mining industry can inject a significant uncertainty into the whole mining-dominated economy - that is, into the service and supporting

^{1/} A brief, recently presented to the Select Committee of the Ontario Legislature studying the Report of the Ontario Committee on Taxation, presents these problems of a mining-dominated economy, very succinctly, "The rate of extraction and treatment of ore by a mining company can and does have profound and sometimes disastrous effects on the economy of a community which is dependent on the mining operation for its existence ... Accelerated production creates peaks of employment, necessitates rapid growth of the community with accompanying demands for rapid expansion of civil services and facilities and, at the same time, speeds depletion of the ore bodies on which the economy is dependent. Any reduction in an established rate of mine production results in serious unemployment, which in turn creates increased financial burdens and other problems for the municipality. This condition renders almost impossible the orderly financial planning and development of a mining municipality". See brief presented by the Association of Northern Ontario Mining Municipalities, as reported in the Globe and Mail, August 1, 1968, p. B2.

industries that depend mainly on mining but which usually employ several times as many workers as the mining industry employs. When such uncertainty hovers over these service industries there is less likelihood of their developing into the permanent well-organized industries that can be expected in a more stable economy.

This unevenness and uncertainty of the mining economy can be moderated in two ways. One way is to design the application of public policy so it tends to smooth out the lumpiness in mining development and stimulates exploration and development when depletion threatens to cut back production excessively. The other is to promote industries that have more stability and certainty in their development and in their long-run potential. In the Yukon, the tourist industry, though still quite seasonal, offers the greatest future opportunities in this respect. The forest industries, a possible lead-zinc-silver smelter and possible greenhouse enterprises also offer a contribution to economic stability and certainty in the Yukon. For this reason, special support and assistance to the expansion of these industries is warranted by the economic benefits they would provide in offsetting the volatility and uncertainty of the mining industry. If the Yukon economy remains too heavily dependent on mining its economic potential will be weakened.

Entrepreneurship

Business and industrial leadership in a community are an important component in the economic environment. In this, the Yukon appears to be well favoured.

In the course of this Study there has been an opportunity to explore this facet of the economic environment quite extensively. There was impressive evidence of general enthusiasm, ability, experience and initiative in the top enterprise people that the Yukon had attracted and held. Though they were relatively few in number, as might be expected in a population of 14,000, there were remarkable demonstrations of their energy and capacity not only in industrial development but in joint action to get at the roots of the Yukon's economic problems and work toward remedying them. The contribution of Yukon entrepreneurship to the economic environment can be expected to be substantial in terms of competent enterprise.

Influence of External Markets

The Yukon economy depends greatly on outside markets for disposition of its output. The demand and prices of its mineral products are determined by world

forces rather than local conditions. Even the prices paid for tourist services are determined mainly by the demand from people outside the Yukon.

Yet the evidence indicates that this dependence on outside markets is unlikely to raise serious problems for the Yukon economy, at least for the next 15 or 20 years. External market forces have little influence on currently operating mines because they have long term contracts for their products for the most part and by exploiting the high grade ores they ordinarily have scope to absorb such fluctuations in prices as they may be exposed to. Price declines tend to slow mineral exploration rather than production.

An extended minerals market slump could affect the longer-run rate of growth of the economy. Yet the long-run market outlook for the major minerals produced in the Yukon is particularly strong. The indicated world reserves for asbestos, lead and zinc are now expected to be depleted within the next 20 years. Prices for these as well as for other Yukon minerals like copper, silver, nickel and molybdenum, are strong now and are expected to strengthen further over these next two decades with the anticipated growth of population and the expansion of mineral metallurgy and technology that continues to expand

the demand for these depleting resources. The fourfold growth of Canada's mining industry since 1950 is likely to be outpaced in future. World markets for Yukon minerals can be expected to continue as strong or grow stronger over the next decade or two.

Influence of Volatility of the Economy

The uncertainty in the outlook for the Yukon mining industry lies more in the great volatility of its growth and decline. Planning now could be designed to smooth out the lumpiness of this process of expansion and depletion. In particular, consideration should be given to the permanence of settlement that can be foreseen 25, 30 or 50 years hence by which time many of the deposits in which operations are initiated over the next 15 years will be depleted and the mines closed. This period is beyond the 15 year span of the terms of reference of this Study but it would be excessively cavalier to ignore its critical importance for the viability of the Yukon. It should not be overlooked because this later period could again bring back a period of violent and continuing net decline in Yukon mining and the whole Yukon economy. It is desirable to consider now whether greater long-run permanence should not be a major objective of economic

policy in the meantime. It is also desirable to consider whether other industries like tourism, forest products, smelters and such could be stimulated and expanded to the point where they may offset a part of this anticipated decline of mining eventually and can maintain the growth and permanence of the rest of the economy. In 1968, a key policy question for the Yukon was whether the new economic growth foreseen ahead was to be developed on the same boom-and-bust basis of 60 years before or whether measures could be developed which would smooth its growth and strengthen the economy for the long run.

These were the considerations that needed to be taken into account in the long-run planning for a permanent development and settlement in the Yukon. The most important applications of these considerations relative to depletion-abandonment were concerned with social services and cultural amenities and the organization of settlement in terms of townsites and municipal structure. These cannot all be fully examined here but the critical areas for future consideration and planning can be taken up.

Social Services, Housing, Townsite and Municipal
Development, Cultural and Other Amenities

Our review of the social services (education, health, welfare, etc.)^{1/} in the Yukon showed that excellent progress had been made, especially in the 1960's, in expanding and improving these services. Moreover, there was evident in the Yukon an initiative for continued action to improve and expand these services as needs and funds warranted. Thus, it is not anticipated that either the availability or quality of social services will be a handicap to effective growth of the Yukon economy. A massive expansion of such social services will, of course, be needed by 1985 to meet the requirements of the projected economic expansion of the Yukon.

Yet it is clear that social services must comprise much more than such things as education, health and welfare in the Yukon. In the expanding economy of the Yukon, with its frontier remnants, and with such a limited accumulation of the amenities found in more settled areas of Canada, social services must include housing, townsite development, cultural amenities and many other things that

^{1/} Special reports on these were prepared as background studies for this Report.

may not ordinarily be comprehended in the term "social services". Yet when new urban developments are associated with new mining operations, part of the economic environment relates to the possibilities of the company, the government, the people, or all three making early and adequate provision for these social and cultural amenities that have become an accepted part of life elsewhere.

Thus the social costs of mining development today include much more than the costs of minimum facilities for a transient population. They must include not only reasonable provision for the social and cultural amenities that have become an accepted part of life elsewhere but also the social costs involved in the depletion and abandonment of mines. In the Yukon, where a relatively rapid and dominating expansion of mining may be expected, this heavy burden of future abandonment can largely be foreseen. In a developing frontier economy like that of the Yukon, where many new policy decisions are still to be made, where the prospective pattern of mining areas can be foreseen reasonably well and where the initial pattern of roads is already well established, the opportunities to minimize this future burden of the social costs of depletion and abandonment and the opportunities for stimulating greater stability and permanence in the economy may be apparent.

Measures to moderate these potential weaknesses of the Yukon economy can be instituted in the meantime. They are warranted for several reasons. The first is that unless measures are taken now to reduce the impact of this burden the Yukon economy will continue to be considered as a potentially unstable and uncertain economy by those considering permanent residence. A second is that the economic and political potential of the Yukon depends on its having greater economic stability and viability than has been available in the past. The permanence of settlement also depends on such stability and viability. Permanent settlement can contribute to more effective local services and government in the Yukon. But a transient population that has its transiency bolstered from time to time by evidence of instability and lack of viability in the economy makes it necessary for the federal government to rescue and support the economy and its financial administration periodically.

Along with the measures to stabilize the growth of the economy and to moderate the effects of mine depletion and abandonment, there are other steps that can reduce the impact of uncertainty and stimulate the kinds of services and amenities that encourage permanent settlement and a permanent labour force. In the modern Yukon,

people cannot be expected to become permanent residents unless they can enjoy working, eating, sleeping, recreation and cultural conditions that are reasonably comparable to those found elsewhere. Today, if frontier conditions prevail, the stay in the Yukon tends to be short, just long enough to make a stake.

In the Yukon, some excellent progress in this has been made over the conditions found in the early 1950's and before. This was particularly evident in the city of Whitehorse. Yet in all urban centres some elements of minimal frontier conditions remain.

Moreover, in the new development of the mining industry now foreseen for the Yukon, the task of providing the living and cultural conditions needed to attract families as permanent settlers will become very great. Much more of the cost of these should properly be borne by the mining companies and by public investment than has been the case in the past. Some mining companies operating in other isolated areas have already taken the initiative in this respect.

Provision for the full range of these social services cannot be possible at every mine site but improved roads and air services can make these available in a few main urban centres. In other areas and countries, mine and

forest workers are regularly carried up to 100 miles or more daily between home and work. A special effort in predevelopment planning should be made to try to stimulate the kind and location of urban development that will provide these conditions over the long run. Such locations can probably be confined to as few as five or ten main centres in the Yukon. These centres can be generally indicated from the location of the mining potentials. These new urban centres to be established should probably aim at an anticipated population of 5,000 people or more.

In considering the location of the urban developments required for a potential new mine, consideration should be given first to whether nearby existing urban centres could be expanded to provide satisfactorily for the new requirements. Secondly, in case established urban centres are unsatisfactory, consideration should be given to the long-run pattern of development expected in the area and in this context, where the urban development may be most effectively located so it can be reasonably convenient for the mine workers to reach, can be large enough to provide all necessary services and amenities for them and their families and can be soundly enough located and industrially supported to survive with reasonable strength the decline and abandonment of nearby mines that may be expected in the future.

For new urban centres, consideration may need to be given to establishing sound principles for their development beforehand. An illustration of the effectiveness of such a policy is given by the pattern developed by the government of British Columbia for creating their "instant" new towns. In that case, public provision is made for construction of houses, schools, co-operative retail stores, recreation facilities and such. In addition, a local town council is provisionally appointed by the government until an election by the residents can be arranged. The town is complete and independent of the company from the beginning and is designed for permanence. In British Columbia, of course, these towns are mostly based on the more permanent renewable forest resources rather than on depletable minerals.

Yet housing, retail stores and a municipal organization are not enough in any of these new towns today. In a region with the sparsity of population of the Yukon a special effort is ordinarily needed to inaugurate in these new urban centres the cultural and other amenities that people must enjoy today to feel that they are not existing in a backwater. Yet these are the kinds of things that the people themselves must ordinarily support and promote if they are to be suitably developed,

although public funds for them are always available. Many cultural bodies in the rest of Canada would, of course, be happy to contribute to planning and assisting with such things as theatre, libraries, repertoire training schools, and such. Government has a major role in the Yukon in supporting the provision of facilities as well as in the extension of such things as radio, television and other communication services to these urban centres.

To achieve the responsibility of viability and self-reliance in the economy the people of the Yukon must choose the path of greater economic stability. Growth without certainty of stability can mean only that the economic future is uncertain while it is so heavily dependent on depletable mines. At present, two schools of thought on this are still evident in the Yukon. There is still too much of the old irresponsible "grab and git" philosophy of the gold rush days. But there is evidence also that mining executives are recognizing more and more their responsibilities for these social costs of making a living in the Yukon and are ordinarily finding that promoting the development of social and cultural amenities and national parks can yield quite substantial economic benefits by way of a more permanent and stable economy and a more responsible and productive labour force.

Economic Growth in Surrounding Areas

Although in most of the area surrounding the Yukon there is much enthusiasm for economic development, in general the outlook for the Yukon is the brightest of the whole region.

Alaska tends to be less well served with resources for development than the other three surrounding areas, that is, than northern British Columbia and Alberta and the District of Mackenzie. Recent oil and gas finds in northern Alaska may indicate that this deficiency will be modified. Yet her current paucity of resources is likely to encourage Alaska to co-operate as fully as possible so as to enjoy some of the fruits of Yukon economic expansion. In discussions by the Study Team with Alaska's Secretary of State this readiness to co-operate was emphasized. There are indications that the real costs to Yukon shippers of not having a tidewater port in the Panhandle under Canada's control was being recognized in Alaska when the value of studying the concept of a free port was raised by Alaskan officials. For Canada, the extra cost of shipping through the Panhandle ports may be borne in two ways: (1) by the extra cost and inconveniences being borne by Yukon

shippers; (2) by constructing a railway to a Canadian tidewater port. As economic development and rail and road transportation pushes northward through British Columbia toward the Yukon, the economic advantages of the latter approach tends to increase.

Moreover, the recent growth of mineral indications in the Mackenzie District and northern British Columbia, and growing opportunities for economic expansion in all four Canadian parts of this northwestern region indicate that a co-ordination in their development could yield most fruitful benefits to Canada as a whole.

There are no obstacles to the progress of the Yukon economy in any of these surrounding areas. In fact, a remarkable enthusiasm for economic advance was noted in all parts of the region. Overall, the region is at a stage where, with a combined effort, great progress seems assured in the next decade or two.

Economic Environment of Public Policy

Public policy for the Yukon and for northern Canada as a whole has had a long tradition of paternalistic welfare in its approach to economic development. Only in the past few decades has this approach been modified. Under the old philosophy it was never expected that economic

development would reach much further than promotion of native arts and crafts with a bit of high-grade mining where the ore was particularly rich. There was even a period, a decade or more ago, when Arctic char were airlifted from the Arctic Islands to Montreal restaurateurs.

These traditional techniques of short-lived paternalistic promotion may still seem acceptable in the more barren and unproductive regions of the North. But the Yukon and other parts of the northwestern region have reached a stage where a major advance can be made if public policy creates a favourable environment for private initiative. Substantial progress has already been made in adapting public policy to these new conditions. But a more favourable economic environment would now be promoted by positive support for a rational system of transport and other services in the North such as have been publicly supported in Canada's past in other new development areas. A more favourable economic environment will be created by instituting measures to promote growth as well as stability and certainty in these northern economies, such as by measures to dampen the volatility of the mining economy and to support the development of renewable resource industries like forestry

and tourism, as a means of adding continuity and stability to the economy.

A more favourable economic environment would be created by instituting more planning and providing more information to assist sound economic development. The federal contribution to this initial development can be particularly important in its early planning and financing stage. Yet the Territorial Government must carry much responsibility for administration and application in the meantime and its ability to carry out this role should be strengthened for the time being. An effective industrial development arm for the promotion of industrial expansion, to compile and provide information on the economy and to serve otherwise the development needs of the Yukon and its region is becoming essential. It is a great weakness in the economic environment of the northwest if adequate information is neither being compiled nor made available. In the course of this economic Study of the Yukon a comprehensive compilation of economic data for the Yukon was compiled.^{1/} It is recommended that a special agency be set up for the time being in the Territorial administration to ensure that these economic data are kept

^{1/} See Analysis of Statistics and Statistical Needs of the Yukon Territory, by Joan Gherson, Ottawa, July, 1968.

up, to assist the Dominion Bureau of Statistics in maintaining, extending and making available all data compilations for the Yukon and to promote and facilitate the programs of economic development for the Territory.

Main responsibility for promoting favourable environment rests with the federal government and it is our conclusion that this should be made a specialized responsibility. It is concluded that the task of research, planning and co-ordination for this northwestern region of Canada should be made the responsibility of a special development authority responsible to the appropriate federal minister. It will be a responsibility of this authority to help create a productive economic environment.

A most remarkable feature of the economic environment of Canada's North has been the progressive advance of the boundary of economic growth northward. In 1968, it was possible to say that this favourable economic environment might be considered as reaching north through northern British Columbia and Alberta and most of the Yukon and eastward probably through the Mackenzie District to about the meridian of 110 degrees west. It may be that within a few more decades this margin may have moved again further north and east. This means that development policy for the North must remain flexible over the long run. Canada's

North has now reached a stage where it would be particularly beneficial to the northern regions to delineate again the boundary between the regions of favourable and unfavourable economic potential and to adapt public policies suitably to the new delineation.

CHAPTER 18

THE POTENTIAL VIABILITY OF THE ECONOMY

There is excellent potential for growth and good possibilities for strength and viability in the Yukon economy but both the growth and viability depend greatly on new and skilfull strategy in public planning and investment. A brief review of the strengths and weaknesses of the Yukon economy illustrates the unique challenge of its development and indicates the special measures that may need to be initiated for it.

Strengths of the Yukon Economy

The Yukon economy has strength in the abundance and value of its resources, particularly in minerals. Its potential for economic growth lies mainly in mining, which offers a fifteenfold expansion from 1967 given a rational and systematic support in services. The tourist and forest

industries offer notable resources and a substantial though smaller absolute growth potential but a greater degree of stability and permanence to the economy than mining. A possible smelter would, if feasible, also add substantially to output and stability. In entrepreneurship and industrial leadership, the Yukon resources are also impressive though still few in number.

The Yukon economy has growing strengths in the recent and continuing advances of technology and new services. These advances are reducing high costs, expanding the range and depth of resource development and opening new opportunities for profitable enterprise.

The Yukon economy has strengths in the opportunities to co-ordinate its development with that of the surrounding region, which, with the Yukon, is now at the "take-off" stage in economic potential.

Weaknesses of the Yukon Economy

The Yukon economy has structural weaknesses related to its massive dependence on the mining industry. With the industries not dependent on mining expected to contribute less than 20 per cent of the gross output by 1985, the economy is particularly vulnerable to the variabilities of the mineral industry.

Thus the Yukon economy has weaknesses not so much in the level of its growth as in its unevenness and long run uncertainty. Over the decade or more after 1970, the outlook indicates there will be a sharp slump in private capital investment in mining, relative to the 1966-70 period, unless there is a substantial expansion of transportation and other services. If such an expansion of these services occurs then a massive but uneven rate of new mining construction can be expected and this will be superimposed on an economy already extended by rapid growth. When this combined development of mining and support facilities is largely completed by 1980 to 1985, the Yukon economy will drop back to probably less than half its level over that period. A good part of the unevenness of this investment pattern could be removed by pre-planning and co-ordination.

The Yukon economy has weaknesses in its long run uncertainties. The next 15 to 20 years may be uneven but there are no great uncertainties. The uncertainties lie beyond that, in the period beginning about 25 to 30 years hence, when depletion and abandonment of mines coming into production in the next decade or so become sufficient to undermine the growth of the overall economy. The impact of this weakness will be less severe if the rate of

mineral discovery can be stimulated at that time or if other industries can be built up in the meantime sufficiently to support a larger share of the economy.

The Yukon economy has weaknesses in its basic supporting services. A rational and systematic approach to transportation and power services for the Yukon could remedy most of these weaknesses.

Other weaknesses in the Yukon economy include the continuing high costs due to physical and economic handicaps; the remnants of frontier traditions which may divert Yukoners from the most effective approaches to development and tend to undermine the progress toward more permanent settlement and a more stable economy; the remnants of a paternalistic and welfare approach to public policy that is now outdated except perhaps in the barren and permanently frozen regions of the Northwest Territories; and the lack of a co-ordinated regional approach to economic development in the northwest region of the Territories.

The Economic Outlook

The outlook for the Yukon economy has three alternative facets that warrant consideration. The first is the

outlook if the current ad hoc development approach is continued and each new development problem is dealt with as it arises. In this case, the relatively rapid economic growth since 1966 will be continued until about 1970 based mainly on new public and private investment in new facilities and services for the several new mines now coming into production. This new investment for mining comprises probably more than half of the current growth in the economy and when it is completed the economy will fall back to dependence largely on the output of mining again. Over the next decade or more, after 1970, some new investment in mining and other parts of the economy will take place in these circumstances, but the growth can be expected to be quite slow, probably only doubling by 1985, and the long-run stability of such a mining-dominated economy will be quite weak.

The second facet of the outlook for the Yukon economy is the potential that would develop if public policy decreed that a rational and systematic program of development be undertaken over the long run. Such a development approach would have as its objectives, particularly, a rational system of transport and other services in the Yukon and measures to promote greater certainty and permanence in the Yukon economy. With these kinds

of programs in progress, the rate of growth of the economy would be rapid, estimated to multiply the 1967 economy about fifteenfold by 1985. Such economic growth in the Yukon tends to be volatile and uneven but the expansion of the economy could be smoothed and a favourable environment for further stable growth generated if the extremes of unevenness were moderated by effective pre-planning and co-ordination of development investment. In addition to thus smoothing the growth of the mining industry, the strength and viability of the economy could be supported by special measures to promote the growth of the less volatile but more permanent sectors of the economy, such as, tourism, forest industries, smelting and others as appropriate. By these means, there can be built into the Yukon economy as it progresses, the potential not only for growth but also for greater stability and permanence.

The third facet is the outlook for the longer run, beyond the next 20 to 30 years. This period is beyond the 15-year period for projections for this Study but it is not beyond the period for consideration of the viability of the Yukon economy. The long-run future, both economically and politically, must turn on this long-run viability of the economy. Unless the impact of depletion-abandonment that lies ahead of any rapidly expanded

mining-dominated economy can be moderated by special measures, the uncertainties that lie ahead can be expected to ensure that only a limited permanence will be generated in the economy. Without such measures the Yukon economy could be in absolute decline by 1995 or 2000. Long-run economic planning for the Yukon must be cognizant of this and initiate steps to promote the building in of the necessary certainty and permanence as development progresses.

There can be little doubt that, if the growth, viability and continuity of the Yukon economy are to be rational and optimum, an effective task of pre-planning and development co-ordination must be carried out.

Pre-planning Growth and Viability

This task of working out the most fruitful alternatives for Yukon economic development is an extensive one. It will be concerned primarily with working out, initially, a reasonable and systematic long run development approach for the Yukon. The first steps toward this objective would be to carry forward the appraisal of the structure of the economy initiated in this Study. This phase would require building up over time more detailed data on the economy and developing a simulation model of

the economy on which to test the effects of various expenditures and other measures on the growth and structure of the economy. The specifications for this simulation model, based on a preliminary input-output table have been set out in a special report prepared as a background paper for this Study. Such a simulation will require the gathering and analysis of a great deal of additional data on the Yukon economy. This will be a most effective means of gaining the necessary insights into the special problems of the economy and their solutions.

Along with this basic task, there would be required a major effort to develop ways of strengthening the growth, viability and continuity of the economy including measures to support and co-ordinate it with development in the surrounding areas.

The third task would be to review the growth and changes in the economy as its development progresses and to develop and test measures for promoting effective modifications if necessary.

If the growth and viability of the Yukon economy are to be most effectively developed, special efforts in addition to such planning, must be made, especially in the early stages. Attention should be given to the value of a specialized development body, for this purpose. The considerations related to such a development authority should be noted.

Considerations Relative to an
Industrial Development Authority

There are compelling reasons that support a specialized development effort at this time.

The potential growth and viability of the Yukon economy depend greatly on the effective planning of Yukon development and its co-ordination with the development of the whole region.

Effective and rational economic development of the Yukon will involve extensive and complex inter-relationships and will be concerned with co-ordination among several areas and jurisdictions. For these conditions, the importance of an intensive and specialized effort may be apparent.

The very large investments of public funds expected to be involved in the Yukon and related developments, suggest the importance of early initiation of specialized planning and co-ordination of programs to avoid the risk of costly omissions.

If the Yukon is to be drawn out of its present insularity and into the regional development context that can expand and strengthen its economic potential most effectively, a substantial and co-ordinated extension of supporting services from contiguous areas in Canada will

be required. There is also the related consideration of co-ordinating other parts of the development of the Yukon with the rest of the northwest region and with Canada as a whole.

There is a strong probability that, in the new and changing technological environment, the economy of the Yukon may require continuing study and review to adapt its development to the new conditions.

The task of planning the developmental techniques that will moderate the adverse effects of volatility and uncertainty in the Yukon economy, stimulate its viability and greater evenness of growth and promote permanent settlement, is likely to require specialized and intensive attention.

In addition to this planning relative to the overall economy, much consideration will be needed for townsites, municipal organization, social and cultural amenities, etc., in view of the social costs that may be foreseen in the future depletion and abandonment of mines.

The task of appraising effectively the comparative feasibilities of the alternative smelter complexes that may be appropriate to the Yukon and the northwest region is another example of the work that needs to be undertaken.

There is a difference between this advance industrial planning and the administration of ongoing present programs including the day-to-day territorial housekeeping. Yet as the planning and development progresses, this task of departmental and territorial administration will be greatly expanded by taking up the administration of the long range development and its implementation. Because of the extent, importance and urgency of this growing day-to-day task of administration and policy implementation it would be desirable for the planning task to be separate and independent to a degree to prevent it from being submerged in the mass of day-to-day housekeeping and other priorities that arise.

Such an industrial development authority, if it is effective, may not be required beyond the next 10 to 15 years. By that time also the economic as well as the political outlook should be more clearly foreseen and the future of the development authority should be more readily apparent.

There are several alternative organizations that might be adopted for such a specialized development authority but the one that seems most suited to the task in hand would be a separate development authority, responsible for planning, promotion and co-ordination of economic development in the northwestern region of Canada's northern Territories, and reporting to the Minister of Northern Development.

APPENDICES

APPENDIX A

ACKNOWLEDGEMENTS

We wish to pay tribute to all those who have assisted us in this Study of the potential of the Yukon economy. Such a study could not have been carried out without the assistance of a great many people and groups.

We wish particularly to express our appreciation to the people of the Yukon as well as the public officials, businessmen and others who have provided us with so much information, advice and assistance. Special mention should be made of the particularly competent assistance provided by senior officials of the major mining companies operating in the Yukon. In addition, it was most helpful from the beginning to have the opportunity to meet and discuss facets of the Yukon economy with the several development-minded bodies in the Yukon. We refer particularly to meetings with the Council of the Yukon Territory, the Yukon Research and Development Institute, the Yukon Chamber of Mines and the Whitehorse Chamber of Commerce.

The support, advice and co-operation of senior officials in both Ottawa and Whitehorse have added notably to the results of the study. We would like to acknowledge especially our debt to Deputy Minister J. A. MacDonald, and Messrs. A. D. Hunt, T. F. Wise and other officials of the Department of Indian Affairs and Northern Development in Ottawa and to Commissioner James Smith, and Messrs. G. K. Fleming, F. B. Fingland, K. J. Baker, W. J. M. Gibson and other officials of the Government of the Yukon Territory in Whitehorse.

The contribution of people in other parts of this northwest region was also notable. Particularly valuable were our discussions with Mr. Keith Miller, Secretary of State in Alaska and with other officials of the State and Federal Governments in Juneau as well as the helpful assistance provided by Mr. Lawrence A. Dineen, Director in the Department of Economic Development. In British Columbia, Premier W. A. C. Bennett and Mr. J. S. Broadbent, vice-president of the Pacific Great Eastern Railway, gave much time and much useful information and advice on northern development in that Province. Mr. Don Purvis, vice-president of the Canadian National Railways for the Mountain Region, provided much information and useful advice. In Alberta, Mr. G. H. Finland, of the Alberta

and Northwest Chamber of Mines, gave us many insights into the northern mining industries.

Special appreciation is extended to those who have contributed briefs to us. A list of these is included in the Appendix. Without exception the briefs were particularly well considered and a most valuable reference for our purposes in this study.

We have been particularly fortunate in the associated consultants who have assisted us with special studies most of which are to be published and will be available as reference reports. In this context we are especially indebted to Dr. G. C. Monture and Mr. W. B. Magyar of Resources Engineering of Canada Ltd., Toronto and Ottawa, for their report, Mineral Industry Study, Yukon Territory; to Mr. C. H. Gairns, of Industrial Forestry Service Ltd., Prince George, for his report, Forest Resource Study; to Mr. Keith Henry, of C.B.A. Engineering Ltd., Vancouver, for their report, Yukon Power Survey; to Messrs. J. I. Guest, and T. D. Heaver of Intrcontinental Resource Consultants Ltd., Vancouver, for their report, The Transportation Services of the Yukon Territory; to Professor S. J. May for his studies on econometric models; to Dr. Lloyd C. Francis for his contributions in the early stages of the project; and to Mr. W. M. Baker for advisory services on the tourist industry.

A particular tribute should also be paid to one of our own staff, Mrs. Joan Gherson, recently departed to Brussels for a three-year sojourn, whose great competence and special efforts made a major contribution through her reports on the analysis and compilations of statistics and on the social services which have been major reference sources for everyone concerned in the studies.

Finally it remains to express both a general and a personal appreciation to Professor F. W. Anderson for his notable contribution as one of the principals participating in the project from the beginning.

APPENDIX B

LIST OF BRIEFS

Yukon Research and Development Institute,
Whitehorse.

Yukon Chamber of Mines, Whitehorse.

Mr. George O. Shaw, Member of the Territorial
Council, Dawson City.

The Yukon Electrical Company Limited, Mr.
R. H. Choate, General Manager, Whitehorse.

Yukon Wilderness Unlimited, John and Mickey
Lammers & Sons, Box 1126, Whitehorse.

Mrs. Terry Bailey, Whitehorse.

APPENDIX C

TERMS OF REFERENCE

The terms of reference for this study of the Yukon economy, as set out in a letter from the Department of Indian Affairs and Northern Development dated February 6, 1967, were as follows:

The Government of the Yukon Territory and the Department of Indian Affairs and Northern Development require that a comprehensive study of the economy of the Yukon Territory shall be undertaken. This study will have a bearing on the formulation of federal and territorial economic, social and administrative policies and programs. Areas for research and tasks which would appear to be implicit in such a study are the following:

- (a) Development of several basic statistical series in areas such as investment, the labour force, and interregional movements of goods, services, and funds. Such series might afterward be maintained by the federal and territorial governments;
- (b) Examination of the external market forces which have a bearing on Yukon economic development. This would involve analysis of the impact on the Yukon of changes in demand and commodity prices in resource markets, and a comparison of the Yukon with other resource producing regions;

- (c) Examination of the economic impact of significant territorial and federal programs of expenditures. Much work has already been done on those subjects in relation to federal-territorial financial agreements, but some further attention should be given to subjects such as the economic aspects of fiscal relations between the federal and territorial governments and the ability of the territory to meet its own fiscal needs.
- (d) Development of a mathematical model of the Yukon economy appropriate for the use of computer simulation techniques. Such a model would be used to test hypotheses developed under other sections of the study and to examine the consequences of various alternative federal and territorial policies and programs of action. It would also be used to indicate the impact of various investment programs and other stimuli which might arise from the private sector. It is anticipated that the model would be developed with sufficient thoroughness to remain a useful analytical tool for a number of years after the completion of the study.
- (e) Indication of the sectors of the Yukon economy which have the best growth potential and suggestions regarding policy alternatives for maximum economic growth.

A fifteen year period to 1982 or 1983 should be assumed in the preparation of any forecasts necessary to the completion of various parts of the study.

The report resulting from the study shall be made to the Government of the Yukon Territory and to the Minister of Indian Affairs and Northern Development as soon as practicable and, if possible, within a year.

APPENDIX D

REPORTS PREPARED AS PART OF THE YUKON ECONOMIC
STUDIES AND PUBLISHED AS REFERENCE VOLUMES

- Volume II Statistical Appendix
- Analysis of Statistics and Statistical
 Needs of the Yukon Territory
- by Joan Gherson
-
- Volume III Selected Social and Resource Studies of
 the Yukon Territory
- Education in the Yukon Territory
- by Joan Gherson
- Health Services in the Yukon Territory
- by N. L. Glover
- Welfare Services in the Yukon Territory
- by Joan Gherson
- Housing in the Yukon Territory
- by Joan Gherson
- Justice and Corrections in the Yukon
 Territory
- by Joan Gherson
- The Potential of the Yukon Tourist
 Industry
- by D. W. Carr and A. W. Burges
- The Agricultural Potential of the Yukon
 Territory
- by D. W. Carr
- Hunting, Trapping and Fishing in the
 Yukon Territory
- by D. W. Carr

Studies Prepared by Specialist Consultants

Mineral Industry Study, Yukon Territory

by W. B. Magyar and Dr. G. C. Monture
of Resources Engineering of Canada,
Ltd., Toronto.

Forestry Resource Study, Yukon Territory

by C. H. Gairns of Industrial Forestry
Service Ltd., Prince George, B.C.

Yukon Power Survey

by Keith A. Henry of C.B.A. Engineering
Ltd., Vancouver, B.C.

Transportation Services of the Yukon Territory

by J. I. Guest and T. D. Heaver of
Intrcontinental Resource Consultants
Ltd., Vancouver, B.C.

