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Mapping the Economic Potential of Canada's North

Centre for the North

ECONOMIC PERFORMANCE AND TRENDS

The Conference Board of Canada
Insights You Can Count On

Mapping the Economic Potential of Canada's North
by *The Conference Board of Canada*

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Preface

The Centre for the North has established three foundational themes for its approach to research in the North: thriving communities, economic development, and security and sovereignty. *Mapping the Economic Potential of Canada's North* is the first project along the economic development foundational line for the Centre.

Using previous work done by the Northern Development Ministers Forum combined with initial literature reviews, and consultation with a group of Northerners, a collection of seven key industries was identified—oil and gas, mining, forestry, fishing, utilities, construction, and tourism. For each of the seven industries identified, a list of ideal indicators was developed to assist in assessing each industry's current and potential economic contribution to the North's economy. These indicators comprised a "wish list" of data that would give a clear picture of each industry's current capacity, constraints, and future possibilities.

The work is designed as a starting point for future research in the area and, as such, it identifies many challenges as well as potential future directions for additional research.

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ABOUT THE CENTRE FOR THE NORTH

The Centre for the North is a major, five-year research initiative of The Conference Board of Canada. The Centre brings together Aboriginal leaders and representatives of businesses, governments, and community organizations to change the conversation about Canada's North—and, ultimately, to provide insights into how sustainable prosperity can be achieved in the North.

The Centre for the North is guided by the following founding principles:

- The Centre is "North-centric." It examines all issues from a Northern perspective, seeks to maximize Northern engagement, and prioritizes Northern interests.
- The Centre takes a "holistic" and action-oriented approach. It explores the full range of Northern challenges and opportunities, and offers strategies that will lead to action.
- The Centre considers not just the territorial North, but also the Northern regions of the seven provinces with boundaries that stretch into the North.
- The Centre takes a short- to long-term perspective, identifying immediate and future issues and actions.

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The Conference Board of Canada is grateful to the investors and roundtable members of the Centre for the North that, through their membership, support the Centre's research program.

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(Note: The findings and conclusions of this report are entirely those of The Conference Board of Canada, not of the Centre investors and roundtable members.)

EXECUTIVE SUMMARY

Mapping the Economic Potential of Canada's North

At a Glance

- This work is part of a foundational series of studies undertaken on behalf of the Centre for the North and is meant to provide a "launch pad" for further inquiry into the future economic potential for the North.
- The seven key industries examined in this study are separated into primary industries (oil and gas, mining, forestry, and fisheries); enabling industries (utilities and construction); and potentially emerging industries (tourism).
- The report looks at the supply and demand for each industry, as well as the supporting and constraining factors that will impact the industries' future development.

Understanding the economic potential of Canada's North is limited in its current status. The primary goal of this study is to develop an overall view of the future economic potential of Canada's North.

In looking to develop an understanding of the economic potential, this report closely examines seven key industries and their current economic contribution to the North. In particular, it looks at the supply and demand for each industry, as well as supporting and constraining factors that will impact the industries' future development.

This work is part of a foundational series of studies undertaken on behalf of the Centre for the North and is meant to provide a "launch pad" for further inquiry into the future economic development potential of the North.

The seven key industries examined in this work are separated into primary industries, enabling industries, and potentially emerging industries.

PRIMARY INDUSTRIES

OIL AND GAS

The oil and gas sector presents significant potential for future economic development in Northern Canada. Unconventional resources as well as undeveloped conventional resources in the North will increase in importance as conventional resources mature. Northern Alberta (oil sands) and Northern British Columbia (shale gas) are examples where this transition to unconventional resources is already under way. The oil sands represent Canada's largest-ever industrial development project. In the territories, constraints such as challenging climate and lack of infrastructure have resulted in largely undeveloped oil and gas resources.

MINING

Northern Canada's mining future is challenging due to remoteness and limited infrastructure, whether for transportation or power. Despite challenges, there are many reasons why the mining future of Northern Canada is

expected to be strong, including the existence of large resource deposits, stable political environment, and the current global demand for Canada's metal and non-metallic minerals resulting in high mineral prices.

FORESTRY

The Canadian forestry industry has contracted significantly in the second half of this decade. The industry is currently in a position where it needs to change to move forward; to continue growing, it will have to become more competitive internationally and less dependent on the U.S. economy. Additionally, the industry will likely have to shift its production toward value-added products.

FISHERIES

Fisheries are well established across Canada, both in saltwater and freshwater locations. This industry has reached a significant level of maturity and, aside from some limited room for growth in the Far North, seems unlikely to grow over the coming years. This is an important industry for the North, but not one with significant growth potential.

ENABLING INDUSTRIES

UTILITIES

Northern communities have the best opportunity for access to utility services when a nearby industrial project or development provides an anchor load to justify the required investment. This pattern is particularly noticeable in Yukon and the Northwest Territories. Nunavut faces more significant challenges because of its relatively smaller dependence on resource extraction industries.

CONSTRUCTION

The construction industry in the North is another example of a key enabling industry. Current funding initiatives proposed across the territories would generate a considerable temporary impact on the size and strength of the construction industry. This boon would be limited by the number of available tradespeople as well as its duration, expected to last a short time only. Longer-term opportunities for the construction industry in the North may be found in innovative new construction techniques needed to deal with challenging climates.

POTENTIALLY EMERGING INDUSTRIES

TOURISM

Tourism activity in Canada's North accounts for a relatively small fraction of overall tourism in Canada. This sector is difficult to measure accurately, partly because it mainly comprises smaller businesses that open seasonally. In addition, tourism activity for the territories tends to be under-reported.

Although non-commercial services represent an important aspect of Northern economies, they are not viewed as drivers for growth in Northern communities.

The range of tourism products available in the Canadian North is diverse. There are, however, some common product themes among Northern regions, including adventure tourism, wildlife viewing, hunting and fishing, touring, and Aboriginal cultural tourism.

OTHER INDUSTRIES

This report does not examine non-commercial services such as health, education, and social services. Although these non-commercial services represent an important aspect of Northern economies, and are essential for thriving, they are not viewed as drivers for growth in Northern communities.

Additionally, commercial services that are followers of other industries are not included. These commercial services will emerge as the need and opportunity for them arise out of growth in the primary and enabling industries.

There is a complex relationship between sectors in the Northern economy. The resource extraction industries have been the engine of growth, and will continue to fulfill that role. They attract population, require support services, and generate employment and income. These industries also require a certain minimum level of support from what this report refers to as enabling industries. If these industries are lacking, the cost of establishing them may constrain the potential expansion

of resource industries. For example, there is a relationship between the quality of resources that the mining industry can develop and the cost of adding road, rail, and electricity infrastructure. Non-commercial services bear a similar relationship; when they are not present, they add cost to resource extraction industries and may also constrain the pace of development. Such industries are excluded from this analysis to keep the scope more manageable. These industries cannot be ignored—rather, they provide opportunities for further research.

CHAPTER 1

Introduction

Chapter Summary

- The Centre for the North's geographic definition of Canada's greater North includes the three territories and the 16 economic regions (in the North of seven provinces). These were selected to represent the North as the economic baseline.
- This report is the first project along the economic development foundational line for the Centre for the North, and looks at primary industries, enabling industries, and potentially emerging industries.
- The work is designed as a starting point for future research in the area and, as such, it identifies many challenges (e.g., data gaps) as well as potential future directions for additional research.

Central to the Centre for the North's purpose is the goal of working with Northerners from all walks of life to achieve a shared vision of sustainable prosperity for the North. This sustainable prosperity includes both economic and social development that benefits current and future generations while, at the same time, protects the environment. The Centre has established three foundational themes for its approach to research in the North: thriving communities, economic development, and security and sovereignty.

This report focuses on the foundational theme of economic development. It is the first project along the economic development foundational line for the Centre for the North. It is designed as a starting point for future research in the area and, as such, it identifies many challenges (e.g., data gaps) as well as potential future directions for additional research.

As long as resource sectors expand, they will drive enabling industries—e.g., utilities and construction—to also grow.

Canada's Northern economies are highly dependent on natural resource industries—especially oil and gas, mining, forestry, and fishing. Its vast land mass with plentiful natural resources has drawn companies to explore, develop, and exploit the North's rich natural assets. These primary industries are expected to continue to dominate the Northern economy and present opportunities to expand.

Developing alongside primary industries are enabling industries that effectively facilitate the continued development of the primary industries. Included in enabling industries are utilities and construction. As long as resource sectors expand, they will drive these enabling industries to grow as well. Each of these industries is an essential contributing factor in furthering the economic development of any sector within the North.

Tourism, a potentially emerging industry, is also included in this work. Northern tourism organizations are positive about the potential for expansion of tourism activity in the North. Non-commercial services, such as health, education, and social services, represent another essential aspect of the economy. As Northern communities grow, there are increasing needs for health, education, and social services. These public services represent a key element of economic development in the North; however, they fall outside the scope of this research.

The Centre for the North's geographic definition of Canada's greater North includes the three territories and 16 economic regions (in the North of seven provinces).

Additionally, commercial services that are followers of other industries were not included. These commercial services will emerge as the need and opportunity for them arise out of growth in the primary and enabling industries. As following industries, they also fall outside the scope of this research. Finally, commercial services, such as finance and insurance, might be considered to be somewhat location-independent, making them less important to a primarily space-based evaluation.

But what economic potential does exist, in which sectors, where? This report attempts to answer these questions by looking at the North's key industries.

METHODOLOGY

The development of an economic baseline for the North is the first major step in being able to identify its economic potential; that is, quantifying the size and the industry mix of various Northern economies. The Centre for the North's geographic definition of Canada's greater North includes the three territories and 16 economic regions (in the North of seven provinces). These were selected to represent the North in our economic baseline. (See Exhibit 1.)

There are major challenges that needed to be addressed to estimate the North's economic output. Statistics Canada produces employment data for several industries in the economic regions in its Labour Force Survey. These data were converted to output by The Conference Board of Canada using provincial productivity data (output per employee in each industry). The provincial productivity data were estimated using Statistics Canada's Provincial Economic Accounts. All output is expressed in real (2002) dollars.

The Labour Force Survey for the economic regions is estimated annually.[1] Employment is available for major three-digit North American Industry Classification System industry groupings. The groupings used in our analysis were agriculture, other primary industries (which include forestry, mining, and fishing and hunting)[2]; and construction, manufacturing, utilities, wholesale and retail trade, transportation and warehousing, information and arts, finance and insurance, commercial services, non-commercial services, and public administration. These industry groupings line up perfectly with the provincial productivity data that were used.

These baseline economic data were indispensable in the next steps: identifying key industries in the North and the key regions for these industries. Using baseline economic data, previous work done by the Northern Development Ministers Forum combined with initial literature reviews, and consultation with a group of Northerners, a collection of seven key industries was identified—oil and gas, mining, forestry, fishing, utilities, construction, and tourism. This preliminary list was vetted among the research team as well as the group of Northerners; the industries identified were found to be the strongest industries with greatest economic contribution and potential across the North. Non-commercial services, which are not within the scope of this work, also represent a prominent share of the Northern economy.

For each of the seven industries identified, a list of ideal indicators was developed to assist in assessing each industry's current and potential economic contribution to the North's economy. These indicators comprised a "wish list" of data that would give a clear picture of

1 Statistics Canada, "Labour Force Survey—2008," CANSIM table 282-0061.

2 Note that Statistics Canada does not isolate the mining sector from the overall primary industry.

Exhibit 1
Northern Economic Regions

Source: The Conference Board of Canada.

each industry's current capacity, constraints, and future possibilities. As research on this work began, it became clear that this wish list was, in many cases, a list of indicators that are simply not developed for the North. (See Appendix B.)

There were a few specific challenges with the data collection. The largest challenge had to do with being able to separate Northern and Southern data for each of the provinces. Many statistics are available at the provincial level, but there are few at the regional levels used in this research to designate the North. Additionally, data for different regions, provinces, or territories were often collected using different metrics, which made comparisons difficult. As well, the data collected by Statistics Canada often were not available at the disaggregated level needed for this research. For example, data for the primary sector—which includes oil and gas, mining, forestry, and fishing—are grouped together.

Despite these data challenges, this report has gathered a significant amount of information on each of the seven selected industries and built a profile of the existing strengths and future opportunities of these sectors in the North. Part of this work identifies larger data holes that serve as suggestions for further research.

CHAPTER 2

Oil and Gas

Chapter Summary

- Canada has a large endowment of crude oil and natural gas, ranking 12th in the world in oil reserves (excluding oil sands—second if oil sands are included) and 19th in the world in natural gas reserves.
- Canada is the world's third-largest natural gas producer (behind Russia and the United States) and eighth largest crude oil producer.
- The Arctic region of the world has been estimated by the United States Geological Survey to contain more than 44 billion barrels of conventional crude oil and 770 trillion cubic feet of natural gas.
- The oil and gas resources of the territories remain largely undeveloped, constrained by challenging climate, lack of infrastructure, a fragile natural environment, workforce issues, and distance to market.

The Arctic region of the world has been estimated by the United States Geological Survey to contain more than 44 billion barrels of conventional crude oil and 770 trillion cubic feet (tcf) of natural gas at 95 per cent confidence level.[1] Although much of the estimated oil and gas is expected to be found in Russia and in Alaska, Canada has significant potential in the Arctic region. In addition, much of Canada's existing oil and gas production falls in the geographic North as defined by the Centre for the North.

Canada is the world's third-largest natural gas producer (behind Russia and the United States).

Canada has a large endowment of crude oil and natural gas, ranking 12th in the world in oil reserves (excluding oil sands—second if oil sands are included) and 19th in the world in natural gas reserves. Canada is the world's third-largest natural gas producer (behind Russia and the United States), and eighth largest crude oil producer.[2] Currently, crude oil production comes primarily from onshore reserves in Western Canada, with some production offshore Newfoundland and onshore Northwest Territories. Natural gas production originates primarily in the three Western provinces, with smaller volumes offshore Nova Scotia and onshore Yukon, Northwest Territories, and Ontario.

1 Gautier and others, "Assessment of Undiscovered Oil and Gas in the Arctic," 1177–78. Note that the estimated potential is much higher at lower confidence levels (83 billion barrels of oil and 1,547 tcf of gas at 50 per cent, and 83 billion barrels and 2,990 tcf at 5 per cent).

2 Rankings based on Finley, *BP Statistical Review of World Energy*.

THE OIL AND GAS INDUSTRY IN CANADA'S NORTH

Separating reserves and production data for the North versus the South is challenging, since resources are assessed on a geological rather than a geographic basis. The task is further complicated by the lack of exploration-based data for vast regions of the North.

ECONOMIC POTENTIAL FOR CONVENTIONAL CRUDE OIL

The National Energy Board (NEB) estimates that there are 451.6 million cubic metres of remaining conventional oil reserves in the Western Canada Sedimentary Basin (WCSB) and 161.2 million cubic metres in Newfoundland and Labrador offshore, with a total of 607.7 million cubic metres for all of Canada.[3] Approximately 64 per cent of the remaining reserves are light oil. The conventional oil offshore Nova Scotia and Newfoundland (Grand Banks), totalling 144.8 million cubic metres, are part of Southern Canada, as are the 7.7 million cubic metres in Manitoba. The 12.7 million cubic metres identified for Yukon and Northwest Territories fall under Northern Canada. The remaining 442.5 million cubic metres in the WCSB are not clearly delineated between Northern and Southern Canada. Of the 442.5 million cubic metres, 218.8 are conventional heavy oil. An earlier assessment by NEB, based on geological plays where heavy oil has been discovered, placed this resource almost entirely within Southern Canada.[4] It is therefore reasonable to assume that fewer than 244 million cubic metres of the 442.5 million cubic metres of conventional oil resources estimated by NEB are located in Northern Canada, and that the majority of reserves in that area are conventional light oil.[5]

3 National Energy Board, *2009 Reference Case Scenario*, Appendix 3, Table A3.1.

4 National Energy Board, *Conventional Heavy Oil Resources.* Table 4.3 identifies 1.468 million cubic metres of remaining resource in a region that includes areas of both North and South. The remainder of the total 189.2 million cubic metres (Table 9.1) of remaining reserves is located in the South.

5 Crude oil resources are often described as conventional or unconventional, depending on the technology used to exploit them. They are also described as heavy, medium, or light, based on the specific gravity of the crude. Conventional light crude is the simplest to extract and refine.

CONSTRAINTS AND PROSPECTS FOR CONVENTIONAL CRUDE OIL

Conventional crude oil production in Western Canada has been gradually declining for more than a decade. Total Canadian conventional crude production has remained fairly constant over the past 10 years, primarily because increasing offshore production from Newfoundland and Labrador has offset the declines in the West. The consensus expectation, as illustrated by the NEB outlook,[6] is that conventional oil production will resume a declining path for Canada overall, and will continue to fall gradually over the foreseeable future.

Separating reserves and production data for the North versus the South is challenging, since resources are assessed on a geological rather than a geographic basis.

ECONOMIC POTENTIAL FOR OIL SANDS

NEB estimates that 98 per cent of Canada's remaining crude oil reserves are in the form of bitumen in the oil sands.[7] With initial reserves estimated at 28.39 billion cubic metres and remaining established reserves estimated at 27.45 billion cubic metres,[8] this resource is vast, and at the early stages of exploitation. In addition, the technology is shifting from shallow, minable sands to deeper deposits that must be exploited by drilling (82 per cent of the remaining reserves). The entire resource is located within Northern Canada and represents the future of Canada's oil industry.

Oil sands exploitation to date has been entirely within Northern Alberta. The total surface area under which oil sands are believed to exist is 140,000 square kilometres, with 602 square kilometres currently being mined.[9] Investment in oil sands projects peaked at $19.2 billion in 2008[10] as crude oil prices also peaked. Although

6 National Energy Board, *2009 Reference Case Scenario*, Figure 5.1.

7 Ibid., 18.

8 Ibid., Appendix 3, Table A3.1.

9 Government of Alberta, "Energy—Facts and Statistics."

10 Ibid.

investment has waned as a result of the recession, lower oil prices, and tighter credit conditions, there are still 100 oil sands projects on the books for current or future development. Only eight of these projects are mines—the remainder are in situ or drillable projects.[11]

The cost and availability of labour has constrained the pace of development and increased project costs.

In 2008, oil sands production was 1.3 million barrels per day (bpd) and upgrading capacity was 1.2 million bpd. Upgrading refers to the process of converting the heavy, viscous bitumen into a lighter synthetic crude, primarily by adding hydrogen. Upgrading is important because of the difficulty in transporting raw bitumen and because of the limited ability of North American refineries to process bitumen without upgrading. Over the coming decade, bitumen production is expected to increase to as much as 3 million bpd.

CONSTRAINTS AND PROSPECTS FOR OIL SANDS

The level of investment in oil sands production depends on a range of factors: production costs; bitumen and natural gas prices; materials costs; and the availability and cost of specialized labour. In 2008, the cost of producing a barrel of bitumen was estimated by the Canadian Energy Research Institute to range between $37 per barrel (for Steam Assisted Gravity Drainage—SAGD—projects) and $62.70 per barrel (for mining projects), with upgrading adding $38.75 per barrel to the cost. The price of crude oil is therefore one of the key determinants of investment.[12] At current oil prices (below $80 per barrel), some projects are marginal, or perhaps uneconomic when production and upgrading costs are added together. Another key factor is the price of natural gas, particularly for SAGD projects. These projects use large volumes of natural gas to produce steam for injection into the underground formation. Recent reductions in natural gas prices have reduced costs for such projects. A third determinant of investment is the cost and availability of materials. Both specialized equipment and basic construction materials increased rapidly in price between 2000 and 2008, making the capital cost of an oil sands project a moving target. The recession that began late in 2008 has stabilized input costs, although the effect may erode as the recovery proceeds. In addition, the cost and availability of labour has constrained the pace of development and increased project costs.

Although the path may not be entirely clear, oil sands development is broadly expected to continue until production reaches at least 3 million barrels per day.

Notwithstanding the tremendous economic opportunities presented by the oil sands, continued improvement is required on a range of environmental issues. The growing footprint of oil sands activity means an increasing overall impact on land, air, and water, even though the intensity of environmental impacts might be decreasing for any individual project. Increasing public attention to and scrutiny of these environmental impacts has reinforced the need for companies to continue to improve. The Alberta government has also launched initiatives to deal with water use, cumulative effects, land-use planning, and tailings management.

Although the path may not be entirely clear, oil sands development is broadly expected to continue until production reaches at least 3 million bpd. Upgrading capacity will continue to expand, as will exports of bitumen and synthetic crude oil. Exports are primarily to the U.S., although additional pipeline capacity to the West coast has been applied for and would provide access to markets in Asia. Regardless of the path, oil sands development and operations are expected to provide long-term economic growth, income, and employment in Northern Alberta. Projects in Saskatchewan are also possible, depending on the results of efforts to delineate the size and quality of the resource. Finally, oil sands

11 Oil sands extraction uses two primary technologies. The mines referred to are open pit mines from which the sands are extracted and processed. In situ technologies use horizontal drilling and steam injection to produce bitumen from wells (rather than mining). In situ technologies are used for bitumen resources too deep for mining.

12 The National Energy Board estimated significantly lower costs in the range of $22 per barrel for SAGD projects and $40 per barrel for integrated mining and upgrading. National Energy Board, *Canada's Oil Sands Opportunities and Challenges to 2015*, ix.

will continue to increase in importance to Canada's oil industry as bitumen and synthetic crude production increases and conventional oil production decreases.

ECONOMIC POTENTIAL FOR CONVENTIONAL NATURAL GAS

Canada has long relied on conventional natural gas resources, which now appear to be in the early stages of decline. Conventional natural gas refers both to the type of reservoir (and related extraction technologies) and the location of the natural gas. Natural gas resources are typically estimated using the concept of ultimate potential—the volume of natural gas that can reasonably be expected to be found, based on current technologies, current knowledge of geology, and current economic conditions. NEB, in a 2004 resource assessment, concluded that Canada's ultimate potential for conventional natural gas is 14,214 billion cubic metres (bcm),[13] of which 3,285 bcm are in the Northern territories (or offshore North), and 790 bcm are in the offshore region of Labrador that forms part of the Canadian North, as defined for this report. The 1,436 bcm of conventional natural gas potential onshore in British Columbia is also located primarily in the North. NEB also identifies 196 bcm in the Southern portion of Yukon and the Northwest Territories. Finally, a portion of the 5,855 bcm estimated for Alberta is in the North. The natural gas ultimate potential for Northern Canada is therefore estimated at 5,707 bcm (40 per cent of Canada's total) plus a portion of Alberta's 5,855 bcm. Of the 5,707 bcm, only 1,425 bcm have been discovered to date. Thus, 40 per cent of the natural gas believed to exist in the North has been discovered, as compared with 65 per cent for the more maturely explored WCSB.

Within the territories, NEB identified 1,714 bcm of potential in the Mackenzie Beaufort region, 1,124 bcm in the Arctic islands, 134 bcm elsewhere in the Northwest Territories, 145 bcm in Yukon, and 168 bcm in the Eastern Arctic/Hudson Bay. In terms of discovered resources, the Arctic islands (331 bcm) and Mackenzie Beaufort (254 bcm) contain almost all of the discoveries to date. The Southern portion of Yukon/Northwest Territories has 27 bcm of discovered natural gas, and the Colville Hills region another 17 bcm.

Canadian natural gas production to date has been primarily from Alberta, British Columbia, and Saskatchewan, with production from Sable Island and offshore Nova Scotia contributing smaller volumes. There is some production in other provinces, and one project at Inuvik to serve local residents and generate electricity.

Forty per cent of the natural gas believed to exist in the North has been discovered, compared with 65 per cent for the more explored Western Canada Sedimentary Basin.

CONSTRAINTS AND PROSPECTS FOR CONVENTIONAL NATURAL GAS

Conventional natural gas production from the WCSB began to decline in 2008, as a result of lower levels of drilling activity, lower levels of demand in North America, lower natural gas prices, and an abundance of natural gas production in the United States. Conventional natural gas is expected to fall from its current 90 per cent of total production as tight gas and shale gas production continues to expand. Alberta is expected to experience the largest reduction. Total Canadian natural gas deliverability[14] is expected to decline from 15.1 billion cubic feet/day (bcf/d) in 2009 to just 13 bcf/d in 2012.[15]

Conventional natural gas development in Northern Canada (north of 60 degrees) faces some important long-term challenges. As indicated, most onshore natural gas reserves and potential are located in the Mackenzie River Delta and Beaufort Sea. These reserves were discovered more than 30 years ago, and may be nearing the end of a long wait for infrastructure. (See Exhibit 2.) The current

13 National Energy Board, *Canada's Conventional Natural Gas Resources*, Table 1.1A. The total remaining resource base (conventional plus unconventional) was updated to 12,424 bcm in the 2009 Energy Market Assessment.

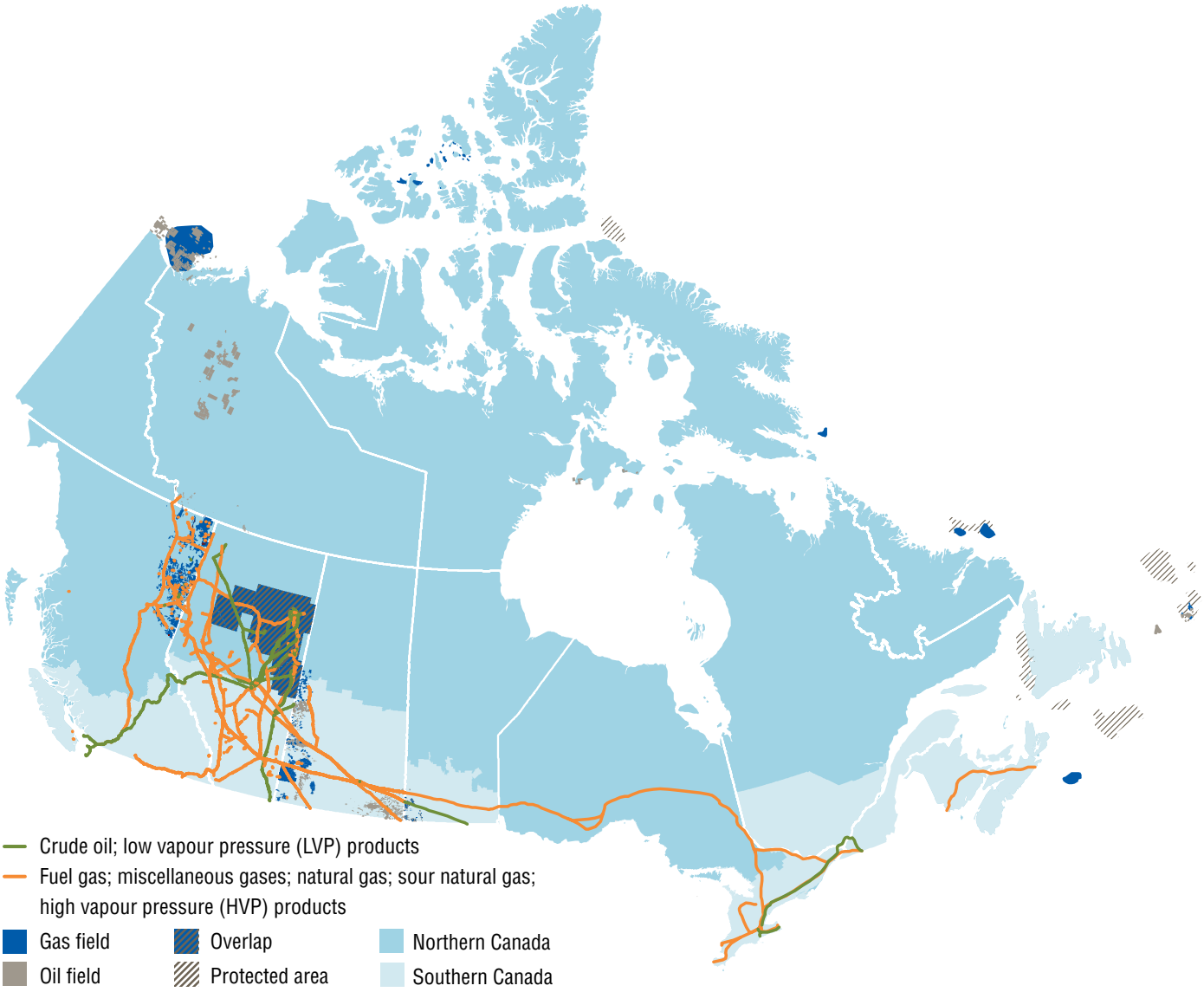
14 Natural gas deliverability refers to potential production in a given time period if all wells capable of producing were operating at capacity. Actual production is often lower due to operating constraints, gathering pipeline constraints, etc.

15 National Energy Board, "Canadian Natural Gas Entering a New Reality," 2.

Mackenzie Gas Project has been under regulatory review for several years, with the current review at a time when construction costs are high and natural gas prices uncertain. A competing project from the Alaska North Slope is also proceeding. Once the pipeline infrastructure is committed and constructed, additional exploration can be expected both in the Mackenzie region and in areas of known gas potential along the pipeline route.

The Arctic islands represent the second-largest potential in the North. The reserves were discovered decades ago under incentive programs that no longer exist. The harsh environment in the North represents a significant barrier to overcome. Although the water is relatively shallow (avoiding the complexity of deep water drilling technologies), same-season access to deal with production problems creates operating challenges that are currently

Exhibit 2
Canadian Oil and Gas Pipeline Structure



Sources: Golder Associates; The Conference Board of Canada.

under review by NEB for the entire Canadian Arctic offshore region.[16] Ice coverage represents a significant technical challenge to operating in the Arctic islands as well. Given the distance to market for the Arctic islands, pipeline access is probably not economic—liquefied natural gas (LNG) technology may represent the best development option for this gas. However, competing LNG projects around the world that are capable of large production volumes and could be expanded do not face the same kinds of operating challenges. Although the incremental costs associated with this northern location may one day be overcome, this has not been the case to date.

A major challenge to the development of natural gas is the cost of moving the gas by pipeline from Labrador to a market large enough to anchor a pipeline project.

Offshore Northern Labrador has also been identified as having significant natural gas potential, with some discoveries to date. Once again, the particular operating challenges of this region have stalled development. Although the resource is in relatively shallow water, two major challenges exist. First, the combination of shallow water and seasonal ice cover make sub-sea pipelines more expensive and challenging to build. The potential for ice scouring the seabed means that pipelines must be trenched into the seabed to a depth that protects them from the ice. Although this may be technically achievable, it adds significant costs to any potential pipeline project. The second major challenge is the cost of moving natural gas by pipeline from Labrador to a market large enough to anchor a pipeline project. Several proposals have been developed through the years to create petrochemicals or other industrial markets in Newfoundland and Labrador to support offshore natural gas development, but to date they remain potential projects.

16 The National Energy Board currently has regulatory authority for oil and gas exploration in Northern offshore waters and would be required to issue permits for offshore drilling.

ECONOMIC POTENTIAL FOR UNCONVENTIONAL NATURAL GAS

Unconventional natural gas, particularly shale gas, is expected to be the future of Canada's natural gas industry. The shale gas resource identified to date is primarily in Northeastern British Columbia and in Alberta. Development has focused mainly on Northeastern British Columbia. This resource could be developed rapidly enough to ensure that by 2020 more than half of Canadian natural gas production is from shale and tight gas formations.[17,18] The potential shale gas resource in Northeastern British Columbia is estimated at between 224 and 1,300 tcf. The total Canadian resource potential is between 594 tcf and 1,670 tcf.[19] Shale gas differs from conventional natural gas, however, in that only 20 per cent of the resource in place can be recovered using existing technologies.

Unconventional natural gas, particularly shale gas, is expected to be the future of Canada's natural gas industry.

Exploitation of shale gas has been made possible by advances in two key technologies: horizontal drilling and formation fracturing. The pore space in shale is limited when compared with conventional formations, and the ability of natural gas to move through the formation is further limited by low permeability and the availability of natural fractures. Current drilling technologies allow for a vertical well to be deviated to a horizontal section once the formation depth has been reached. The horizontal portion of the well can be as long as two kilometres, and as many as eight to twelve horizontal wells can be drilled from a single surface location. Once the horizontal sections are completed, fluids and proppants are injected into the formation at pressures that are sufficient to create

17 National Energy Board, *2009 Reference Case Scenario*, Figure 6.2.

18 Shale gas and tight gas refer to the subsurface conditions in which the natural gas is found. Tight gas occurs in geological formations where the porosity and permeability are very low, making it difficult for the natural gas to move through the formation to the well to be produced. Shale is a particular type of rock that exhibits similar properties.

19 National Energy Board, *A Primer*, Table 1.

additional fractures in the shale, allowing for increased natural gas flow to the wellbore and on to the surface. Shale gas wells produce large initial volumes (up to 10 million cubic feet per day or more) and decline rapidly to a sustained production level that is still high by current conventional well standards. Because of the costs of long-distance horizontal drilling and fracturing, shale gas development costs are relatively high, making sustained strength in natural gas prices a key success factor.

Coalbed methane is also included in the unconventional gas category, but has not been included in this section for two reasons. First, the majority of coalbed methane development to date has been in shallow deposits in Southeastern Alberta that are not included in Northern Canada. Second, coalbed methane exploitation has declined over recent years to the extent that it is not expected to provide strong growth potential in the future.

CONCLUSION

The oil and gas sector presents significant potential for future economic development in Northern Canada. As conventional resources continue to mature and decline in importance, the unconventional resources of the North, as well as its undeveloped conventional resources, will increase in importance. The initial stages of this transition are already under way in the Northern areas of Alberta (oil sands) and British Columbia (shale gas). These regions already have oil and gas infrastructure in place, but will see continued investment. The oil sands represent Canada's largest-ever industrial development project. Although the annual investment and timing of specific projects are subject to uncertainty, development will continue and will bring further prosperity to the region. Challenges related to cumulative impacts and environmental pressures must be better managed to fully realize the potential. Shale gas development in Northeastern British Columbia has access to pipeline infrastructure, but will need to develop natural gas processing capacity, particularly acid gas treatment (removal and disposal of carbon dioxide from the raw gas). The incremental investment required for field development, gathering systems, and processing plants will contribute to employment and income in the region for some time to come.

Although some projects are subject to investment and timing uncertainty, oil sands development will continue and will bring further prosperity to the region.

The oil and gas resources of the territories remain largely undeveloped, constrained by challenging climate, lack of infrastructure, a fragile natural environment, workforce issues, and distance to market. The Mackenzie Gas Project, when it proceeds, will at least partly address infrastructure availability for the largest natural gas resource area in the territories. The development of conventional gas reserves near the Arctic islands and natural gas reserves offshore Northern Labrador offer more long-term possibilities.

CHAPTER 3

Metal and Non-Metallic Mineral Mining

Chapter Summary

- The metal and non-metallic mineral mining industry is an important contributor to Northern economies and creates jobs in many communities in the North.
- The metal and non-metallic mineral industry experienced its worst year in recent history in 2009, yet still contributed $6.5 billion (in real terms) to the Canadian economy.
- The situation is expected to turn around in the coming years, as mining continues to be developed—particularly in Canada's North.
- The global economic recovery is putting upward pressure on commodity prices, suddenly making mines in remote Northern areas viable. However, development of mining resources in any area can be difficult, and Canada's Northern regions are no exception.

OVERVIEW

The metal and non-metallic mineral mining industry has a long history of providing wealth and employment to Canadians. From the Klondike gold rush in the late 1800s, to the large-scale development and production of potash in Saskatchewan, to diamonds in the Northwest Territories, the industry has maintained its lustre on the global stage. The industry has endured many boom-bust cycles in its history. In the 1960s, metal and non-metallic mineral mining directly accounted for over 2 per cent of the Canadian economy; by 2009, the industry's share had shrunk to 0.5 per cent. But the situation is expected to turn around in the coming years as mining continues to be developed—particularly in Canada's North.

The metal and non-metallic mineral mining industry has a long history of providing wealth and employment to Canadians.

Even in 2009—the worst year for mining in recent history—the industry contributed $6.5 billion to the Canadian economy (in real terms) and continued to export a diverse variety of resources. There are many spin-off benefits not included in the $6.5 billion: construction, transportation, utilities, warehousing, and communications are some of the other industries that benefit directly from the development and production of a single mine.

Mining is not a short-term activity. It takes years of exploration and development to bring a mine to production. Meanwhile, entire industries are built to support mining, such as construction, communications, transportation, and utilities; and services such as legal, environmental, and financial are used in the development and operation

of a mine. Restaurants and hotels in the area benefit from increased traffic to the area. Entire communities can be established because of a mineral deposit. The Sudbury Basin has remained a long-term mining community—in existence for over 100 years.

Over 45,000 people work directly for the Canadian metal and non-metallic mineral mining industry.[1] Labour income from this employment benefits local businesses and communities, and the income tax contributes to government coffers. The industry is also a large employer of Aboriginal people. In 2006, Aboriginal people accounted for 7.5 per cent of the mining workforce, while representing only less than 4 per cent of the general Canadian population.[2]

THE METAL AND NON-METALLIC MINERAL MINING INDUSTRY IN CANADA'S NORTH

The metal and non-metallic mineral mining industry is an important contributor to Northern economies and creates jobs in many Northern communities. There are several well-developed and emerging mining regions in the North. Currently, there are three large, successful diamond mines in the Northwest Territories, which have created a billion dollar industry; and the Sudbury region in Northern Ontario has provided the province with a lot of wealth and employment since the development of a mining settlement in the late 1800s. In the future, we expect Yukon, Nunavut, Northern Ontario, Northern British Columbia, and Northern Saskatchewan to see substantial growth in their metal and non-metallic mineral mining industries. They all hold large untapped resources that will experience high global demand over the long term.

Mines operating in Northern and remote areas in Canada face a different host of challenges. Our definition of Canada's North includes remote areas that are largely underexplored as well as some well-established mining clusters. The latter environments, such as Ontario's Sudbury Basin, generally have access to essential infrastructure such as energy grids and transportation networks. The former areas, such as regions in Nunavut, have to find ways to supply all their own energy and transportation, as well as skilled labour. Therefore, the costs of developing and operating a mine in remote areas of the North are much more costly and logistically challenging.

Opening a single mine in a very remote area of the North has a major impact on local economies and people, compared with opening a mine in a more established mining region. Economic growth in Nunavut is expected to experience double-digit growth this year, thanks to the opening of the territory's only mine, Meadowbank.[3] Industries that support mining development and operations, including construction, utilities, transportation, communications, and lodging, are either developing or expanding. The local communities—Baker Lake in particular—will continue to experience strong economic and employment growth which can lead to an improvement in the quality of life for residents.

The metal and non-metallic mineral mining industry is an important contributor to Northern economies, and creates jobs in many Northern communities.

Interest in precious metals[4] has been reaching remote areas of Canada's North. Nunavut has an abundance of various minerals, including its share of precious metals, ferrous metals,[5] uranium, and diamonds. Northern Ontario holds the promising "Ring of Fire" deposit; this deposit has chromite diamonds, in addition to base metals[6] and precious metals. A single hole drilled in 2007 set off a staking rush to the area.[7] British Columbia hosts a large deposit of base and precious metals in the Northwest. Meanwhile, Northern Saskatchewan is developing several uranium mines, which will begin production in the coming years.

1 Statistics Canada, "Survey of Employment, Payrolls and Hours."

2 Statistics Canada, *2006 Census of Canada.*

3 The Conference Board of Canada, *Territorial Outlook July 2010.*

4 Precious metals include gold, silver, and platinum.

5 Ferrous metals include steel, pig iron, and alloys of iron with other metals.

6 Base metals include copper, lead, nickel, and zinc.

7 Reynolds, *Northern Ontario's "Ring of Fire."*

ECONOMIC POTENTIAL FOR METAL AND NON-METALLIC MINERAL MINING IN THE NORTH

There is strong potential in the Northern regions to further develop the mining industries. Indeed, private companies have spent billions of dollars exploring and appraising the North, and several regions have garnered considerable excitement from exploration companies and local communities alike. The indicators we have—**economic output** and **exploration expenditures**—all point to a strong mining future for the North. More indicators describing employment in the North would be extremely helpful in assessing supply factors.

SUPPLY

The size of the metal and non-metallic mineral mining industries varies from region to region. Exhibit 3 shows the size of real metal and non-metallic mineral mining output in 2008 in each of the provinces, not just Northern regions (in 2002 $). This indicator gives us a sense of how established the industry is in each region. Ontario has the largest Canadian mining industry, worth $2.5 billion in 2008. This is a well-established and highly developed industry in the province, especially in the Sudbury Basin. Ontario hosts a wide variety of metals, and reserves are still abundant. Copper, nickel, and zinc are plentiful and will continue to experience a healthy demand from industrializing nations. Silver and gold are also abundant in Ontario. Northern Ontario also began producing diamonds in 2008, and there has been exploration for more diamonds.

Saskatchewan has the second-largest amount of mining output, but the large majority of that output is potash mined in the Southern region. Metal mining, which consists primarily of gold and uranium, is mined in the Northern region. Until 2009, Saskatchewan was the largest producer of uranium in the world. Currently, Canada and Kazakhstan together account for half of the world's uranium production.[8]

The Northwest Territories has the next-largest mining industry. Except for one tungsten mine, which is in the process of closing down, mining in the Northwest Territories consists entirely of diamonds. Diamond mining is a relatively new industry for Canada, and it has expanded rapidly over the past 10 years in the Northwest Territories. There are currently three diamond mines in production: Snap Lake, Diavik, and Ekati. Together with Ontario's new Victor mine, the diamond mines in Canada produced 13 per cent of the world's diamond gemstones in 2009. This places Canada behind only Botswana and Russia in terms of diamond gemstone production.[9]

Private companies have spent billions of dollars exploring and appraising the North, and several regions have garnered interest locally and from exploration companies.

Newfoundland and Labrador has a mining industry similar in size to that in the Northwest Territories, although it consists mostly of metal mining. There is a cluster of iron mines close to Labrador City and a large nickel mine near Voisey's Bay, Labrador. Gold deposits are found in Newfoundland, which is considered part of Southern Canada in this analysis.

Quebec has a large mining industry, and mining production is split between the Northern and Southern regions of the province. The province has a long history of mining and mines a diverse array of metals: copper, gold, nickel, zinc, silver, uranium, lead, and more. The Fraser Institute has ranked Quebec in the top 10 jurisdictions since 2001 for overall policy attractiveness.[10]

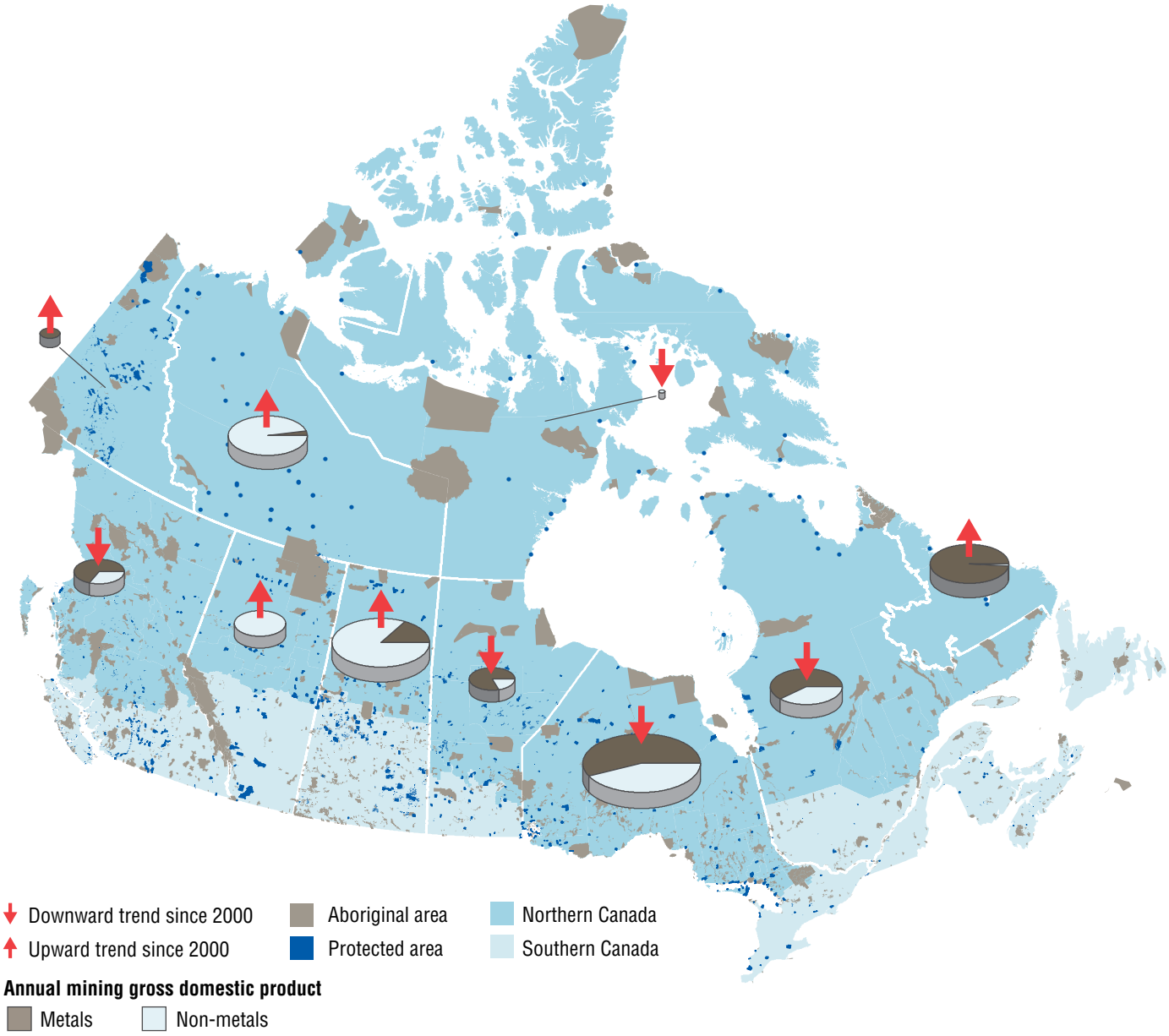
The Fraser Institute conducts an annual survey of mining companies to create a policy potential index that measures the effect government policies have on mineral exploration. The survey covers mining jurisdictions on every continent except Antarctica. While Quebec has been in

8 World Nuclear Association, "Uranium Production Figures."

9 U.S. Geological Survey, *Mineral Commodity Summaries 2010*, 63.

10 Cervantes and McMahon, *Survey of Mining Companies 2009/2010*.

Exhibit 3
Real Output in the Metal and Non-Metallic Mineral Industry, by Province and Territory, 2008



Sources: Statistics Canada Provincial Economic Accounts; The Conference Board of Canada; Golder Associates.

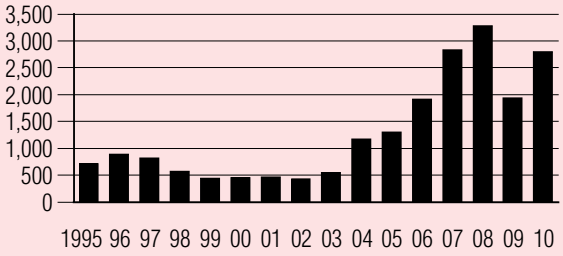
the top 10 for almost 10 years, other provinces and territories have ranked well, especially in recent years. In the latest survey, the 2010 mid-year update, five provinces and territories made the top 10 out of 51 mining jurisdictions: Alberta (1), Quebec (3), Yukon (4), Saskatchewan (5), and Newfoundland and Labrador (7).[11]

11 Cervantes and McMahon, *Survey of Mining Companies, 2010 Mid-Year Update.*

British Columbia has an established mining industry. The Southern region has numerous non-metallic mineral mines, such as limestone and gypsum. The Northern region consists of a variety of metal mines: molybdenum, gold, silver, copper, and zinc. Northern Manitoba also has a notable mining industry; production includes gold, zinc, copper, silver, and nickel.

Exploration and **deposit appraisal expenditures** are forward-looking indicators.[12] An increasing amount of exploration and deposit appraisal money has flowed into Canada over the past 10 years.[13] (See Chart 1.) This type of expenditure is an indicator of future mine development. It can loosely be viewed as a measure of investment that mining companies will hope to benefit from when their findings result in commercial production. The size of the "$" symbol in Exhibit 4 represents the exploration and deposit appraisal spending intentions this year (2010) at the provincial and territorial level.[14] The clear squares show Canada's top 100 exploration projects based on the amount of money spent on exploration and deposit appraisal. Note that the large majority of these projects are located in the North.

Chart 1
Exploration and Deposit Appraisal Expenditures, Canada
($ millions)



Note: 2010 spending intentions as of September 2010.
Sources: Natural Resources Canada; The Conference Board of Canada.

12 All exploration and deposit appraisal figures are from Natural Resources Canada's federal-provincial-territorial Survey of Mineral Exploration, completed in September 2010.

13 Except for a dip in spending during the recent recession when money was tight in the industry.

14 Data for the Northern regions, as we have defined them, are not available.

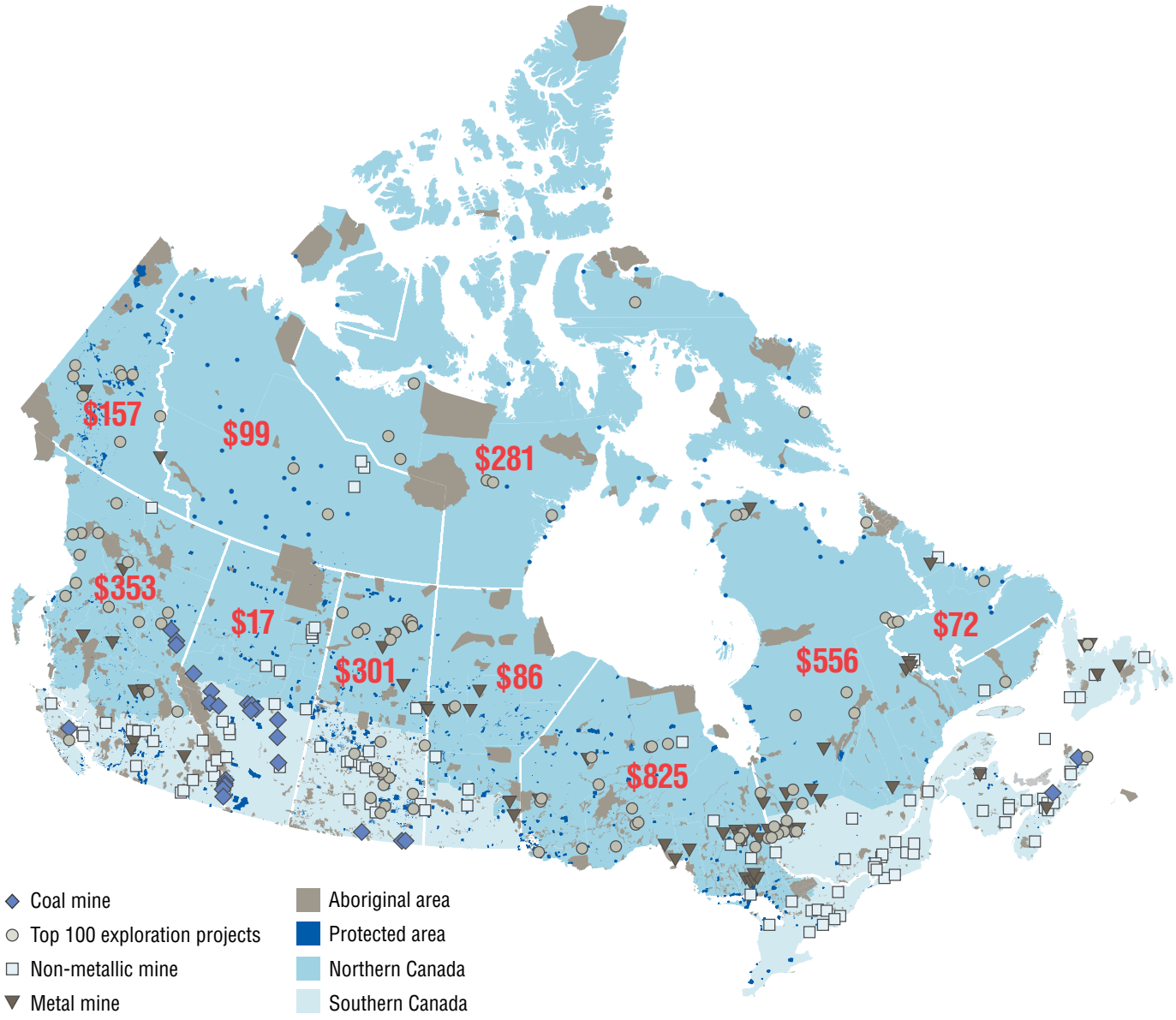
The exploration spending intentions show that Ontario will get the lion's share of exploration and deposit appraisal expenditures, which are expected to hit $825 million this year (up from $536 million in 2009). A key mining area going forward will be the Ring of Fire in the North, which has a world-class deposit of chromite. Chromite can be used in the production of stainless steel, heating units, and other appliances, as well as cars. The province also added Canada's first diamond mine outside the Northwest Territories in 2008, and there is further exploration activity to increase diamond mining in the province.

In Ontario, a key mining area in the Northern part of the province, going forward, will be the "Ring of Fire," which has a world-class deposit of chromite.

Quebec will see large amounts of exploration expenditures flow in ($556 million, up from $379 in 2009). These funds will flow mostly to the Abitibi Belt region. The Canadian Malarctic Project Belt will produce a large quantity of gold once it begins production in the near future. Close by, IAMGOLD's Westwood project has begun construction to get it ready for production. Lithium is gaining a lot of attention as the metal of the future; if electric vehicles gain in popularity, the section from James Bay to Val d'Or will be full of explorers and producers of the metal. The Quebec Lithium Project has a pre-feasibility study out and could be producing lithium as early as 2012. Furthermore, several nickel and uranium deposits are being explored in the North.

British Columbia will benefit from an estimated $353 million in exploration expenditures this year; this is higher than the $217 million the province saw last year, but still not back to pre-recessionary spending levels. Thirteen out of Canada's top 100 exploration projects are found in the Northern region of the province. There is a huge potential to develop copper, silver, and gold mines in the Northwestern region of the province. A large factor in the development of more resources is the lack of energy infrastructure. The viability of many of these mines relies on access to a (currently non-existent) transmission line. The province and the mining companies have had to

Exhibit 4
Exploration and Deposit Appraisal Expenditures, Spending Intentions, 2010
($ millions)



Note: Revised spending intentions at September 2010.
Sources: Natural Resources Canada; The Conference Board of Canada; Golder Associates.

work together to commit to building a transmission line to bring power to the region. The proposed $400-million transmission line is currently undergoing an environmental assessment, and construction is anticipated in the coming months.[15] Metal mining output in British Columbia is expected to double if all the proposed mining projects in the Northwestern region proceed with their development.

15 British Columbia Ministry of Energy, Mines and Petroleum Resources, *NTL Agreements Will Create Jobs, Power B.C.'s Northwest.*

It is unlikely the cluster of mining projects in the region will be economically viable without such infrastructure. (See Chapter 6 for more details.)

Exploration expenditures in Saskatchewan will top $301 million, down slightly from the $311 million spent in 2009. Potash exploration in the South will get the bulk of the funds, but several uranium projects in the North are being explored. A new uranium mine—Cameco's Cigar Lake—is expected to open in the next three years. In fact, nine out of Natural Resources Canada's top 100 exploration projects in Canada are uranium properties in Northern Saskatchewan.[16]

About $281 million will be spent on exploration in Nunavut in 2010 (up from $188 million in 2009). The territory's only producing mine, Meadowbank, just achieved commercial production in March 2010, beginning what appears to be a promising future for Nunavut's mining industry. Eight of the 100 top exploration projects are in the territory. The minerals being explored are quite diverse and include gold, diamonds, uranium, copper, and zinc. The Meliadine (gold) project may be the next mine to go into production, with its positive preliminary assessment; it has the advantage of being close to Rankin Inlet on Hudson Bay, making transportation feasible.

Nunavut's only producing mine, Meadowbank, achieved commercial production in March 2010, beginning what appears to be a promising future for the mining industry.

Yukon's estimated exploration expenditures will top $157 million this year, up from $91 million in 2009. Several mines are due to begin production over the medium term, including Wolverine (copper and zinc), Carmacks (copper), and Victoria Gold (gold). These projects would contribute significantly to Yukon's mining industry. Furthermore, several other exploration projects are located throughout the territory that could help contribute to Yukon's mining industry going forward.

This year, $99 million is expected to be spent exploring in the Northwest Territories, up from only $44 million in 2009. Exploration expenditures have fluctuated tremendously over recent years, peaking at $194 million in 2007. No new diamond mines are on the immediate horizon until the Gahcho Kué project puts out a feasibility study. Output at the Diavik mine is expected to fluctuate as the underground mine is opened and the open pit is closed. Meanwhile, Snap Lake's output will increase, making up for temporary closures during the economic downturn. There is some good news on the metals front. The life of the Cantung tungsten mine has been extended into 2014. Fortune Mineral's NICO Gold-Cobalt-Bismuth-Copper Project is advancing and will likely begin production before Cantung exhausts its reserves.

Demand for metal and non-metallic minerals will vary, depending on the type of mineral produced.

Manitoba is expected to see $86 million flow into the province in exploration expenditures this year, down slightly from $98 million in 2009. The industry is expected to see gold production increase with production at Snow Lake, and the Lalor mine will begin producing gold, silver, copper, and zinc in the next couple of years.

Newfoundland and Labrador will see $72 million in exploration expenditures this year, about half the amount experienced in 2008. Several iron ore mines are planning to boost production in the near future, including Labrador City operations and the Wabush mine. New Millennium Capital and Tata Steel are opening an iron mine in Schefferville, Labrador.

DEMAND

Demand for metal and non-metallic minerals will vary depending on the type of mineral produced. Therefore, not all Northern regions will benefit equally from increasing global demand. Generally, the Conference Board expects demand and prices for metals—especially those associated with industrial activity—to climb over the medium term. Copper is used in piping, wiring, and refrigeration; nickel is used in stainless steel, batteries, and magnets; iron is used in the creation of alloyed steel for non-residential construction; uranium generates

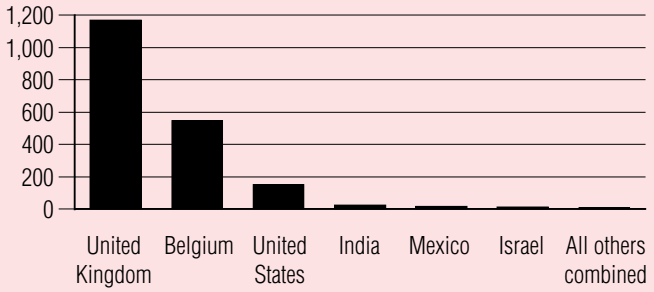
16 National Resources Canada, *Map of Top 100.*

nuclear power. The expansion of the global economy—particularly Brazil, Russia, India, and China (the BRIC countries)—will create a strong demand for these metals and others; the emerging middle class in these countries will continue to purchase appliances and vehicles.

Future demand for gold is more difficult to predict—given that demand can come from so many different sources, some of which can fluctuate wildly: jewellery, monetary exchange, investment, medicine, electrical wiring, and more. Current demand for gold is at an unprecedented high, with little seen recently to believe that prices will not remain high over the short term.

There is healthy demand for Canadian diamonds. Canadian diamonds are typically exported to European countries to be sorted and sold through Antwerp and London. Exports of Canadian diamonds topped $1.9 billion in 2009. Over 88 per cent of these exports went to the United Kingdom or Belgium for cutting and polishing.[17] (See Chart 2.)

Chart 2
Value of Canadian Diamond Exports, by Country, 2009
($ millions)



Sources: Industry Canada; The Conference Board of Canada.

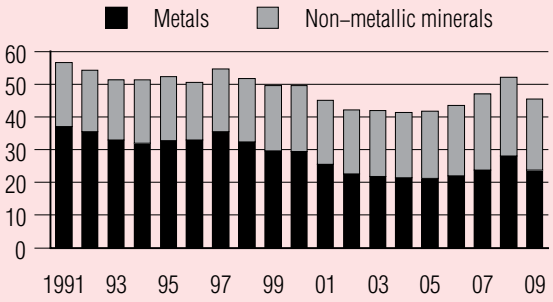
Very little diamond cutting and polishing is currently done in Canada. Also, while many of these Canadian facilities operate in Southern Canada, this is changing. The size of Sudbury's Crossworks Manufacturing recently doubled; before it doubled, the company was polishing about 10 per cent of Victor mine diamonds in Ontario.[18] Since diamond exploration continues in the Northwest Territories, Nunavut, Ontario, Quebec, and Saskatchewan, supply is expected to continue. Developing and expanding more cutting and polishing facilities in Northern Canada would create jobs and yield an even higher value-added export product.

CONSTRAINTS

Supply constraints include skilled labour availability. There is an aging workforce, along with a lack of young miners and female miners. The Mining Industry Human Resources Council found in its annual survey that over 50 per cent of employees working in the mining industry are 45 years of age or older; the average age for retirement in the industry is 59.5 years.[19]

Employment data are limited for the North. Statistics Canada groups all primary sectors (agriculture, mining, fishing, and forestry) together, so we cannot distinguish how labour is spread among the primary sectors in the Northern regions. For the country as a whole, the industry employed 45,600 people in 2009: metal mining employed 23,800 and non-metallic mineral mining employed 21,800. Given the industry's vulnerability to large swings in commodity prices, it is not surprising that output, and therefore employment, fluctuates in response. (See Chart 3.)

Chart 3
Canadian Employment in Metal and Non-Metallic Mineral Mining
(number of employees, 000s)



Sources: Statistics Canada; The Conference Board of Canada.

17 Industry Canada, "Trade Data Online."

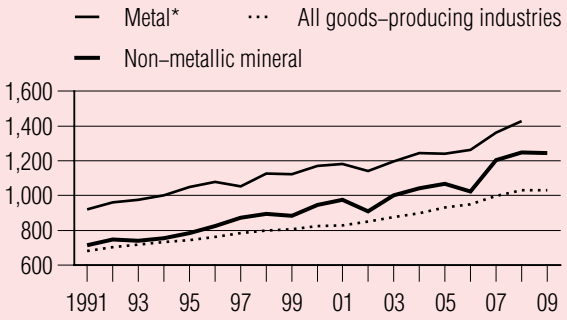
18 "Diamond Manufacturing Plant Doubles in Size."

19 Mining Industry Human Resources Council, *Canadian Mining Industry Employment and Hiring Forecasts 2010.*

It can be hard to attract new workers into the mining profession. Due to the remoteness of some of the Northern mines, workers live in camps away from friends and family for weeks. In some places, such as Nunavut, the industry is so new that very few residents have been trained in any related skills, so labourers must be attracted from elsewhere until the required skill sets can be developed locally. Increased relationships between the industry and educational institutions would help attract workers and make sure they have the right skills.

It is a very high value-added sector and wages are quite high in the industry: in 2008, average weekly wages (including overtime) were $1,430 in metal mining and $1,250 in non-metallic mineral mining. These wages are among the highest of the goods-producing industries (the average wage for all goods-producing industries was $1,030). (See Chart 4.)

Chart 4
Average Weekly Earnings in the Canadian Mining Industry, Including Overtime
($)



*Data for 2009 metal mining were too unreliable for Statistics Canada to publish.
Sources: Statistics Canada; The Conference Board of Canada.

Aboriginal labourers are increasingly choosing the mining industry to build their careers. According to the 2006 census, 7.5 per cent of all mining employees in Canada are Aboriginal, up from 5.1 per cent in 2001.[20] Saskatchewan (20.7 per cent) and Ontario (17.2 per cent) had the highest proportion of Aboriginal people. The relatively young age of the Aboriginal population, along with the Northern geographic location of many Aboriginal communities, makes this group an attractive pool of labour to draw from. Training programs will be essential for Aboriginal participation in the skilled workforce. Nunavut Arctic College now offers programs in mine training, exploration, and construction trades. Several mining companies operating in Aboriginal communities have agreements to offer various skills training.

Many Northern regions have a strong history in mining and are highly developed, while others offer underexplored regions with significant potential for resources.

A second supply constraint is the number of years it takes to bring a mine to full production. Skilled construction workers can be hard to come by when other regions in Canada are expanding. All the permitting, assessment, and consultation work that goes along with bringing a mine into production can add years to the process, particularly if the project is located in more remote areas of Canada. Developing mines in Nunavut and Northwestern British Columbia, for example, is extremely costly. Often, there are no roads, water, electricity, railroads, ports, labour, or airstrips nearby. Everything has to be built from the ground up. In the case of British Columbia, governments came together to support a transmission line, which could allow a number of mines to come to production.

Environmental assessments and other licences (such as water licences) are a necessary challenge for the industry. These assessments take a significant amount of time and effort and can cause a lot of confusion for all parties involved due to overlapping and inefficient processes in place. These inefficiencies can deter investors. This investment environment is in contrast to other mining countries, where sometimes the environmental assessment process is not as stringent or comprehensive. The challenge for Canada is to create a competitive investment environment that does not compromise its environmental obligations.

20 Natural Resources Canada, “Aboriginal Participation.”

The devolution of responsibilities for land and resources has been a hot topic for the three territories. Yukon is the only territory that has completed the transfer of responsibilities for land, water, and resource management. The Northwest Territories has come close to completing the devolution process, but has had some setbacks. Nunavut has not yet begun its process.

The North has an abundance of metal and non-metallic minerals. Many of the regions in the North have a strong history in mining and are highly developed, while others offer underexplored regions with significant potential for resources. The continuing global economic expansion and Canada's politically stable environment are key strengths that should help strong demand for Canadian minerals to continue in the future.

CONCLUSION

Global demand for Canada's metal and non-metallic minerals is expected to be strong over the medium term. The global economic recovery is putting upward pressure on commodity prices, suddenly making mines in remote Northern areas viable.

A few hot mining spots will emerge in the North. The Ring of Fire in Northern Ontario will become a big player in chromite mining. Northern Saskatchewan will start producing several gold and uranium mines in the near future. The three territories' metal mining industries have begun an expansion; a number of mines are expected to begin production in the next 10 years. Northern British Columbia will benefit from a new transmission line to its Northwestern corner, which will enable several mines to begin production. Northern Manitoba will host at least two new metal mines in the near future; Labrador will see a boost in iron ore production from several mines.

The remoteness of some mines will pose a challenge. The viability of many mines in Nunavut depends directly on transportation infrastructure. Mineral development projects in the territory usually include building roads, railways, airstrips, and/or ports; these substantial costs can keep a resource deposit in the ground. In Northern British Columbia, the infrastructure concerns are primarily energy-related. The viability of large resource deposits in the Northwest is dependent on ample, competitively priced power.

Global economic recovery is putting upward pressure on commodity prices, making mines in remote Northern areas viable.

Development of mining resources in any area can be difficult, and Canada's Northern regions are no exception. There is much work required from both project proponents and the respective governing agencies in each region to ensure that mine development takes place in a manner that is environmentally responsible and provides economic rewards to residents, benefits to local governments, and also monetary benefits to project proponents. Northern Canada's mining future is buoyed by the existence of a stable political environment and the existence of large resource deposits and potential. This, coupled with strong global demand and high mineral prices, will result in a strong mining future for Northern Canada.

CHAPTER 4

Forestry

Chapter Summary

- Most of the Canadian forestry output is generated in British Columbia, Quebec, and Ontario, and a large share of the industry is located in the Northern parts of those provinces.
- The potential of the forest industry in the North depends on the availability and renewability of the forest as well as the demand for Canadian forest products.
- The Canadian forest industry has contracted significantly in the second half of this decade. This puts the industry in a position where changes are necessary in order to move forward.
- How the forest industry is able to adapt to changing supply conditions and the changing needs of local and foreign markets will dictate the performance of the industry over the long run.

OVERVIEW

Canada is home to a vast area of forested land. Canada's territory is estimated at 738.5 million hectares, and more than half, 398.28 million hectares, is forest land, wooded land, or land with tree cover. Currently, the forestry sector uses 256.7 million hectares of Canada's land.[1] When referring to the forest industry, we often mean the forestry and logging industry, the wood products manufacturing industry and, in some instances, the paper manufacturing industry.

THE FOREST INDUSTRY IN CANADA'S NORTH

Data on the economic indicators of the forest industry are available at the national and provincial levels.[2] Data specific to our definition of the North were not readily available. However, despite the lack of Northern data, the general state of the Canadian forest industry may be used as an indication of the industrial trends in the North. Most of the Canadian forestry output is generated in British Columbia, Quebec, and Ontario, and a large share of the industry is located in the Northern parts of those provinces. (See Exhibit 5.)

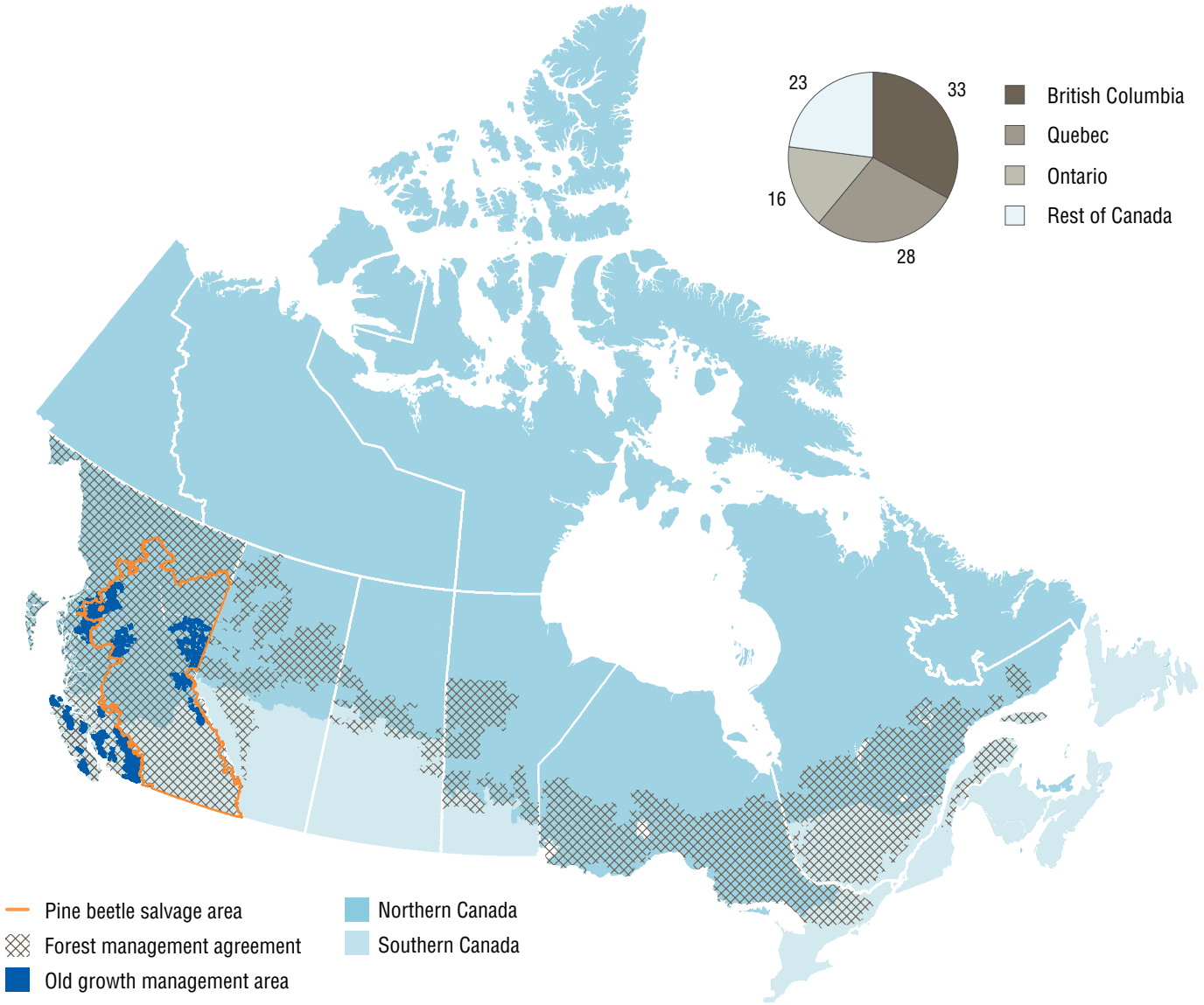
Global Forest Watch Canada maps in "Canada's Commercial Forest Tenures"[3] provide information on the operating area of major forest companies in all provinces. The operating area in British Columbia covers nearly all of the province (and most of the province is considered the North). Most of the operating area of major forest companies in Ontario is located in

1 Natural Resources Canada, "Canada's Forests."

2 Data on output and employment were pulled from Statistics Canada's CANSIM tables. Employment data are from "Survey of Employment, Payroll and Hours."

3 Global Forest Watch Canada, "Canada's Commercial Forest Tenures, 2003."

Exhibit 5
The Forest Industry Across Canada, 2010
(share of the forest industry output, per cent)



Sources: Statistics Canada; The Conference Board of Canada; Golder Associates.

the Northern part of the province. The operating area in the North of Quebec is mainly located in Saguenay Lac-Saint-Jean and the Southern area of the "Nord du Québec."

In British Columbia, the economic regions' portion of The Conference Board of Canada's definition of the North (Cariboo, North Coast, Nechako, and Northeast) generated about one-third of the provincial exports in forest products in 2001.[4]

The economic regions' part of the Northern portion of Quebec (Saguenay-Lac-Saint-Jean, Côte-Nord, and Nord-du-Québec) generated 38 per cent of the total

4 Baxter, Berlin, and Ramlo, *Regions & Resources*.

softwood production in Quebec in 2008.[5] In June 2009, the estimated production capacity (in dry metric tons) of the eight pulp and paper mills located in Northern Quebec accounted for 24 per cent of the total production capacity in Quebec.[6]

Northern Ontario (including Northwestern and Northeastern economic regions) represents about 90 per cent of the province's landmass. Most of the productive forest in Ontario is located in the boreal forest and the Great Lakes–St. Lawrence forest regions. The boreal forest is in Ontario's north while the Great Lakes–St. Lawrence forest region is split into a Northern and Southern part.[7]

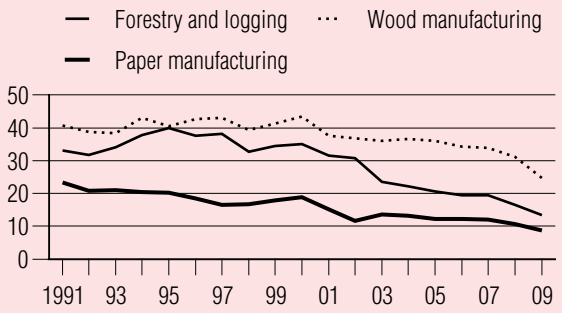
The real GDP of the forest industry in Canada (including forestry and logging, wood products manufacturing, and paper manufacturing) reached $20.5 billion (2002 $) in 2009.[8] This represents 1.7 per cent of total Canadian GDP. The output of the forestry industry in relational-to-overall GDP has been undergoing a gradual decline since the first half of the 1990s, with its share of total output falling from 3 to 1.7 per cent. The share started to decline in the early 1990s and then remained relatively constant afterwards, until it began an even more significant decline over the second half of this decade, in line with the collapse of U.S. home construction. Forestry employment (including forestry and logging, wood manufacturing, and paper manufacturing) also declined significantly over the last decade. In fact, forestry has lost more than 135,000 jobs across Canada between 2000 and 2009.[9]

Precipitous declines in employment occurred in 2008 and 2009 in line with falling output due to the global recession and the downturn in U.S. housing. However, although most of the recent industrial contraction is explained by the recession, falling demand from the U.S., and a rapid appreciation in the Canadian dollar, the industry was already experiencing difficulties when the downturn began. The industry has been decimated by easing demand for paper (mainly due to the switch to online sources) and increased competition from lower-cost producers in the international market.[10]

British Columbia is the most important province in terms of output from forestry, logging, and wood products manufacturing. Output peaked between 2002 and 2005 during the housing boom, but has since dropped markedly, especially in 2008 and 2009 as the U.S. housing crisis struck.[11]

Employment in the forestry and logging industry (including support activities) saw significant declines over the last decade, especially during the last two years, when employment fell from 19,300 workers in 2007 to 13,355 workers in 2009.[12] In just one decade, employment was cut by 60 per cent. Over the same period, a similar picture was seen in wood products manufacturing and paper manufacturing employment, which recorded 24,768 and 8,663 jobs, respectively, in 2009.[13] (See Chart 5.)

Chart 5
Forestry Employment in British Columbia
(number of employees, 000s)



Sources: Statistics Canada; The Conference Board of Canada.

5 Conseil de l'industrie forestière du Québec, *2009 Statistiques* .

6 Ministère des Ressources naturelles et de la Faune, *Industrie des Pâtes et Papiers*, Chapitre 11.

7 Ontario Investment Service, *Where Investment Opportunities "Grow on Trees."*

8 The Conference Board of Canada, *Canadian Outlook Autumn 2010: Economic Forecast*.

9 Statistics Canada, "Survey of Employment, Payrolls and Hours."

10 Natural Resources Canada, "Canada's Forests, Sustainability Indicators."

11 Statistics Canada, "Provincial Gross Domestic Product by Industry."

12 Statistics Canada, "Survey of Employment, Payrolls and Hours."

13 Ibid.

Quebec is the second-largest province in terms of forestry, logging, and wood manufacturing output, and the first for pulp, paper, and paperboard mills production.

Quebec's forestry and logging output peaked in 2005 during the U.S. housing boom. In 2005, the Quebec government mandated the Commission Coulombe to study public forest management in Quebec.[14] The Commission concluded that Quebec's forests were overharvested and it was decided that the annual allowable cut (AAC) would be reduced by 20 per cent by 2008. However, output in forestry and logging fell by more than 35 per cent between 2005 and 2008, and it continued to fall in 2009.[15] Forest industry employment experienced a similar fate over the same period. In 2009, forestry and logging employed 12,248 people, wood products manufacturing 28,402, and paper manufacturing 27,349.[16] (See Chart 6.)

The potential of the forest industry in the North depends on the availability and renewability of the forest, as well as the demand for Canadian forest products.

Ontario places third in terms of its forest industry output. Ontario's forestry and logging output represented 10 per cent of the Canadian total in 2009. Production peaked in 2000 but has since been declining gradually, despite peak demand created during the U.S. housing bubble. As the sector was already losing ground, the effects of the recession exacerbated the situation. Between 2000 and 2009, output fell by almost two-thirds.[17] Employment also experienced important declines over the last decade, especially in 2007, 2008, and 2009. In 2009, forestry and logging employed 4,386 people, wood products manufacturing 15,912, and paper manufacturing 20,401.[18] (See Chart 7.)

14 Frigon, "Quebec's Cut Reduction Taking a Toll."

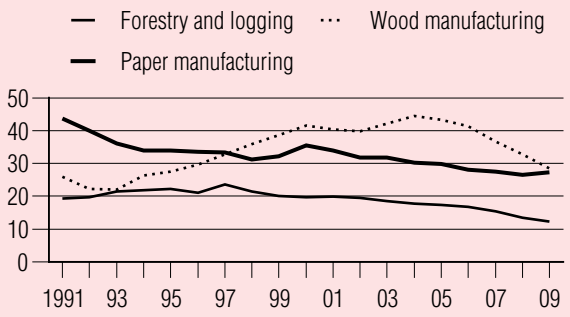
15 Statistics Canada, "Provincial Gross Domestic Product by Industry."

16 Statistics Canada, "Survey of Employment, Payrolls and Hours."

17 Statistics Canada, "Provincial Gross Domestic Product by Industry."

18 Statistics Canada, "Survey of Employment, Payrolls and Hours."

Chart 6
Forestry Employment in Quebec
(number of employees, 000s)



Sources: Statistics Canada; The Conference Board of Canada.

Chart 7
Forestry Employment in Ontario
(number of employees, 000s)

Sources: Statistics Canada; The Conference Board of Canada.

ECONOMIC POTENTIAL FOR FORESTRY IN THE NORTH

The potential of the forest industry in the North depends on the availability and renewability of the forest as well as the demand for Canadian forest products.

SUPPLY

The supply of forest products depends on many conditions. They include geographical factors, legislation, forest fires, insect infestations, and other factors in the natural environment as well as demographic factors affecting the availability of workers. Those factors are discussed in the "Constraints" section below.

DEMAND

The demand for Canadian forest products will depend on a number of factors, but foremost on the industry's ability to diversify its "product mix and geographic markets."[19]

The United States is the principal buyer of Canadian forest products. The 2008–09 U.S. housing crisis has shown how vulnerable the Canadian forest industry is to the state of the North American housing market and the U.S. economy in general. Reflecting a U.S. housing recovery, residential construction is expected to grow at an annual compound rate of 15.4 per cent between 2010 and 2015. Between 2015 and 2030, residential construction is expected to grow at a much slower compound annual rate of 1 per cent.[20] This slower growth in residential construction may slow forest product exports to the U.S. over the long run.

The demand for Canadian forest products will depend on a number of factors, but foremost on the industry's ability to diversify its product mix and geographic markets.

The demand for forest products should gradually shift from the U.S. to Asia,[21] but this will also depend on a number of factors. For example, the Chinese demand for Canadian wood products will depend on overall Chinese economic growth, the acceptance of wood as a building material, as well as the trend in population migration from rural to urban areas.[22] The conversion from imperial units (feet and inches) to lumber metric units could allow Canadian mills to gain an edge over their competitors in China.[23]

Another opportunity involves climate change regulations. Potential greenhouse gas (GHG) emissions reduction targets may create a market for dead fibre (resulting from mountain pine beetle—MPB—infestations),[24] and more generally for wood pellets. Trees need to absorb and store carbon dioxide to grow.[25] The combustion of wood residuals, such as wood pellets, emits the carbon that the tree initially stored. In the event of restrictions on GHG emissions, this carbon neutrality would make wood residuals an attractive source of energy. For example, Ontario's initiative to eliminate coal from Ontarian power plants may provide an incentive to invest in wood pellets in the province.[26]

The 2008–09 U.S. housing crisis has shown how vulnerable the Canadian forest industry is to the state of the North American housing market and the U.S. economy.

Finally, Canada has the largest independently certified forest land in the world.[27] Because of growing awareness about environmental issues, this is a label that North American consumers may look for when buying woods in the future, supporting demand for Canadian forest products.

CONSTRAINTS

The provinces have the responsibility for managing most of Canada's commercial forests. They regulate the supply of timber by setting the available harvest area or the AAC. The AAC is based on characteristics of the forest—such as age and growth potential—after allowing for soil quality; losses from fire, insects, and disease; and environmental concerns. The AAC "is based on the principle of sustainable development so that timber is not depleted at rates exceeding re-growth capacity."[28] The length of time it takes for a tree to become mature may vary depending on its geographical location. Since the growing season is shorter in the North, trees grow at a slower rate. The installation of forestry infrastructures further north, despite slower-growing

19 Natural Resources Canada, *The State of Canada's Forest.*

20 The Conference Board of Canada, *Canadian Outlook Long-Term Forecast 2009.*

21 Canadian Council of Forest Ministers Innovation Working Group, *Forest Sector Innovation Framework.*

22 Stirling, "B.C. Lumber Producers Target Growing Chinese Market," 4–6.

23 Ibid.

24 Stirling, "After the Beetle."

25 Canadian Council of Forest Ministers, *Marking Canada's Progress.*

26 Kryzanowski, "Pellet Production Boom," 4–7.

27 Canadian Council of Forest Ministers, "Sustainable Forest Management in Canada."

28 The Conference Board of Canada, *Insights on Western Canada,* 71.

trees and a smaller number of trees to be harvested, combined with longer transportation distances, could translate into higher production costs per output.

Climate change is another factor that can potentially affect the supply of forest products in a number of different ways. Climate change may affect the extent of insect infestations and forest fires, the speed of tree growth, as well as the choice of the tree species to be planted and the harvest periods.[29] On the regulation front, GHG emission targets can influence how much forest is harvested because of the carbon storage nature of trees. Forested land could be used as temporary emissions sinks.[30]

The extent of the protected areas, where resources extraction is forbidden, is a factor when assessing the potential growth of the Canadian forest industry.

One of the most serious insect infestations in Canada was caused by the MPB. The MPB epidemic resulted from the unusually high number of old pines (the tree species usually targeted by the MPB) and mild winters.[31] The epidemic has now lost some speed, but simply because there are fewer pines to be infected.[32] British Columbia's AAC is expected to be reduced soon to allow regeneration of the forest.[33] Meanwhile, the decline of sawlogs resulting from the MPB infestation is expected to lead to the closures of many sawmills in British Columbia over the next eight years.[34] Production is expected to fall after 2013, as the industry faces the technical and economic difficulties of processing MPB-infested wood.[35]

Forest fires can also limit the potential supply of forest products. On average, 2.5 million hectares of Canada's boreal forest are burnt annually. The factors influencing the extent and frequency of forest fires include "fire management measures, short-term weather conditions, as well as the age structure of the forest."[36] The areas vulnerable to fire and the length of the fire season are expected to extend over the long term. These changes may lead to "more frequent and severe fires, shorter growth periods between fires, proportionally younger stands, and a decrease in the carbon storage of Northern Canadian forests."[37]

The extent of the protected areas, where resources extraction is forbidden, is one more factor to consider when assessing the potential growth of the Canadian forest industry. Exhibit 6 illustrates the protected areas included in the North under federal, provincial, territorial, and Aboriginal jurisdictions. Some areas are under the joint management of different jurisdictions.[38]

Climate change is another factor that can potentially affect the supply of forest products in different ways.

Some forest areas are protected by private organizations and do not appear in Exhibit 6. The *Canadian Boreal Forest Agreement*, signed on May 2010, was an agreement between the forest industry and environmental organizations. Under the agreement, no harvesting (or road building) is to be undertaken on 29 million hectares of boreal forest land to protect the habitat of woodland caribou across Canada. The protected areas are mainly located in Quebec (8.5 million hectares where a portion is located in the North in the Saguenay-Lac Saint-Jean region) and Manitoba (10 million hectares, mostly located in the North).[39] In exchange for this commitment from the industry, the nine participating environmental organizations agreed to suspend "divestment" and "do not buy" campaigns targeting participating companies' operations

29 Natural Resources Canada, *The State of Canada's Forest.*

30 Ibid.

31 British Columbia Ministry of Forests, Mines and Lands, "Mountain Pine Beetle in B.C."

32 Stirling, "Taking the Right Iron to Beetle Wood," 12.

33 "New Report Sees B.C. Mill Closures From Pine Beetle," 26–27.

34 Ibid.

35 Ibid.

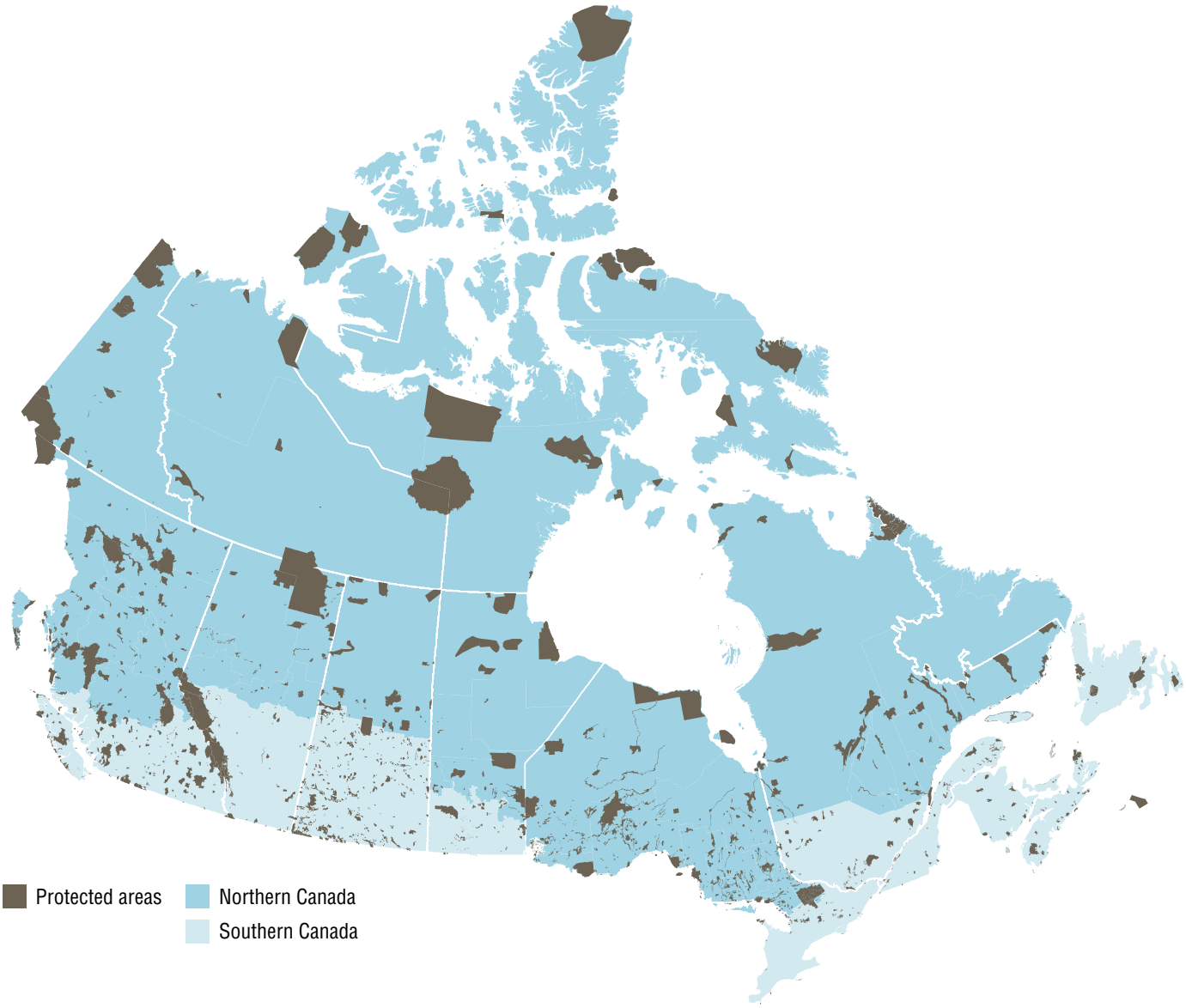
36 Natural Resources Canada. "The Atlas of Canada, Animation of the Projected Changes."

37 Ibid.

38 Natural Resources Canada, "The Atlas of Canada, Protected Areas."

39 Forest Products Association of Canada and others, *The Canadian Boreal Forest Agreement.*

Exhibit 6
Protected Areas Across Canada



Sources: Golder Associates; The Conference Board of Canada.

and products.[40] Although this agreement limits harvesting areas, it may have a positive impact on the demand for forest products over the medium term.

Forest management agreements may also influence the supply of forest products through the amount of timber that can be harvested across Canada. Although forest management agreements do not forbid resource

40 Forest Products Association of Canada and others, *The Canadian Boreal Forest Agreement: Ontario*.

extractions, the forest industry does have to adjust its timber production to respect requirements for the conservation of the ecosystem.[41]

The Canadian forest industry is in a position where changes are necessary in order to move forward.

Finally, demographic factors may restrain industrial growth over the long term. The proportion of forestry workers aged 55 and over has increased through time. The share of workers of this age group over total workers was at 10.5 per cent in 2000 and reached 19 per cent in 2008.[42] The aging of the population and population migrations to urban areas are demographic factors that may limit the supply of the forestry industry over time. Since most of the urban areas are located in the South, this may translate into a migration of the population (and potential forestry workers) from the North to the South of Canada. This could then restrain growth of the forest industry in the North.

41 The Conference Board of Canada, *Insights on Western Canada*, 71–72.

42 Statistics Canada, "Labour Force Survey Estimates by North American Industry Classification System."

CONCLUSION

How the forest industry is able to adapt to changing supply conditions and the changing needs of local and foreign markets will dictate the performance of the industry over the long run. The Canadian forest industry has contracted significantly in the second half of this decade. Many factors, such as falling demand for newsprint, the appreciation of the Canadian dollar, growing competition from abroad, and the U.S. housing downturn, have worked against the industry. This puts the industry in a position where changes are necessary in order to move forward. The Canadian forest industry has been highly dependent on the U.S. economy. The recovery of the U.S. economy should provide a boost to the industry. However, to continue growing, it will have to become more competitive in the international market and gain greater access to foreign markets in Asia. To face the competition, the industry will likely have to shift its production toward value-added products and invest in cost-efficiency technologies. Environmental regulations on GHG emissions may also create a setting for a market for wood residuals and wood pellets.

CHAPTER 5

Fisheries

Chapter Summary

- Canada has always had a significant fishing industry. In 2004, 2005, and 2006, Canada ranked sixth in the world for seafood exports in terms of total value. The industry was valued at $4.18 billion in 2006.
- There are two distinct types of fishers at work in Canada: freshwater and saltwater. Landed values for saltwater fisheries in 2007 were $1.89 billion compared with freshwater fisheries landed values for the same year at $63.57 million.
- Data constraints are a key challenge in this sector, as many data points are not collected uniformly across the country. Therefore, developing a precise picture of the role of the fishing sector in the North of Canada is a near impossible task.
- Future research may be better able to collect more precise statistics.

OVERVIEW

Canada has always had a significant fishing industry. In 2004, 2005, and 2006, Canada ranked sixth in the world for seafood exports in terms of total value.[1] The industry was valued at $4.18 billion in 2006.[2] Canada's fishing activities in the North are significant and warrant discussion.

THE FISHING INDUSTRY IN CANADA'S NORTH

The initial data scan revealed there were seven Northern regions in which the importance of fisheries were found, including Northern British Columbia, Northern Manitoba, Northern Newfoundland and Labrador, the Northwest Territories, Nunavut, Northern Ontario, and Northern Quebec. The assessment of current and future opportunities for economic growth in the fishing industry focuses on these seven areas. Where data are available for other areas, they are discussed as well.

Data constraints were a key challenge in this sector, as many data points are not collected uniformly across the country. Additionally, there were difficulties separating the data by North–South lines in the provinces. Therefore, developing a precise picture of the role of the fishing sector in the North of Canada is a near impossible task. This assessment attempts to identify qualitative and quantitative data, wherever available, and present as complete a picture as possible for each area.

1 Fisheries and Oceans Canada, *Canadian Fisheries Statistics 2006*, 3.

2 Ibid.

There are two distinct types of fisheries at work in these regions: freshwater and saltwater. These are both important industries in Canada; saltwater fisheries, however, have a significantly greater share of the revenues due to their size and capacity. Landed values for saltwater fisheries in 2007 were $1.89 billion compared with freshwater fisheries landed values for the same year at $63.57 million.[3]

This sector does not deal with fish farming or recreational fishing; it also does not address fishing that is part of a more traditional or land-based economy. These activities fall into agriculture, tourism, and traditional/land-based economy sectors, respectively.

ECONOMIC POTENTIAL FOR FISHERIES IN THE NORTH

One of the best ways to understand the value of the fisheries sector to Canada is to examine the landings values for each province. The landing value refers to the part of the fish catch that is put ashore. This is one of the more complete data sets available for this sector and includes all the Northern regions identified for this sector (aside from Nunavut). Other indicators used to build a profile of the fishing sector for the North include key species harvested, trends observed in harvests, labour force data, and information on the fleet of fishing vessels active in each region. These data sets are available at provincial levels and not separated along North–South lines. This challenge is highlighted in each case.

The landings values are split into freshwater and saltwater fisheries.

SALTWATER FISHERIES SUPPLY

For the collection of saltwater fisheries, there are three regions represented in Chart 8 that include the North: Pacific (British Columbia), Newfoundland and Labrador, and Quebec. The other three provinces that are represented are all fully in the South of the country, according to the Centre for the North's division lines. None of these regions that include Northern parts of provinces represent only the Northern portion. We must therefore take information for these regions as a whole, with an understanding that the landings will represent some Northern and some Southern landings. Newfoundland and Labrador has the second-highest landings values for the country, after Nova Scotia at $532.6 million. The Pacific region, which represents all of British Columbia, had the third-highest saltwater landings at $293.9 million, and Quebec was firmly in between New Brunswick and Prince Edward Island with $144.8 million in landings.

Freshwater and saltwater fisheries are important industries in Canada, but saltwater fisheries have a greater share of the revenues due to their size and capacity.

The landed volume for Newfoundland and Labrador remained fairly consistent in the years 2004–07.[4] The decline in the price of snow crab meant the total value fell 8 per cent between 2005 and 2006 to $474 million.[5] Key species in 2006 for the province were shrimp (34 per cent of total landings) and crab (21 per cent of total landings).[6] Newfoundland and Labrador's share of total landings in Canada remains steady at the 25 and 24 per cent levels for 2005 and 2006, respectively.[7] The stability in the year-over-year landed volume, and total share of landings in Canada, indicate that this is a mature industry in Newfoundland and Labrador; however, there will likely continue to be a strong fishing industry there.

One landings-related statistic was available for a strictly Northern portion of the province; Labrador commercial fish landings in 2005 totalled over 12,300 tonnes and were valued at $18 million.[8] Industry across coastal Labrador has diversified into shrimp, snow crab, char, Icelandic scallop, rock-cod, whelk, and turbot.[9]

3 Fisheries and Oceans Canada, "Commercial Fisheries: Landings."

4 Fisheries and Oceans Canada, *Canadian Fisheries Statistics 2006*, 6.

5 Ibid.

6 Ibid.

7 Ibid.

8 Northern Development Ministers Forum, "Newfoundland & Labrador."

9 Ibid.

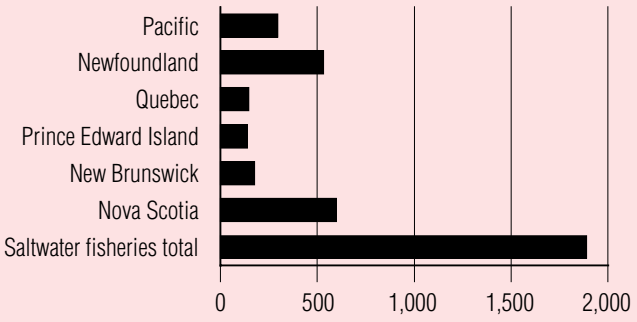
British Columbia contributed 19 per cent of total fishing value in Canada for 2006, for a total of $360 million.[10] Key species harvested were salmon, trout, and smelt (17 per cent); flounder, halibut, and sole (15 per cent); and shrimp and prawn (11 per cent).[11]

The province of Quebec was in fifth place with respect to the value of commercial fishing.[12] Quebec saw a shift in 2007 compared with 2006. There were a total of 56,448 landed tonnes, for a value of $156 million. This is less volume (by 7 per cent) but more revenue (by 24 per cent) than for 2006; the shift is largely due to the rise in value of snow crab, which had a record increase in 2007.[13] In addition to the highly valued snow crab, Quebec landings were also made up of lobster, shrimp, groundfish, and pelagic fish, among other species.[14] Regionally, the highest increase in the value of landings was observed in the North Shore at 62 per cent. This region, which happens to be the only one situated entirely within Northern Quebec, captured $34.4 million and 14,000 tonnes in landings.[15]

A recent report has announced that "a commercial fisheries harbour is being constructed in Pangnirtung to help support the development of fisheries in the territory.

Nunavut has recently identified the fishing industry as a future opportunity, as discussed at length in the new report, *The Management of Fisheries and Oceans in Canada's Western Arctic*, released in May 2010 by the Standing Senate Committee on Fisheries and Oceans. In particular, the Committee has identified an increased harvest in Arctic char as a goal for future development of the industry.[16] This plan would see growth in harvest in each of the current three areas of fisheries in the territory: Kivalliq, Kitikmeot, and Baffin.[17] The Kivalliq and Kitikmeot areas are focused on the commercial development of Arctic char,[18] whereas the Baffin area is focused on large-scale offshore turbot and shrimp fisheries.[19]

Chart 8
Value of Saltwater Landings for Canada, 2007
($ millions)



Sources: Department of Fisheries and Oceans; The Conference Board of Canada.

The Senate report follows a report by Fisheries and Oceans Canada, in cooperation with the Government of Nunavut, which announced that "a commercial fisheries harbour is being constructed in Pangnirtung to help support the development of fisheries in the territory."[20] Fisheries have been a focus in Nunavut over the past few years. The Nunavut Fisheries Strategy was released in 2005; it represents a partnership between the Government of Nunavut and Nunavut Tunngavik Inc. and focuses on providing economic development opportunities in the offshore and inshore fisheries.[21]

The Nunavut fisheries industry has experienced recent growth. The 2006 estimated landed value of turbot was over $35 million, a figure that was up almost 50 per cent

10 Fisheries and Oceans Canada, *Canadian Fisheries Statistics 2006*, 6.

11 Ibid.

12 Ibid.

13 Fisheries and Oceans Canada, *Portrait of the Quebec Capture Sector in 2007*.

14 Ibid.

15 Ibid.

16 Standing Senate Committee on Fisheries and Oceans, *The Management of Fisheries and Oceans in Canada's Western Arctic*.

17 Government of Nunavut and Nunavut Tunngavik Incorporated, *Nunavut Fisheries Strategy*, 6.

18 Ibid.

19 Ibid., 7.

20 Government of Canada, "Canada's Northern Strategy: Our North, Our Heritage, Our Future," 17.

21 Northern Development Ministers Forum, "Nunavut."

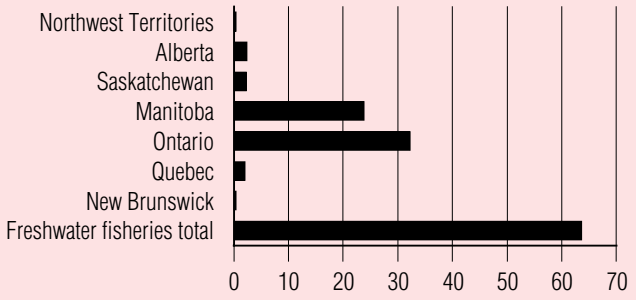
from the previous year.[22] It is estimated that Nunavut's fisheries currently contribute between $12 million and $14 million annually to the territorial economy; of this, $7.5 million to $9.5 million enters the economy as income and another $4.4 million is understood to enter the land-based economy.[23]

Nunavut straddles the line between saltwater and freshwater fisheries, as its focus in Arctic char includes "anadromous forms, which migrate to the ocean to feed before returning to spawn in freshwater. In the case of Arctic char, . . . the anadromous form is the most sought-after for food and commercial use."[24]

FRESHWATER FISHERIES SUPPLY

Freshwater landings taking place in Canada operate at a smaller scale. Ontario and Manitoba are the clear leaders, with freshwater landings valued at $32.2 million and $23.8 million respectively.[25] The activities in these two provinces combined represent over 88 per cent of the total freshwater fish landings by value for all of Canada.[26]

Chart 9
Value of Freshwater Landings for Canada, 2007
($ millions)



Sources: Department of Fisheries and Oceans; The Conference Board of Canada.

22 Northern Development Ministers Forum, "Nunavut."

23 Government of Nunavut and Nunavut Tunngavik Incorporated, *Nunavut Fisheries Strategy*, 7.

24 Standing Senate Committee on Fisheries and Oceans, *The Management of Fisheries and Oceans in Canada's Western Arctic*, 12.

25 Fisheries and Oceans Canada, *Canadian Fisheries Statistics 2006*, 8.

26 Ibid.

The annual revenue from commercial fishing in Manitoba is about $35 million.[27] This represents 11,758 tonnes of fish harvested.[28] Within Manitoba, three lakes make up the bulk of commercial fishing activities. In the 2006–07 harvesting year, Lake Winnipeg (which is partly in Northern Manitoba) accounted for the largest portion of landings in Western Canadian freshwater fisheries at 6,354 tonnes; Lake Winnipegosis (situated entirely in Northern Manitoba) was second (1,119 tonnes); and Lake Manitoba (situated partially in Northern Manitoba) was third (1,093 tonnes).[29] Although Manitoba's fishing industry is smaller than Ontario's, the relative size to the economy of the province as a whole makes it a much more important sector in Manitoba.

The combined activities in two provinces, Ontario and Manitoba, represent over 88 per cent of the total freshwater fish landings by value for all of Canada.

The major harvested species in Manitoba are whitefish, pickerel, sauger, northern pike, perch, and mullet.[30]

Currently, about 3,800 Manitobans earn their living as commercial fishers.[31] These people are primarily found on the lakes of the boreal shield and boreal plains regions. Of these, about 1,800 are licensed and about 2,000 are hired to help set and lift nets or process the catch.[32]

Other freshwater fisheries are active across Canada in Alberta, Saskatchewan, and the Northwest Territories. Alberta's harvest for the same time frame (2006–07)

27 Government of Manitoba, *Annual Report: State of the Environment Reports—Fish*.

28 Fisheries and Oceans Canada, Freshwater Institute, "Annual Summary of Fish Harvesting Activities (2006–2007)."

29 Ibid.

30 Ibid.

31 Government of Manitoba, *Annual Report: State of the Government Reports—Fish*.

32 Ibid.

was 1,957 tonnes.[33] Utikuma Lake (situated in Northern Alberta) accounted for the largest volume, making up 43.7 per cent of the total, followed by Lesser Slave Lake (also entirely in Northern Alberta) at 34.6 per cent.[34] The major harvested species in Alberta are whitefish, pickerel, and northern pike.[35]

Saskatchewan had a harvest of 2,556 tonnes of fish for 2006 and 2007.[36] This represented a landed value and market value in the province of $2.7 million and $6.1 million, respectively.[37] Reindeer Lake accounted for the largest volume in Saskatchewan at 17.9 per cent, and Ile-a-la Crosse Lake was second at 8.9 per cent.[38] Both these lakes are entirely in Northern Saskatchewan. In Saskatchewan, the key species harvested are whitefish, mullet, pickerel, northern pike, and lake trout.[39]

Given the information available, it is likely that the fisheries of the North will not grow considerably in the future, having already reached maturity.)

Based on the most recent data available, the Northwest Territories has seen a drop in fish harvests. The 2006–07 harvest was 565 tonnes, representing a 37 per cent drop from the previous year.[40] The bulk of the harvest in the Northwest Territories was in Great Slave Lake, which accounted for 95.4 per cent of landings.[41] Unfortunately, Great Slave Lake is currently facing some challenges with its fish population; however, a recovery strategy is in place and active to address these challenges.[42] The most important species in the Northwest Territories are whitefish, pickerel, lake trout, northern pike, and inconnu.[43]

CONSTRAINTS

Fisheries are well established across Canada both in saltwater and freshwater locations. This industry has reached a significant level of maturity and aside from some limited room for growth in the Far North, as planned for Nunavut, seems unlikely to grow over the coming years. The challenges faced in the Northwest Territories with Great Slave Lake indicate that the focus for much of the industry is now on maintaining a stable industry rather than increasing the production of the fisheries. For the most part, that balance seems to have been found across Canada, including the seven Northern areas focused on in this section of the report. The key constraint factor limiting the further development of the fisheries industry is the available supply of fish.

CONCLUSION

The data challenges in this sector are substantial. Different branches of Fisheries and Oceans Canada publish slightly different statistics on their respective regions, making comparisons between regions difficult. This challenge is further compounded when trying to separate out Northern portions of each province. The most detailed statistical information available from Statistics Canada at a regional level is not available at a precise fisheries industry level; rather, fisheries are combined with a collection of other "primary" industries, including forestry and mining. Therefore, developing a precise picture of the role of the fishing sector in the North of Canada is a near impossible task. Future research may be better able to collect more precise statistics. Given the information available, we do feel that the fisheries of the North are not likely to grow considerably in the future, having already reached maturity. This is an important industry for the North, but not one with significant growth potential outside Nunavut.

33 Fisheries and Oceans Canada, Freshwater Institute, "Annual Summary of Fish Harvesting Activities (2006–2007)."

34 Fisheries and Oceans Canada, Freshwater Institute, "Annual Summary of Fish Harvesting Activities (2006–2007)."

35 Ibid.

36 Ibid.

37 Ibid.

38 Ibid.

39 Ibid.

40 Ibid.

41 Ibid.

42 Standing Senate Committee on Fisheries and Oceans, *The Management of Fisheries and Oceans in Canada's Western Arctic*. 26.

43 Fisheries and Oceans Canada, Freshwater Institute, "Annual Summary of Fish Harvesting Activities (2006–2007)."

CHAPTER 6

Utilities

Chapter Summary

- Utilities contribute between 2 and 4 per cent of GDP in each of Canada's provinces and territories.
- Utility services may be considered enabling industries—they are not the basic industries upon which economic growth is founded, but their absence or inadequacy adds substantial costs for other industries and for the general population.
- Northern communities have the best opportunity for access to utility services when a nearby industrial project or development provides an anchor load to justify the required investment. This has been the pattern in Yukon and the Northwest Territories in particular. Nunavut faces the most significant challenges because of its relatively smaller dependence on resource extraction industries, and because of a geographically dispersed population.

OVERVIEW

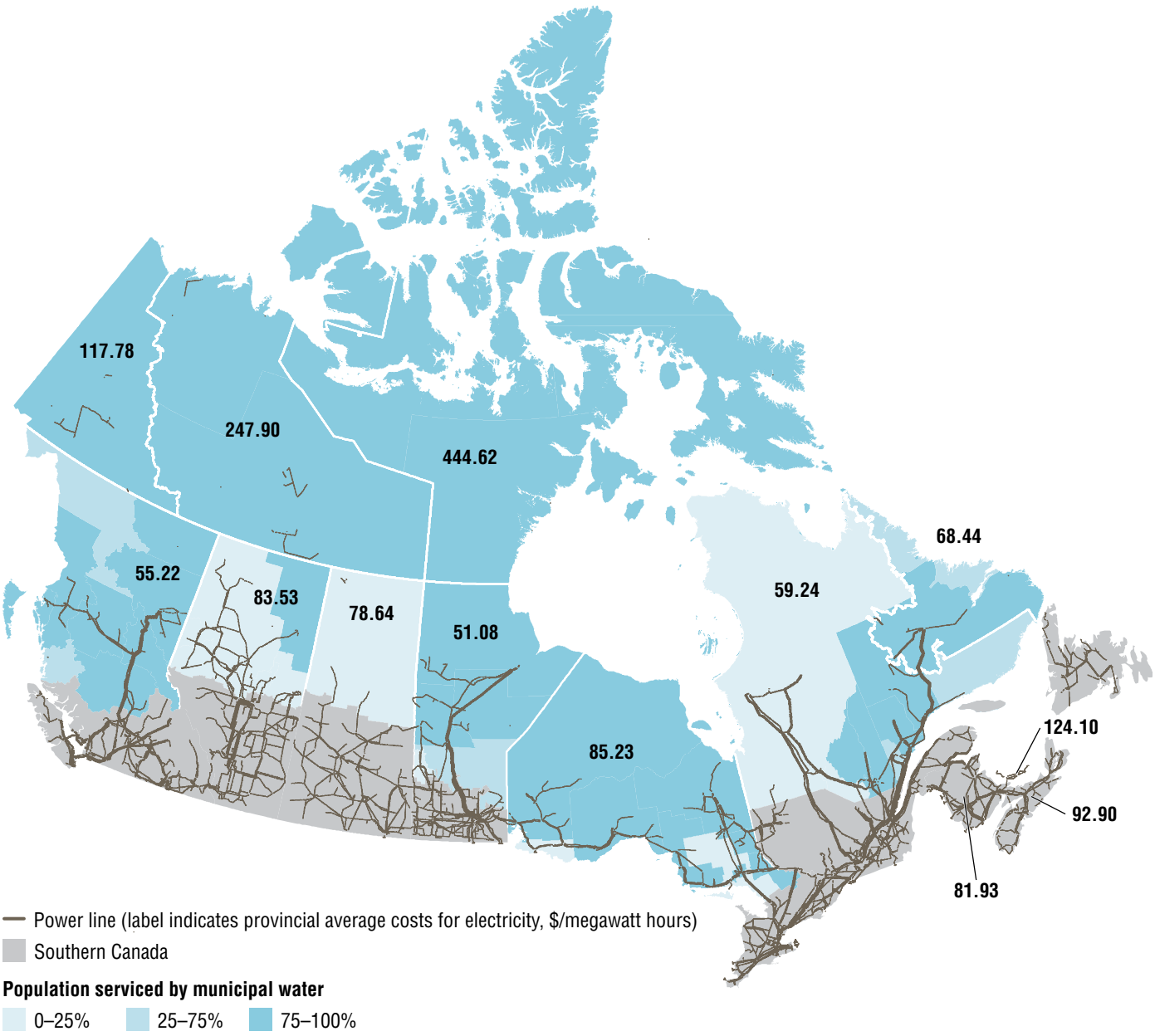
The utilities sector includes companies or organizations that transport or deliver electricity, natural gas, or water to end consumers. Electric utilities include companies that generate electricity as well. Utilities contribute between 2 and 4 per cent of GDP in each of Canada's provinces and territories. In this report, utilities are considered as enabling industries because they provide necessary support for other sectors, but, of themselves, do not provide a reason for economic development. One might argue that the large-scale hydroelectricity projects in the Northern sections of the provinces provide a counter-example. However, the other segments of the utility sector examined here support economic development rather than lead it.

THE UTILITIES INDUSTRIES IN CANADA'S NORTH

The contribution of the utilities sector to the Northern economies in each of Newfoundland and Labrador, Quebec, Manitoba, and British Columbia is higher, in part because the Northern regions of these provinces generate significant amounts of hydro electricity.

The discussion in this section focuses on electricity and water in Yukon, the Northwest Territories, and Nunavut. Unfortunately, regional data within provinces for utilities are not available, or can be obtained only at the community or municipal franchise level. A careful analysis of micro-level data was not possible within the terms of reference of this study. Exhibit 7 shows electricity transmission infrastructure and municipal water access for Northern Canada. Natural gas is typically not available to end consumers, or is available in very limited parts of Canada's North, and is therefore not profiled. The Northern regions of the provinces face issues similar

Exhibit 7
Electricity Transmission Infrastructure and Municipal Water Access



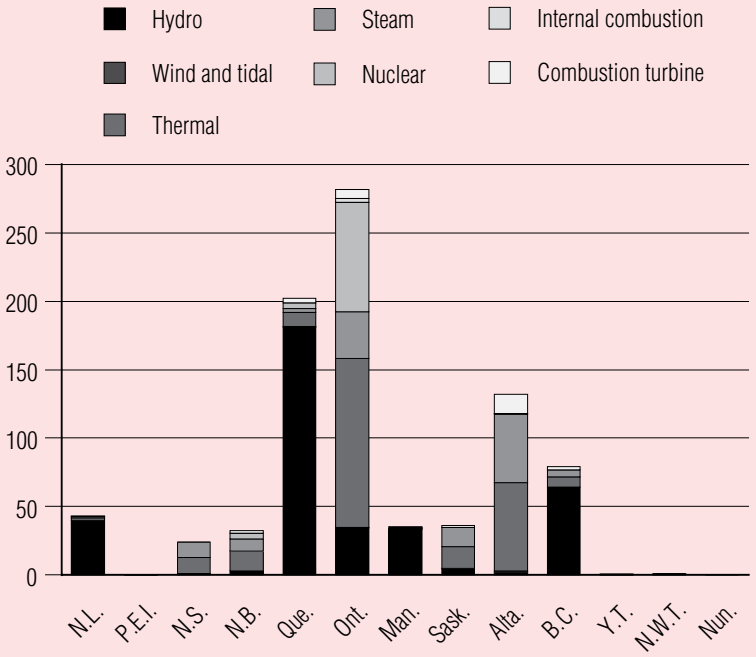
Sources: Golder Associates; The Conference Board of Canada.

to those in the territories regarding water quality, electricity costs, and electricity. However, provincial data do not separate Northern regions from Southern, making analysis difficult.

ECONOMIC POTENTIAL FOR ELECTRICITY IN THE NORTH

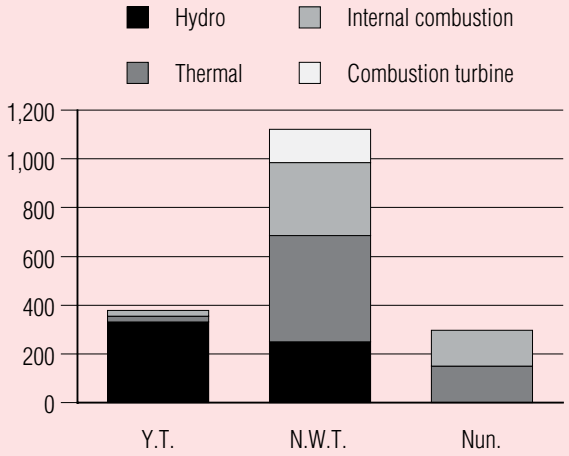
Canada's electricity sector relies heavily on renewable and low-emitting sources of energy—hydro, nuclear, wind, and biomass. Chart 10 shows energy generated

Chart 10
Electric Energy by Generation Technology, 2008
(gigawatt hours, 000s)



Sources: Statistics Canada; The Conference Board of Canada.

Chart 11
Electric Energy by Generation Technology for the Territories, 2008
(gigawatt hours)



Sources: Statistics Canada; The Conference Board of Canada.

by province or territory and by technology for 2008. The three territories generate substantially less electricity than the provinces, with their detail shown in Chart 11.

Four provinces—Quebec, British Columbia, Manitoba, and Newfoundland and Labrador—are heavily reliant on hydroelectricity. Nova Scotia, Alberta, Saskatchewan, and to a certain extent, Ontario, rely on electricity from coal. Ontario has the largest nuclear fleet, with some nuclear generation in New Brunswick and Quebec as well.

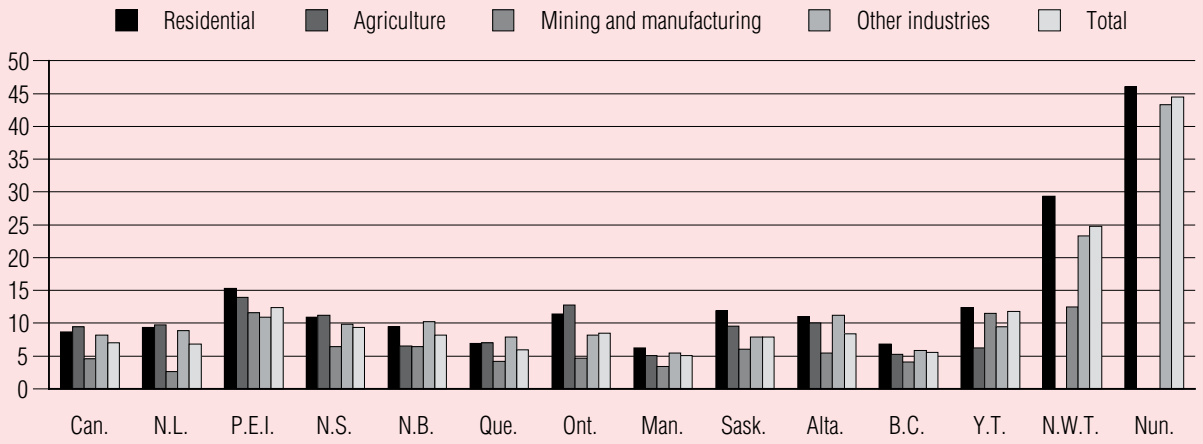
The three territories present very different generation profiles. In 2008, Yukon generated 70 per cent of its electricity from hydro power, the Northwest Territories only 16.5 percent, and Nunavut had no hydro generation. Within the thermal generation category, Nunavut relied entirely on diesel generation, whereas the Northwest Territories' thermal generation is about two-thirds diesel and one-third natural gas (with all of the gas generation occurring at Norman Wells).

The most direct impact of the generation mix on electricity consumers is evidenced by the retail prices shown in Chart 12. Residences in Nunavut paid, on average, 46 cents per kilowatt hour (kWh) for electricity, more than five times the national average, while residences in the Northwest Territories paid 29 cents/kWh (three times the national average), and Yukon residences 12 cents/kWh (1.5 times the national average).

Yukon has the twin advantages of lower-cost hydro power and a population that is highly centralized in Whitehorse.

The heavy reliance on diesel generation in Nunavut and the Northwest Territories is a significant constraint on economic development for industry as well. The constraint is amplified by low population densities and a lack of transmission infrastructure. Yukon has the twin advantages of lower-cost hydro power and a population that is highly centralized in Whitehorse. More remote communities in Yukon face similar pricing and reliability concerns as those in the other territories. Electricity consumption in Yukon is focused in the commercial sector (50 per cent of the total) and residential (37 per cent).

Chart 12
Electricity Prices by Sector and Province or Territory (2008 average)
(cents/kWh)



Sources: Statistics Canada; The Conference Board of Canada.

Both the Northwest Territories and Nunavut have explored options for increasing hydro generation and reducing thermal, particularly diesel. The Northwest Territories has identified an average generation cost of 20 cents/kWh for hydro power, 65 cents/kWh for thermal, and 32 cents/kWh for the system average in 2007–08.[1] The Northwest Territories has six hydro stations, with a total of 54 MW[2] of installed capacity. Each of these stations was originally built to serve mining projects plus other regional loads. As a result, the territory has limited electricity transmission capacity. The hydro strategy identifies 11,500 megawatts (MW) of hydro potential, but focuses on five projects totalling 176 MW of incremental capacity: Bear River (126 MW), Taltson (35 MW), Snare site 7 (13 MW), La Martre (1 MW), and Snowdrift (1 MW). Of the five, only Snare and Taltson have existing hydro capacity.[3] The Taltson project is the most advanced, and includes a 700-kilometre transmission line to power diamond mines. The Bear River project is intended to provide power to the Mackenzie Gas Project.

Compared with the Northwest Territories, Nunavut faces greater challenges and is pursuing a broader strategy. Low population density makes large-scale generation and related transmission facilities expensive. Nunavut has chosen, instead, to encourage and examine alternative renewable energy resources that could be used to displace diesel-fired electricity. These resources include small hydro, tidal, wind, geothermal, and electricity from waste. Qulliq Energy Corporation continues to study the alternatives, although the options are somewhat limited. The first gold mine has begun operations in Nunavut, giving some hope that, in the longer term, growth in resource extraction will provide surplus power to proximate communities.

ECONOMIC POTENTIAL FOR WATER IN THE NORTH

This report considers water in the same light as other utilities—a necessary support for the industries that drive economic development. Access to sufficient industrial water and sufficient water of appropriate quality for human consumption is a prerequisite to healthy industries and communities. Canadians have access to abundant sources of freshwater, and Canada ranks among the highest per capita users of water in

1 Government of the Northwest Territories—Industry, Tourism and Investment. *Electricity Review,* 32–33.

2 One megawatt (MW) of installed capacity represents the ability to produce up to one million watts of power at any given moment.

3 Government of the Northwest Territories, *Draft NWT Hydro Strategy*, 20.

the world. However, increasing populations and expanding land use are putting pressure on water quality and availability in some regions of Canada. The majority of Canadians are served by municipal water and wastewater treatment facilities, although smaller and more remote communities face significant challenges.

The water we use comes from two basic sources: surface water (used by 74 per cent of Canadians) and groundwater (used by 26 per cent of Canadians). Although subprovincial data are not available, most of the provinces and territories included in this report obtain 75 per cent or more of their water from the surface, with Yukon being the exception (only 37 per cent surface water).[4] The reliance on surface water throughout Canada creates a direct link between human activities that pollute or degrade water quality and the requirements for water treatment, as well as a link between wastewater treatment and the quality of water available to downstream communities.

CONSTRAINTS

Many Northern communities are small and remote. Small communities do not have water and wastewater treatment facilities that are large enough to be economically efficient. They typically do not have the revenue base to invest in best available technologies, or ensure that treatment standards and operator certification are at the highest level. Even though Northern communities typically have access to municipal water and wastewater treatment, poor water quality is often an important issue because of its impact on living conditions and human health.

CONCLUSION

The utility services reviewed in this report may be considered enabling industries—they are not the basic industries upon which economic growth is founded, but their absence or inadequacy adds substantial costs for other industries and for the general population. Northern communities have the best opportunity for access to utility services when a nearby industrial project or development provides an anchor load to justify the required investment. This has been the pattern in Yukon and the Northwest Territories in particular. Nunavut faces the most significant challenges because of its relatively smaller dependence on resource extraction industries, and because of a geographically dispersed population. Efforts to date to develop microgeneration solutions have struggled to progress beyond diesel technologies.

4 Environment Canada, *Groundwater—Nature's Hidden Treasure*, Figure 3.

CHAPTER 7

Construction

Chapter Summary

- Construction is considered an enabling industry and is most active where there is a growing and thriving community. This applies equally to residential, non-residential, and engineering construction.
- Simply put—where there is a boom and a need for construction products—they will occur.
- The construction industry in Canada's North has a unique opportunity to develop new and innovative cold climate construction techniques.
- The funding initiatives for the territories, should they all go forward, will have a considerable temporary impact on the size and strength of the construction sectors in these regions. These increased construction demands will be a challenge to meet, however, with the limited number of tradespeople.

OVERVIEW

The construction industry is different from many of the other industries examined for this report. Where primary industries are focused on the harvesting of natural resources—such as minerals, oil, timber, or fish—the construction industry, like the utilities industry, is much more dependent on the development of other industries and communities. Both the construction and utilities industries have complex relationships with primary industries as they are both necessary elements in the success of primary industries. And, the growth opportunities for construction and utilities are amplified by the development of primary industries. These are key enabling industries in the North. This is particularly true because resource extraction industries require a certain minimum level of support from construction and utilities and are often able to share the related cost with communities or other industries. A comparison of electricity availability and cost between Nunavut and Yukon illustrates the benefits of synergies between resource extraction, larger population centres, and service industries.

Where there is a boom and a need for construction projects, whether residential or industrial, they will occur.

Construction is most active where there is a growing and thriving community. It is the needs created by these communities and their primary industries that drive the construction industry in the region. This applies equally to residential, non-residential, and engineering construction. Simply put—where there is a boom and a need for construction projects, whether residential or industrial, they will occur. It is an industry that is not only dependent on the successes of other industries and the economy in general, but it is also one that tends to follow these other industries, especially into less populated regions such as the Canadian North.

In addition to enabling primary industries, such as mining and oil and gas, as part of developing those projects in and of themselves, the construction industry responds to primary industries' need for transportation infrastructure, power generation, and housing for the industry.

A scan of the Northern construction industry identified three regions where there could be substantial growth.

The construction industry in Canada's North also has a unique opportunity to develop new and innovative cold-climate construction techniques. This innovation opportunity is increased by the changing climate in the North: receding permafrost, less predictable weather patterns, and changing needs from primary industry will all be driving factors in increased cold-climate building innovations.

There are other factors that play a large role in the profitability and therefore the activity of the construction sector. These include the input prices of necessary commodities such as concrete, prefabricated windows and doors, lumber and timber, as well as transport margins, and service fees for architectural, engineering, and legal and accounting services. Although these input prices have been down in the past year (2009), they are expected to rise again in the near term. Labour and other costs are on the rise: "With construction activity expected to increase in all three of these segments and the industry's workforce aging, shortages—particularly for skilled trades—are expected to re-emerge,"[1] resulting in higher costs.

THE CONSTRUCTION INDUSTRY IN CANADA'S NORTH

An initial scan of the construction industry in the North identified three regions where there could be substantial growth and demand in the near future: the Northwest Territories, Northern Alberta, and Yukon. Each of these three regions shares the common driver of a strong growth in demand for construction activities emerging from primary industry, in particular from mining and oil and gas. Having reviewed the sector across the North, we expand the list of key regions to include Nunavut and Northern Saskatchewan, which may emerge as areas of growing construction needs. Table 1 shows the percentage of GDP derived from the construction industry in the Canadian North for the years 1999–2008.

1 The Conference Board of Canada, "Canada's Non-Residential Construction Industry," 6.

Table 1
Construction GDP as Per Cent of Total GDP for the North
(per cent)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average
Northern Newfoundland and Labrador	15.8	15.6	19.0	17.2	21.1	20.5	21.8	23.3	17.0	19.8	1910.3
Northern Quebec	6.8	7.1	6.3	4.6	5.5	5.3	4.6	4.4	4.8	4.1	533.4
Northern Ontario	6.6	6.0	5.9	6.5	6.0	5.9	5.0	5.7	5.2	5.4	583.5
Northern Manitoba	5.2	6.5	5.2	5.4	6.7	5.1	5.7	5.4	7.4	5.9	582.1
Northern Saskatchewan	19.7	24.1	19.9	16.5	17.2	18.8	21.3	21.6	18.1	20.9	1980.7
Northern Alberta	12.1	13.2	13.9	11.7	10.8	10.8	11.1	11.1	10.5	10.6	1158.7
Northern British Columbia	7.3	8.7	8.2	9.7	8.8	6.5	7.1	7.0	5.8	5.6	747.5
Nunavut	8.4	7.1	7.1	10.6	13.7	14.3	15.0	14.4	19.8	24.9	1353.1
Northwest Territories	8.1	10.8	14.6	11.0	6.9	9.1	10.8	10.3	9.1	9.8	1003.9
Yukon	6.3	5.8	7.1	6.3	6.2	7.5	8.5	9.3	9.4	8.4	747.7

Sources: Statistics Canada; The Conference Board of Canada.

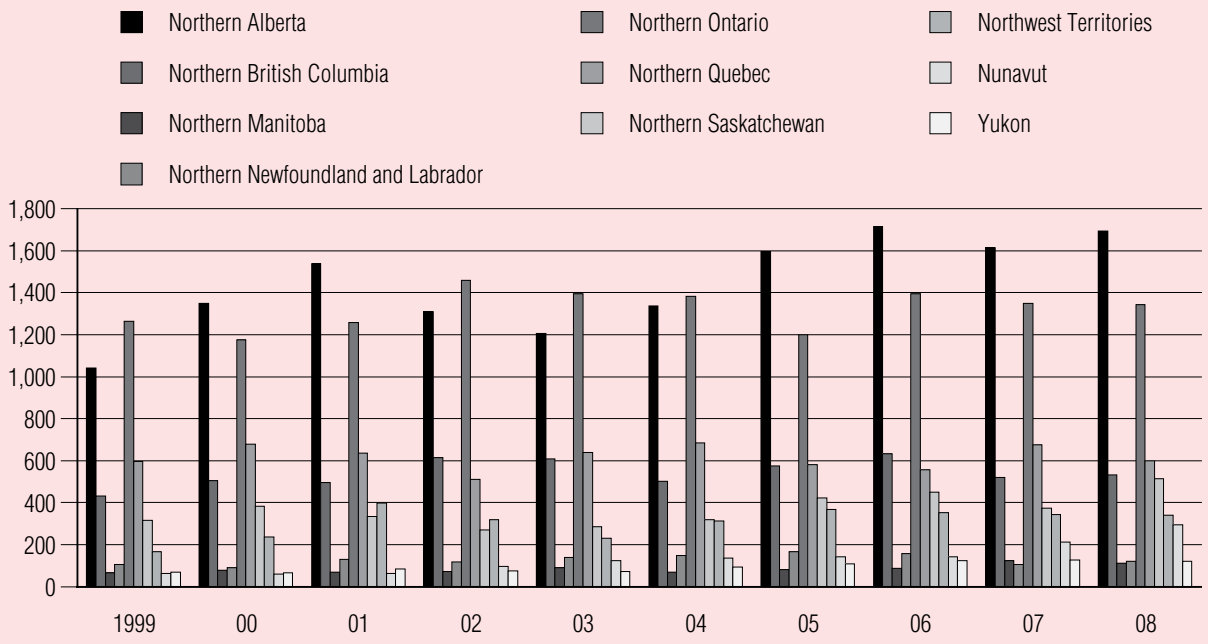
ECONOMIC POTENTIAL FOR CONSTRUCTION IN THE NORTH

The initial identified regions of focus were confirmed as growth areas through a year-over-year examination of the GDP for the construction industry in these regions from 1999–2008. These 10 years show a steady rise in the construction GDP for each region. The construction GDP for the Northwest Territories for 1999 was $165 million compared with $340 million for 2008. In Northern Alberta, the steady increase has gone from $1.04 billion in 1999 to $1.69 billion in 2008. Yukon has also seen a significant upward trend in its construction-related GDP from $69 million in 1999 to $119 million in 2008. Additionally, Nunavut's construction GDP grew from $63 million to $294 million over the same period, showing the largest proportional growth in the industry in the 10 years examined. Activity in Northern Saskatchewan has been much more erratic with construction GDP rising and falling substantially; however, it closed on a high note with $514 million in GDP for 2008.

Many of these regions are still generating only a portion of the GDP when compared with other regions in Canada. For instance, Northern Ontario's construction GDP is second only to Northern Alberta's at $1.34 billion. However, in Northern Ontario, as in the other Northern regions that are not highlighted in this review, construction GDP has been much more stable over the past 10 years. Therefore it is not viewed as a region with significant opportunity for construction growth in the near term. Chart 13 shows the results of this year-over-year construction GDP trend.

Construction GDP for these Northern regions, as a share of total GDP for the province or territory, ranges between 2 and 5.5 per cent. We can observe, in Table 1, a significantly higher share in Alberta (10.6 per cent in 2008), Nunavut (24.9 per cent in 2008), Northwest Territories (9.8 per cent in 2008), and Yukon (8.4 per cent in 2008). Saskatchewan has what appears to be a rising share of construction GDP as well at 20.9 per cent in 2008.

Chart 13
Electricity Prices by Sector and Province or Territory (2008 average)
(cents/kWh)



Sources: Statistics Canada; The Conference Board of Canada.

DEMAND

Two additional factors will play an increasingly large role in the construction industry of the North. The recent initiatives of planned infrastructure spending—as well as the need for advanced construction technologies to build more reliable structures in a changing climate—will both have an impact on the future of the construction industry in the North over the coming years.

Cold and challenging climate construction technologies will need to be adapted and improved in order to meet the needs of industry, infrastructure, and the populations living and working in the North. Although this is a predictable area of future opportunity there are, as yet, no found indicators that accurately predict the potential for these innovations to contribute to the construction industry. It is an area that requires further research.

Cold and challenging climate construction technologies will need to be adapted and improved to meet the needs of Northern industry, infrastructure, and populations.

The planned infrastructure spending has the potential to generate a boom in the construction industry. This spending will support a high level of construction activity for a few years, but once that infrastructure is in place it is unclear whether the construction demands will continue to be high.

Recent federal funding initiatives in the Northwest Territories and Nunavut will have substantial impact. In the Northwest Territories—through the stimulus funding that is a joint federal and territorial or municipal program—there is a total of $7.6 million in eligible costs for various planned infrastructure projects.[2] The Building Canada Fund will have an even greater impact in the Northwest Territories, contributing total eligible costs of $25.1 million through its collective projects.[3] These projects are all devoted to infrastructure development and include landfill expansions, road upgrades, sewage and water treatment plants, as well as a youth centre and a community office. This additional $32.7 million will be a boon; it would represent about 10 per cent of the $340 million in construction GDP for 2008 in the Northwest Territories.[4]

It may be challenging to meet the increased demand for construction in the North because of labour force constraints.

Nunavut will experience an even greater influx in construction spending through the Building Canada Fund, the stimulus funding, and the Recreational Infrastructure Canada programs. The Building Canada Fund, which is cost shared between the federal government (75 per cent) and the Government of Nunavut (25 per cent), has $80.9 million in eligible costs for projects across the territory.[5] The stimulus funding has $7.2 million in total eligible costs; these are shared either between the federal government and the Government of Nunavut or through a three-way cost share that includes an equal portion from the Iqaluit government. Recreational Infrastructure Canada costs are shared between the federal and territorial governments, with total eligible costs of $1.3 million.[6] Each of these funding initiatives is devoted to infrastructure development and include airport improvements, community centres and recreation facilities, community halls, and office developments. In Nunavut, the additional construction activities initiated through these infrastructure funding initiatives have a total eligible cost of $89.4 million. This represents approximately 30 per cent of the territory's 2008 GDP of $294 million.[7]

CONSTRAINTS

It may be challenging to meet the increased demand for construction in the North because of labour force constraints. Nunavut had 634 payroll construction employees

2 Northwest Territories Construction Association, *Construction North of Sixty*, 32.

3 Ibid.

4 Ibid.

5 Ibid.

6 Ibid.

7 Ibid.

in 2008; this was up from the previous year by 70.[8] The Northwest Territories had 2,222 payroll construction employees in 2008.[9] Increasing these labour forces to accommodate the growth initiated through government infrastructure spending will necessarily mean either importing labourers from other regions (likely from the South) or transitioning labourers from other industries in the region. There are reports that recently it has become easier to find tradespeople in the North. Much of this is attributed to a slowdown in Alberta oil sands and softening in the mining and transportation sectors.[10] The estimates hold, though, that without this federal infrastructure spending there would currently be approximately 30 per cent less work in construction in the North.[11]

8 Statistics Canada, "Survey of Employment, Payrolls and Hours," CANSIM table 281-0024.

9 Ibid.

10 Northwest Territories Construction Association, *Construction North of Sixty*, 30.

11 Ibid.

CONCLUSION

All in all, the funding initiatives for the territories, should they all go forward, will have a considerable temporary impact on the size and strength of the construction sectors in these regions. These increased construction demands will be a challenge to meet, however, with the limited number of tradespeople.

Climate change that is currently being experienced in the North, especially in the Far North, will generate another opportunity for future construction development in these regions. There are many challenges that are now being experienced as permafrost recedes and buildings constructed with traditional Northern building techniques lose stability. Innovation that is needed to address building in a changing climate and landscape is a potential opportunity for the North.

CHAPTER 8

Tourism

Chapter Summary

- The tourism sector contributes to trade and immigration flows, promotes investment in infrastructure, and strengthens Canada's brand and international profile.
- The range of tourism products available in the Canadian North are diverse, and vary from region to region because of substantial differences in accessibility and tourism infrastructure.
- The tourism sector in Northern regions is difficult to measure accurately. It mainly comprises small businesses that open seasonally, often for only a few months of the year.
- A crucial step in moving forward with developing the tourism sector in Canada's North would be to develop a method for measuring the sector's impact on the overall economy.

OVERVIEW

The tourism sector contributes to the economic success of every region in Canada. In addition, it provides an important opportunity for domestic and international visitors to experience Canada's richly diverse culture and heritage. It contributes to trade and immigration flows, promotes investment in infrastructure, and strengthens Canada's brand and international profile.

Tourism activity[1] in Canada accounts for approximately 2 per cent of Canada's GDP—about the same amount as the agriculture, forestry, fishing, and hunting sectors combined. According to Statistics Canada, tourism activities generated $71.5 billion in revenues, and directly contributed $29.2 billion to Canada's GDP in 2009. Tourism activity generated nearly $21 billion in government revenues that year, and employed about 650,000 Canadians. There are about 160,000 tourism-related enterprises in Canada,[2] the vast majority of which are small, local businesses.

The four key tourism industry groups are transportation, accommodation, food and beverage services, and "other," which includes recreation and entertainment, and travel services. Tourism industries are ones that would either cease to exist without tourism activities, or would exist in a much reduced form. However, not all money spent on

1 Tourism activity is defined as the activities of a person travelling to and staying in a place more than 80 kilometres from home, and includes both business and personal activities. Excluded are activities such as commuting and travel to study or for job relocation. International travel is considered tourism activity regardless of distance travelled.

2 Canadian Tourism Commission, *Year in Review: Facts & Figures.*

tourism activities falls within the core tourism industries: about 17 per cent of tourism spending falls into non-tourism categories, such as retail and personal services.

THE TOURISM INDUSTRY IN CANADA'S NORTH

Tourism activity in Canada's North accounts for a relatively small fraction of overall tourism in Canada. One study, by the Northern Development Ministers Forum, estimated that tourism in Canada's North generated $2.45 billion in spending in 2007. Much of this spending ($1.7 billion) was concentrated in Northern Ontario.[3]

The tourism sector in Northern regions is difficult to measure accurately. It mainly comprises small businesses that open seasonally, often for only a few months of the year. Tourism activity for the Northern territories tends to be under-reported, as data for territories obtained from national tourism surveys are often suppressed because of small sample sizes. Tourism data for Northern regions of the Canadian provinces are also quite challenging to obtain: Alberta, Saskatchewan, Ontario, and Quebec are the only provinces that track annual visitation and tourism spending in their Northern areas.

Some common product themes among the Northern regions include adventure tourism, wildlife viewing, hunting and fishing, touring, and Aboriginal cultural tourism.

The range of tourism products available in the Canadian North are diverse, and vary from region to region because of substantial differences in accessibility and tourism infrastructure. However, there are some common product themes among the Northern regions, including adventure tourism, wildlife viewing, hunting and fishing, touring, and Aboriginal cultural tourism.

TOURISM ACTIVITY IN THE CANADIAN TERRITORIES

Yukon

Visitor volumes (2009): 282,874
Tourism revenues (2009): $164 million

Tourism plays a significant role in Yukon's economy. A 2008 territorial government survey revealed that 27 per cent of businesses in Yukon derive at least a portion of their revenues from tourism activities.[4] The United States is by far the territory's largest source market (see Table 2), accounting for more than two-thirds of same-day and overnight visitors. According to Tourism Yukon, a substantial number of U.S. visits are made up of Alaskan cruisers who take a day trip into the territory while making a port stop in nearby Skagway (exact figures are not reported).

Table 2
Tourism Activity in Yukon
(per cent)

Top markets	
United States	68
Canada	22
Other international (mainly Germany, United Kingdom, Australia)	10

Reasons for Visiting Yukon*	
Leisure travel	83
Business travel	7
Other	10

*Breakdown is estimated, based on the Government of Yukon's 2004 Yukon Visitor Exit Survey.
Sources: Government of Yukon Department of Tourism and Culture; Yukon Bureau of Statistics.

In sharp contrast to the rest of the Northern regions, domestic travellers account for a relatively small proportion of annual visits to Yukon. However, it should be noted that the Yukon government tracks only visitors crossing

3 Northern Development Ministers Forum, *Tourism Potential in Canada's North*, 8.

4 Government of Yukon Department of Tourism and Culture, *2010–2011 Tourism Yukon Situational Analysis.*

the border into Canada from Alaska. It does not capture domestic visitors who travel to Yukon without including a trip to Alaska in their itinerary, and it does not track the origin of most air passengers arriving in Whitehorse.

Germany is Yukon's main overseas market, accounting for one-quarter of all international visits.

Overseas travellers make up approximately 10 per cent of the territory's annual visits. Germany is its main overseas market, accounting for one-quarter of all international visits, followed by the United Kingdom and Australia. Condor, a German airline, operates direct flights from Frankfurt to Whitehorse during the summer season, which represents the only direct air service to a Northern Canadian destination from overseas.

Yukon focuses its tourism product marketing on outdoor activities, touring, and cultural experiences. The three main consumer segments targeted in its marketing plan are "adventure challengers," who seek physically strenuous, adventure-oriented tourism; "scenic outdoor travellers," who prefer less demanding outdoor activities, such as touring, visiting historic sites, and wildlife viewing; and "cultural explorers," who seek cultural experiences, such as visiting museums and festivals. Wilderness tourism and, to a lesser degree, Aboriginal cultural tourism, are currently two areas of focus for tourism product development.[5]

Northwest Territories

Visitor volumes (2009): 73,000
Tourism revenues (2009): $130.3 million

Like Yukon, the Northwest Territories identifies tourism as an important part of the territorial economy, generating more revenues than all other renewable resource sectors combined. Business travel is a crucial key market, accounting for nearly half of all visits, and more than half of all tourism revenues in 2009.[6]

Sport hunting for caribou and polar bears has traditionally been a major driver of tourism spending in the Northwest Territories. There is also a small, but highly popular niche market for sheep hunting in the Mackenzie Mountains. Although sport hunters account for a relatively small percentage of visits to the territory, hunters spend an average of nearly $15,000 per trip, generating a significant proportion of tourism spending. Polar bear hunters typically pay between $30,000 and $50,000 for a hunt.

Aurora borealis (northern lights) viewing is the main draw for the Northwest Territories' international visitors.

However, this sector has been faced with a series of setbacks in recent years. The U.S. is the primary market for sport hunting in the territory, but it was hurt severely by the economic recession of 2008–09. In addition, the U.S. added polar bears to its endangered species list in 2008, making it illegal for American hunters to return home with polar bear products. Furthermore, barren ground caribou hunting has been suspended indefinitely because of depleted stocks. Consequently, Northwest Territories Tourism is working with polar bear and caribou hunting outfitters to develop new tourism products.

Aurora borealis viewing (northern lights viewing) is the main draw for the Northwest Territories' international visitors, who are made up primarily of Japanese tourists. (See Table 3.) However, Japanese visits to Canada have plunged in recent years, and the outlook for this market remains subdued. Therefore, the territory is exploring other overseas markets for this product sector. In addition, the territory has cited Aboriginal cultural tourism and diamond tourism as two other product sectors with potential for growth.

5 Government of Yukon Department of Tourism and Culture, *2010–2011 Tourism Yukon Implementation Plan.*

6 Government of the Northwest Territories, *Northwest Territories Tourism 2010/11 Marketing Plan.*

Table 3
Tourism Activity in the Northwest Territories
(per cent)

Top markets	
Canada (domestic)	77
United States	13
Other international (mainly Japan)	10

Reasons for Visiting N.W.T.	
Leisure travel	54
Business travel	46

Source: Northwest Territories Tourism.

Table 4
Tourism Activity in Nunavut
(per cent)

Top markets	
Canada (domestic)	83
United States	13
Other international (mainly Japan)	4

Reasons for Visiting Nunavut	
Leisure travel	42
Business travel	50
Other	8

Source: Nunavut Tourism; Nunavut Economic Development and Transportation.

Nunavut

Visitor volumes (2009): 17,000
Tourism revenues (2009): $30 million[7]

Nunavut's tourism sector is very small compared with other Northern regions, but it is growing quickly. Visits to the territory jumped 27 per cent between 2006 and 2008, the last two years that a visitor exit survey was conducted.[8] Similar to the Northwest Territories, business travel is a significant driver of tourism, accounting for about half of all visits. (See Table 4.)

Tourism is still in the early stages of development in Nunavut, and tourism infrastructure remains very basic. Tourism is focused mainly on outdoor adventure activities, such as dog sledding, camping, hiking, kayaking, and wildlife viewing. In addition, the Arctic cruise sector has expanded considerably in recent years and, although it is still quite small, there are potentially significant opportunities for growth. There were about 3,000 cruise passenger visits to the territory in 2008, a 40 per cent increase over 2006.[9]

Eco-tourism and cultural tourism are two areas of focus for product development in Nunavut.[10] In the category of eco-tourism, the territory is looking to expand its capacity for wildlife viewing and experiences "on the land." In the category of cultural tourism, the territory hopes to develop authentic experiences for travellers interested in learning more about Inuit culture. However, Nunavut's tourism industry prefers not to label this "Aboriginal" tourism because of the potentially negative connotations, from their point of view, associated with this term. More practically, the majority of residents in Nunavut are Inuit, and therefore most of the tourism products offered in the territory are provided by Inuit people.

THE ECONOMIC POTENTIAL FOR TOURISM IN THE NORTH

DEMAND

Tourism demand in Canada is poised for strong growth over the long term. In 2009, overnight visitors, including domestic, U.S., and overseas travellers, spent an estimated $36 billion in Canada. The latest forecast by the Canadian

7 Visitor volumes and tourism revenues are estimates provided by Nunavut Tourism.

8 DataPath Systems, *Nunavut Exit Study 2008 Final Report*.

9 Ibid.

10 Colleen Dupuis, phone Interview by Marta Bristow, May 19, 2010.

Tourism Research Institute (CTRI) at The Conference Board of Canada suggests this figure will rise to nearly $46.5 billion by 2014.[11]

A key driver of growth is the baby-boom generation (i.e., those born during the post-Second World War baby boom between 1946 and 1965). Baby boomers make up 30 per cent of the Canadian population, and are now passing through the prime travel age of 55 to 70 years of age. Consumers in this age bracket tend to be more affluent, are highest up the professional ladder, tend to be empty nesters, and therefore have comparatively more time and money for travel. In addition, research suggests baby boomers have the highest propensity to travel for pleasure, and a lower tendency to travel to visit friends and family.

Aurora borealis viewing, wildlife viewing, hiking and camping, and cultural experiences are the Northern travel activities of most interest to Canadians.

Northern regions may be well positioned to capitalize on the strong potential for tourism growth, according to a recent Canadian Travel Intentions survey by CTRI. Of the Canadians polled in February 2010, 38 per cent said they were interested or very interested in travelling to Canada's North sometime in the next five years. Among this group, 36 per cent were most interested in Yukon, and 30 per cent were most interested in travelling to Northern provincial regions, particularly Northern British Columbia, Labrador, and Northern Ontario. Another 18 per cent were most interested in travelling to Nunavut, and 16 per cent were most interested in the Northwest Territories. Of course, expressed travel intentions do not necessarily lead to actual trips taken, but the survey results do indicate there is significant market potential for travel destinations in the North. (See Table 5.)

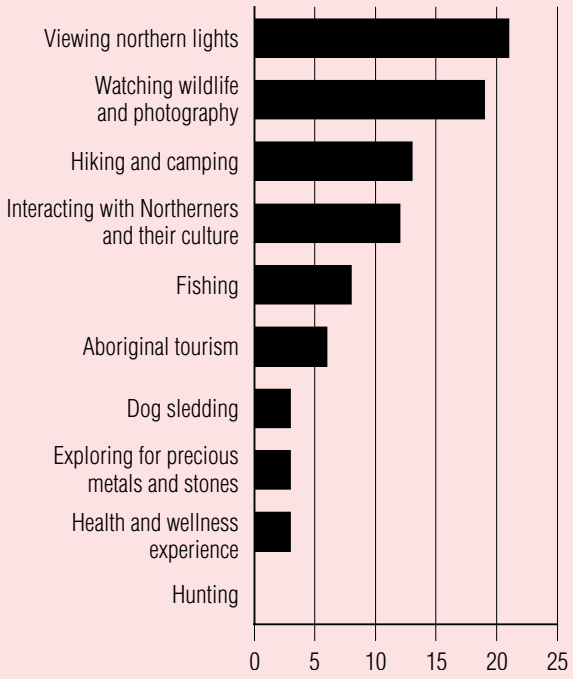
Aurora borealis viewing, wildlife viewing, hiking and camping, and cultural experiences are the Northern travel activities of most interest to Canadians, according to the survey. (See Chart 14.) Of the Canadian respondents interested in taking a trip to the North, 21 per cent were highly interested in viewing the northern lights, followed by watching wildlife and photography (19 per cent), hiking and camping (13 per cent), and interacting with Northerners and their culture (12 per cent).

Table 5
Northern Destination of Most Interest to Canadians
(per cent)

Top markets	
Yukon	36
Northern provincial region	30
Nunavut	18
Northwest Territories	16

Source: Canadian Tourism Research Institute, "Canadian Travel Intentions Survey" (February 2010).

Chart 14
Northern Tourism Activities of Most Interest to Canadians
(per cent)



Source: Canadian Tourism Research Institute

11 Hermus and Bristow, *Travel Markets Outlook*, 2.

SUPPLY

The range of tourism products available in Northern regions varies widely between regions, in part because of regional differences in accessibility and tourism infrastructure. However, there is some consensus among Northern tourism organizations about opportunities for expanding the tourism sector in the North. Product sectors identified as having growth potential for Northern tourism include:

1. Outdoor Adventure Tourism

Product sectors related to outdoor adventure activities, such as wildlife viewing, adventure activities, and road touring, are key tourism activities in the North, and they continue to attract strong interest from visitors in all markets. All three territories have financial resources dedicated to expanding their product capacity in this area, especially in remote areas.

There is some consensus among Northern tourism organizations about opportunities for expanding the tourism sector in the North.

For example, Churchill, Manitoba, has developed a successful wildlife viewing industry by marketing itself as the "Polar Bear Capital of the World." Thousands of visitors flock to the region for polar bear viewing in October and November, when the bears gather at the edge of Hudson Bay to wait for the ice to freeze over.

2. Aboriginal Cultural Tourism

While this is still a relatively undeveloped product sector in Canada, research suggests there is a great deal of market potential for authentic Aboriginal cultural experiences, especially from key European travel markets. A recent study by the Canadian Tourism Commission and Insignia Research revealed that a substantial number of potential French, German, and British travellers to Canada were interested in "authentic" Canadian Aboriginal travel experiences.[12]

However, a number of significant challenges are associated with developing this market, including cultural and community sensitivities, a lack of support within First Nations communities, inconsistent product quality, human resource issues, and government land-use restrictions.[13]

All three territories have financial resources dedicated to expanding their product capacity in outdoor adventure activities, especially in remote areas.

The Aboriginal Tourism Association of BC is often cited as a successful model for developing this sector. The organization released a "Blueprint Strategy" in 2005, based on extensive market research, industry stakeholder consultations, and product development analysis. It estimated Aboriginal tourism activities in the province would generate $50 million in revenues by 2012, up from $35 million in 2005.[14] The association also developed an Authenticity and Quality Standards Program to certify companies that are: 1) majority owned and operated Aboriginal tourism business; 2) market ready; and 3) offer approved, culturally appropriate content.

3. Arctic Cruises

Most cruise activity in Canada's North is related to the Alaska cruise market. In 2009, Prince Rupert, British Columbia, received nearly 55,000 passengers[15] off cruise ships making a port call on the way to Alaska. (See Exhibit 8.) Arctic cruising, on the other hand, is a niche market that accounts for a very small segment of Canada's cruise industry, and there are little data available for this sector. Yet, the information that is available suggests it has grown significantly in recent years. For example, 3,000 cruise passengers visited Nunavut ports in 2008, a 40 per cent increase over 2006.[16] In addition, Makivik Corporation, an Inuit company based in Northern Quebec, launched Cruise North Expeditions in 2005,

12 Canadian Tourism Commission, "Aboriginal Tourism Opportunities for Canada."

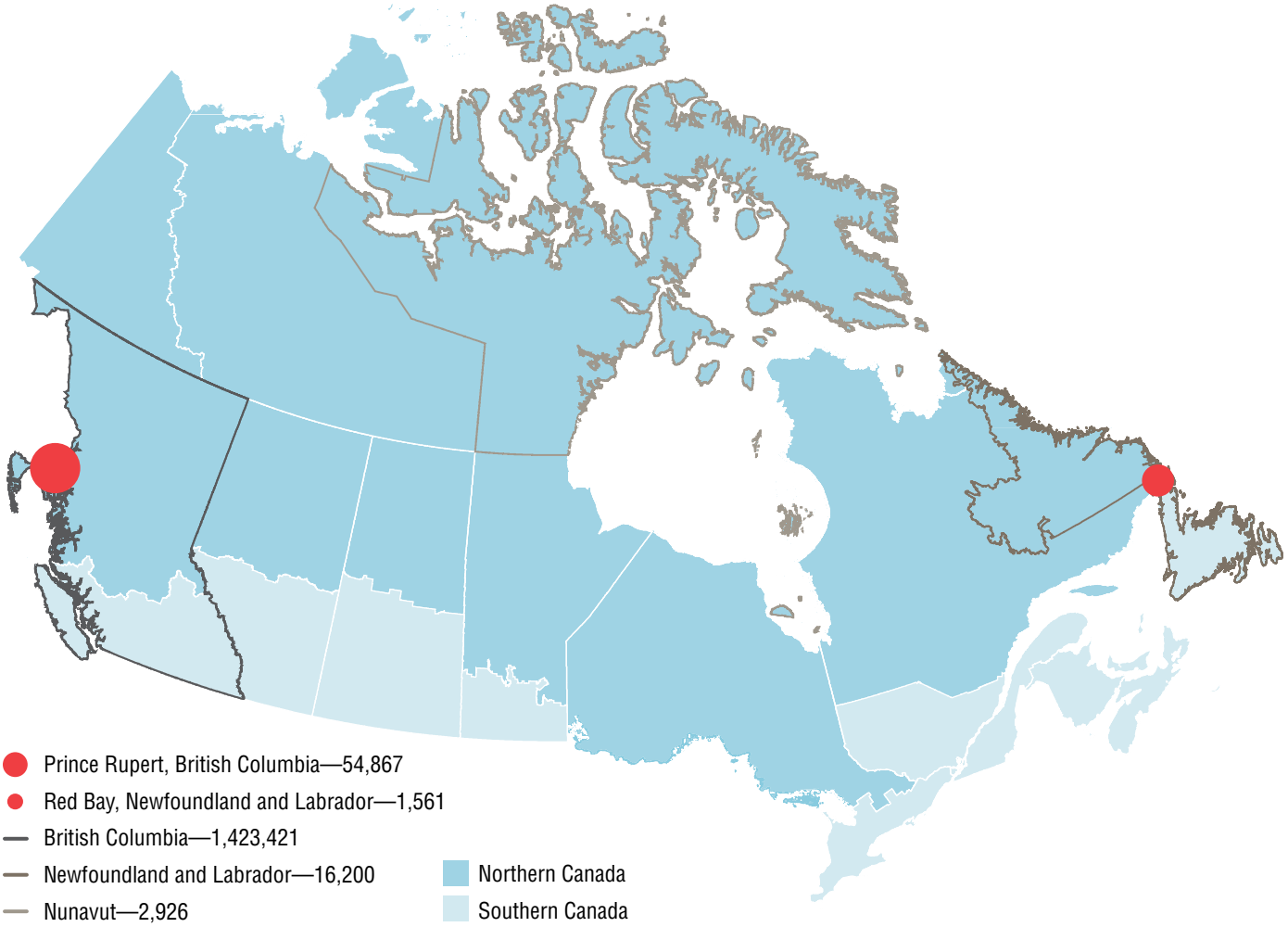
13 For a more detailed discussion of some of these issues, see: Aboriginal Tourism Team Canada, *Aboriginal Tourism in Canada, Part II*.

14 Aboriginal Tourism Association of BC, "Blueprint Strategy."

15 British Columbia Ministry of Tourism, Trade and Investment, "Industry Performance."

16 DataPath Systems, *Nunavut Exit Study 2008 Final Report*.

Exhibit 8
Cruise Revenue Passenger Volumes, 2009
(passenger visits at port of call)



Note: Data are for 2009, with the exception of Nunavut (2008).
Sources: Cruise B.C.; Cruise Newfoundland and Labrador; Nunavut Department of Economic Development and Transportation; Statistics Canada; The Conference Board of Canada; Golder Associates.

offering Arctic cruises to Nunavut and Labrador. A handful of other companies also operate a small number of Arctic sailings. Tourism Nunavut and Makivik both report that interest in Arctic cruising is strong, and is expected to continue rising.

Expanding the capacity of this sector, however, is a difficult prospect, mainly because of the costs involved with procuring ships that are fit for Arctic waters. Most ships used for Arctic cruises are foreign-registered, retrofitted ice breaker and/or scientific vessels leased by cruise companies. But, foreign-flagged ships are subject to Canada's restrictive marine cabotage laws, which limit a cruise company's ability to offer Canadian cruise itineraries.

4. Meetings and Conventions

Business travel is a crucial tourism market for the North, in particular for the Northwest Territories and Nunavut, where half of all visitors to those territories are there on business trips. Activity in other key sectors of Northern economies will continue to fuel demand in

this market, and it is generating opportunities for cities in the North to host meeting and convention events. In fact, tourism organizations report growing interest in the North as a meetings and conventions destination, but capacity for these events is limited, especially in the three territories. For example, the largest meeting venues in Yellowknife and Whitehorse can accommodate a maximum of only 500 people.

Substantial capital investment would be needed to expand meetings and conventions capacity in the territories and to upgrade current facilities, but the potential return on investment could be huge. A study co-produced by Maritz Research Canada and The Conference Board of Canada demonstrated that meetings activity in Canada generated $23.8 billion in revenues and directly contributed nearly 223,000 full-year jobs to the Canadian economy in 2008.[17]

CONSTRAINTS

Many issues impede the tourism sector in Canada's Northern regions from capitalizing on their full growth potential. While many of these challenges differ regionally, there are a number of obstacles common to many regions, including:

There is a need for expansion of the intercommunity transportation system in the Northwest Territories and, in fact, Nunavut has virtually no highway system at all.

Air Access

The ability to get to a destination is an integral part of planning and taking a trip. Air capacity is a critical element of tourism sector growth, because improvements in air access are directly related to the growth potential of a source market. Northern tourism regions depend heavily on air access to bring in visitors, and vast regions of the North are accessible only by air. (See Exhibit 9.)

However, air services to Canada's North are relatively expensive, placing its tourism destinations at a disadvantage, in terms of price-competitiveness. Flight schedules can be inconsistent and inconvenient, especially for visitors travelling from abroad. In many communities, airport infrastructure is aging and inadequate, and needs significant upgrading. And, even if the airport infrastructure is in place, expanding the level of air capacity can be a complicated and costly venture, as airlines are often reluctant to gamble on new air services without a financial incentive.[18]

Substantial capital investment would be needed to expand meetings and conventions capacity in the territories, but the potential return on investment could be huge.

Road Access/Intermodal Transportation

Inadequate transportation infrastructure is an issue affecting many economic sectors in the North, not just tourism. In 2008, a joint report released by the three territorial governments described the transportation system in the North as "under-developed," and "built decades ago, well below the standards required for large-scale development." The report noted that resource development is "stretching this infrastructure to its limit."[19] In particular, the report points to the need for an expansion of the intercommunity transportation system in the Northwest Territories, and to the fact that Nunavut has virtually no highway system at all.

Human Resources Issues

Tourism businesses all across Canada are grappling with human resources issues, such as difficulties in recruiting and retaining staff and a lack of skilled workers. These issues are magnified in remote regions of Canada's North, where the pool of available workers is much smaller.

A recent study[20] the Canadian Tourism Human Resource Council revealed that as demand in the Canadian tourism sector continues to grow, the supply of labour will have an

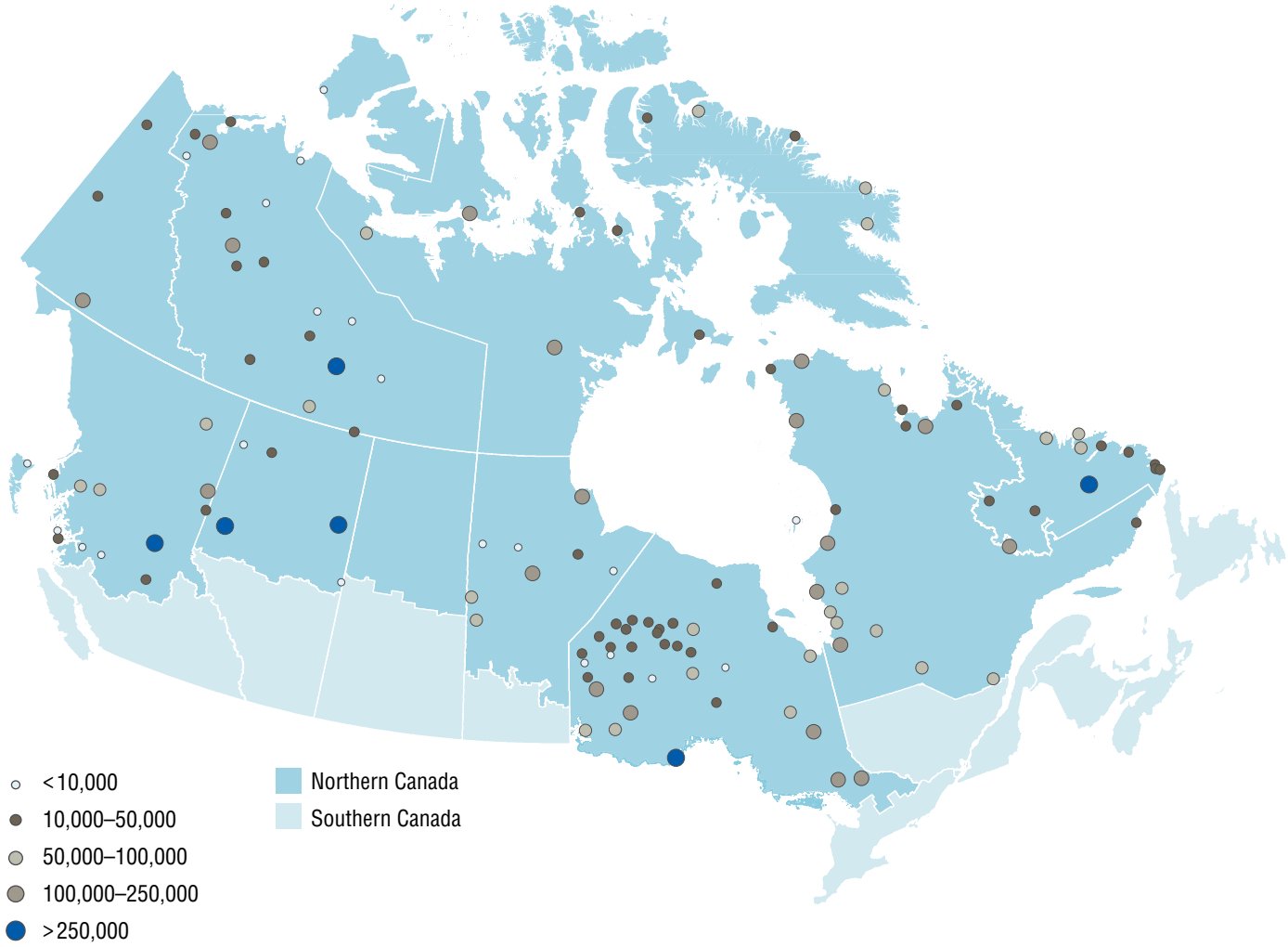
17 Maritz Research Canada and The Conference Board of Canada, *Canadian Economic Impact Study Update 2007–2008*.

18 The Northwest Territories commissioned a study of potential opportunities associated with expanding air access to the territory. See Government of the Northwest Territories, *International Air Travel, Tourism and Freight Opportunity Study*.

19 Government of Yukon, *Northern Connections*, 6–7.

20 Canadian Tourism Human Resource Council, *Economic Recession Only a Temporary Reprieve*.

Exhibit 9
Air Capacity, 2009 and 2010
(annual available seat capacity on scheduled flights to airports in Northern Canada)



Sources: BACK Aviation Solutions Inc.; Statistics Canada; The Conference Board of Canada; Golder Associates.

increasingly difficult time keeping up. The consequences of labour shortages in Canada's North—such as missed opportunities for investment in the sector and the inability to meet potential demand—could substantially reduce the potential growth of Northern tourism revenues. Tourism stakeholders and all levels of government must work together to proactively respond to potential labour shortages, by developing strategies to expand the supply of labour and improve labour force productivity.

Lack of Quantitative Data

As mentioned earlier in this report, there is a lack of standardized data measuring the performance of the tourism sector in Northern regions, with only a few discrete measures currently available. This not only diminishes the importance of the sector, because it is unable to quantify its economic contribution, but it also represents a considerable roadblock in the sector's ability to attract investment.

CONCLUSION

The Canadian tourism sector is poised for robust growth over the long term, and Canada's North may be well positioned to capitalize on this potential. Domestic and foreign travellers are increasingly interested in new and unique travel experiences, which are abundantly available in the North. Outdoor adventure activities, wildlife viewing, Aboriginal cultural tourism, Arctic cruising, and other Northern tourism segments have been the focus of recent product development efforts, which are significantly enhancing the potential for tourism growth.

However, there are a number of challenges hindering the ability of Northern regions to capitalize fully on the growth potential of the tourism sector. These include transportation issues such as air and road access, constraints in human resources, and the lack of quantitative data available to measure the performance of tourism in the North.

A crucial step in moving forward with developing the tourism sector in Canada's North would be to develop a method for measuring the sector's impact on the overall economy; that is, to create a composite figure representing the tourism sector's GDP. This would provide Northern regions with a more comprehensive and realistic depiction of the economic significance of tourism, using terminology that is consistent and comparable with other, more established, industries.

The best approach would be to develop a framework to calculate tourism GDP, primarily by using supply-side (industry) data that are collected regularly, or that could be collected regularly, to provide the tourism sector with a measurement tool that could be used over time. This would be much more effective than developing extensive survey methods that would provide only a one-time snapshot of the sector. With a measurement framework in place, estimates of the tourism sector's performance could be generated regularly—perhaps on a quarterly basis.

Data that are currently, or potentially, available for this composite figure include:

- tourism industry revenues (and, if available, tourism prices);
- tourism industry employment;
- tourism industry establishments; and
- tourism industry activity levels (border crossings, attendance at various events, etc.).

The methodology for integrating the various components of tourism GDP would involve aligning the collected data as closely as possible with Statistics Canada's definition and scope of the tourism sector. In addition, data would be adjusted to incorporate key Northern characteristics. For example, when looking at restaurant operating expenditures, the average percentage share of wages may be different in Northern regions than it is in Canada overall.

CHAPTER 9

Conclusion

Chapter Summary

- As conventional oil and gas resources mature and production declines, opportunities arise for unconventional resources to become more important. Technology development is facilitating this transition.
- Every Northern region has potential to further develop mining opportunities.
- Tourism also represents a strong growth potential, but from a modest initial base.
- Forestry and fishing are mature renewable industries that have approached or reached sustainable harvest levels.
- Commercial or industrial construction will continual to be cyclical, and will opportunistically follow resource-based industrial development.
- Further research into economic potential in the North could target the industries that would make the largest financial contribution (mining and oil and gas), or the industries that would have the greatest impact on local society (fishing, tourism, and construction).

This report has reviewed the economic potential for several of the key industries in Canada's North. These industries fall into three categories: primary industries whose performance drives economic activity within a given region; enabling industries whose presence and performance reduce costs or otherwise facilitate development of primary industries (but do not drive economic growth on their own); as well as potentially emerging industries that are currently small, but could represent significant future growth potential. The primary industries reviewed are oil and gas, mining, forestry, and fisheries. Utilities and construction are identified as enabling industries, in that their presence contributes to the ability to expand leading industries and manage costs. Tourism is the potentially emerging industry examined in this work. Also of importance to Northern economies and communities are non-commercial services, such as health and education. These non-commercial services are integral to the North; however, they are not considered drivers for growth and are therefore outside the scope of this report.

The oil and gas sector and the mining sector represent the two most important industries examined in terms of both their potential contribution to Northern economies and related growth opportunities. These industries also have significant environmental impacts that must be understood and managed properly as projects are developed and implemented. Both sectors represent resource extraction opportunities that are based on

locational distribution. They have the ability to build infrastructure and develop necessary services, providing that the resources are of sufficient quality and quantity to justify the additional expense.

The oil and gas sector presents strong regional opportunities, some of which have waited for decades for development to proceed. As conventional oil and gas resources mature and production declines, opportunities arise for unconventional resources to become more important. Technology development is facilitating this transition. Oil sands and shale gas provide two examples of this transition. Both face opportunities as a result of conventional resource depletion (including rising costs for conventional projects) and from new technologies. Oil sands development faces increasing public scrutiny in terms of infrastructure development, investments, labour supply, and the environmental impacts that it brings. Shale gas and oil sands are both relatively high-cost resources and must seek appropriate market opportunities. Conventional oil and gas resources in the frontier regions of Canada face different challenges, most of which relate to infrastructure to develop the resource and move it to market at competitive prices.

Commercial or industrial construction in Canada's North will continue to be cyclical, and will opportunistically follow resource-based industrial development.

Every Northern region has potential to further develop mining opportunities, although the specific opportunities and level of current development are specific to each province or territory. Saskatchewan has strong potential for uranium mining to expand from its current base. Yukon brought a second mine into operation in the fall of 2010; a third mine, Wolverine, is due to begin production shortly. The Northwest Territories represents Canada's most recently developed mining industry—diamonds. Nunavut has recently opened its first gold mine. Ontario and Quebec have long histories of diverse mining operations. The challenges and constraints to growth for mining in the North include changes in the demand for each product, supply constraints (particularly skilled labour), remoteness, infrastructure, and the long lead times required to bring new properties to full production. Environmental performance is coming under greater scrutiny and the predevelopment environmental screening requirements are expanding, adding time and cost to the development process. Devolution of responsibilities for land and resources also creates a need for capacity building to ensure that review processes are as efficient as possible while still protecting the environment and reaching decisions that society supports. Although such changes are consistent with sustainable development, they impact the pace and cost of new projects.

Every Northern region has potential to further develop mining opportunities, although the opportunities and development are specific to each province or territory.

Forestry and fishing in Canada are both mature renewable industries that have approached or reached sustainable harvest levels and require careful management to maintain their long-term viability. As a result, apart from local niche opportunities, our review has not identified any significant long-term development potential for either industry.

The construction industry is currently benefiting from stimulus spending and targeted government programs in the North. These funding commitments are not permanent, and must be properly managed while funding is available, to provide the best results possible. Commercial or industrial construction will continue to be cyclical, and will opportunistically follow resource-based industrial development.

Tourism represents a strong growth potential, but from a modest initial base. The market opportunity appears to be strong, with a growing number of Canadian travellers who want to see and experience the North. Two significant challenges this industry faces are the access constraints that arise from limited infrastructure in the North (airports, roads, hotel beds, year-round services) and the ongoing development of products of consistent quality.

The data necessary to fully explore each of these industries and their future potential do not currently exist. Specifically, this project ran into major data collection roadblocks such as difficulty separating data for Northern and Southern portions of provinces, breaking Statistics Canada "primary industry" data up into the collection of primary industries in this report, and challenges comparing data collected using different metrics in different regions. This report has compiled the best and most complete data available to profile each industry identified for its potential in the North. However, any future research in this area needs to account for these data challenges and address them through innovative solutions.

Further research into economic potential in the North could target the industries that would make the largest financial contribution (mining and oil and gas), or the industries that would have the greatest impact on local society (fishing, tourism, and construction). They could also examine individual projects in detail, providing development case studies that illustrate best practices or areas that need improvement. These studies would also benefit from a more focused geographic approach, narrowing in on the local economies that are impacted, rather than taking a pan-Northern approach.

APPENDIX A

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APPENDIX B

List of Desired Indicators

MINING INDICATORS

Labour constraints
Surface access rights
Road infrastructure
Rail infrastructure
Production/shipments (physical units and value)
Employment
Resource measures: potential resource, discovered, under production
Total area leased
Cumulative production
Reserves life index (reserves/annual production)
Cumulative production as per cent of initial in place
Some measure of resource quality and depth
Water availability and access
Distance to market/market size
Key minerals
Some measure of level of processing within region
Exploration expenditures
Project details for new mines
Infrastructure utilization
Availability and consumption of key inputs—energy, water, etc.
Area under exploration licences
Area under development/production licences
Government fiscal share
Government royalty/fiscal revenues

OIL AND GAS INDICATORS

Labour constraints
Surface access rights
Road infrastructure (only relevant in remote locations)
Production (physical units and value)—Canadian and export markets
Employment
Resource measures: potential resource, proven reserves, under production
Total area leased
Cumulative production
Reserves life index (reserves/annual production)
Cumulative production as per cent of initial in place
Exploration expenditures
Exploration well completions (useful mostly if a trend is available)
Development expenditures
Development well completions (useful mostly if a trend is available)
Infrastructure—pipeline capacity, miles of pipe, processing/refining capacity, etc.
Area under exploration licences
Area under development/production licences
Government fiscal share
Government royalty/fiscal revenues

FORESTRY INDICATORS

Labour constraints
Surface access rights
Road infrastructure
Rail infrastructure
Shipments (physical units and value)
Employment
Sustainable yield (old growth vs. new?)
Production level (old growth vs. new?)
Pine beetle or other pest threats
Forest cover and impacts of climate change on forest cover
Certifications
Water availability and access
Distance to market/market size

FISHERIES INDICATORS

Employment
Labour constraints
Revenues
Exports
Fish processing capacities
Types of fish/seafood harvested
Number of fisheries registered
Number of fisheries licensed, by species
Number of commercial vehicles licensed by type and size
Landings (amount of fish brought to shore)
Fish quotas
Sustainable yield rates
Production level
Impacts of conservation plans/quota limits
Impacts of overfishing in international waters
Impacts of climate change
Impacts of increased/changed shipping patterns
Impacts of pollution
Distance to market/market size
Consumption rates
Fisheries certification

UTILITIES INDICATORS

Revenues
Customer counts
Deliveries by customer class (for retail utilities mostly)
Domestic vs. export deliveries (oil and gas in particular)
Average delivery prices by customer class (for retail utilities)
Assets in service—value
Transmission capacity
Load/utilization factors
Interconnections and capacity
Miles of pipe/wires
Generating capacity—by fuel (electrics only)
Energy generated (electrics only)
Employment

CONSTRUCTION INDICATORS

Revenue
Access to roads
Access to rail
Access to materials
Access to water
Type of construction—residential, industrial (which industries?)
Labour constraints
a. engineers
b. masons
c. Northern specialists
d. labourers
Employment
Equipment sales
Construction earnings
Planning permissions for residential and non-residential development
House prices
Construction confidence

TOURISM INDICATORS

Revenues
Overnight visitors (by origin, purpose of visit, method of transportation)
Air capacity to commercial airports
Air passengers
Cruise passengers
Hotel indicators (rooms available, revenues, average occupancy, average rates)
Employment
GDP of tourism sector

services

+ **Executive Networks**
  Exchange Ideas and Make New Contacts on Strategic Issues

+ **e-Library**
  Access In-Depth Insights, When You Need Them Most

+ **The Niagara Institute**
  Develop Leaders of the Future With Interactive and Engaging Leadership Development Programs

+ **The Directors College**
  Canada's University-Accredited Corporate Director Development Program

+ **Custom Research**
  Tap Into Our Research Expertise to Address Your Specific Issues

+ **Customized Solutions**
  Help Your Organization Meet Challenges and Sustain Performance

+ **e-Data**
  Stay on Top of Major Economic Trends

+ **Conferences, Seminars, and Workshops**
  Learn From Best-Practice Organizations and Industry Experts

Centre for the North

The main purpose of the Centre for the North (CFN) is to work with Aboriginal leaders, businesses, governments, communities, educational institutions, and other organizations to achieve a shared vision of sustainable prosperity in the North. Most important, the Centre will help define the actions required to realize that vision.

Key Objectives

- Examine the full range of challenges and opportunities related to sustainable prosperity and then develop policies and strategies that take into account the interrelationships among all factors.
- Engage First Nations, Inuit, and Métis leaders and communities to ensure that their voices are incorporated into the dialogue and analysis on the full range of issues.

Exclusive Benefits of Membership

- Involvement in biannual meetings that discuss issues of interest to Northern communities.
- Access to the biannual *Territorial Outlook*. This economic forecast presents the fiscal outlook for each of Canada's three Northern territories and includes output by industry, labour markets, and demographics.
- Access to Conference Board research on Northern issues, including case studies, typology, and analysis of thriving communities.
- Access to the IGLOO web portal—an interactive website that contains information about CFN, its research, and networks that allow users to connect through common interests and share information, blogs, etc. The central feature is a map that will contain a wealth of information, as well as geographic information system capabilities to display and manipulate this information.
- Access to a members-only website that includes archived webinars, resources and information, and past meeting presentations.

Our Goal . . .

. . . is that within five years the Centre will have built a common vision of sustainable prosperity among key Northern stakeholders, and will have helped them define the actions required to realize that vision.

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