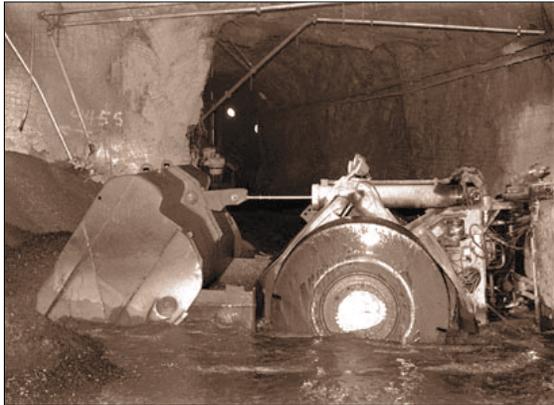


Looking Beneath the Surface:

An Assessment of the Value of Public Support for the Metal Mining Industry in Canada



MiningWatch Canada
Mines Alertes

 **Pembina Institute** for Appropriate Development

Holistic and practical solutions for a sustainable world.

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An Assessment of the Value of Public Support for the Metal Mining Industry in Canada

by Mark Winfield, Ph.D., Catherine Coumans, Ph.D.,
Joan Newman Kuyek, D.S.W., François Meloche, B.Sc. (Agr.)
and Amy Taylor, M.R.M.

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About MiningWatch Canada

MiningWatch Canada is a coalition of labour, Aboriginal, environmental, social justice and development organizations from across Canada with a mandate to support communities affected by mining in Canada, and affected by Canadian mining companies abroad. It is a coordinated public interest response to the threats to public health, water and air quality, fish and wildlife habitat and community interests posed by irresponsible mineral policies and practices in Canada and around the world.

The aims of the organization are to:

- ensure that mineral development practices are consistent with the goals of sustainable communities and ecological health;
- strengthen technical and strategic skills within communities and organizations faced with impacts of mineral development;
- impose appropriate terms and conditions on mining and in some cases prevent the development of projects that would adversely affect areas of ecological, economic and cultural significance; and
- advocate policies to improve the efficiency and reduce the risks of mineral development.

For more information, visit our website at www.miningwatch.ca, or contact us at:

MiningWatch Canada
Suite 508, 880 Wellington Street
Ottawa Ont., K1R 6K7
Telephone (613) 569-3439 Fax (613) 569-5138
e-mail: canada@miningwatch.ca

About the Pembina Institute

The Pembina Institute is an independent, citizen-based environmental think-tank specializing in the fields of energy-environment, climate change, environmental economics and environmental governance. The Institute engages in environmental education; policy research, analysis and advocacy; community sustainable energy development; and corporate environmental management services to advance environmental protection, resource conservation, and environmentally sound and sustainable resource management. Incorporated in 1985, the Institute's head office is in Drayton Valley, Alberta with additional offices in Ottawa and Calgary and research associates in Edmonton, Vancouver, Saskatoon, Toronto, and other locations across Canada.

For more information on the Institute's work, please visit our website at www.pembina.org or contact us at:

Pembina Institute for Appropriate Development
Suite 505, 124 O'Connor Street
Ottawa, Ont., K1P 5M9
Telephone (613) 235-6288 Fax (613) 235-8118
e-mail: info@pembina.org



About the Authors

Mark Winfield, Ph.D.

Mark Winfield is Director of the Pembina Institute's Environmental Governance Program. Prior to joining Pembina, he was Director of Research with the Canadian Institute for Environmental Law and Policy. Dr. Winfield holds a Ph.D. in Political Science from the University of Toronto, and has published on a wide range of environmental law and policy issues, including hazardous wastes, toxic substances and pollution prevention, biotechnology regulation, community right-to-know issues, and environmental governance. Dr. Winfield has been involved in many environmental law reform and policy development processes at the provincial, federal and international levels. He also teaches environmental politics and policy at the University of Toronto and York University.

Catherine Coumans, Ph.D.

Catherine Coumans is Research Coordinator at MiningWatch Canada. She holds an M.Sc. from the London School of Economics and a Ph.D. in Anthropology from McMaster University. Before starting at MiningWatch Canada, Dr. Coumans taught at Cornell University while holding a postdoctoral position there and she established an international support coalition for mining-affected communities of Marinduque in the Philippines. Dr. Coumans has written and published extensively on indigenous religio-political movements, the impact of mining on communities and social and cultural responses to large-scale resource extraction projects, as well as on the environmental implications of mining technology.

Joan Newman Kuyek, D.S.W.

Joan Kuyek is the National Coordinator of MiningWatch Canada in Ottawa. A community organizer and popular educator by vocation, Dr. Kuyek has been instrumental in creating a number of organizations in her home community, including the Sudbury Better Beginnings Better Futures Association, GEODE (a community economic development corporation), and the Sudbury Community Legal Clinic. She worked for the United Church of Canada as the National Animator for the Church and the Economic Crisis Project and from 1989-91 for the World Council of Churches. She is the author of a number of books and articles, including Fighting for Hope: Organizing to Realize our Dreams, and The Phone Book: Working at Bell Canada.



François Meloche, B.Sc. (Agr.)

François Meloche is an environmental analyst for the Groupe investissement responsable, a division of Demers Conseil inc. in Montreal. His areas of work include research and consulting around shareholder engagement with companies in the oil-and-gas, forestry and mining sectors. He has worked for Michael Jantzi Research Associates Inc. in Toronto and the Interfaith Center on Corporate Responsibility in New York.

François Meloche est analyste au Groupe investissement responsable, une division de Demers Conseil inc. Il étudie entre autre les entreprises du secteur de l'énergie, des forêts et des mines et agit comme consultant pour des actionnaires responsables. Il a travaillé pour Michael Jantzi Research Associates Inc. à Toronto et le Interfaith Center on Corporate Responsibility à New York.

Amy Taylor, M.R.M.

Amy Taylor is Director of the Pembina Institute's Ecological Fiscal Reform Program. Since joining the Pembina Institute in May of 2000, she has completed numerous projects on ecological fiscal reform for the National Round Table on the Environment and the Economy and the Green Economy Secretariat of the British Columbia Government. Ms. Taylor has co-organized and run an international conference on environmental taxation and worked with industry leaders to advance environmental tax shifting in Canada. She came to the Pembina Institute following work with the BC Ministry of Finance, where she was the lead author and researcher for the BC government's 1999 discussion paper, "Environmental Tax Shift: A Discussion Paper for British Columbians."



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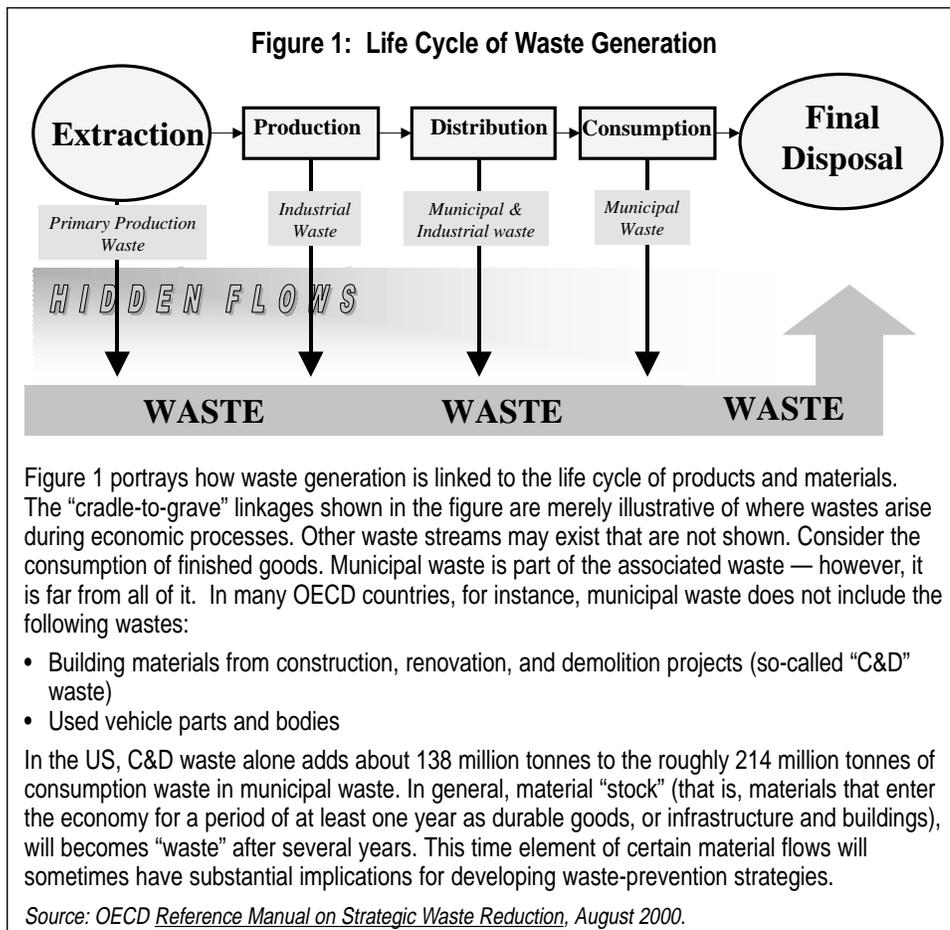
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I. INTRODUCTION

Materials and Sustainability

Around the world, international organizations such as the Organization for Economic Cooperation and Development (OECD), national policy makers and the public are engaging in a pressing debate about the need to promote more sustainable forms of production and consumption. This debate involves questions about the economic value of the environment and the most sustainable use of ecological resources. It raises questions about social sustainability, and the way that economic activities impact the health and well-being of individuals and communities. The debate on sustainability now informs policy discussions on improving resource conservation, fiscal policies that promote unsustainable economic practices, the role of subsidies in international trade, environmental tax shifting, and rethinking “distorting methods of calculating national wealth that largely dismiss resource wealth and ecological goods and services.”¹

These discussions are taking place in the context of urgent warnings by the OECD that “[a]ll major global ecosystems are in decline”² and by academics that the economy has already exceeded many ecological limits.³ Resource extraction and material consumption are central to these stresses on the biosphere. The centrality of issues was recognized in Principle 8 of the 1992 Rio Declaration, committing the Parties to the elimination of unsustainable pat-



terns of production and consumption, and in Chapter 4 of Agenda 21 — Changing Consumption Patterns.⁴ It has been estimated that, to achieve sustainability worldwide, the material intensity of each unit of economic output will need to be reduced by 50% and, in industrial countries like Canada, it will have to fall by factors of between four and 10.⁵

The implication is that society's demand for goods and services will have to be met with a significant reduction in new material inputs. This can be achieved through waste prevention and reduction in the design and delivery of goods, and the recycling and reuse of existing materials stocks, rather than disposing of used materials at one end of the materials cycle and inputting newly extracted ones at the other.⁶ Although the use of certain metals, such as mercury, should be phased out due to their extremely toxic properties,⁷ other metals are especially good candidates for these approaches. Metals do not lose their mechanical or metallurgical properties when recycled, while retaining their economic value.

As a result metals can be re-used and recycled through the economy almost without limit.⁸

The Environmental and Social Impacts of Mining

The scale of the environmental and social impacts of mining has been central to arguments regarding the need to reduce the consumption of newly extracted materials. The current rates of materials consumption are considered unsustainable, not so much due

to shortages of materials themselves, but rather due to the extent of the environmental and social costs associated with their extraction and processing.⁹

Mineral and metal extraction leaves an enormously damaging and lasting environmental footprint, and the consequences of mining accidents, such as tailings dam failures, are potentially calamitous.¹⁰ In addition to major disturbances of the landscape, the destruction of fish, wildlife, and plant habitat, and the disruption of surface and groundwater flows, mining, and metal mining in particular, generates enormous quantities of waste.

Mining requires removing from the Earth metal bearing ore together with “overburden,” the dirt, rock and biological systems that cover the ore. Only a very small portion of the material removed is actually used. On average, for example, 200 tonnes of ore and overburden are removed to produce

Table 1: The Environmental Impact of Minerals Extraction¹¹

Activity	Potential Impacts
Excavation and Ore Removal	<ul style="list-style-type: none"> • Destruction of animal, plant and fish habitat, human settlements, and other surface features (surface mining) • Land subsidence (underground mining) • Increased erosion; silting of lakes and streams • De-watering of lakes and draw-down of aquifers • Waste generation (overburden) • Acid drainage and metal contamination of surface and groundwater • Impacts of producing energy used in extraction and removal
Ore Concentration	<ul style="list-style-type: none"> • Waste generation (tailings) • Organic chemical contamination (tailings may contain residues of chemicals used in concentration processes) • Acid drainage and metal contamination of surface and groundwater • Impacts of producing energy used in milling/concentration
Smelting/Refining	<ul style="list-style-type: none"> • Air pollution (acid-rain precursors and heavy metals) • Waste generation (slag) • Impacts of producing energy used for smelting

Table 2: World Ore and Waste Production for Selected Metals, 1995¹³

Metal	Ore Mined (million tons)	% of Ore that Becomes Waste (excluding overburden)
Iron	25,503	60.00
Copper	11,026	99.00
Gold	7,235	99.99
Zinc	1,267	99.95
Lead	1,077	97.50
Aluminum	856	70.00
Manganese	745	70.00
Nickel	387	97.50
Tin	195	99.00
Tungsten	125	99.75

one tonne of copper.¹² As Table 2 illustrates, the ratios of product to waste for some precious metals, such as gold, are much lower. These ratios are likely to deteriorate further as existing high-grade reserves are exhausted and lower-grade resources developed. Such patterns have been seen in Canada in recent years.

It has been estimated that the Canadian mineral industry generates one million tonnes of waste rock and 950,000 tonnes of tailings *per day*, totalling 650 million tonnes of waste per year.¹⁴ This is more than 20 times the amount of municipal solid waste generated each year by all of the residences, industries, commercial establishments, and institutions in Canada combined.¹⁵ Globally, humans now move more earth by mining than is carried to the sea by all the world's rivers.¹⁶

Mine operations are a major source of water pollution. Mine water and waste-mill slurry may be extremely acid or alkaline, and may contain suspended solids, residual mine-mill chemicals, heavy metals, ammonia, and, in the case of uranium mines, radioactive substances. Runoff from abandoned tailings may be acidic, and contain dissolved solids, heavy metals and other toxic substances due to acid mine drainage (AMD).

In 1993 it was estimated that in Canada there was a cumulative total of 700 million tonnes of waste rock and 1.8 billion tonnes of sulphide tailings with the potential to cause AMD.¹⁷ Cyanide-collection reservoirs and contaminated tailings left behind by heap-leaching, a new technology for extracting gold from very low-grade ores using cyanide solutions, pose major threats to wildlife and groundwater.¹⁸

In addition, ore extraction and concentration operations, refining and smelting, and tailings areas are major sources of air pollution. In 1980 it was estimated that over 60,000 tonnes of particulate matter were released into the atmosphere from tailings in Canada each year, while the metal smelting sector is a leading source of a range of heavy metals, including cadmium, mercury, lead, nickel and arsenic, as well as acid-rain precursors, such as sulphur dioxide.¹⁹

Data on pollutant releases and transfers from the mining sector in Canada are incomplete, due to the exemption of extraction phase mining from the National Pollutant Release Inventory. The exemptions from reporting pollutant releases and transfers for the coal and metal mining sectors were removed from the United States Toxic Release Inventory (TRI) in 1998. As a result, the metal mining sector emerged as the largest source of total on- and off-site releases to the environment of TRI substances, constituting 51.2% of all pollutant releases reported to the TRI in 1999.²⁰

The Legacy of the Past

There are at least 10,000 abandoned mines in Canada. Estimates of the costs of cleaning up of just some of the sites under federal responsibility are at least \$1 billion.²¹ The Mining Association of Canada itself has estimated the cost of abandoned mine remediation in Canada at \$6 billion.²² In the United States, the Mineral Policy Center puts the cost of abandoned mine remediation for that country at between \$32 and \$72 billion.²³ At the global level, representa-

Gold and Waste

Among the metals, gold is distinguished by two things – its minute production and vast environmental disruption. The gold rings exchanged by couples during weddings require the processing of tonnes of ore, most likely by cyanide leaching. It has been calculated that to create a pair of gold wedding rings, the ore processed is the equivalent of a hole in the ground that is three metres long, two metres wide and two metres deep.

Source: L. Brown, *Eco-Economy: Building an Economy for the Earth*, (New York: W.W. Norton and Co., 2001) pp.123 and 129.



Acid Mine Drainage

Acid Mine Drainage (AMD) occurs when sulphide-bearing minerals in rock are exposed to air and water, changing the sulphide to sulphuric acid. This acid dissolves heavy metals such as lead, zinc, copper, arsenic, selenium, mercury and cadmium into ground and surface water. Naturally occurring bacteria can significantly increase the rate of this reaction. AMD and heavy metals pollution can poison ground and drinking water, and destroy aquatic life and habitat. Commonly mined ore bodies that pose a risk of AMD include gold, silver, copper, iron, zinc, lead, multi-metal combinations, and coal.

Source: BC Miningwatch, *Fact Sheet #1. Acid Mine Drainage: The Perpetual Pollution Machine*.

Short-Lived New Mines In Canada

Yukon

- Mount Nansen Mine: Owned by BYG Resources, and touted as a generator of economic development in the North when it opened in 1996, this gold mine closed in 1998 when it went into receivership.
- Ketz River: Also owned by BYG Resources, this mine opened in 1994 and closed in 1998.
- Brewery Creek Mine: Owned by Viceroy Resources, this is an open pit, cyanide heap-leach mine. The first ore was piled August 1996 and the mine is slated to close this year.

BC

- Tulsequah Chief: If it opens, this projected mine will have a lifespan of seven years.
- Eskay Creek: Owned by Barrick-Homestake, this mine opened in 1995 and has 51 million grams of reserves; last year it mined 9.1 million grams. At this rate, the deposit will be mined out in six years.

Manitoba

- Maskwa Mine: Owned by Canmine, if opened this mine has a projected 10-year lifespan.

Ontario

- Goldcorp has re-opened a closed gold mine with estimated reserves of 107.7 million grams, which they are mining at the rate of 14.3 million grams a year (six-year mine life).
- Lac Des Iles: Owned by North American Palladium and recently expanded, the estimated life of this mine is 11 years.
- Aquarius Mine: Owned by Echo Bay, this mine is projected to operate for six years.

Quebec

- Bell Allard: This zinc and copper mine, owned by Noranda, has a five-year mine life.

Newfoundland and Labrador

- Shabogama: This quartz mine has a 10-year mine life.

Saskatchewan

- McArthur River: This uranium mine has a 15-year mine life.

NWT

- Even the Diavik and Ekati Diamond Mines only have a projected life of 20 years.

Source: All data was taken from the *Canadian Minerals Yearbook* and company reports.

tives of the mining industry themselves have placed the costs of closing and rehabilitating old and abandoned mines to be in the “trillions” of dollars.²⁴

Social Impacts

The scale of mining as an industrial activity tends to marginalize the significance of other activities. New towns and populations connected with mines often displace local and indigenous cultures that have lived on the land for centuries. The enormous energy demands of mines and their associated smelting and refining operations require new dams, transmission lines and power plants. New and enlarged roads change the landscape and forest forever. New small businesses grow up that are dependent on the mine and income derived from working there. Young workers’ expectations grow to match the new sources of wealth.

However, mining is an activity with a short-term life, and long-term consequences. Most new mines in Canada now last less than 15 years before the ore is depleted or working the mine becomes uneconomic.²⁵ The benefits brought to the community during the mine’s life are not sustained after closure. The result can be boom-and-bust cycles for host communities.

Mining creates many costs to individuals, families and communities. Some of these have been quantified but appear on different ledgers from reports on the economic performance of the mining industry. These social costs include impacts on health in both the community and workplace; physically disabling injuries among miners; changes in leadership and social relationships; the impacts of boom-and-bust economic cycles; the destruction of indigenous livelihoods and other distortions of the local economic base; and dramatic changes in regional cultures.²⁶

These social and environmental impacts are in many ways intrinsic to the industry, and there are fundamental limits to the degree that they can be reduced or eliminated.²⁷ Indeed, the environmental and social impacts of the industry are likely to increase over time, as higher quality reserves are exhausted and attention turns to lower-grade sources. Such a shift will result in the disruption of larger geographic areas, generation of increased quantities of waste, greater application of energy and materials in processing and transportation, and shorter operating lives for mines.

The industry has attempted to address some aspects of its social and environmental impacts through undertakings such as the Global Mining Initiative.²⁸ However, this work has focused on mitigation of the adverse impacts of continuing mineral development, rather than the larger questions of the overall social and environmental sustainability of current metals use and consumption patterns.²⁹

Subsidies for primary resource extraction have been identified as a key barrier to moving towards more sustainable patterns of material use. Public expenditures to support and promote the development, extraction and processing of new materials reduce the costs of new materials relative to those of secondary materials or the redesign of products or processes to reduce material use. The

OECD has identified subsidy removal for primary materials extraction as a key instrument for waste prevention for these reasons.³⁰

In Canada, studies completed for the Canadian Council of Ministers of the Environment (CCME) in the mid-1990s, concluded that “there is a potential bias in the tax system towards the use of virgin materials relative to recycled materials.”³¹ More broadly, in its 2000 and 2001 Economic Surveys of Canada, the OECD noted that various direct and indirect subsidies for non-renewable resource-based activities, including mining, remained in place.³² In addition to highlighting the potential harmful environmental consequences of this support, the OECD questioned the investment rationale for the preferential treatment of exploration and development activities in these sectors.³³ The OECD concluded with a recommendation that, “the preferential tax treatment of conventional resource sectors, such as oil and gas and minerals and metals should be eliminated.”³⁴

Economic Benefits

In addition to these environmental considerations, increasing attention has been paid to the adverse economic impacts of the preferential treatment of certain economic sectors. A number of studies completed over the past four years, including the work of the federal Minister of Finance’s Technical Committee on Business Taxation, have highlighted the low effective tax rates on Canada’s non-renewable resource sectors, particularly mining and oil and gas, relative to other sectors, especially with respect to capital investment (see Table 3).³⁵

These differences have been the subject of growing criticism, as they tend to have the effect of reallocating capital to those industries with the most preferred tax treatment, rather than to those that may have the best prospects for economic growth, thereby undermining comparative advantage and productivity.³⁷ This has resulted in recommendations that these variations in effective tax rates be reduced, and in particular that the tax rules for the non-renewable resource sector be brought into line with those of other industries.³⁸

Other studies note that the value of the Canadian dollar has declined largely due to the world decline in commodity prices. Canada is an important producer and exporter of a subset of such goods, particularly non-energy commodities (e.g., minerals and metals).³⁹ This has led to further arguments in favour of levelling tax burdens across sectors of the economy. In addition to improving allocative efficiency, such a levelling would have the side effect of somewhat lessening the Canadian real exchange rate’s sensitivity to commodity price variations.⁴⁰

Table 3: Effective Tax Rates on Marginal Investments³⁶ and Federal Effective Corporate Tax Rate (1997)

Industry	Rate on Marginal Investment (%)	Federal Effective Corporate Tax Rate (%)
Forestry	28.8	8
Mining	8.7	6
Oil and Gas	5.5	16
Manufacturing	17.9	16
Construction	37.0	14
Transportation	27.9	14
Communications	23.9	17
Public Utilities	30.3	26
Wholesale Trade	32.1	20
Retail Trade	33.8	16
Other Services	27.6	16

Source: Adapted from the Report of the Technical Committee on Business Taxation.

It has also been observed that the current system of corporate tax expenditures tends to favour capital-intensive sectors, such as mining, to the detriment of labour-intensive businesses, particularly in the service sector. This is seen to indirectly disadvantage non-capital intensive enterprises demanding highly specialized labour, the types of knowledge-based firms that are critical to innovative activity.⁴¹ Although in recent years the mining industry has emphasized its role as an increasingly knowledge-based sector,⁴² its focus remains on exploration and extractive processes. Even studies prepared for the industry note that key innovations on the value-added use of metals and other materials are occurring outside of the sector.⁴³

Commentators examining the economic role of the mining industry have highlighted the instability of the metal mining and smelting sectors as sources of employment and other economic benefits, noting that the profitability of any particular operation depends on the international price of the commodity as well as the local costs of production. International commodity prices can fluctuate widely, leading metal mines, mills and smelting facilities to shut down when prices are low, and bringing new producers and competitors on line when prices are high.⁴⁴

Even when mines are operating, the employment and income potential associated with them is likely to be relatively short term and/or shrinking. In addition to the decline, in the typical operating period for new mines before deposits are exhausted⁴⁵ workers are increasingly displaced as technological developments take place in a sector that is a mature industry.⁴⁶ In other words, the number of workers needed to produce a given quantity of metal from metal ores has been falling rapidly, with a resulting fall in net employment in the sector, even when production increases.⁴⁷

Project Objectives

Mining has been portrayed as a sector that “built” Canada. The industry commonly refers to this history while asserting its continuing importance to the Canadian economy. But the industry must now also face questions about its environmental, social and economic sustainability. Public expenditures once viewed as laudable support for a key industry are now being questioned domestically and internationally as distortions of investment signals and market prices, while promoting unsustainable patterns of resource consumption. There is also a growing question about the “legality” of these expenditures in the context of the international trade agreements to which Canada is a signatory.⁴⁸

Given these factors, questions must be asked as to whether public funds should be spent to support primary resource extraction when investment in other types of economic activity may provide for more sustainable uses of natural resources and more sustainable employment in remote communities facing the disruptions of boom-and-bust cycles in mining.

In this context, this report seeks to:

- assess the data and statistics on the key public *benefits* of the metal mining sector to Canadian society in terms of employment, royalties and contributions to Gross Domestic Product (GDP) as provided by industry and government sources, and to identify trends in these benefits over time;
- assess the direct *costs* of the metal mining sector to the public through direct and indirect government expenditures to support and promote its activities, the assumption of the liabilities and costs for abandoned mine remediation by governments, and government's acceptance of the risks of assuming remediation costs associated with the abandonment of operating mines, and to document trends in these costs over time; and
- present an assessment of the trends in public expenditures and abandoned mine remediation liability and risk acceptance related to the metal mining sector in Canada relative to the sector's economic benefits.

The project was motivated, in part, by the approximate and incomplete sense of the magnitude of the costs and benefits of mining. The focus of the project is on metal mining, as this is the most economically significant sub-sector within the mines and minerals industry, accounting for 65% of total value of metal and non-metal mine production in Canada,⁴⁹ and the one most relevant in terms of material flows and consumption.

Data currently provided by the mining industry and Canadian governments to the public focuses heavily on the *benefits* that mining provides to society. There are, however, a number of problems with the way this data is presented. Some of the data is aggregated in such a way that it does not lend itself readily to rigorous evaluation. The oil-and-gas sector, for example, is sometimes included in the total value of mineral production.⁵⁰ Furthermore, the data on indirect earnings and employment related to the mining sector is sometimes so broadly inclusive that it leads to the conclusion that one in 40 working Canadians, or 386,000 people, are employed in the sector.⁵¹ Actual employment in the Canadian metal mining sector in 2001 was a more modest 30,000.⁵²

On the other hand, the various *costs* that the mining sector imposes on Canadian society, when referred to at all in government or industry statements, are mentioned only in general terms. The following quotation, taken from a recent Natural Resources Canada publication, is typical:

This economic success, and the many social benefits it affords, has not been achieved without some social and environmental costs. Mine closures, social disruption, acid mine drainage, mine reclamation, site rehabilitation, tailings dam stability, protection of habitat, endangered species and representative ecosystems are all issues that require ongoing attention.⁵³

The data provided by governments is scattered, not presented in a readily accessible manner, and sometimes simply not made publicly available at all. Nonetheless, the data we do have strongly suggests that these costs, including direct and indirect subsidies, the costs of cleanup and perpetual care of abandoned and toxic mine sites, and health costs to workers and communities impacted by mining, to name but a few, are significant.

It is clear that there is an urgent need to provide a more complete picture of both the benefits and the costs of the Canadian mining sector to the public and to Canadian policy makers tasked with the sustainable stewardship of our financial, social and environmental resources. This project allows us to establish a partial estimate of the costs to society through public spending on direct and indirect support to the sector and the cleanup of abandoned mines. This will be a first step in establishing full-cost accounting for the Canadian mining sector.

The Canadian federal government has committed to assessments of incentives and disincentives for environmentally sound practices. A framework for analyzing public policy barriers to sound environmental practices was prepared by the government's Task Force on Economic Incentives and Disincentives to Sound Environmental Practices in 1994.⁵⁴ Taxation and spending was included as a category of barriers. Although the National Round Table on Environment and Economy has undertaken ongoing work on ecological fiscal reform, no comprehensive study on the incentives and disincentives to sound environmental practices has been completed for an economic sector by the federal government to date.⁵⁵

Full-Cost Accounting: The Need for an Ecological Approach

This study recognizes that, in addition to public expenditures, there are important and related environmental and social costs associated with mining. These costs are not easily calculated in monetary terms and do not appear in public accounts.

A wide range of international organizations, government departments and non-governmental organizations now recognise that to measure sustainable progress and changes in social well-being we need to measure more than yearly economic transactions and growth as reflected in Gross National Product (GNP) and Gross Domestic Product (GDP).⁵⁶ GDP “fails to account for the depletion and pollution of natural resources, the value of services provided by nature, and many benefits and costs to societal well-being.”⁵⁷ In fact, in counting “the depletion or degradation of our natural resources as income rather than depreciation of an asset, the GDP violates both basic accounting principles and common sense.”⁵⁸

Various ways of measuring the value of environmental and social benefits and costs are still evolving, as are indicator systems to measure progress towards sustainable development.⁵⁹ There are also efforts under way to track and measure government subsidies to corporations as part of the production costs assumed by society.⁶⁰ Out of this work new models are evolving that track societal “progress” in a broader sense than merely through economic transactions. In the US, Redefining Progress has worked with a Genuine Progress Indicator model since 1994.⁶¹ In Canada, the Pembina Institute, Canadian Policy Research Networks, National Round Table on the Environment and Economy and others are working to integrate measurement tools such as the Genuine Progress Indicator, the UN Human Development Index, the Index for Social Health, and other environmental, social and economic indicator frameworks for sustainability accounting.⁶²

This report contributes to this evolving field of sustainability measurement by focusing on the Canadian mining sector. A full accounting of the social and environmental costs of the industry is needed, including those costs that are not easily quantifiable in dollar terms. This project made a pragmatic decision to start by focusing on the quantifiable public expenditures made by Canadian governments in support of the metal mining industry, including both direct subsidies, and assumptions of risks and liabilities for abandoned mine remediation. In this report, these are termed the “public costs” of mining. As stated earlier, many other social and environmental costs that are borne by individuals, groups and ecosystems remain to be addressed.

Outline of the Report

This report consists of three parts. Part I includes this introduction, outlining the rationale and objectives of the project, and describing the methodology, data sources and assumptions used in the assessment of the public costs and benefits of the metal mining industry in Canada. Part II provides overviews of the public costs and benefits of the metal mining sector in five leading jurisdictions: British Columbia; the Yukon Territory; Ontario; Quebec and the federal government. Part III provides a summary and analysis of the findings of the jurisdictional studies, overall conclusions, and recommendations for action by governments, and for future research.

Chapter Endnotes

¹ The report of the High-Level Advisory Group on the Environment to the Secretary-General of the OECD; November 25, 1997. <http://www.oecd.org/subject/sustdev/hlage.htm>.

² *Ibid.*, p. 10.

³ Donella Meadows, Denis Meadows and J. Randers, *Beyond the Limits*, (Toronto: McClelland and Stewart, 1992).

⁴ See, in particular, Art. 4.18.

⁵ The need for a 90% reduction in material intensity in OECD countries was acknowledged in the October 1994 Carnoules Declaration, endorsed by prominent individuals including the former executive directors of the Business Council for Sustainable Development and the Brundtland Commission (in T. Green, *Lasting Benefits from Beneath the Earth*, 1998:69). See also G. Gardner and P. Sampat, *Mind over Matter: Recasting the Role of Materials in Our Lives*, Worldwatch Paper 144, (Washington: Worldwatch Institute, 1998); J. Young and Aaron Sachs, *The Next Efficiency Revolution: Creating a Sustainable Materials Economy*, Worldwatch Paper 121, (Washington: Worldwatch Institute, 1994). Fresenius Environmental Bulletin, (special edition on The Material Intensity Per Unit of Service (MIPS) project of the Wuppertal Institute für Klima, Umwelt und Energie in Wuppertal, Germany, Vol.2, No.8, 1993.

⁶ On these approaches see Strategic Waste Prevention: OECD Reference Manual ENV/EPOC/PPC(2000)5/FINAL (Paris: OECD, August 2000), Chapters 2 and 3. Also G. Gardner and P. Sampat, *Mind over Matter: Recasting the Role of Materials in Our Lives*, Worldwatch Paper 144, (Washington: Worldwatch Institute, December 1998).

⁷ For a good overview of the toxic properties of mercury see *Mercury Study Report to Congress* (Washington: US EPA, December 1997). See also <http://www.scorecard.org>.

⁸ Natural Resources Canada, *Metals and Minerals Policy of Canada*, (Ottawa: Government of Canada, 1996), p. 12.

⁹ J.E. Young, *Mining the Earth*, Worldwatch Paper 109, (Washington: Worldwatch Institute, 1992).

¹⁰ As illustrated by the August 1995 Omai Gold mine tailings dam collapse in Guyana (for a detailed discussion of this incident see <http://www.probeinternational.org>); the March 1996 Marcopper tailings dam failure in the Philippines (for a detailed discussion of this incident see http://www.miningwatch.ca/publications/Marinduque_backgnd.html), and April 1998 Boliden tailings dam failure in Spain (for a detailed discussion of this incident see <http://www.antenna.nl/wise/uranium/mdaffl.html>). On the potential for mining tailings dam collapses in Canada, particularly in the context of climate change, see P.E. Perkins, “Climate Change and the Canadian North: Ecological Economic Implications Related to Mining,” paper presented to the conference of Canadian Society for Ecological Economics, October 1997.

¹¹ Adapted from J.E. Young, Mining the Earth, Worldwatch Paper 109, (Washington: Worldwatch Institute, July 1992), Table 5.

¹² G. Gardner and P. Sampat, Mind over Matter: Recasting the Role of Materials in Our Lives, Worldwatch Paper 144, (Washington: Worldwatch Institute, December 1998), p. 18.

¹³ *Ibid.*, Table 3.

¹⁴ Government of Canada, The State of Canada’s Environment, (Ottawa: Minister of Supply and Services, 1991), pp. 11–19.

¹⁵ Total municipal solid waste generation in Canada is estimated to be approximately 30 million tonnes per year.

¹⁶ J.E. Young and Sachs, The Next Efficiency Revolution: Creating A Sustainable Materials Economy, Worldwatch Paper 121, (Washington: Worldwatch Institute, 1994).

¹⁷ G. Feasby and R.K. Jones, Report on the Results of a Workshop on Mine Reclamation — Toronto, Ontario, March 10–11, 1994, (Ottawa: Natural Resources Canada, 1994), p. 10.

¹⁸ See P. Muldoon and M. Winfield, Brief to the House of Commons Standing Committee on Natural Resources Regarding Mining and Canada’s Environment, (Toronto: CELA and CIELAP, April 1996), pp. 5–7.

¹⁹ *Ibid.*, pp. 8–10.

²⁰ US EPA, Toxic Release Inventory 1999 — Executive Summary, (Washington: US EPA, 1999).

²¹ MiningWatch Canada, Mining’s Toxic Orphans: A Plan for Action on Federal Contaminated and Unsafe Mine Sites, (Ottawa: MiningWatch Canada, 2000), http://www.miningwatch.ca/publications/Abandoned_Mines.html.

²² Quoted in A. Robinson, “Mining industry lobbies for future of industry,” The Globe and Mail, September 14, 1994. This figure was likely based on G. Feasby and R.K. Jones, Report of the Results of a Workshop on Mine Reclamation (Toronto, March 10-11, 1994), (Ottawa: Natural Resources Canada, 1994).

²³ Mineral Policy Centre, Golden Dreams, Poisoned Streams, (Washington: MPC, 1997).

²⁴ Sir Robert Wilson, Chairman, Rio Tinto, quoted in “Abandoned Mines a ‘Gigantic’ Environmental Problem,” World Bank Press Review, May 15, 2002.

²⁵ See the sidebar “Short-Lived New Mines in Canada” on page 4.

²⁶ On the social impacts of mining, see Mining and Communities: A Literature Review and Annotated Bibliography, (Ottawa: Miningwatch Canada, 2000); Between a Rock and a Hard Place, (Ottawa: Miningwatch Canada, 1999); On the Ground Research, (Ottawa: Miningwatch Canada, 2000); and C. Cleghorn, N. Edelson, and S. Moodie, Gaining Ground: Women, Mining and the Environment, (Whitehorse: Yukon Conservation Society, 2001).

²⁷ For example, Breaking New Ground: The Report of the Mining, Minerals and Sustainable Development Project, (London: Earthscan Publications, May 2002), notes that “large scale mining operations inevitably produce a great deal of waste,” p. 234. Chapter 10 of the report provides a good overview of the scale and nature of the environmental impacts of mining operations.

²⁸ See <http://www.globalmining.com>.

²⁹ See, for example, Breaking New Ground: The Report of the Mining, Minerals and Sustainable Development Project, (London: Earthscan Publications, May 2002), especially Chapters 4, 10, and 11.

³⁰ Environment Directorate, Strategic Waste Prevention: OECD Reference Manual ENV/EPOC/PPC (2000)5/FINAL, (Paris: OECD, August 2000), Chapter 5.

³¹ J. Mintz, A Comparison of Tax Incentives for Extraction and Recycling of Basic Materials in Canada, (Winnipeg: CCME, 1995); See also Duanjie Chen, Jack Mintz, Kim Scharf and Sergio Traviza, Taxation of Virgin and Recycled Materials: Analysis and Policy, (Toronto: University of Toronto, 1995).

³² OECD, Economic Surveys: Canada, (Paris: OECD, August 2000), p.124.

³³ *Ibid.*, pp.124–125.

³⁴ Ibid., p.155.

³⁵ See for example, Technical Committee on Business Taxation, Report, (Ottawa: Department of Finance, 1998), Tables 3.10 and 4.1; J. Mintz, Most Favoured Nation: Building a Framework for Smart Economic Policy, Policy Study 36, (Toronto: C.D. Howe Institute, 2001), Figure 22. J. Mintz, Most Favoured Nation, notes that the effective tax rates on labour for the mining sector are relatively higher (Table 3). However, this is a function of the high wage levels in the sector, rather than deliberate public policy decisions with respect to the effective tax rate on the sector. In contrast, the lower effective tax rates on capital for the sector are a result of specific tax measures targeted at the mining and other non-renewable resource sectors.

³⁶ Effectively the tax paid on the income earned from the marginal project.

³⁷ See, for example, Technical Committee on Business Taxation, Report, (Ottawa: Department of Finance, 1998), p. 3.3; J. Mintz, Most Favoured Nation, pp. 95–96. For a detailed discussion of the rationale for the preferential tax treatment of the mining industry see R. Boadway and H. Kitchen, Canadian Tax Policy, Canadian Tax Paper 103, (Ottawa: Canadian Tax Foundation, 1999), pp. 255–8.

³⁸ Technical Committee on Business Taxation, Report, (Ottawa: Department of Finance, 1998), pp. 5.30–5.32. These recommendations have often been expressed as proposals to lower overall corporate tax rates towards those enjoyed by the non-renewable resource sectors. This study regards the question of the appropriate level of overall corporate taxation as a separate issue from the levelling of tax burdens among sectors, and one that is beyond the scope of this study.

³⁹ D. Laidler and S. Aba, Productivity and the Dollar: Commodities and the Exchange Rate Connection: Commentary 158, (Toronto: C.D. Howe Institute, February 2002), p. 2.

⁴⁰ Ibid., p. 2 and p. 13.

⁴¹ M. Leblanc and F. Vaillancourt, “Regional Distribution of Federal Corporate Tax Expenditures,” Choices Public Finance, (IRPP), Vol.1, No 13, November 1995; See also J. Mintz, Most Favoured Nation, p. 95; Technical Committee on Business Taxation, Report, p. 3.3.

⁴² See for example, Global Economics Limited, Mining Innovation: An Overview of Canada’s Dynamic, Technologically Advanced Mining Industry, (Ottawa: Mining Association of Canada, November 2001).

⁴³ Ibid., p. ii.

⁴⁴ See, for example, T.M. Power, The Role of Metal Mining in the Alaskan Economy, (prepared for: Southeast Alaska Conservation Council and Northern Alaska Environmental Center, February 2002), pp. 16–18.

⁴⁵ See the sidebar “Short-Lived New Mines in Canada” on page 4.

⁴⁶ The 1998 Canada Minerals Yearbook gives the following figures for metal mine productivity in Canada:

1961 1538 tonnes ore mined per employee;
1992 8894 tonnes ore mined per employee;
1997 9872 tonnes ore mined per employee; and
1998 11270 tonnes ore mined per employee.

⁴⁷ See, for example, T.M. Power, The Role of Metal Mining in the Alaskan Economy, (Prepared for: Southeast Alaska Conservation Council and Northern Alaska Environmental Center, February 2002), pp. 19–20.

⁴⁸ Allegations regarding direct and indirect public expenditures in support of the Canadian forest industry, for example, have been at the centre of the ongoing trade dispute between Canada and the United States regarding Canadian softwood lumber exports. See for example, B. McKenna and S. Chase, “Canada vows to fight duty,” The Globe and Mail, March 23, 2002. For a good summary of the dispute see The Gallon Environment Letter, Vol.5, No.12, March 21, 2001.

⁴⁹ See Chapter VII of this report on Federal Government.

⁵⁰ A Consultation Paper on Canadian Values Underlying the Sustainable Development of Minerals and Metals: A Framework for Progress, (Ottawa: Natural Resources Canada, 2001). In press.

⁵¹ Natural Resources Canada, Canadian Minerals Yearbook 2001.

⁵² See Chapter VII of this report on Federal Government.

⁵³ A Consultation Paper on Canadian Values Underlying the Sustainable Development of Minerals and Metals: A Framework for Progress, (Ottawa: Natural Resources Canada, 2001). In press.

⁵⁴ Task Force on Economic Incentives and Disincentives to Sound Environmental Practices, Report, (Ottawa: Department of Finance, November 1994).

⁵⁵ See National Round Table on the Environment and Economy, Toward a Canadian Agenda for Ecological Fiscal Reform: First Steps, (Ottawa: 2002). A recent study by the Office of the Commissioner for Environment and Sustainable Development examined supports for investments in the renewable and conventional energy sectors. See Commissioner for Environment and Sustainable Development 2000 Report to the House of Commons, (Ottawa: May 2000), Chapter 3. An Inventory of Subsidies and Incentives for the Mining Industry in Ontario was completed for the Recycling Council of Ontario in 1995 by students at Innis College, University of Toronto.

⁵⁶ United Nations Division for Sustainable Development, the World Bank the OECD, Redefining Progress, the Green Scissors Campaign in the US and the International Institute for Sustainable Development and the Pembina Institute in Canada, and government agencies such as the US EPA and Environment Canada.

⁵⁷ Pembina Institute: <http://www.pembina.org/green/overview.htm>.

⁵⁸ Redefining Progress, November 1999, Why Bigger Isn't Better: The Genuine Progress Indicator-1999 Update, p. 2.

⁵⁹ <http://www.iisd1.iisd.ca/measure/compindex.asp>.

⁶⁰ <http://www.iisd.org/subsidywatch/default.htm>.

⁶¹ See pages 3-4 for a brief description of methodology in: Redefining Progress, November 1999, Why Bigger Isn't Better: The Genuine Progress Indicator-1999 Update, p. 2.

⁶² Pembina Institute: <http://www.pembina.org/green/overview.htm>.

II. METHODOLOGY

Introduction

As described in Chapter I, this project has three major objectives:

1. To document the level of government expenditures, and governmental assumptions of liabilities and risks, in support of the metal mining sector in Canada, including the identification of major gaps in information regarding the nature and extent of these public expenditures, liabilities and risks, and to identify changes in their structure and levels over time;
2. To assess the economic benefits associated with the Canadian metal mining industry as presented by governments and the mining industry, and to document trends in the generation of benefits by the sector over time; and
3. To present an assessment of the trends in public expenditures, and assumptions of liability and risk, related to the metal mining sector in Canada relative to the sector's economic benefits.

The Choice of Jurisdictions for Study

This study examines the public costs and benefits of the metal mining industry in Canada in four provincial/territorial jurisdictions (British Columbia, Yukon Territory, Ontario and Quebec) and at the federal level.

The provincial/territorial jurisdictions were chosen on the basis of the economic significance for metal mining taking place within their borders relative to other provinces and territories. Ontario, Quebec and British Columbia, the three largest producers, account for 68% of the value of Canada's metal production in 2000. This is illustrated in Table 4. The Yukon Territory was included to capture the unique role played by the federal government in the territories.

The federal government was included as it is a significant source of many different forms of support to the metal mining industry throughout Canada.

The Choice of Time Frame

This study looks at the public costs and benefits of the metal mining industry in Canada during two time periods: 1994/5 and 2000/1. The 1994/5 time frame predates the major reductions of government expenditures that occurred throughout Canada in the late 1990s, and provides a baseline for analysis prior to this restructuring of government activity.¹ The 2000/1 fiscal year is the most recent for which complete information on government expenditures are available.

Table 4: Value of Metal Production in Canada, 2000

Province	000\$	% of Total
Newfoundland	996,624	9.0
New Brunswick	522,973	1.7
Quebec	2,248,183	20.3
Ontario	2,715,804	33.5
Manitoba	1,014,484	9.2
Saskatchewan	513,682	4.6
Alberta	256	0.0
British Columbia	1,572,066	14.2
Yukon Territory	51,942	0.5
Northwest Territory	58,396	0.5
Nunavut Territory	384,464	3.5
TOTAL	11,078,873	100.0

Source: Mineral Statistics Handbook, 2000.

Time series data on expenditures and benefits are reviewed to ensure that the data for the 1994/5 and 2000/1 years reflected trends over the study period, and did not contain anomalous single year results.

Defining the Metal Mining Sector

Given its status as the most economically significant element of the mines and minerals sector, and its importance in terms of materials consumption and flows, this study focuses on the metal mining sector. This focus provides boundaries to the study, particularly as the mineral aggregate (sand and gravel), industrial mineral, gem, and coal sectors are often subject to different regulatory regimes and support structures, and raise different environmental issues compared to the metal mining sector. The mining of radioactive metals, such as uranium, is subject to unique regulatory and support arrangements and therefore is excluded from the study for similar reasons.

Approaches to Defining Public Costs of Metal Mining

Methodologies to identify and document the full range of forms of support provided by governments to a given sector or activity are still at a developmental stage. The work that has been done to date has tended to focus on incentives provided through the tax system, rather than the full range of government measures, such as direct grants, program expenditures or liability assumptions,² that might be provided.³ However, recent work by the Commissioner of the Environment and Sustainable Development⁴ and the C.D. Howe Institute⁵ has attempted to take some of these less direct types of support into account as well.

This study focuses its attention on federal, provincial and territorial government expenditures, including tax measures, such as tax expenditures and credits, specifically targeted or unique to the metal mining industry. Programs or tax measures that provide general economic benefits, or were available to other sectors, such as program spending on employment insurance, health care and workers' compensation, and tax expenditures for research and development activities, are not included. Although other studies approaching the issue of subsidy identification have examined the situation of a given sector relative to other sectors,⁶ it was beyond the resources of this study to conduct and develop comprehensive pictures of other sectors for the purposes of comparison. Furthermore, relative to other sectors, the favourable treatment of the mining sector in Canada in terms of taxation has already been well established through the work of the Technical Committee on Business Taxation.⁷

More broadly, given the focus of international initiatives on the need to remove subsidies for unsustainable patterns of materials production and consumption,⁸ the project's goal is to develop a detailed understanding of the framework of institutional, financial and policy supports provided by Canadian governments to the metal mining industry, a sector central to this issue. At the same time, by focusing on programs specifically targeted to the metal mining industry, we identify the expenditures and supports made available to this industry and not provided to other sectors.

For the purposes of this study, the public costs of the metal mining industry are examined within each of the three major stages of mining activity:

Stage One: Prospecting and Exploration

This includes primary exploration activities such as airborne geophysics, line cutting, prospecting, ground geophysics, geochemical surveys, geological surveys, hand trenching/stripping, mechanical trenching/stripping and drilling, claim staking and processing, and advanced exploration such as exploratory shafts, construction or reconstruction of mine workings, large-scale surface stripping, and bulk sampling.

Stage Two: Mine Development and Operation

This includes the construction and operation of mine infrastructure and workings, the excavation and removal of ore for commercial processes, the disposal of waste rock and overburden, and milling and ore concentration. Smelting operations are not included in the definition of mine operations for the purposes of this study.⁹

Stage Three: Closure, Remediation and Long-Term Care

This includes the cessation of mine operations, removal of buildings or structures, ensuring the stability of tailings and impoundment structures, shaft backfill and capping, hydrogeology and groundwater monitoring, surface water monitoring and ongoing treatment, removal of hazardous wastes, and the rehabilitation of affected ecosystems.

The public costs of mining associated with these stages of the mine life cycle are identified within each of the following five categories:

1. Direct government expenditures to the mining industry

This includes payments provided directly to prospectors by government to support their activities, grants for the development and operation of a mine, and direct equity investments by government for the purpose of providing capital to the sector. The provision of compensation for mineral claims in areas subsequently designated by governments as protected is also included.

2. Expenditures to operate government delivered programs that directly benefit the mining industry

This includes the work of geological surveys, and the activities of government agencies whose primary focus is market development, industry promotion or technical, scientific, economic or policy research and analysis that serves the needs of the metal mining industry.

3. Tax measures, including tax expenditures and credits and other fiscal measures

This includes tax expenditures — measures specifically designed to reduce the tax payable by a mining company or by those investing in the mining

sector relative to what otherwise would have been payable under basic corporate and mining royalty tax rates. Examples of such measures would include tax “holidays,” where no mining taxes or royalties would be payable by new mines for a set period, and programs that permit deductions of exploration or capital investment costs from tax payable by mining companies. In some cases, direct financial incentives may be provided to mining companies or investors in the form of refundable tax credits. The value of these measures is considered in terms of forgone revenue and/or refundable tax credits provided in a given year.

4. Infrastructure provided at public expense to support mining exploration or operations

This includes the construction of roads, power lines, rail lines, and ports, wholly or partially at public expense to support the development and operation of a particular mine.

5. Liability risks and long-term cleanup costs assumed by the public for mining operations

This includes the costs of the remediation of abandoned mines for which the owner or operator cannot be identified or has gone bankrupt, where ownership of a closed mine site and its associated liabilities is transferred back to the Crown, or where an operating mining company has not been required to provide financial assurances for some or all of the costs associated with mine closure and long-term care, thereby leaving the Crown to assume these risks in the event of bankruptcy or abandonment.

The approach resulted in 15 potential lines of inquiry for each jurisdiction under study, as outlined in the following matrix:

	Stage 1: Prospecting and Exploration	Stage 2: Mine Development and Operation	Stage 3: Closure, Remediation and Long-Term Care
Direct expenditures to industry			
Government operating expenditures serving industry needs			
Tax expenditures			
Infrastructure support			
Rehabilitation expenditures and liability assumption			

Data Sources

To the greatest extent possible, this project relied on governments’ own statements of their expenditures, activities and liabilities, drawing on annual budget documents, estimates, public accounts, and public announcements, such as press releases and backgrounders related to particular programs. In addition, extensive follow-up inquiries and interviews were conducted with federal, provincial and territorial officials as necessary.¹⁰

Significant methodological challenges exist with respect to the estimation of the value of tax expenditures in terms of the levels of revenue forgone by governments in a given year. This is due to the difficulties associated with identifying base tax rates against which to measure the reductions in tax payable, and the potentially complex interactions between different tax measures and basic tax rates. The Office of the Commissioner of the Environment and Sustainable Development, for example, declined to estimate the value of federal tax expenditures in the energy sector in its 2000 study of government support for energy investments.¹¹

For the purposes of this study, we have relied on the public statements from the governments under study, such as budget documents, public accounts, departmental and ministry estimates and other official documents, regarding the value of specific tax measures in a given year in terms of forgone revenue or refundable tax credits provided.¹²

In some cases, governments stated that they were unable to provide figures for the value of a particular tax measure in given years. Where the program in question was considered to be of potential significance, and historical data related to forgone revenue or tax credits provided under the program was available, estimates of the value of the program in the year in question were developed by the project team on the basis of this historical data and known industry expenditures, where these could be gathered from the relevant governments or Statistics Canada. These estimates and their foundations are clearly identified in the text, and are intended to provide an indication of the scale of the support provided through a given program, rather than a precise estimate. Where no current public statements by governments or historical data regarding the value of a tax measure is available, this is noted in the text, and the measure assigned a value of zero for purposes to estimating total expenditures and support to the sector in a given year.

Non-Metal Mining-Related Expenditures

Some government expenditures and activities, particularly those of mines departments and ministries, may serve sub-sectors of the mining industry in addition to metal mining, such as industrial minerals, gems and coal. In situations where expenditures associated with such sub-sectors could not be disaggregated from metal mining-related expenditures in budgetary documents, analyses to discern the relative importance of metal mining versus non-metal mining were conducted and public expenditure figures adjusted accordingly. These analyses were based on the relative levels of economic activities associated with metal and non-metal mining within the jurisdictions in question.

Promotional Versus Regulatory Functions of Mine Ministries and Departments

In some jurisdictions, mines departments and ministries carry out regulatory activities related to the protection of public goods (e.g., health, safety and environmental protection) as well as the provision of research, promotional and marketing services to the industry. In these cases, efforts were made to disaggregate these regulatory expenditures from other expenditures on the basis of budgetary or personnel allocations. The bases of these estimates in relation to specific agencies are described in the text.

The study does not examine regulatory expenditures related to metal mining by non-mining ministries or departments, such as those of Ministries of the Environment related to air and water pollution control. This was due to the difficulties associated with disaggregating the metal mining-related aspects of these activities from operations related to other sectors, and the view that these expenditures clearly related to the protection of public goods, rather than the provision of services to the industry.

Infrastructure Support

In general, formally structured programs with annual budgetary allocations to provide infrastructure support to mines and other resource developments are rare, although they have existed in the past in some jurisdictions. More commonly, government assistance for the construction of road, rail and other infrastructure has occurred as one-off contributions for the development of individual mines. In jurisdictions where this has been the case, specific examples are provided to illustrate the level and type of support provided. However, due to the irregular nature of these expenditures, they are not included in the annual spending totals.

Liability and Risk Assumption for Abandoned Mine Remediation

Except for the jurisdictions' current annual program expenditures on abandoned mine remediation, the total cumulative liabilities assumed by the Crown over time on behalf of the mining industry for abandoned mine rehabilitation are not included in the estimates of total annual expenditures.¹³ However, where possible, total estimates of the liabilities resting with the Crown for each jurisdiction are provided. In situations where the Crown has assumed remediation liability risks in relation to operating mines by requiring financial assurances that are inadequate to cover all closure and remediation costs, estimates of the annual value of this service in terms of the saved cost of capital to the industry that otherwise would have been required for financial assurances are provided.

Excluded Costs

This study focused on the documented public expenditures related to the metal mining industry. The wider social and environmental costs associated with the industry, such as the health impacts of air and water pollution from the sector, and social effects of the industry's cyclical employment patterns, are not included. This was due to the methodological complexity of developing such estimates and the resource limitations of this study. However, the potential significance of these costs should be recognized, and be the subject of future studies. The opportunity costs to host communities of lost development alternatives to mining have not been included for similar methodological reasons. The estimates of liability and risk for abandoned mine remediation assumed by the Crown provide a limited proxy for some of the long-term environmental costs associated with the industry.

The study did not examine the question of whether the mineral royalties charged by provincial and territorial governments reflect reasonable rates of return for the resource to the Crown. This is a potentially significant issue. The Ontario Fair Tax Commission concluded in its 1994 report, for example, that the existing mining tax structure was failing to capture the underlying value of the province's mineral resources.¹⁴ However, addressing this issue would require the development of estimates of the real value of the resource, an effort that was beyond the resources of this study.

The economic value of other forms of support that may be in place were excluded for similar reasons. This would include such things as:

- Access to water resources at little or no cost;¹⁵
- The provision of electrical power by provincial utilities below cost;¹⁶ or
- The status of non-renewable resource extraction as an overriding priority in land-use planning policies.¹⁷

Approaches to Defining Benefits from the Metal Mining Sector

The benefits attributed to the metal mining industry were defined in terms of three dimensions for the purposes of this study:

- Employment in the metal mining sector;
- Metal mine royalties (i.e., metal mining-specific tax revenues) provided by the sector; and
- Contribution of the metal mining sector to provincial, territorial or national Gross Domestic Product (GDP).¹⁸

A number of sources were employed to develop estimates of benefits, including data provided by provincial and territorial mine ministries and departments, Natural Resources Canada and Statistics Canada. As with costs, data was sought that disaggregated the contributions of the metal mining sub-sector, defined as exploration and extraction, milling and concentration, and mine closure phases of mine operations, from the benefits associated with the wider metals and minerals sector. Consistent with the focus on expenditures unique to the metal mining industry (as opposed to programs or tax measures available to other sectors in addition to the mining sector), revenue benefits were limited to those specific to the sector, such as the relevant mineral royalty charges, rather than revenues from generally applied corporate, payroll and income taxes. However, these other benefits are captured in part through consideration of the sector's contribution to jurisdictional GDP.

As with the estimates of costs, benefit figures are provided for 1994/5 and 2000/1. In addition, figures are provided each year for total employment, tax revenues and all industries' contribution to GDP for each jurisdiction. This permits the identification of shifts in total benefits provided, and calculations of the relative contribution of the metal mining sector to overall economic activity and revenues over time.

Relating Costs and Benefits

For each jurisdiction, a calculation of the benefits, in terms of employment, metal mining mineral royalties, and contribution to GDP being provided by the metal mining industry relative to government expenditures for 1994/5 and 2000/1 as identified in the study, is provided. This permits an estimation of the trend in the ratio of government support to the sector in relation to the generation of economic benefits. Estimates of the level of public expenditure per employee in the sector are also provided.

Corrections for Inflation

Figures used for calculating total expenditures and comparing benefits and expenditures are converted via the Consumer Price Index (CPI) to 2000 dollars.¹⁹

Chapter Endnotes

¹ Major spending reductions were implemented in Ontario and at the federal level in the 1995/6 fiscal year, and in Quebec in 1996/7. A major fiscal restructuring occurred in British Columbia in 2001/2.

² Liability assumptions are defined as situations where the Crown accepts responsibility for the costs of closing and/or remediating mines and other sites of mineral activity, such as exploration sites, that have been operated by mining firms.

³ J. Mintz, [A Comparison of Tax Incentives for Extraction and Recycling of Basic Materials in Canada](#), (Winnipeg: CCME, 1995); See also Duanjie Chen, Jack Mintz, Kim Scharf and Sergio Traviza, [Taxation of Virgin and Recycled Materials: Analysis and Policy](#), (Toronto: University of Toronto, 1995).

⁴ A recent study by the Office of the Commissioner of the Environment and Sustainable Development examined tax and non-tax supports for investments in renewable and conventional energy sources, although the primary focus was on supports provided through the tax system. See Commissioner of the Environment and Sustainable Development, [2000 Report to the House of Commons](#), (Ottawa: Minister of Public Works and Government Services, May 2000), Chapter 3. This study was not able to establish values for key tax federal tax expenditures in support of the conventional sector, and therefore may underestimate the support provided to that sector.

⁵ See for example, J. Mintz, [Most Favoured Nation: Building a Framework for Smart Economic Policy](#), Policy Study 36, (Toronto: C.D. Howe Institute, 2001), Chapter 4, which attempts to take into account such factors as educational, health and infrastructure subsidies.

⁶ Ibid, Chapter 4.

⁷ Technical Committee on Business Taxation, [Report](#), (Ottawa: Department of Finance, 1998), Tables 3.1; 3.10; and 4.1.

⁸ See, for example, World Conference on Environment and Development, [The Rio Declaration](#), Principle 8 and [Agenda 21](#), Chapter 4 – Changing Consumption Patterns; The report of the High-Level Advisory Group on the Environment to the Secretary-General of the OECD; November 25, 1997. <http://www.oecd.org/subject/sustdev/hlage.htm>; Environment Directorate, [Strategic Waste Prevention](#): OECD Reference Manual ENV/EPOC/PPC (2000)5/FINAL, (Paris: OECD, August 2000); OECD, [Economic Surveys: Canada](#), (Paris: OECD, August 2000), p.155.

⁹ Smelting operations were excluded as they do not constitute part of the extractive phase of mining, which has been consistently identified as the most unsustainable aspect of the mining process. In addition, smelting operations may be involved in the processing of secondary materials as well as newly extracted ores.

¹⁰ Interviewees are identified by organizational affiliation rather than by name.

¹¹ Office of the Commissioner of the Environment and Sustainable Development, [2000 Report to the House of Commons](#), (Ottawa: Minister of Public Works and Government Services, May 2000), Chapter 3. On approaches to establishing the value of tax expenditures, see for example, K. Ketchum, R. Lavinge and R. Plummer, “Oil Sands Tax Expenditures,” Department of Finance Working Paper 2001-17, (Ottawa: Department of Finance, 2001).

¹² It is important to note that these estimates provided by governments may not account for the interactions among different initiatives. J. Mintz, C.D. Howe Institute, personal communication, July 18, 2002.

¹³ In effect, these assumed liabilities are treated as a capital deficit rather than as part of annual expenditures.

¹⁴ Ontario Fair Tax Commission, Fair Taxation in a Changing World, (Toronto: University of Toronto Press, 1994), Chapter 23.

¹⁵ See, for example, Organization for Economic Cooperation and Development, Economic Surveys: Canada, (Paris: OECD, August 2000), pp.127–128.

¹⁶ See, for example, the sidebar “Power and Low Cost” in the BC Chapter on page 26.

¹⁷ See, for example, Ontario Ministry of Municipal Affairs and Housing, 1997 Provincial Policy Statement, Part III, Policy 2.2.

¹⁸ GDP figures considered in the study are direct.

¹⁹ Using Statistics Canada information, different correctors were used for different regions to convert 1994/5 figures to 2000 figures:

BC: 0.9312

Ontario: 0.8914

Yukon: 0.911

Federal: 0.8987

III. British Columbia

I. Introduction

The Metal Mining Industry in BC

Most of British Columbia lies within the Western Cordillera, a geologic formation that contains a wide variety of minerals.¹ The metal mining industry in BC includes production of gold, silver, lead, zinc, copper and molybdenum. The map below shows the geographic distribution of major metal mines in British Columbia operating in 2001. As the figure demonstrates, metal mines in British Columbia are scattered throughout the province.

Figure 2: Metal Mine Operation in B.C. – 2001



OPERATING MINES - 2001			
Company Name (Mine Name)	Location	Capacity (tonnes/day)	Products
1 Highland Valley Copper (Highland Valley Copper)	Highland Valley	120,000	Copper, molybdenum, silver, gold
2 Northgate Exploration (Kames)	Timule Lake	30,000	Gold, copper
3 Thompson Creek Mining Co. (Endako)	Fraser Lake	30,000	Molybdenum
4 Imperial Metal Corp. (Huckleberry)	Kamano	18,000	Copper, molybdenum, gold, silver
5 Imperial Metal Corp. (Mount Polley)	Likely	18,000	Copper, gold
6 Cominco Ltd. (Sullivan)	Kinberley	6,900	Zinc, lead, silver
7 Westmin Resources Ltd. (Myra Falls)	Butte Lake	3,500	Copper, zinc, gold, silver
8 Wheaton River Resources Ltd. (Golden Bear)	NW B.C.	1,000	Gold
9 Pione Resources Group Ltd. (Eskay)	Stewart	300	Gold, silver

Source: British Columbia Ministry of Energy and Mines Statistics (www.em.gov.bc.ca/Mining/MiningStats/default.htm).

Table 5 shows the number and type of metal mines operating in British Columbia in 2000. Note that there are two more mines listed here than in Figure 2. This is the result of two mine closures between 2000 and 2001. Both the

Snip operation of Homestake Canada and the Blackdome operation of Claimstaker Resources closed in 2000.

The most important metals produced in the province of British Columbia are copper and gold. Figure 3 demonstrates the value of these metals in BC between 1989 and 2000. The general trend in the value of copper production in the province has been a decline while the value of gold production over the same time period has gradually increased.

Legislative and Institutional Framework for Metal Mining in BC

The key government agency responsible for metal mining in British Columbia is the Mines Division of the Ministry of Energy and Mines. The Ministry of Energy and Mines manages and encourages the development of metal mining in British Columbia and regulates and inspects activities related to mineral exploration. The Mineral Titles Branch in conjunction with the Government Agents Branch of the Ministry of Small Business, Tourism and Culture administers the acquisition of mineral titles under the *Mineral Tenure Act*.

There are several key pieces of legislation of direct relevance to the metal mining industry in British Columbia. These include the *Mineral Land Tax Act*, the *Mineral Tax Act*, the *Mineral Tenure Act*, the *Mines Act* and the *Mining Rights Amendment Act*. Each of these is described briefly in the sidebar “BC Mining Legislation” on page 24.

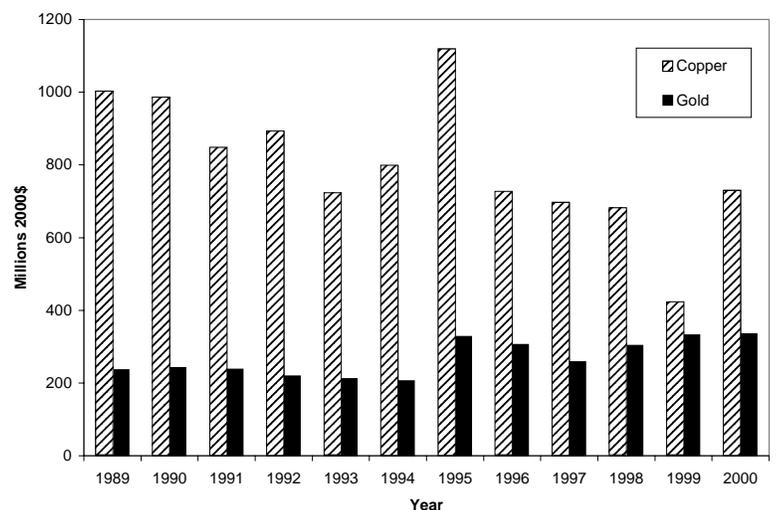
To a degree, the Ministry of Environment Lands and Parks (MELP)² is also responsible for metal mining in British Columbia. The Contaminated Sites Program, which is administered by MELP, maintains a contaminated sites registry and facilitates and regulates contaminated site assessments and cleanups throughout the province.³ As well, the Environmental Assessment Office (EAO) is the provincial agency that leads assessments of major development proposals in British Columbia for many sectors including metal mining.⁴

Table 5: Operating Mines in BC – 2000

Company Name	Operation	Location	Metal
Boliden Limited	Myra Falls	Buttle Lake	Cu, Zn, Pb, Au, Ag
Claimstaker Resources	Blackdome	Clinton	Au, Ag
Highland Valley Copper	Highland Valley Copper	Highland Valley	Cu, Mo, Ag, Au
Homestake Canada	Eskay	Stewart	Au, Ag
Homestake Canada	Snip	Iskut River	Au
Imperial Metal Corp.	Huckleberry	Kemano	Cu, Mo
Imperial Metal Corp.	Mount Polley	Likely	Cu, Au
Northgate Exploration	Kemess	Thutude Lake	Cu, Au
Teck Cominco Limited	Sullivan	Kimberley	Pb, Zn, Ag
Thompson Creek Mining Company	Endako	Fraser Lake	Mo
Wheaton River Resource Limited	Golden Bear	Telegraph Creek	Au

Cu — Copper Mo — Molybdenum Au — Gold Ag — Silver Pb — Lead Zn — Zinc
 Source: British Columbia Ministry of Energy and Mines (MEM) Statistics (www.em.gov.bc.ca/Mining/MiningStats).

Figure 3: British Columbia Value of Metal Production



Source: British Columbia Ministry of Finance. *British Columbia Financial and Economic Review*, (Victoria: Government of British Columbia, 2001).

BC Mining Legislation

The *Mineral Land Tax Act* governs the taxation of mineral land. The Mineral Land Tax is levied on the assessed value of freehold mineral land and production areas. Tax rates are set on a sliding scale, dependent on the size and designation of the land.

The *Mineral Tax Act* is the major piece of provincial legislation for the assessment and payment of coal and mineral taxes in British Columbia.

The *Mineral Tenure Act* governs the claiming and staking of mineral title in British Columbia.

The *Mines Act* guides the permitting of mine operations in British Columbia. Health, Safety and Reclamation Code falls under the *Mines Act* and regulates worker and public safety and environmental impacts. The Mineral Exploration Code, introduced in 1998, sets out standards of practice for exploration and development.

In 1998, the *Mining Rights Amendment Act* amended the *Mineral Tenure Act*, the *Parks Act* and the *Coal Act* to enable the government to provide compensation for pre-existing mineral claims in parks. The 1999 Mining Rights Compensation Regulation of the *Mineral Tenures Act* sets out the means to negotiate appropriate compensation based on "the value that would have been paid to the holder of the expropriated mineral title if the title had been sold on the date of expropriation, in an open and unrestricted market."

Through the legislation discussed in the sidebar "BC Mining Legislation", the Government of British Columbia manages, facilitates and encourages metal mining in the province.

Recent Policy Initiatives to Support the Metal Mining Industry in BC

The 1998 Budget and Right-to-Mine Legislation

The 1998 provincial budget included a plan to make British Columbia more competitive, to attract investment and to create jobs. This budget announced a plan to "develop regulatory and tax changes that would stimulate mineral exploration in the province, encourage the development of new mines and allow existing mines to compete more effectively in world markets." Initiatives announced in this budget included streamlined regulation, implementation of a new exploration code and the provision of greater certainty of access to public lands for exploration.⁵ In particular, the *Mineral Exploration Code* (Revised Part 11 of the *Health, Safety and Reclamation Code for Mines in British Columbia*) was introduced in May 1998. The *Mineral Exploration Code* created a one-window permit application process and established exploration-specific standards of practice. The *Mining Rights Amendment Act*, also adopted in 1998, asserted a right of miners to explore and develop mineral claims in all non-protected areas of the province. These provisions were to assure access to claims for exploration purposes and require compensation for owners of claims expropriated for the creation of parks. The *Mining Rights Compensation Regulation* was subsequently adopted in 1999. This regulation defined the process (developed in consultation with the mining industry) for establishing the value of expropriated claims for compensation purposes.⁶ An Office of the Mining Rights Advocate was also established as part of these initiatives.

These changes have been accompanied by reductions in the budget of the Ministry of Environment, Lands and Parks (MELP and its successors, the Ministry of Water, Land and Air and the Ministry of Sustainable Resource Management). MELP's budget fell from \$263 million in 1994/5 to \$201 million in 2000/1.⁷ In July 2001, Premier Gordon Campbell's Liberal government announced further reductions of 30-40%. These cuts will be achieved through the elimination of over 1,000 positions. It has been estimated that in total, over the past decade, the budgets of environmental protection agencies in British Columbia have fallen by 60-70%.⁸

The 2001 Budget

Two major new tax incentives related to mining in British Columbia were introduced in the province's July 2001 budget. These are the BC Mining Flow-Through Share Tax Credit (BC MFTS) and the provincial Sales Tax Exemption for Mining Equipment and Machinery. The impact of these important initiatives is described in the public expenditure summary section later in this chapter.

May 2002 Legislative Proposals

In May 2002 the British Columbia government introduced Bill 54, *The Miscellaneous Statutes Amendment Act, 2002*. Among other things, Bill 54 would provide for exemptions for mining companies from permit requirements un-

der the *Mining Act* and *Waste Management Act*, and expand mining industry rights on public and private lands.⁹ Bill 38, the new *Environmental Assessment Act*, introduced in the same month, would significantly weaken the environmental assessment process in British Columbia.¹⁰

Chapter Overview

The provincial government dedicates a portion of its total expenditures to support the metal mining industry in the province. In return, the government receives tax dollars from the metal mining industry, the industry employs a portion of the province's citizens, and contributes to provincial Gross Domestic Product (GDP).

In this study we assess the benefits of and public expenditures on the metal mining industry in British Columbia for the years 1994/5 and 2000/1.

With respect to benefits, metal mining royalties, metal mining contribution to GDP and employment in the metal mining industry are described. In terms of public costs, public expenditures on metal mining in BC is outlined and quantified. Three types of expenditures — direct expenditures, program expenditures, and tax expenditures — for the three stages of mining — prospecting and exploration; mine development and operation; and mine closure, remediation and long-term care — are considered.

Public expenditures on metal mining takes many forms, including program expenditures, tax credits, tax exemptions and support in the form of the creation and existence of formal government divisions that are solely responsible for fostering and managing the mining industry in the province. Public expenditure on metal mining in British Columbia is described in detail in Part II of this chapter. For each of the expenditure initiatives, we provide a description and year of implementation or time span of the initiative, as well as figures for expenditures in 1994/5 and 2000/1 where relevant and/or possible.

Benefits attributable to the metal mining sector are described in Part III. Here we also discuss the benefits in the context of the costs, providing benefit-to-expenditures ratios and considering trends over time.

Data Limitations and Qualifications

There are several limits to this study that warrant mention. First, while we include the budget of the Mines Division of the Ministry of Energy and Mines, this division does not deal exclusively with metal mining in BC. The Mines Division is responsible for industrial minerals and coal mining in the province. To the extent that the Mines Division of the Ministry of Energy and Mines manages, regulates and facilitates operations beyond those associated solely with metal mines, estimates for public expenditures in this area in relation to the metal mining sector could be exaggerated. To address this concern we conduct analyses in which we scale down the relevant total budget figures in proportion to the relative value of metal mining versus non-metal mining and coal mining in BC.

Power at Low Cost

In an attempt to continue operations at the Highland Valley Copper Mine, the mine's owners complained about high electric prices from BC Hydro. The Government of British Columbia subsequently indicated it would be willing to offer a rate cut to the copper mine by the provincially owned utility.

Source: Dowd, Allen. April 29, 1999, Reuters.

On the other hand, there are several expenditure items that are not captured in this analysis. The British Columbia government was unable to provide estimates of the value of some key tax expenditures implemented since 1995, such as the New Mine Allowance. In addition, the BC Mining Flow-Through Share Tax Credit and Sales Tax Exemption for Mining Equipment and Machinery, which will provide major financial benefits to the metal mining sector, were introduced in the July 2001 budget and therefore fall outside of the 2000/01 fiscal year considered for the purposes of this analysis. However, the significance of these new expenditures is highlighted in the text. As well, the BC government was unable to provide estimates for expenditures on the recently introduced tax credit for flow-through shares or the new and expanded mine allowance.

Furthermore, while the Ministry of Environment, Lands and Parks and its successors, the Ministries of Sustainable Resource Development and Air, Water and Land Protection, have dealt with metal mining through the Contaminated Sites Program and the Environmental Assessment Office, consistent with our overall approach to the identification of costs we have not included expenditures on these initiatives in this analysis.

Public expenditure related to infrastructure support for metal mining in the province has also not been captured in this analysis. Similarly, reduced rates for electricity, often part of formal agreements to lower the operating costs of mining companies during times of financial difficulties, have not been included; such arrangements do not occur through regularly structured programs. However an illustrative example of such an arrangement is provided in the sidebar, "Power at Low Cost."

Finally, and probably most importantly, in this analysis we have not included in our estimate of public costs the public liability associated with the remediation of abandoned metal mines and exploration sites. As described in the following sections, this is a result of the lack of any such estimates on the part of the British Columbia government. Given this and other limitations in description of expenditures as outlined above, we believe that the estimates for public costs provided in this report are conservative, and may be significantly below the actual costs.

II. Public Expenditures on Mining in BC

Stage 1: Prospecting and Exploration

In this section of the chapter, we describe and quantify public expenditures related to metal prospecting and exploration in British Columbia. Public expenditures are categorized as direct expenditures, program expenditures and tax expenditures.

Several key initiatives have been introduced in British Columbia to facilitate and promote prospecting and exploration in the province. Table 6 describes initiatives that entailed direct grants to either companies or individuals that were in place in 1994/5 and 2000/1. These initiatives are designed to provide increased incentive to undertake prospecting and exploration activities in Brit-

ish Columbia and include the Prospectors Assistance Program (PAP), the Mineral Exploration Incentive Program (MEIP) and the Accelerated Mine Exploration Program (AMEP) (together these last two initiatives constitute the Explore BC program).

Total expenditure on the above initiatives in 1994/5 was \$3,900,000. By 2000, Explore BC (MEIP and AMEP) was no longer in place and direct expenditures to industry in the form of grants for encouraging exploration and prospecting fell to \$500,000 and constituted only the PAP.

In addition to the above, several program initiatives have been introduced in British Columbia to facilitate prospecting and exploration in the province. While such initiatives do not necessarily entail direct expenditures to the metal mining industry, they are nonetheless designed to facilitate and increase metal exploration and prospecting in British Columbia. These initiatives include the British Columbia Geological Survey and the Corporate Resources Inventory Initiative (CRII) described in Table 7.

Total program expenditures related to prospecting and exploration in 1994/5 were \$5,874,500. In 2000, total program expenditures related to prospecting and exploration were \$4,343,330.

In 2000/1 the key tax initiative in place in British Columbia designed to encourage mineral exploration in the province was the BC Mining Exploration Tax Credit (METC). This initiative was implemented in 1998 when global metal prices were relatively low.

Table 6: BC – Direct Expenditures – Prospecting and Exploration

Initiative	Time Span	Description
Prospectors Assistance Program (PAP)	Initiated in 1994, ongoing	PAP provides grants of up to \$10,000 for grassroots exploration for new mineral deposits by individual prospectors. <i>Government expenditure on this program was \$500,000 in 1994/5¹¹ and 2000/1.¹²</i>
Explore BC	1994/5	This program provided part of the risk capital required by companies or individuals to finance exploration programs, extend the economic lives of existing mines and contribute to community stability in mining regions. Explore BC is made up of two incentive initiatives: the Mineral Exploration Incentive Program (MEIP) and the Accelerated Mine Exploration Program (AMEP). These are described in more detail below. <i>Total expenditure on this initiative in 1994/5 was \$3,400,000 (\$2,400,000 for MEIP and \$1,000,000 for AMEP).</i>
Mineral Exploration Incentive Program (MEIP)	1994/5	MEIP provided grants to eligible exploration companies or individuals, to cover up to one-third of eligible expenses on properties with identified economic potential. Maximum assistance was \$150,000 per project. <i>Total expenditure on this project in 1994/5 was \$2,400,000.¹³</i>
Accelerated Mine Exploration Program (AMEP)	1994/5	AMEP provided grants to mining companies to cover up to one-third of eligible exploration expenses at existing mines for the purpose of discovering additional reserves. Maximum assistance was \$150,000 per project. <i>Total expenditure on this project in 1994/5 was \$1,000,000.¹⁴</i>

Table 7: BC – Program Expenditures – Prospecting and Exploration

Initiative	Time Span	Description
Geological Survey Branch	Began in 1895, ongoing	This branch is responsible for providing the geological inventory of the province. The main purpose of the geological inventory is to facilitate mineral development in the province. <i>The budget of the Geological Survey Branch declined from \$5,537,000 in 1994/5¹⁵ to \$4,097,330 in 2000/1.¹⁶</i>
Corporate Resources Inventory Initiative (CRII)		Funds associated with CRII augment the base budget of the Geological Survey Branch. CRII funds in 2000 were used to complete an aggregate inventory in the Sea to Sky Highway corridor and to undertake detailed mineral potential studies of the North Coast in support of new Land and Resource Management Planning. <i>Expenditure on this program in 1994/5 was \$337,500.¹⁷ Expenditure on this program in 2000/1 was \$246,000.</i>

Table 8: BC – Tax Expenditures – Prospecting and Exploration

Initiative	Time Span	Description
BC Mining Exploration Tax Credit (METC)	METC was announced in April 1998, ongoing	METC is a refundable exploration tax credit for mining exploration expenses incurred after August 1, 1998. It provides for a 20% credit on expenditures incurred by prospectors and corporations conducting grassroots mineral exploration in BC. Retroactive to August 1, 1998 (and announced July 2000), proceeds received under the tax credit program can be passed to flow-through share investors. <i>Expenditure on this initiative in 2000/1 was \$4,000,000.¹⁸</i>

Direct, program and tax expenditures related to prospecting and exploration in British Columbia are summarized in Table 9.

Table 9 highlights two key points regarding public expenditures on prospecting and exploration in BC. First, there has been a shift in funds away from direct expenditures and towards tax expenditures. Explore BC and the METC are explicitly designed to increase mineral exploration in British Columbia. Explore BC was the major initiative in place to support prospecting and exploration in the province in 1994/5. By 1998, Explore BC was no longer in place and the major support initiative for prospecting and exploration was the METC. In 2001 a second tax initiative, the BC Mining Flow-Through Shares Tax Credit (BC MFTS), was implemented to provide incentives for individual prospectors in BC.

Table 9: BC – Summary of Expenditures – Prospecting and Exploration

Initiative	1994–1995 (\$)	2000–2001 (\$)
Direct Expenditures:		
Prospectors Assistance Program (PAP)	500,000	500,608
Explore BC	3,400,000	n/a
Total Direct Expenditure	3,450,000	500,608
Program Expenditures:		
Geological Survey Branch	5,537,000	4,097,330
Corporate Resources Inventory Initiative (CRII)	337,500	246,000
Total Program Expenditure	5,874,500	4,343,330
Tax Expenditures:		
Mining Exploration Tax Credit (METC)	n/a	4,000,000
Total Tax Expenditure	0	4,000,000
Total Prospecting and Exploration (current\$)	9,774,500	8,843,938
Total Prospecting and Exploration (2000\$)	10,496,671	8,843,938

n/a = initiative was not in place and thus is not associated with any expenditure

The second point relates to the overall trend in expenditures between 1994/5 and 2000/1. Total public expenditures on prospecting and exploration were \$10,496,671 (2000\$) in 1994/5 and \$8,843,938 (2000\$) in 2000/1. That is a decline in total public expenditures related to exploration and prospecting of 16%. This decline appears to be the product of a reduction in funds given to the BC Geological Survey Branch.

While the Explore BC Program was no longer in place in 2000, the METC more than offsets expenditures on this initiative. The PAP was in place in both 1994/5 and 2000/1 and had virtually the same budget for both time periods. Similarly, the CRII was in place in 1994/5 and 2000/1 and, while 2000 saw a slight reduction in expenditures on this initiative, the decline amounted to less than \$10,000. In contrast, the BC Geological Survey Branch realized a decline in funding of 26%; that is over \$1,000,000. This implies that, while the provincial government is implementing new tax incentives (METC and BC MFTS) for exploration and prospecting, they are decreasing programmatic expenditures associated with government divisions.

Stage 2: Mine Development and Operation

In this section of the chapter, we describe and quantify public expenditures related to metal mine development and operations in British Columbia. Public expenditures are categorized as program expenditures or tax expenditures.

In addition to facilitating and encouraging exploration and prospecting in the province of BC, there are also several initiatives already in place associated with mine development and operations. Table 10 describes expenditures in 1994/5 and 2000/1 on several items related to mine development and operations in British Columbia. While these initiatives are not explicitly designed to encourage metal mining in British Columbia, the majority of them *are* intended to manage and facilitate the development and operations of the metal mining industry in British Columbia, allowing for ease of mine staking, claiming and permitting in the province. Only expenditures on Mine Review and Permitting and Mine Health and Safety are associated with protecting employees and the environment.

Program expenditures related to mine development and operations totalled \$12,940,000 in 1994/5 and \$8,947,483 in 2000/1.

The initiatives described above mostly relate to managing and facilitating the development and operations of metal mines in British Columbia. In contrast to this, the new mine allowance and the manufacturing and processing investment tax credit, described in Table 11, are explicitly designed to provide incentive to increase mining in the province. British Columbia also has an investment allowance for metal mines. According to the BC government, this initiative does not provide an incentive to mine operators in the province. A recent study by PriceWaterhouse Coopers, however, identifies the Investment Allowance as an incentive feature of mine tax policy in BC.²⁷

Table 10: BC – Program Expenditures – Development and Operation

Initiative	Time Span	Description
Mineral Titles Branch	Ongoing	This branch administers mineral, placer and coal tenures throughout the province. <i>The budget for the Mineral Titles Branch was \$2,300,000 in 1994/5¹⁹ and \$1,854, 959 in 2000/1.²⁰</i>
Land Management and Policy Branch	In place in 1994/5; no longer in place	This branch was responsible for regional operations including mineral exploration permitting, inspections, land-use planning and regional geology. <i>The annual budget for this branch in 1994/5 was \$4,900,000.²¹</i>
Environment and Land Use	Not in place in 1994; now in place	This branch develops policies and strategies for mineral land-use planning, including related legislative proposals; analyzes and disseminates mineral resource data for planning and policy issues; monitors implementation of land-use plans and policies; supports ministry regional staff; and coordinates ministry involvement in provincial environmental assessment policies and procedures. <i>The annual budget of the Environment and Land Use Branch in 2000/1 was \$278,119.²²</i>
Mine Review and Permitting Branch	In place in 1994/5; now part of Mines Branch activities (below)	This branch ensures that large proposed, operating and abandoned mines meet the province's sustainable resource development goals. <i>The annual budget of this branch was \$1,700,000 in 1994/5.²³</i>
Mine Health and Safety Branch	In place in 1994/5; now part of Mines Branch activities (below)	This branch monitors the health and safety of persons employed in the mining industry with the province through workplace inspections, audits, enforced compliance with the Health, Safety and Reclamation Code for Mines in BC, and investigation of accidents or dangerous occurrences. <i>The annual budget of the Mine Health and Safety Branch was \$2,440,000 in 1994/5.²⁴</i>
Mines Branch	Ongoing	The Mines Branch has two major components: mine review and permitting, and mine health and safety inspections. <i>The total annual budget for the Mines Branch in 2000/1 was \$6,814,405.²⁵</i>
Mineral Development Agreement (MDA)	1985-1989/90 and 1989/90-1995	The MDA is a federal-provincial agreement designed to strengthen and diversify the province's mineral sector. Activities sponsored by MDA fall into five sectors: geoscience, technological development, economic development, public information, and evaluation and administration. <i>Expenditure by the Government of British Columbia on this initiative in 1994/5 was \$1,600,000.²⁶</i>

Table 11: BC – Tax Expenditures – Development and Operation

Initiative	Time Span	Description
New Mine Allowance	Implemented in 1995, ongoing	New or expanding mines that begin production before January 1, 2010 are eligible for the new mine allowance. Under this scheme, mining operators, when calculating mineral taxes payable, are able to claim 133% of qualifying capital expenditures incurred to open, re-open or expand a mine in BC. <i>The BC government was unable to provide an estimate of expenditures under this program.</i>
Manufacturing and Processing Investment Tax Credit	In place in 2000 only; replaced by the sales tax exemption in 2001	<i>Expenditure on this initiative is estimated at \$4,307,692 in 2000/1.</i> ²⁸
Investment Allowance (IA)	Began in 1990, ongoing	IA is an allowance for a return on capital invested in a mine. It is designed to approximate the cost of capital to the industry, regardless of the manner in which costs are funded. <i>The BC government argues that as the IA is designed to approximate a normal rate of return on capital, it is not considered as public expenditure.</i>

Table 12: BC – Summary of Expenditures – Development and Operation

Initiative	1994–1995	2000–2001
Program Expenditures:		
Mineral Titles Branch	2,300,000	1,854,959
Land Management Policy Branch	4,900,000	n/a
Environment and Land Use Branch	n/a	278,119
Mine Health and Safety Branch	2,440,000	n/a
Mine Review and Permitting Branch	1,700,000	n/a
Mines Branch	n/a	6,814,405
Mineral Development Agreement	1,600,000	n/a
Total Program Expenditure	12,940,000	8,947,483
Tax Expenditures:		
New Mine Allowance	n/a	*
Manufacturing and Processing Investment Tax Credit	n/a	4,307,692
Investment Allowance	*	*
Total Tax Expenditure	0	4,307,692
Total Development and Operations (current\$)	12,940,000	13,225,175
Total Development and Operations (2000\$)	13,896,048	13,225,175

n/a = initiative was not in place and thus is not associated with any expenditure
* = the Government of British Columbia does not have an estimate of expenditure on this initiative

Expenditures on the New Mine Allowance and the Investment Allowance are not available from the Government of British Columbia. While the government does track expenditures by the metal mining industry on new mines or mine expansions, they do not estimate their own expenditures related to these mine development incentive programs.

Program and tax expenditures related to mine development and operations in British Columbia are summarized in Table 12.

Program and tax expenditures related to metal mining development and operations in BC totalled \$13,896,048 (2000\$) in 1994/5 and \$13,225,175 (2000\$) in 2000/1.

As was the case with prospecting and exploration, programmatic expenditures associated with development and operations is declining while tax expenditures are increasing. In 1994/5, the sum of the Mineral Titles Branch, the Land Management Policy Branch and the Mine Review Permitting Branch was \$12,177,835 (2000\$). In 2000/1, the sum of Mineral Titles Branch, the Environment and Land Use Branch and the Mines Branch was \$10,802,442 (2000\$). That is a decline in expenditures of over 11% between 1994/5 and 2000/01. In contrast to this, tax expenditures increased from zero to \$4,307,692 during the same time period, without taking into account expenditures on the new mine allowance.

Stage 3: Closure, Remediation and Long-Term Care

In this section of the chapter, we describe and quantify public expenditures related to metal mine closure, remediation and long-term care in British Columbia.

Beyond the limited duties performed within the Mines Branch related to mine health and safety, in BC there is essentially

no programmatic expenditures related to metal mine closure, remediation and long-term care. Instead, mine closure, remediation and long-term care is largely dealt with through regulatory frameworks that require site closure and rehabilitation plans along with posting of mine site reclamation bonds.

Current expenses related to safety measures at historic exploration and mine sites are in the range of \$5,000-\$30,000 a year.²⁹ This money is not associated with a particular program, but instead is secured from general revenue under section 17 of the *Mines Act*. In 2000, as part of the Historic Mine Sites program, the Ministry of Energy and Mines hired an intern to perform site inspections on 60 of the historic mine sites in the province at a cost of \$89,000.³⁰ Here again, funds for this project came from the general operating budget of the Ministry of Energy and Mines rather than a specific program associated with mine closure, remediation and long-term care.³¹

There is one tax initiative in place in British Columbia that relates to metal mine closure, remediation and long-term care. In April 2000, the Government of British Columbia announced that it would eliminate the mineral tax on mine reclamation funds. This was an attempt to increase incentives for mine operators to establish mine reclamation funds.

Table 13: BC – Tax Expenditures – Closure and Remediation

Initiative	Time Span	Description
Elimination of the mineral tax on mine reclamation funds	Introduced in April 2000, ongoing	The provincial government recalled the mineral tax on investment earnings in mine reclamation funds. Mining companies are now able to receive a tax deduction for such investment income when it is earned. <i>The BC government claims that there is essentially no forgone tax revenue associated with this change; prior to implementation, the mineral tax discouraged companies from contributing to such funds. Instead, operators would post a bond or some other form of security to cover reclamation concerns.</i> ³²

While not included in our figures for total public expenditures, it is important to consider the public liability of historic³³ mine and exploration sites in the province. As the following discussion will reveal, such expenditures have the potential to be substantial despite the fact that they are currently largely unknown.

There is presently a substantial gap between the value of the liability of operating mines and the value of reclamation bonds posted in British Columbia. As of July 1995, the province estimated that the sum of “unfunded liabilities” and “scheduled securities” (securities not yet collected) for producing metal mines was about \$200 million.³⁴ According to one contact at the Ministry of Energy and Mines, the current liability for all producing permitted mines is about \$400 million and the amount of liability currently covered by securities is about \$193 million.³⁵ A second contact, on the other hand, estimates reclamation liability for producing metal mines to be approximately \$185 million and unfunded liability to be approximately \$85 million.³⁶ The significant drop in unfunded liability for metal mines from 1995 to 2002 is claimed to be attributable to the number of metal mines that have closed down as opposed to a more aggressive attempt by the government to collect bonds from mining companies.³⁷ According to the Ministry of Energy and Mines, \$85 million represents the level of risk the government is willing to accept.³⁸

Britannia Mine

The abandoned Britannia mine, a copper mine 50 kilometres north of Vancouver, shut down in 1974. This site is one of the worst point sources of metals pollution in North America. Daily, 50 million litres of toxic runoff (metals and acidic waters) flow from the site into Howe Sound. This has severely impacted the aquatic life in Britannia Creek and the Sound.

Vancouver-based Copper Beach Estates, the current landowner who purchased the site in 1979, was ordered four times by the provincial government to halt the toxic runoff at Britannia. But the problem was never adequately addressed.

In May 1998, after decades of pollution and ineffective remediation orders, the BC government initiated a process to identify other parties that could possibly contribute financially to addressing the pollution problems at Britannia.

The *Contaminated Sites Regulation* of the *Waste Management Act* empowered the province to include previous mine owners in a cleanup order. Under the joint and several liability clause, former owners were identified as potentially responsible parties (PRPs) for the cleanup. It was this threat that brought all parties to the negotiation table.

The PRPs and the current landowner have voluntarily negotiated agreements with the province to work toward remediating the Britannia site. The PRPs have agreed to pay \$30 million for remediation expenses (the final cost of the cleanup is estimated at between \$60 million and \$75 million). In return, they will be released from future liabilities related to the site.

Details have not been released as to how the costs will be shared among the parties, which include Aluminum Company of America (Alcoa), the BC government, the Atlantic Richfield Company (ARCO), Canzinc Ltd., Ivaco/Arrowhead Metals Ltd., the Canadian government, and three of Alcoa’s subsidiaries located in Delaware (Intalco Aluminum Corporation, Alumax Inc. and Howmet Holdings Corporation).

Copper Beach has committed \$5 million towards cleaning up the site. The company has agreed to pay the estimated \$1.7 million per year total maintenance and operating costs for the treatment plant in perpetuity.

An application has been made to the Canada-BC infrastructure program to finance two-thirds of the estimated \$12 million cost of building the treatment plant, with the remaining one-third provided from the potentially responsible parties’ contribution.

Source: BC Ministry of Environment, Lands and Parks, press release April 12, 2001, and from the MELP website, first printed in *MiningWatch Canada* and CCSG Associates, *Financial Options for the Remediation of Mine Sites*, June 21, 2001.

Mt. Washington Mine

For thousands of years the Tsolum River on Vancouver Island provided rich runs of coho, pink, chum and cutthroat salmon and steel-head trout. The river was rich in invertebrate life and free from silt.

Impacts on the river started in the 1950s with clear-cut logging that occurred along almost its entire length and breadth. The logging brought flooding, movement of gravel, silting, and smothering of fish eggs. Irrigated agriculture further reduced water levels, and farm fertilizers left their own impacts. Spawning gravel was removed from the river to build the airbase at Comox.

In 1964 Mt. Washington Copper moved into the upper watershed and built an open-pit mine. It went into receivership in 1966, leaving unreclaimed pits and waste rock piles where pyrite ores lay exposed to water and oxygen. Due to its high sulphur content, when it came into contact with oxygen and water, this ore quickly formed sulphuric acid. A copper leachate also formed and reached the Tsolum River, and from there the Courtenay Estuary. By 1985, the river was as good as dead.

Attempts to deal with the disaster, including piling all the waste rock in one place and mixing it with lime, have not worked

The copper has destroyed the fishery that used to generate \$2 million per year. It has been estimated that the cost to residents and taxpayers so far of this environmental disaster is over \$60 million.

The solution is to research and monitor water flowing from the mine to determine all the sources of contamination, to pipe the leachate from these sources to a water treatment plant, and to monitor and treat the problem in perpetuity. Despite pressure from citizens' groups, this has not yet happened. The estimate to build the treatment plant is \$6 million.

Source: Father Charles A.E. Brandt, "Tsolum: Concern for this damaged river grows," *Victoria Times Colonist*, October 10, 1995; and Environmental Mining Council of British Columbia and BC Wild, *Acid Mine Drainage: Mining and water Pollution Issues in BC*, (Victoria: EMCBC, 1998).

In an attempt to obtain more accurate data on outstanding liability in the province, mining companies have recently been requested to estimate outstanding reclamation liabilities as part of their permit application and in their Annual Reclamation Reports.³⁹ Not all companies are complying yet with this request.⁴⁰ The discrepancy in the figures reported by the Ministry of Energy and Mines (presented above) imply substantial uncertainty as to the actual liability associated with operating mines in the province. Indeed, while the Ministry of Energy and Mines has records of the amount and type of security held for mine reclamation in the province, they have less information on the estimated reclamation liabilities at operating mines. And that is to say nothing of the liability associated with historical metal mines in the province, of which there are thousands.⁴¹

The Historic Mines Sites program of the Ministry of Energy and Mines was established to determine how many mine sites there were that had ceased production, had no *Mines Act* permit and had the potential for environmental and health and safety issues.⁴² The Historic Mines Sites Program identified 1,898 sites. Of the 1,898 Historic Mine Sites, about 1,170 were metal producers. While the reclamation costs for these sites are unknown,⁴³ cleanup costs associated with the Britannia mine demonstrate that such expenses can be substantial. Cleanup of Britannia is expected to cost the province at least \$45 million; the province has already spent \$75,000 on monitoring at the site. Using estimated remediation costs of historical sites in Ontario and adjusting it to account for the level of mining activity in British Columbia, which is approximately 42% of that in Ontario, suggests that the potential costs of remediating historical sites in BC could be at least \$190 million.

Obtaining firm estimates of the provincial liability and developing plans to deal with it does not seem to be on the policy horizon in British Columbia. The BC government has been engaged in multi-stakeholder consultations to, among other things, review the province's mine reclamation security policy. One of the options being considered is "self-assurance." The objective of *realizable* financial securities is to insure that if the operating company defaults, for whatever reason, the public will not be left carrying the financial burden of mine reclamation. Behind this rationale is a long history of mining companies and specific projects thought to be very solid, but that nonetheless failed through unforeseen market forces or bad management practices. By allowing companies to "self assure," on the basis of the current financial position of a company, the Government of British Columbia, like that of Ontario, will be exposing the public to a liability that has the potential to be substantial.

There is also an expectation that cuts under the new Liberal government will greatly reduce the department's ability to monitor mines. One option for dealing with reduced operating budgets being considered is to cease issuing permits for primary exploration. Under this option the province would agree to assume the liability of reclaiming primary exploration sites.⁴⁴

Mineral Rights Compensation

In 1998, the provincial government implemented a policy unique to BC to compensate mine operators in cases where mineral title is expropriated for the creation of parks. Compensation is negotiated based on “the value that would have been paid to the holder of the expropriated mineral title if the title had been sold on the date of expropriation, in an open and unrestricted market.”^{44b} In contrast to the initiatives described thus far in this chapter, this recent initiative is designed to provide incentive, in the form of compensation, to mine operators to relinquish their mineral rights for the purpose of park creation in the province. Thus, while the expenditures described up to this point were either associated with promoting metal mining or facilitating metal mine development and operations, this expenditure is associated with limiting and reducing mineral title in the province. Nonetheless, this expenditure would not occur were it not for the existence of mines in British Columbia and as such is included in the total value of public expenditures on metal mines in British Columbia.

Table 14: BC – Program Expenditures – Mineral Rights Compensation

Initiative	Time Span	Description
Mineral Compensation	April 1998	If mineral title (mineral claims or leases) is expropriated for the creation of parks, compensation is payable to the holder of a mineral title in an amount equal to the value of the rights expropriated. <i>Expenditure on this initiative in 2000 was \$992,773.</i> ⁴⁵

Public Expenditures Summary

Table 15 summarizes public expenditures on metal mining in British Columbia for 1994/5 and 2000/1. As the figures indicate, public expenditures on metal mining related to prospecting and exploration, development and operations, and mine closure, remediation and long-term care, without accounting for expenditures related to the Investment Allowance or the New Mine Allowance, remained relatively stable between 1994/5 and 2000/1. Including expenditures on either the Investment Allowance or the New Mine Allowance would increase the figures presented in Table 15. Between 1994/5 and 2000/1, there was a general decline in programmatic expenditures and a general increase in tax expenditures.

Analysis to Remove Non-Metal Mining-Related Expenditures

As was stated earlier in the report, to the extent that the Mines Division of the Ministry of Energy and Mines and the British Columbia Geological Survey are responsible for activities beyond those associated only with metal mining, by including the total budgets for these departments we will be overestimating public expenditures on metal mining in BC. Likewise, the Mineral Rights Compensation program applies not just to metal mining but non-metal mining as well. To address this concern, we conduct an analysis in which we attempt to account for the responsibilities of the various departments over metal mining versus non-metal mining and coal mining. We do this by adjusting the ex-

A Dangerous Precedent

As part of a plan to allow the Huckleberry Mine in British Columbia to continue operating, “[t]he Province of BC through Energy and Mines will agree that there will be no increase in the reclamation bonding requirement for a period of 2 years, provided there is no material change in the mine plan which would significantly increase the potential liability to the Province.”

Source: Government of British Columbia, Huckleberry Economic Plan, 1999.



Windy Craggy

In May 1993, Royal Oak Mines Inc. (ROM) acquired a 39.3% controlling interest in Geddes Resources, whose only significant asset was a 100% interest in a block of mineral claims located in the vicinity of Windy Craggy mountain in northwestern BC. In June 1993, the provincial government announced that it would permanently protect the region that included Windy Craggy, through the creation of Tatshenshini Provincial Park, and would provide compensation for holders of mineral claims in the area.

The compensation package for ROM amounted to \$166 million, and included:

- \$29 million direct compensation for the loss of the Windy Craggy property
- \$50 million of taxpayers' money invested in Kemess (another mine owned by Royal Oak) in return for a royalty on copper sold. (This royalty was not being received as of February 1999.)
- \$20 million for Kemess mine development, to be matched by Royal Oak
- \$49 million for construction of a power line from BC Hydro's Kennedy substation near Mackenzie, 320 kilometres to the Kemess property
- \$14 million for a road from the site to the BC Rail line for an airstrip and an emergency health clinic at the mine site
- \$4 million to find and train people to work on the Kemess mining project

Source: Environmental Mining Council of British Columbia, personal communication, 2002.

Table 15: BC – Summary of Total Expenditures

Initiative	1994–1995	2000–2001
Prospecting and Exploration		
Direct Expenditures:		
Prospector's Assistance Program	500,000	500,608
Explore BC	3,400,000	n/a
Program Expenditures:		
Geological Survey Branch	5,537,000	4,097,330
Corporate Resources Inventory Initiative	337,500	246,000
Tax Expenditures:		
Mining Exploration Tax Credit	n/a	4,000,000
Total Prospecting and Exploration (current\$)	9,774,500	8,843,938
Total Prospecting and Exploration (2000\$)	10,496,671	8,843,938
Development and Operations		
Program Expenditures:		
Mineral Titles Branch	2,300,000	1,854,959
Land Management Policy Branch	4,900,000	n/a
Environment and Land Use	n/a	278,119
Mine Health and Safety Branch	2,440,000	n/a
Mine Review and Permitting Branch	1,700,000	n/a
Mines Branch	n/a	6,814,405
Mineral Development Agreement	1,600,000	n/a
Tax Expenditures:		
New Mine Allowance	n/a	*
Investment Allowance	*	*
Manufacturing and Processing Tax Credit	n/a	4,307,692
Total Development and Operations (current\$)	12,940,000	13,225,175
Total Development and Operations (2000\$)	13,896,048	13,225,175
Closure, Remediation and Long-Term Care		
Elimination of Tax on Reclamation Funds	n/a	0
Mineral Rights Compensation	n/a	992,733
Total Public Expenditure (current\$)	22,714,500	23,091,886
Total Public Expenditure (2000\$)	24,392,719	23,091,886
n/a = initiative was not in place and thus is not associated with any expenditure		
* = the Government of British Columbia does not have an estimate of expenditure on this initiative		

penditure figures according to the relative value of production for metal mining versus that of non-metal mining and coal mining. The Mineral Rights Compensation Program is adjusted in the same manner.

In addition, in some jurisdictions, mines departments and ministries carry out regulatory activities related to the protection of public goods (e.g., health, safety and environmental protection) as well as the provision of research, promotional or marketing services to the industry. In these cases efforts were made to disaggregate regulatory expenditures from other expenditures on the basis of budgetary or personnel allocations. Below we adjust total expenditure figures to exclude activities related to regulatory activities.

The Mines Division of the Ministry of Energy and Mines

In BC the Mines Division is responsible for metal mining, industrial mineral mining and structural materials, and coal mining. In 1994 the total value of metal and non-metal (industrial mineral, structural materials and coal) production in British Columbia was \$2,676,670,000. The metal portion of this figure was \$1,354,351,000 or 51% of the total value. This figure can be used to adjust the budget of the Mines Division.⁴⁶ The total budget for the Mines Division in 1994 was \$11,340,000. Taking 51% of this figure yields a value of \$5,737,854. A similar

methodology can be used to adjust the 2000 figures. In 2000, the value of metal constituted 55% of the total value of metal and non-metal production (industrial minerals, structural materials and coal) in British Columbia. Fifty-five percent of the 2000 budget of the Mines Division (\$8,947,483) is \$4,899,067.

Mineral Rights Compensation

The Mineral Rights Compensation can be adjusted using the same methodology employed above. In 2000, the value of metal constituted 55% of the total value of metal and non-metal production (industrial minerals, structural materials and coal) in British Columbia. Fifty-five percent of the expenditure on the Mineral Rights Compensation Program (\$992,773) is \$543,579.

The British Columbia Geological Survey

The work of the British Columbia Geological Survey also relates to metals and non-metals. In this analysis, we adjust the budget figure for the BC Geological Survey to account for only work related to metal mining. Using the same figures as before, we adjust the 1994/5 budget for the BC Geological Survey to 51% of the total budget for that year and we adjust the 2000/1 budget to 55% of the total budget for that year. Fifty-one percent of the total budget of the BC Geological Survey in 1994 (\$5,537,000) is \$2,801,631. Fifty-five percent of the total budget of the BC Geological Survey in 2000 (\$4,097,330) is \$2,243,435.

Regulatory Activity Versus Non-Regulatory Activity

In addition to the above analyses, it is also useful to adjust public expenditure figures to reflect only expenditures associated with facilitating and promoting metal mining in the province, thus excluding pure regulatory functions of mine ministries. In 1994, two branches of the Mines Division carried out regulatory functions related to metal mining in British Columbia, namely the Mine Review and Permitting Branch and the Mine Health and Safety Branch. To exclude all regulatory functions of the Mines Division in our public expenditure estimates we therefore remove the budgets of these two branches in our total estimate. Together, these two branches constitute 37% of the total budget of the Mines Division.⁴⁷ Because a detailed breakdown of the individual components of the 2000/1 Mines Branch budget is not available, we cannot be certain the portion the Mines Branch activities that were strictly regulatory. However, we can use the portion of the 1994/5 budget that was regulatory (37%) as a proxy for 2000/1 regulatory activities.⁴⁸ Reducing by 37% the estimate presented earlier for the Mines Division (\$4,899,067) yields total estimated non-regulatory expenditures for the Mines Branch of \$1,708,726. (The Mines Division in 1994/5 included the Mineral Titles Branch, Land Management Policy Branch, Mine Health and Safety Branch, and Mine Review and Permitting Branch. In 2000/1, it included the Mineral Titles Branch, Environment and Land Use Branch and Mines Branch.)

Summary of Analysis to Remove Non-Metal Mining and Regulatory Expenditures

Taking the above adjustments into account reduces our estimate for total public expenditures on metal mining by 46% in 1994/5 and 36% in 2000/1. Total public expenditures in 1994/5 is reduced from \$24,392,719 to \$13,189,661 (2000\$). In 2000/1, total public expenditures declined from \$23,091,866 to \$15,378,222. Table 16 summarizes public expenditures on metal mining in British Columbia after conducting analyses to eliminate expenditures associated with non-metal mining and purely regulatory activities.

After adjusting for Table 16's analysis, the increase in public expenditures between 1994/5 and 2000/1 is 17%.⁴⁹ Expenditures on closure, remediation and long-term care represents less than 4% of the total public expenditure on metal mining.

**Table 16: BC – Summary of Total Expenditures –
Non-Metal Mining and Regulatory Expenditure Removed**

Initiative	1994–1995	2000–2001
Prospecting and Exploration		
Direct Expenditures:		
Prospectors Assistance Program	500,000	500,608
Explore BC	3,400,000	n/a
Program Expenditures:		
Geological Survey Branch	2,801,631	2,243,435
Corporate Resources Inventory Initiative	337,500	246,000
Tax Expenditures:		
Mining Exploration Tax Credit	n/a	4,000,000
Total Prospecting and Exploration (current\$)	7,039,131	6,990,043
Total Prospecting and Exploration (2000\$)	7,559,204	6,990,043
Development and Operations		
Program Expenditures:		
Mineral Titles Branch	1,163,732	1,015,656
Land Management Policy Branch	2,479,319	n/a
Environment and Land Use	n/a	152,280
Mine Health and Safety Branch	0	n/a
Mine Review and Permitting Branch	0	n/a
Mines Branch	n/a	2,368,972
Mineral Development Agreement	1,600,000	n/a
Tax Expenditures:		
New Mine Allowance	n/a	*
Investment Allowance	n/a	*
Manufacturing and Processing Tax Credit	n/a	4,307,692
Total Development and Operations (current\$)	5,243,082	7,844,600
Total Development and Operations (2000\$)	5,630,457	7,184,354
Closure, Remediation and Long-Term Care		
Elimination of Tax on Reclamation Funds	n/a	0
Mineral Rights Compensation	n/a	543,579
Total Closure, Remediation and Long-Term Care (2000\$)		543,579
Total Public Expenditure (current\$)	12,282,213	15,378,222
Total Public Expenditure (2000\$)	13,189,661	15,378,222

n/a = initiative was not in place and thus is not associated with any expenditure
* = the Government of British Columbia does not have an estimate of expenditure on this initiative

Note that the figures presented in Table 16 do not include the liability associated with either operating or abandoned mines in British Columbia. Were the provincial government to remediate such mine sites, total expenditures in British Columbia associated with metal mines would increase substantially. Despite the significant, and to a certain degree as of yet unknown, liabilities associated with metal mine site cleanup in BC, current expenditures on mine closure, remediation and long-term care are very low.

Completing the Picture: Recent Initiatives

In 2001 the British Columbia government implemented two very important tax initiatives related to mining in the province: the BC Mining Flow-Through Share Tax Credit (BC MFTS) and the Sales Tax Exemption for Mining Equipment and Machinery. Each of these initiatives is described briefly in Table 17.

The estimated 17% increase in total public expenditures since 1994/5 described above does not account for expenditures associated with either of these initiatives. The BC MFTS was implemented to encourage individuals in British Columbia to undertake mineral exploration activities, yet the Government of British Columbia has not to date evaluated the success and associated expenditures of this initiative. Comments by the BC Ministry of Finance, however, indicate that the effect of recent tax initiatives to support mineral exploration could be substantial. According to the BC Ministry of Finance, “the Mining Exploration Tax Credit com-

bined with the ability of companies wishing to flow through some or all of their METC benefits to investors and the federal government’s temporary tax-assisted exploration incentive program has the effect of reducing BC investors’ net costs to approximately 35% of their original investment.”⁵¹ This means that for every dollar invested in exploration in BC, public expenditure on that dollar (federal and provincial combined) is 65 cents.

The Sales Tax Exemption for Mining Equipment and Machinery was implemented in July of 2001 and replaced the Manufacturing and Processing Investment Tax Credit put in place in 2000. Total expenditure on this initiative

for 2001 is estimated at \$78 million. The British Columbia government estimates that the mining portion of this exemption was \$16.8 million in 2001.⁵²

Substituting the estimated \$4.3 million spent on the manufacturing and processing tax credit with the \$16.8 million associated with the sales tax exemption that replaced it, increases total public expenditures substantially. Indeed, taking this initiative into account increases recent public expenditures from \$15,378,222 to \$27,870,529 in 2001/2 and results in a 111% increase in expenditures over the 1994/5 figures.

III. Benefits

The metal mining industry, along with the mining industry more generally, has often been touted as a sector that built Canada. While historically this may have been the case, today it is contributing less and less to the British Columbia economy. In times of increasing public expenditures and diminishing returns for public investment in metal mining, it is important to evaluate the benefits derived from the metal mining industry.

Table 18 describes the benefits from metal mining in relation to other industries. It also presents trends in the benefits over time. Benefits considered in this analysis include employment, royalty payments, and contribution to GDP.

The data in Table 18 reveal some striking points. First, metal mine employment declined between 1994/5 and 2000/1 by 6%. In contrast to this, all industry employment in British Columbia increased by over 11%. At the same time, the contribution of metal mine employment to all industry employment declined between 1994/5 and 2000/1 by over 15%.

Second, between 1994/5 and 2000/1 provincial royalties from metal mines declined substantially, by almost 30%,

Table 17: BC – New Tax Expenditures

Initiative	Time Span	Description
British Columbia Mining Flow-Through Share Tax Credit (BC MFTS)	July 30, 2001 to January 1, 2004	The BC MFTS program allows individuals who invest in flow-through shares to claim a non-refundable tax credit equal to 20% of their BC flow-through mining expenditures. Any unused credit at the end of a taxation year may be carried back three years or forward 10 years. BC flow-through mining expenditures are specific exploration expenses that are incurred after July 30, 2001 and before January 1, 2004 and renounced by the corporation issuing the flow-through shares. <i>The Government of British Columbia (Ministry of Finance/ Mines Energy Petroleum) was unable to provide an estimate of the value of this tax expenditure.</i>
Sales Tax Exemption for Mining Equipment and Machinery	2001 and ongoing	This initiative provides a sales tax exemption for the purchase, lease or use of qualifying machinery and equipment used in coal and mineral exploration and development and operation of coal and mineral mine sites. <i>Expenditure on the mining portion of this initiative for 2001/2 was estimated at \$16.8 million.</i> ⁵⁰

Table 18: BC – Metal Mining Benefits

Factor	1994-1995	2000-2001	% Change 94-00
Metal Mine (MM) Employment	3,564	3,350	-6.00
All Industries Employment in BC	1,754,000	1,949,000	11.12
MM % of Total Employment	0.20	0.17	-15.41
BC Metal Mine Royalties ⁵³	48,700,601	34,143,000	-29.89
Total Tax Revenue	15,228,414,948	17,908,000,000	17.60
MM % of Total Tax Revenue	0.32	0.19	-40.38
Metal Mine Contribution to GDP	527,985,497	574,224,337 ⁵⁴	8.00
Total All Industries GDP	93,618,934,965	115,039,137,642	22.88
MM % of Total All Industries GDP	0.56	0.50	-12.11

while total tax revenue increased by over 17%. In addition, royalties from metal mines contributed less to total tax in 2000/1 than they did in 1994/5 by 40%.

Finally, it is worth noting that the contribution of the metal mining industry to GDP has not kept pace with the contribution of all industries to GDP. Furthermore, the metal mining industry, while having a reputation for being a major contributor to the provincial economy constituted less than 1% of the contribution of all industries to provincial GDP. It is also worth noting that the value of wages and salaries for metal mine workers in BC in 1994 was \$231,864,000. This represented just over half (53.9%) of the metal mine contribution to GDP in the same year. In other words, despite an 8% increase in the metal mine contribution to BC's GDP from 1994/5 to 2000/1, metal mine employees are only realizing a portion of the value of metal mining in the province.

While mining may have been a sector that built Canada historically, as the above discussion reveals the benefits of the metal mining industry, at least in terms of employment and royalty payments are, of late, declining. In Table 19, we explore the relationship between the benefits of metal mining and public expenditures (using the figures presented in the analyses to remove non-metal mining-related and regulatory expenditures above) by presenting ratios of benefits (employment, royalty payments, and contribution to GDP) to total public expenditures.

Of particular interest here is the trend in the ratios over time. For each of employment, royalty payments and contribution to GDP, the ratio of benefits to public expenditures declined between 1994/5 and 2000/1. In other words, the provincial government is getting less and less return in terms of employment, royalty payments and contribution to GDP for every dollar it invests in the metal mining industry in British Columbia.

In the case of employment, the figures indicate that, for every job in metal mining, the Government of British Columbia is spending more and more public money. Conversely, it means that for every dollar spent on metal mines in BC, fewer jobs in the metal mining industry are maintained. Indeed, while

public expenditure per employee was \$3,701 in 1994/5 it increased by 24% to \$4,591 in 2000/1.

A similar message is revealed for both royalty payments and contribution to GDP. The ratio of royalty payments to public expenditures fell by 40% between 1994/5 and 2000/1. Table 20 summarizes royalty payments and public expenditures in BC for the study period. As the figures indicate, as royalty payments decline, public expenditures increase. And while royalty payments in 1994/5 outweighed public expenditures by a factor of approximately 3.7, in 2000/1 royalty payments outweighed public expenditures by a factor of 2.2, a decrease of 40%.

Table 19: BC – Ratio of Benefits to Expenditures

Factor	1994-1995	2000-2001	% Change 94-00
Employment	0.00027	0.00022	-19
BC Royalty Payments	3.69233	2.22022	-40
Contribution to GDP	40.03020	37.07999	-7

Table 20: BC – Ratio of Royalties to Expenditures

Factor	1994-1995	2000-2001	% Change 94-00
Royalty Payments	48,700,601	34,143,000	-30
Total Public Expenditures	13,189,661	15,378,222	17
Royalties-to-Expenditures Ratio	3.69233	2.22022	-40

The ratio of contribution to GDP to public expenditures fell by 7.4 % between 1994/5 and 2000/1, despite the 8% overall increase in contribution to provincial GDP by the metal mining industry.

Note that because the recently introduced flow-through share tax credit and sales tax exemption are outside of our study period, we have not included expenditures on these initiatives when calculating the benefit-to-expenditure ratios presented in Table 20. The ratios would be substantially altered were these recent tax initiatives taken into account. Replacing the production and manufacturing investment tax credit with the sales tax exemption results in an increase in total public expenditures of 111% (in contrast to 17%). This increase in expenditures reduces the 2000/1 benefit-to-expenditure ratio substantially and results in even greater reductions in benefit-to-expenditure ratios over time. For example, employing the sales tax exemption rather than the production and manufacturing investment tax credit results in reductions in the employment, royalty payments, and contribution to GDP benefit-to-expenditure ratios of 56%, 67% and 49% respectively. These figures are presented here for illustrative purposes only to give a sense of the impact of the 2001 BC budget initiatives.

The analysis of the benefits flowing from the industry is further complicated by consideration of the impact of shifts in world markets for metals on the fortunes of the BC mining industry, as illustrated by the sidebar “Economic Impacts” on page 40.

IV. Conclusions

Public expenditures on the metal mining industry in British Columbia are substantial. Our conservative analysis indicates that in 1994/5 the provincial government spent \$13,189,661 (2000\$) to encourage, facilitate and manage metal mining in British Columbia. By 2000/1, that figure had increased by 17% to \$15,378,222 (2000\$). This increase was accompanied by a general decline in programmatic (i.e., government division) expenditures and an increase in tax expenditures.

In this analysis, we did not include expenditures on government ministries and divisions that have responsibilities for metal mining in British Columbia, for example the BC Ministry of Environment, Lands and Parks, beyond the Mines Division of the Ministry of Energy and Mines. Similarly, we have not fully accounted for the public liability associated with abandoned mine and exploration sites in the province. This is due to the fact that the Government of British Columbia has no estimate of the actual liability. In addition, there are several tax initiatives in place in BC for which the provincial government was unable to provide an estimate of expenditures and as such estimated public expenditure on these initiatives is currently not included in the values for total public expenditures presented here.

The provincial government dedicates substantial public dollars to exploration and mine development activities in the province, especially during times of low metal prices. This expenditure distorts market signals for metals in British Columbia and biases markets towards virgin mineral extraction rather than metal recycling.

Economic Impacts of World Copper Prices on BC's Metal Mining Sector

Between 1994 and 2000, public expenditure on the metal mining industry in British Columbia increased by 17%. During the same period, the value of metal production in the province increased by only 8%. Between 1994 and 2000 there was a 26% decline in the value of production relative to public expenditure. This implies that the provincial government is getting less value per dollar invested, and that the effectiveness of the provincial government in influencing the growth and success of the metal mining industry is questionable.

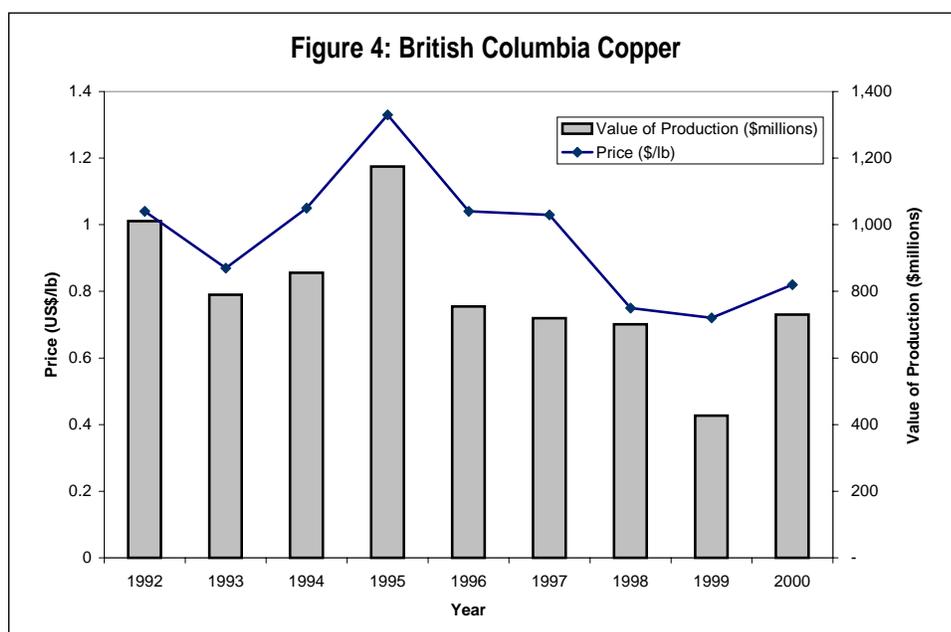
Indeed, experience shows that the ability of the provincial government to influence the value of metal production in BC is somewhat limited by the substantial effect of the world market for metal commodities, which essentially determines the price of metals in British Columbia. The British Columbia economy is a relatively small, open economy that trades in competitive global markets. This means that, for most goods, British Columbia has little influence on world prices.⁵⁵ Metal mining is no exception to this rule.

Metal prices, combined with the level of production, determine the total value of metal production in a particular region.⁵⁶ Since 1994, world prices for both copper and gold, the two most important metals to the BC economy, have declined. The price of copper fell by 22% between 1994 and 2000 while the price of gold declined by 27%.⁵⁷ Thus, for the total value of production of gold and copper to increase in British Columbia during this time period, the amount of metal production taking place would have to increase enough to offset the decline in world prices. During times of low commodity prices, the British Columbia government, like other provincial governments in Canada, through programs and tax incentives designed to increase exploration and mine development, works to increase production in an attempt to offset declines in prices such that the total value of production will increase. As the following discussion will reveal however, the success of such attempts is uncertain at best.

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Despite the substantial increase in public expenditures on metal mining in British Columbia, our analysis reveals that the Government of British Columbia is reaping diminishing returns in terms of the value of metal production, employment, royalty payments and contribution to GDP. Between 1994/5 and 2000/1, public expenditures on metal mining in British Columbia increased by 17%. During the same period, the value of metal production increased by only 8% and the contribution of the metal mining industry to provincial GDP increased by 8%. These figures hint at diminishing returns on public investment in metal mining in British Columbia. When one considers the trend in employment and royalty payments over the same period of time, the argument of diminishing returns becomes even more compelling. Despite the 17% increase in public expenditures on metal mining in British Columbia between 1994/5 and 2000/1, employment in metal mining declined by 6%. Similarly, royalty payments from the metal mining industry in BC declined by almost 30% during the same period.

An investigation of expenditure-to-benefit ratios associated with metal mining in British Columbia reinforces questions regarding the value of additional government expenditures on this industry. Indeed, the benefits of metal mining in terms of employment, royalty payments, and contribution to GDP per dollar spent by the provincial government on metal mining in the province are declining substantially — by 19%, 40% and 7% respectively.



As Figure 4 indicates, when the world price of copper decreases, so too does the value of production in British Columbia. By the same token, when the price of copper increases, so too does the value of production in the province. The strong relationship between the value of production and the global price of metals, coupled with the inability of the metal mining industry in British Columbia to drive global metal prices, compromises the strength of policy intervention by the British Columbia government in influencing the value of metal production in British Columbia. Even in the case of gold, where the total value of production increased despite declining world prices, the increase was associated with diminishing returns on the investment.

Chapter Endnotes

- ¹ British Columbia Ministry of Finance, British Columbia Financial and Economic Review, (Victoria: Government of British Columbia, 2001).
- ² Now called Ministry of Air, Water and Land.
- ³ British Columbia Ministry of Finance, British Columbia Financial and Economic Review, (Victoria: Government of British Columbia, 2001).
- ⁴ Ibid.
- ⁵ <http://www.nrcan.gc.ca/mms/efab/tmrd/menu08.htm>.
- ⁶ PDAC, A Guide to the Regulatory Requirements and Procedures for Exploration, Development and Mining in Canada: British Columbia, (Toronto: PDAC, January 2000).
- ⁷ British Columbia Ministry of Finance, 1995 Budget Report, (Victoria: BC Ministry of Finance, 1995), British Columbia Ministry of Finance, Public Accounts 2000/01, (Victoria: BC Ministry of Finance, 2002).
- ⁸ David Boyd, "Cuts to the Ministry of Water, Land and Air," Victoria Times Colonist, 2002.
- ⁹ See West Coast Environmental Law, "Deregulation Backgrounder: Bill 54 — Miscellaneous Statutes Amendment Act, 2002" May 23, 2002, <http://www.wcel.org/deregulation/bill54.pdf>.
- ¹⁰ See West Coast Environmental Law, "Deregulation Backgrounder: Bill 38 — The New Environmental Assessment Act," May 15, 2002, <http://www.wcel.org/deregulation/bill38.pdf>.
- ¹¹ Ministry of Energy and Mines, Mines and Petroleum Resources, Mineral Resources Division, British Columbia Mineral Exploration Review 1994, (Victoria: Government of British Columbia, 1995), p. 22.
- ¹² Ministry of Energy and Mines, Ministry of Energy and Mines Performance Report 2000/2001, (Victoria: Government of British Columbia, 2001), p. 6.
- ¹³ Ministry of Energy and Mines, Mines and Petroleum Resources, Mineral Resources Division, British Columbia Mineral Exploration Review 1994, (Victoria: Government of British Columbia, 1995), p. 22.
- ¹⁴ Ibid.
- ¹⁵ Ministry of Energy, Mines and Petroleum Resources, 1994-1995 Annual Report, (Victoria: Government of British Columbia, 1995), p. 20.
- ¹⁶ Ministry of Energy and Mines, Ministry of Energy and Mines Performance Report 2000/2001, (Victoria: Government of British Columbia, 2001), p. 6.
- ¹⁷ BC Provincial Geologists Journal, 1994, p. 21.
- ¹⁸ Ministry of Finance and Corporate Relations, "Table F2: Economic Development and Business Assistance Programs Tax Expenditure," British Columbia Budget Report 2001 (Victoria: Ministry of Finance, 2001), p. 118.
- ¹⁹ Ministry of Energy, Mines and Petroleum Resources, 1994-1995 Annual Report, (Victoria: Government of British Columbia, 1995), p. 21.
- ²⁰ Ministry of Energy and Mines, Ministry of Energy and Mines Performance Report 2000/2001, (Victoria: Government of British Columbia, 2001), p. 6.
- ²¹ Ministry of Energy, Mines and Petroleum Resources, 1994-1995 Annual Report, (Victoria: Government of British Columbia, 1995), p. 22.
- ²² Ministry of Energy and Mines, Ministry of Energy and Mines Performance Report 2000/2001, (Victoria: Government of British Columbia, 2001), p. 6.
- ²³ Ministry of Energy, Mines and Petroleum Resources, 1994-1995 Annual Report, (Victoria: Government of British Columbia, 1995), p. 23.
- ²⁴ Ibid. p. 24.
- ²⁵ Ministry of Energy and Mines, Ministry of Energy and Mines Performance Report 2000/2001, (Victoria: Government of British Columbia, 2001), p. 6.
- ²⁶ Ministry of Energy and Mines, Mines and Petroleum Resources, Mineral Resources Division, British Columbia Mineral Exploration Review 1994, (Victoria: Government of British Columbia, 1995), p. 23.
- ²⁷ Gregory New (ed.), Canadian Mining Taxation 2001 Edition. (Toronto: PricewaterhouseCoopers Ltd., 2001).
- ²⁸ Total expenditure on this initiative was \$20 million in 2000/1. We estimate the metal mine portion of this expenditure to be \$4,307,692 based on the portion of the recent sales tax exemption attributable to mining.
- ²⁹ Ministry of Energy and Mines, personal communication, March 4, 2002.

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Gold production in British Columbia in 1994 was 12.2 million grams. By 2000, it had increased substantially to 25.2 million grams. While the increase in production over this time period exceeded 106%, the increase in the value of production was hampered by low prices of gold. The value of gold production in British Columbia between 1994 and 2000 increased by approximately 63%, substantially less than the 106% increase in production. Thus, in the case of gold, while the price of gold fell between 1994 and 2000, the increase in production of gold in BC was more than enough to offset the decline in world gold prices; an overall increase in the value of production resulted, albeit at a rate less than that of overall production.

The trend in the value of copper production in British Columbia between 1994 and 2000 tells a slightly different story. In 1994 copper production in BC was 246 million kilograms. By 2000, it had increased by approximately 9.9% (BC Stats) to 270 million kilograms. However, over the same time period, the value of copper production in British Columbia fell from \$797 million to \$730 million, a decline of 8.4%. This implies that the effect of world prices outweighed the effect of the increased production and, therefore, the overall value of production fell. Figure 4 demonstrates the strong link between global commodity prices and the value of copper production in British Columbia.

- ³⁰ This report will be released in spring of 2002.
- ³¹ Ministry of Energy and Mines, personal communication, April 4, 2002.
- ³² Mineral, Oil and Gas Revenue Branch, Government of British Columbia, personal communication, January 17th, 2002.
- ³³ BC refers to “Historic Sites,” which are sites that have produced but had no *Mines Act* permit.
- ³⁴ British Columbia Advisory Council on Mining – Mine Reclamation Security Policy Taskforce, Report and Recommendations to the Minister of Employment and Investment, (Victoria: Ministry of Employment and Investment, April 1996), p. 15-16.
- ³⁵ Ministry of Energy and Mines, personal communication, February 26, 2002.
- ³⁶ Ministry of Energy and Mines, personal communication, March 21, 2002.
- ³⁷ *Ibid.*, April 4, 2002.
- ³⁸ *Ibid.*
- ³⁹ *Ibid.*, March 21, 2002.
- ⁴⁰ Ministry of Energy and Mines, personal communication, March 4, 2002.
- ⁴¹ *Ibid.*, April 4, 2002.
- ⁴² *Ibid.*
- ⁴³ *Ibid.*
- ⁴⁴ Ministry of Energy and Mines, March 4, 2002, personal communication.
- ^{44b} Mineral Rights Compensation Regulation, B.C. Reg 19/99, 5(1).
- ⁴⁵ Ministry of Energy and Mines, Ministry of Energy and Mines Performance Report 2000/2001, (Victoria: Government of British Columbia, 2001), p. 6.
- ⁴⁶ Including Mineral Titles Branch, Land Management and Policy Branch, Mine Health and Safety Branch, and Mine Review and Permitting Branch in 1994/5. Including Mineral Titles Branch, Mines Branch, and Environment and Land Use in 2000/1.
- ⁴⁷ Including the Land Management and Policy Branch, the Mineral Titles Branch, the Mine Review and Permitting Branch, and the Mine Health and Safety Branch.
- ⁴⁸ To the extent that regulatory activities are a greater or lesser portion of total activities of the Mines Branch in 2000/1 relative to 1994/5, we will be under- or over-estimating total non-regulatory expenditures by the Mines Branch in 2000/1.
- ⁴⁹ The increase in expenditures after conducting analyses to remove non-metal mining-related and regulatory expenditures is mainly due to the fact that the Mines Division was adjusted downward by less in 2000 than in 1994 (because metal mining constituted a relatively greater portion of the total value of metal and non-metal mineral production in 2000 versus 1994).
- ⁵⁰ Government of British Columbia, personal communication.
- ⁵¹ Ministry of Energy and Mines, British Columbia Mineral Exploration Review 2000, (Victoria: Government of British Columbia, 2001).
- ⁵² Government of British Columbia, personal communication.
- ⁵³ Includes mine tax and acreage tax.
- ⁵⁴ Between 1994 and 2000 Statistics Canada altered its industry classification system from Standard Industrial Classifications (SICs) to North American Industry Classifications (NAICs). Thus, GDP figures from Statistics Canada for 1994 are not directly comparable to 2000 figures. To maintain comparability between 1994 and 2000, we used the 1994 GDP figure to estimate a figure for 2000. The estimate is based on the increase in the value of metal production that took place between 1994 and 2000.
- ⁵⁵ British Columbia Ministry of Finance, British Columbia Financial and Economic Review, (Victoria: Government of British Columbia, 2001).
- ⁵⁶ This is distinct from profitability that is determined not just by these two factors but also by operating and regulatory costs.
- ⁵⁷ British Columbia Ministry of Finance, British Columbia Financial and Economic Review, (Victoria: Government of British Columbia, 2001).

IV. Ontario

I. Introduction

The Metal Mining Industry in Ontario

Ontario is Canada's largest producer of metal minerals,¹ producing 24% of the metallic minerals in the country in 2000.² The three highest value metallic minerals produced in Ontario in 2000 were nickel (\$1.49 billion), gold (\$0.96 billion) and copper (\$551 million). Figure 5 shows the principal mining areas of Ontario.

Legislative and Institutional Framework for Metal Mining in Ontario

The key government agency in charge of metal mining in Ontario is the Mines and Minerals Division of the Ministry of Northern Development and Mines (MNDM). The Mines and Minerals Division provides basic geological information gathering and interpretation in support of Ontario's exploration, mine development and mining sectors. The Mines and Minerals Division is also responsible for administering the *Mining Act*, the major piece of legislation of relevance to metal mining in Ontario. The *Mining Act* governs all stages of mine development including staking a claim, acquiring mineral title, beginning production and planning for mine closure.

Metal Mining and the "Common Sense Revolution"

The mining industry emerged as a major beneficiary of the "Common Sense Revolution" policies of the Progressive Conservative government elected in 1995. Between 1995 and 2000, the Ontario government implemented a series of legislative, policy and program initiatives to support and promote the Ontario mining industry.

In January 1996, the Ontario government amended the *Mining Act* through the *Savings and Restructuring Act*. These amendments significantly weakened the Act's provisions regarding obligations for reporting, financial assurances, and mine closure and remediation. In particular, the amendments allow mining companies to self-assure, meaning that rather than posting a bond or a credit, companies simply have to demonstrate financial capacity to close and decommission a mine site. Self-assurances increase the public's exposure to cleanup costs for environmental degradation caused by mining activities.³

The budget for the MNDM's Mine Remediation Branch was reduced by \$1.3 million per year and 12 of 14 mine closure inspectors were laid off at the same time.⁴ In addition, controls on most prospecting activity under the *Public Lands*



Water Use

Mining is a major industrial use of water. Water is pumped out of open pits and underground mines, “dewatering” them to allow mining operations. Water is used to wash ore, and in milling and refining processes. Water is also used to slurry tailings from the mill to the tailings management areas, and is frequently used in a water cover of acid-generating mining tailings as a means of reducing acid generation. While the mining industry describes these uses as “temporary,” the fundamental fact remains that clean water goes in, and contaminated water comes out.

In a survey of water-taking permits for one district in northeastern Ontario, 77% of the permits issued within one year were for mining purposes. Not all of the permits included totals or limits for the amount of water use permitted, but, of those that did, average water-taking volumes were 6.4 million litres per day. Some permits are much higher, such as one issued to North American Palladium Ltd. for their Lac Des Iles Mine, northwest of Thunder Bay, for water taking at a rate of 30 million litres per day for a period of five years.

Source: MiningWatch Canada, *The Boreal Below*, December 2001.

Act were eliminated in November 1996, and prospectors were granted an exemption from environmental liability under the *Environmental Protection Act* in December 1995.⁵

In 1999, the Ministry of Natural Resources announced that, following the Lands for Life Initiative,⁶ mineral exploration would be allowed in new provincial parks and conservation reserves in the province. Mine site development would be subsequently permitted in such areas, and an area under development would be removed from the park or conservation reserve and replaced with a different area.⁷ In March 1999, also as part of its Lands for Life Initiative, the government announced Operation Treasure Hunt and committed \$19 million over two years to acquire geological data on areas of high-potential mineral belts across the province. Also in 1999, the MNDM announced the Abandoned Mine Hazard Abatement Program. This is a four-year \$27 million program to provide a systematic approach to cleaning up abandoned mine sites located on Crown land in the province.

Further support to the sector was announced in the May 2000 provincial budget. Initiatives included reducing the Mining Tax rate from 20% to 10% over five years, a 10-year Mining Tax Holiday for new remote mines, a reduction in the general corporate tax rate, and a reduction in the tax rate for manufacturing and processing, mining, logging, farming and fishing. As well, the provincial government introduced a 5% tax credit for flow-through shares. In the words of the Government of Ontario, these initiatives “send a clear message to the international mining community: Ontario is open for business.”⁸

These additional expenditures in support of the mining industry have occurred at the same time as major cuts to the budgets of the province’s environmental protection agencies. The Ministry of the Environment’s operating budget, for example, fell by 26% between 1994/5 and 2000/1.⁹

Chapter Overview

In this study we assess the benefits of and public expenditures on the metal mining industry in Ontario for the years 1994/5 and 2000/1. On the benefits side, we quantify metal mining royalties, metal mining contribution to Gross Domestic Product (GDP), and employment in the metal mining industry. On the public expenditure side we identify and quantify public expenditures on the metal mining industry in Ontario. Here we considered four types of expenditures — direct expenditures, program expenditures, tax expenditures, and infrastructure support — for three stages of metal mining — prospecting and exploration; mine development and operation; and mine closure, remediation and long-term care.

Public expenditures on metal mining takes many forms including program expenditures, tax credits, tax exemptions and support in the form of the creation and existence of formal government divisions solely responsible for fostering and managing the mining industry in the province.

Public expenditures on metal mining in Ontario are described in detail in Part II of this chapter. For each of the expenditure initiatives, we provide a description and year of implementation or time span of the initiative, as well as figures for expenditures in 1994/5 and 2000/1 where relevant and/or possible.

Benefits attributable to the metal mining sector are described in Part III. Here benefits are discussed in the context of the costs, providing benefit-to-expenditure ratios and considering trends over time.

Data Limitations and Qualifications

There are several limits to this study that warrant mention. First, while we include the budget of the Mines and Minerals Division of the MNDM, this division does not deal exclusively with metal mining in Ontario. The Mines and Minerals Division is also responsible for industrial minerals. To the extent that the Mines and Minerals Division manages, regulates and facilitates operations beyond those associated solely with metal mines, our estimates for public expenditures in this area could be exaggerated. To address this concern we conduct analyses in which we scale down the total budget figures in proportion to the relative value of metal mining versus industrial minerals.

On the other hand, there are several forms of support to the industry not captured in this analysis:

- Public expenditures related to infrastructure support, such as the capital costs of road and rail lines for metal mining in the province, as these expenditures tend to occur on a one-off basis in relation to individual mines, and therefore cannot be included in annual trend analyses;
- Spending by non-mine ministries with regulatory and promotional responsibilities regarding metal mining;
- The degree to which the current mineral royalty system captures the underlying value of the resource — an issue highlighted by the Ontario Fair Tax Commission in its 1994 report;¹⁰
- Access to water resources at no cost to the mining industry as discussed in the “Water Use” sidebar on page 44;¹¹ and
- The overriding priority of non-renewable resource extraction in provincial land-use planning policies.¹²

II. Public Expenditures on Mining in Ontario

Stage 1: Prospecting and Exploration

In this section of the chapter, we describe and quantify public expenditures related to metal prospecting and exploration in Ontario. Public expenditure is categorized as direct expenditures, program expenditures and tax expenditures.

Several key initiatives have been introduced in Ontario to facilitate and encourage prospecting and exploration in the province. Table 21 describes initiatives that entailed direct grants to either companies or individuals in 1994/5 and 2000/1. These initiatives are designed to provide increased incentive to undertake prospecting and exploration activities in Ontario and include prospector assistance funds, Operation Treasure Hunt and Ontario Mineral Exploration Technologies funds. In 1994/5, the provincial government also provided direct research grants to universities and museums in Ontario. While this

Cash for Nipigon Exploration Activity

A big chunk of provincial cash is expected to put the shine back on exploration for metals like gold and copper in the Lake Nipigon region. The Northern Ontario Heritage Fund is providing \$3.5 million so that areas with mineral potential around the lake can be mapped and put on a government website.

Source: Chronicle Journal Newspaper, March 15, 2002.

Table 21: Ontario – Direct Expenditures – Prospecting and Exploration

Initiative	Time Span	Description
Ontario Mineral Exploration Technologies (OMET)	Announced in the spring 2000 budget	OMET is a four-year \$8 million program designed to increase Ontario's attractiveness to mining and mineral exploration companies by investing in high-potential research projects that will develop new exploration technologies. <i>Expenditure in 2000/1 on OMET was \$2,500,000.</i> ¹³
Ontario Mineral Incentive Program	Eliminated in 1996	<i>Expenditure on this initiative was \$3,000,000 in 1994/5.</i>
Operation Treasure Hunt	Began in March 1999	Operation Treasure Hunt is a \$19 million two-year project to acquire geological data on areas of high-potential mineral belts across the province. <i>Expenditure on Operation Treasure Hunt over a two-year period was \$19 million. Spending in 1999/00 was \$9,600,000 and on 2000/01 was \$9,400,000.</i> ¹⁴
Ontario Prospectors Assistance Program (OPAP)	1989-1999	OPAP provided grants of up to \$10,000 annually to individual prospectors who qualified. <i>Expenditure on this program was \$2,000,000 in 1994/5.</i> ¹⁵
Ontario Prospectors Association (OPA)	Announced in 2000	The Ontario government committed up to \$4 million over three years to support the establishment of a new prospectors' association that will work with the private sector to promote grassroots mining exploration in Ontario. <i>Total expenditure over three years on this initiative will be \$4-\$1.3 million per year.</i>
Grants for Research (schools and Royal Ontario Museum)	Discontinued in 1997	This program included grants to colleges and universities working on Ontario-related geoscience projects and problems, as well as funding to the Royal Ontario Museum (ROM) for rock-age dating analyses. <i>Provincial expenditure on grants for research in 1994/5 was \$1,231,600.</i> ¹⁶

expenditure does not provide direct incentive to prospectors in the province, it is tied to increasing geoscience knowledge in the province, which can indirectly spur exploration.

Total expenditures on the initiatives in Table 21 in 1994/5 were \$6,231,600. By 2000/1, direct expenditures related to prospecting and exploration had increased to \$13,233,333. This increase in public expenditures of over 112% is largely attributable to the implementation of Operation Treasure Hunt in 1999.

The Ontario Geological Survey (OGS), comprised of the Geoscience Program, the Resident Geologist Program and the Community Resource Geologist, is the major programmatic initiative in place in Ontario for facilitating and encouraging prospecting and exploration in the province. While the Ontario Geological Survey does not entail direct expenditures to the metal mining industry, it does facilitate and increase metal exploration and prospecting in Ontario by providing up-to-date information on metal resources throughout the province.

Table 22 shows that in 1994/5 total program expenditures related to prospecting and exploration were \$14,473,600. In 2000/1, total program expenditures related to prospecting and exploration were \$11,105,400.

The major tax initiative in Ontario designed to encourage mineral exploration in the province is the recently introduced Ontario Flow-Through Share Tax Credit described in Table 23.

The Ontario Ministry of Finance does not track expenditures related to this or any other mining tax initiative in place to encourage metal mine exploration or development in the province.¹⁹

Direct, program and tax expenditures related to prospecting and exploration in Ontario are summarized in Table 24.

As Table 24 demonstrates, following the recent implementation of the OMET program, and especially Operation Treasure Hunt, there has been a substantial increase in direct expenditures to the metal mining industry in Ontario since 1994/5. This increase is in contrast to the decline in expenditures associated with the OGS. Overall, public expenditures related to prospecting and exploration in Ontario between 1994/5 and 2000/1 increased by 5%. Note that this 5% increase does not account for any expenditure associated with the flow-through share tax credit implemented in 2000. Including expenditure on this initiative would increase total public expenditures on prospecting and exploration beyond the \$24 million presented here.

Despite the 5% increase in government expenditures on prospecting and exploration, exploration and appraisal expenditures on precious and base metals in Ontario declined by 39.7% between 1994/5 and 2000/1.²⁰

Stage 2: Mine Development and Operation

In this section of the chapter, we describe and quantify public expenditures related to metal mine development and operations in Ontario. Public expenditure is categorized as program expenditures or tax expenditures.

In addition to facilitating and encouraging exploration and prospecting in the province of Ontario, there are also programmatic initiatives in place in the province associated with mine development and operations. Table 25 describes expenditures in 1994/5 and 2000/1 on items related to mine development and operations in Ontario. These initiatives, which include the Mines and Min-

Table 22: Ontario – Program Expenditures – Prospecting and Exploration

Initiative	Time Span	Description
Ontario Geological Survey (OGS)		The Ontario Geological Survey consists of a Geoscience Program and a Resident Geologist Program. OGS is responsible for providing up-to-date information on Ontario's mineral resources. <i>The budget for the Ontario Geological Survey was \$14,473,600 in 1994/5¹⁷ and \$11,105,400 in 2000/1.¹⁸</i>
Geoscience Program		The Geoscience Program, based out of Sudbury, is responsible primarily for the collection, interpretation and dissemination of geological, geochemical and geophysical data. <i>Expenditure on this program is included in the budget of the Ontario Geological Survey.</i>
Resident Geologist Program	Established in 1945 at the end of WWII	The Resident Geologist Program represents the client services component of the Ontario Geological Survey. It is designed to monitor and stimulate economically and environmentally sound development of the province's geology and mineral resources. <i>Expenditure on this program is included in the budget of the Ontario Geological Survey.</i>
Community Resource Geologist	In place for eight years in either its current form or its forerunner, the Aboriginal Prospectors Training Program	The role of the Community Resource Geologist is to provide education, information, advice and expertise regarding geology, mineral exploration and mining to First Nations Communities throughout Ontario generally, and northern Ontario particularly. <i>Expenditure on this program is included in the budget of the Ontario Geological Survey.</i>

Table 23: Ontario – Tax Expenditures – Prospecting and Exploration

Initiative	Time Span	Description
Flow-Through Share Tax Credit	Retroactive to October 18, 2000	Offered to individual shareholders, this is a 5% provincial tax credit on top of the 15% federal tax credit and the 100% deduction currently available in respect to the eligible corporate exploration expenses. <i>The Government of Ontario is unable to provide an estimate of the value of the tax expenditure of this initiative.</i>

Table 24: Ontario – Summary of Expenditures – Prospecting and Exploration

Initiative	1994–1995	2000–2001
Direct Expenditures:		
OPA/OPAP	2,000,000	1,333,333
Grants for Research	1,231,600	n/a
Ontario Mineral Incentive Program	3,000,000	
Ontario Mineral Exploration Technologies (OMET)	n/a	2,500,000
Operation Treasure Hunt	n/a	9,400,000
Total Direct Expenditure	6,231,600	13,233,333
Program Expenditures:		
Ontario Geological Survey (OGS)	14,473,600	11,105,400
Tax Expenditures:		
Flow-Through Shares Tax Credit	n/a	*
Total Prospecting and Exploration (current\$)	20,705,200	24,338,733
Total Prospecting and Exploration (2000\$)	23,227,732	24,338,733

n/a = initiative was not in place and thus is not associated with any expenditure
 * = the Government of Ontario does not have an estimate of expenditure on this initiative

erals Division of the MNDM and the Mineral Development Agreement in place in 1994/5, are not necessarily designed to explicitly encourage metal mining in Ontario. Instead they are intended to manage and facilitate the development and operations of the province’s metal mining industry, allowing for streamlined processes for mine staking, claiming and permitting.

Public expenditure on programs related to mine development and operations totalled \$12,791,400 in 1994/5 and \$8,404,600 in 2000/1. As was noted earlier in this chapter, the Mines and Minerals Division of the MNDM does not deal exclusively with metal mining in the province. This division is also responsible for managing and facilitating non-metal mineral (industrial mineral) development in Ontario.

Table 25: Ontario – Program Expenditures – Development and Operation

Initiative	Time Span	Description
Mines and Minerals Division of the Ministry of Northern Development and Mines (MNDM)		The Mines and Minerals Division is composed of several components, including the Ontario Geological Survey; the Mining Lands Section; the Mines Group; and a Marketing Services Section. <i>The annual budget of the Mines and Minerals Division (not including expenditure associated with the Ontario Geological Survey) was \$8,992,400 in 1994/5²¹ and \$8,354,600 in 2000/1.²²</i>
Mineral Development Agreement (MDA)	1987 to 1996	The joint federal-provincial program was designed to stimulate mineral exploration through geoscience projects similar to those conducted under base funding of the OGS. The work was performed by contract staff under the management and supervision of the Mines and Minerals Division. NODA (see below) was part of the MDA in Ontario. <i>Provincial spending on this program was \$3,749,000 in 1994/5.²³</i>
Minerals Program of Northern Ontario Development Agreement (NODA)	Began in 1991 as a four-year initiative	The Northern Ontario Development Agreement is a four-year \$95 million subsidiary agreement that began in 1991. The minerals program of NODA comprises \$30 million of the \$95 million and is the shared responsibility of Natural Resources Canada and the Ontario MNDM. <i>Expenditure on this program is included in the MDA (above).</i>
Canadian Association of Mining Equipment and Services for Export (CAMESE)	Developed in 1981	CAMESE is a trade association made up of Canadian member companies offering products and services to the mining industry. It was established in 1981 for the purpose of assisting members in exporting their goods and services. <i>The Government of Ontario provided \$50,000 to CAMESE in 1994/5 and 2000/1.</i>

To the extent that the Mines and Minerals Division dedicates resources (time and money) to developing and managing non-metal mineral production in the province, the estimates presented above for expenditures on the Mines Division to support metal mining in the province will be overestimated. And while this is certainly the case to a degree, it is unlikely that a substantial portion of the total budget for the Mines Division is dedicated to industrial mineral development. Consider that in 1999 only 10% of those employed in mineral mines in Ontario were employed in non-metal mines. A full 90% of employees were employed in metal mines.²⁴ Similarly, in 1999, the value of salaries and wages associated with non-

metal mines constituted a mere 8% of the total value of salaries and wages associated with mining in Ontario. If the figures for the Mines Division presented in Table 25 were to be scaled down by 10% they would still be substantial: \$8,093,160 in 1994/5 and \$7,519,140 in 2000/1. We address this issue further through analyses presented later in the report.

The major source of expenditures above, the Mines and Minerals Division, is primarily concerned with *managing and facilitating* the development and operations of metal mines in Ontario. In contrast, the tax initiatives described in Table 26 are designed to provide *incentive to increase* mine development and operations in the province. These initiatives include the Basic Mining Profit Tax Exemption, a New or Expanded Mine Tax Holiday, a Remote Mines Tax Holiday, and a reduction in the provincial Mining Tax rate.

Tax expenditures on the initiatives described in Table 26 totalled \$12,000,000 in 1994/5 and \$32,000,000 in 2000/1.

Program and tax expenditures related to mine development and operations in Ontario are summarized in Table 27.

As the figures indicate, public expenditures associated with metal mine development and operations in Ontario increased substantially between 1994/5 and 2000/1. Indeed, in just six years, the Government of Ontario increased expenditures to this stage of mining by 45%, primarily through significant increases in tax incentives. Also between 1994/5 and 2000/1, despite the 45% increase in expenditures described here, metal mine site development in Ontario declined by 8.6%.²⁹

Table 26: Ontario – Tax Expenditures – Development and Operation

Initiative	Time Span	Description
Basic Mining Profit Tax Exemption	Effective April 1, 1996	Mining profits of \$500,000 and less are exempt from the mining tax in Ontario. <i>Expenditure on this initiative is estimated at \$2,000,000 for 1994/5 and 2000/1.</i> ²⁵
New or Expanded Mine Tax Holiday	Initially effective May 20, 1987; altered as per description provided here to May 1, 1991	The new or expanded mine tax holiday is limited to \$10 million in exempt profits per mine and is available for new mines for the first 36 months of operation and for major expansions of existing mines shut down for a continuous period of 60 months. Joint operators of the mine must share the \$10 million exemption limit for the mine. This is effective for projects earned after April 30, 1991. Also note that accelerated depreciation is available on new mine assets used in new mines or the major expansion of an existing mine up to 100%, limited by the profit of the new mine or expansion of an existing mine, whichever is less. <i>Expenditure on the new or expanded mine tax holiday is estimated at \$10,000,000 for 1994/5 and 2000/1.</i> ²⁶ <i>The Government of Ontario is unable to provide an estimate for expenditure associated with the accelerated depreciation of new mine assets.</i>
Remote Mines Tax Holiday	Effective May 7, 1996	The remote mines tax holiday is limited to \$10 million in exempt profits for each qualifying remote mine commencing production after May 7, 1996 for the first 120 months of operation. The exemption is reduced for any mine that previously made a claim under the 36-month tax holiday. Also, the \$500,000 exemption is pro-rated between remote and non-remote mines according to their share of the taxpayer's total mining profit. After the tax holiday remote mines are eligible for a reduced tax rate of 5%. <i>Expenditure on this initiative combined with the reduction in the mining tax rate (described below) is estimated to be \$20,000,000.</i> ²⁷
Provincial Mining Tax Rate	Previous rate was effective April 1, 1986; amended May 2, 2000	Mining tax rates were reduced from 20% to 18% effective May 2, 2000. The rates will continue to decline 2% per year until 2004 when the provincial mining tax rate will be 10%. <i>Expenditure on this initiative combined with the remote mines tax holiday (described above) is estimated to be \$20,000,000.</i> ²⁸

Stage 3: Closure, Remediation and Long-Term Care

In this section of the chapter, we describe and quantify public expenditures related to metal mine closure, remediation and long-term care in Ontario. The major program initiative of the Ontario government with respect to metal mine closure, remediation and long-term care is the Abandoned Mines Rehabilitation Program. The provincial government also provided a relatively small amount of funds to the Mining Innovation, Rehabilitation, Applied Research Corporation (MIRARCO). Ontario now has the most advanced program related to abandoned mine remediation among the jurisdictions studied. Table 28 details expenditures on these initiatives for 1994/5 and 2000/1 where relevant.

While the Abandoned Mines Rehabilitation Project will help to mitigate public liabilities associated with abandoned metal mines in Ontario, it will not be sufficient to address the problem comprehensively. The Rehabilitation Program spent \$700,000 on each of the Hollinger/Timmins and Coldstream/Burchell Lake mines in the first year alone (1999-2000). The Hollinger mine is expected to cost \$1.9 million to completely remediate.³² This is in addition to the more than \$2 million already spent on this mine in the early 1990s.³³

Fourteen-and-one-half million dollars of the Abandoned Mines Rehabilitation Program was spent on the Kam Kotia mine site. These funds will only complete the first two phases of a five-phase rehabilitation program. The total costs for rehabilitating the Kam Kotia are estimated at \$40 million,³⁴ which leaves \$25.5 million dollars in rehabilitation on this site outstanding.

Table 29 summarizes public expenditures related to mine closure, remediation and long-term care in Ontario. While formal expenditures in this area were non-existent in 1994/5, more recently the provincial government made a commitment in the form of a four-year \$27 million initiative to begin to address abandoned mine sites in the province.

Table 27: Ontario – Summary of Expenditures – Development and Operation

Initiative	1994–1995	2000–2001
Program Expenditures:		
Mines and Minerals Division of the MNDM	8,992,400	8,354,600
Mineral Development Agreement	3,749,000	n/a
CAMESE	50,000	50,000
Total Direct Expenditure	12,791,400	8,404,600
Tax Expenditures:		
New or Expanded Mine Tax Holiday	10,000,000	10,000,000
Remote Mines Tax Holiday	n/a	20,000,000
Basic Mining Profits Tax Exemption	2,000,000	2,000,000
Processing Allowance	*	*
Total Tax Expenditure	12,000,000	32,000,000
Total Development and Operations (current\$)	24,791,400	40,404,600
Total Development and Operations (2000\$)	27,811,757	40,404,600

n/a = initiative was not in place and thus is not associated with any expenditure
 * = the Government of Ontario does not have an estimate of expenditure on this initiative

Table 28: Ontario – Program Expenditures – Closure and Remediation

Initiative	Time Span	Description
Abandoned Mines Rehabilitation Program	Implemented in 1999 as a four-year program	This is a four-year \$27 million program to rehabilitate former mine sites and return them to productive use as recreational, community, business or mineral exploration lands. <i>Expenditure on this program was \$10,000,000 in 2000/1.</i> ³⁰
Seed funding for Mining Innovation, Rehabilitation, Applied Research Corporation (MIRARCO) owned by Laurentian University	Seed funding announced in September 1998	MIRARCO is a non-profit applied research and technical service company formed through collaboration between Laurentian University and the private and public sectors. MIRARCO promotes mining innovation and provides a bridge between knowledge providers (researchers and knowledge users-entrepreneurs and private sector companies). MIRARCO comprises several mining research centres. <i>Provincial funds received by MIRARCO in 2000/1 total \$150,000.</i> ³¹

The figures described in Table 29 do not include the substantial costs associated with the liability of all mine and exploration sites in the province that are either abandoned or orphaned. There are, in particular thousands of abandoned exploration sites in the province for which the long-term environmental and human health liability will be substantial. An initial inventory of abandoned sites conducted between 1991 and 1994 identified 6,545 sites “where cleanup work may be warranted.”³⁵ These sites are not covered by securities. This initial survey only assessed 2,200 of the abandoned sites in the province and, at a cost of \$900 per site, it was estimated that an additional \$4 million would be required to assess the remaining sites in the province.³⁶

In 2000, more than 95% of the remaining abandoned sites were assessed through funds provided by the Abandoned Mines Rehabilitation Program. The total number of abandoned sites was reduced to approximately 6,200 in 2000. Almost \$1.5 million was spent to conduct site assessments on about 4,000 sites. This is the equivalent of approximately \$370 per site.³⁷ Estimated rehabilitation costs for these sites have been established on a site-by-site basis.³⁸

All 6,200 assessed sites have been entered into a database called the Abandoned Mines Information System (AMIS). This database is not yet publicly accessible electronically. The rehabilitation estimates that were established have not been entered into the database, nor have they been tallied, according to MNDM, although the rehabilitation estimates are publicly available in the hard copy documentation in Sudbury. Most of the sites are primary and advanced exploration sites that have not produced commercially.³⁹ About 4,000 of the sites are hard rock metal mining sites, both producers and non-producers. The rest are quarries and fall under the *Aggregate Resources Act*, not the *Mining Act*. About 60% of these abandoned mines are, or were, privately held, the rest have officially reverted to the Crown. The Ontario government recognizes, however, that “it is not likely that private sector funds will be available in all cases to clean up all of the 60 percent ‘non-orphaned’ sites.”⁴⁰

The MNDM recognizes that most of the costs for remediation of these historic sites, with an estimated list of potential hazards exceeding 18,000, are now in the public domain.⁴¹ This cost was estimated in 1993 to be more than \$300 million.⁴² The estimated reclamation costs for abandoned mine sites in Ontario have not been updated since 1993, in spite of reclamation cost information that has been collected on more than 4,000 additional sites since then. According to MNDM, “We have not updated this number of \$300 million but it could be low by as much as 50% due to sites that may not have been included in the original survey for one reason or another, e.g., sites returned to the Crown through subsequent failure as was the case with ERG Gold in Timmins.”⁴³ Increasing the original \$300 million estimated cost by 50% would result in an estimated liability of \$450 million. A more definitive estimate of the remediation costs associated with abandoned exploration sites in Ontario could be obtained by tallying the reclamation estimates in the 4,000 individual files on abandoned mines in Sudbury.

Initiative	1994–1995	2000–2001
Program Expenditures:		
Abandoned Mines Rehabilitation Program	n/a	10,000,000
MIRARCO	n/a	150,000
Total Closure, Remediation, Long-Term Care (current\$)	0	10,150,000
Total Closure, Remediation, Long-Term Care (2000\$)	0	10,150,000
n/a = initiative was not in place and thus is not associated with any expenditure		
* = the Government of Ontario does not have an estimate of expenditure on this initiative		

Kam Kotia Mine

Located 15 kilometres northwest of the city centre of Timmins, the Kam Kotia Mine was originally operated as the “War-time Metal Corporation” from 1942 until 1961. In 1961, the property was acquired by Kam Kotia Mines Ltd., principally owned by Robinson Mines Ltd., and was operated until 1972, at which time it was abandoned and became a public liability. The site includes a partially filled open pit, old mill remnants, 200,000 tonnes of waste rock, and over 400 hectares containing six million tonnes of impounded and un-impounded tailings. The Kam Kotia mine tailings are reported to have the highest tailings sulphide concentration in Canada and are strongly acid generating. Surface water runoff from the site is very acidic, and has been reported at pH 1.8 to 2.5, and containing elevated levels of arsenic, zinc and copper. It has been estimated that 35,000 tonnes of tailings are currently clogging the Kamiskotia creek bed, much of which is flushed out and replenished on an annual cycle. Cost of rehabilitation has been estimated to be as high as \$50 million for this single site. To date, the province has committed \$9 million towards cleanup, and engineering studies have been completed for the first two phases of remediation work.

Source: MiningWatch Canada, *The Boreal Below*, December 2001.

Financial Assurances for Operating Mines

In addition to the public liability associated with abandoned exploration and mine sites in Ontario, there is significant liability associated with operating mines in the province. As a result of amendments to the *Mining Act* in 1989 following a tailings dam collapse at an abandoned mine in northern Ontario, mine proponents have had to submit closure plans and provide financial assurance to cover the costs of mine rehabilitation and potential ongoing post-closure costs.⁴⁴ By 1999 the ministry had “approved financial assurance schedules for 66 projects totalling more than \$62 million; of this \$62 million, approximately 80% were in the form of irrevocable guaranteed letters of credit.”⁴⁵

Post June 30, 2000, however, as a result of the implementation of the January 1996 Bill 26 amendments to the *Mining Act*, companies deemed financially secure have been allowed to “self-assure.” The popularity of this option is reflected in the current distribution of money held in financial assurances; to date, a total of \$703.1 million has been collected. Of this amount

- \$53.9 million is held in the form of irrevocable letters of credit;
- \$7.1 million is held as cash including interest;
- \$53.7 million is held in surety bonds;
- \$0.1 million is held through letters of guarantee;
- \$6.0 million is held through a pledge of assets; and
- \$582.3 million is covered through the Corporate Financial Test (or self-assurance).⁴⁶

For Ontario’s 57 metal mines alone (including active mines, mines being closed out, and temporarily suspended mines) the breakdown is as follows:

- Total Financial Assurances Approved: \$567.8 million
- Total Financial Assurances Collected: \$543.4 million

Of the \$543.4 million that has been collected:⁴⁷

- \$9.4 million is held in the form of cash;
- \$40.4 million is held in the form of Letter of Credit;
- \$43.1 million is held as a Surety Bond;
- \$0.14 million is held as a Letter of Guarantee;
- \$1.01 million is held as a Pledge of Assets; and
- \$449.3 million is covered through the Corporate Financial Test (or self-assurance).

In other words, almost 83% of assurances are self-assured, as opposed to having realizable financial assurances provided.⁴⁸

This trend warrants serious concern. The point of collecting *realizable* financial securities before a mining operation begins is to assure that if the operating company defaults, for whatever reason, the public will not be left carrying the financial burden of mine reclamation. Behind this rationale is a long history of mining companies and specific projects that were thought to be sound invest-

Campbell Red Lake Mine

Two serious problems beset the Campbell Red Lake Mine in northern Ontario: leakage from the tailings pond and arsenic trioxide stored underground.

The current tailings impoundment area began receiving depositions in 1983. The tailings impoundment has an underlying layer of clay; beneath the clay is a layer of sand, which is host to the local groundwater aquifer; below the sand are stratum of till and bedrock. Several years ago, groundwater sampling began indicating that arsenic from the tailings had penetrated the clay below the tailings impoundment and had reached the underlying aquifer, and that groundwater was flowing toward both Balmer Lake and Red Lake, but primarily toward Red Lake.

Two plumes are travelling toward Red Lake: the frontrunner a plume of dissolved sulphate, and an arsenic plume travelling at a slower rate. Studies over the last several years have measured both the volume and rate of the groundwater movement, and estimated the presence of arsenic within the plumes. Estimates of the potential for attenuation or adsorption of the arsenic prior to the groundwater discharge into Red Lake have also been developed.

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ments, but that nonetheless failed due to unforeseen market forces or bad management practices, leaving behind the multi-million dollar public liabilities Ontario and other provinces are now facing. By allowing companies to self-assure, on the basis of the current financial position of a company, the Ontario government is in effect exposing the public to a risk of \$582.3 million for all mines and \$449.3 million for metal mines. We estimate the value of the avoided capital costs to the metal mining industry of these arrangements to be \$17.6 million per year.⁴⁹

It is also worth noting that, under Section 183(1) of the *Mining Act*, mining companies in Ontario may now receive an “exit ticket” if they voluntarily return mining lands to the Crown. This provision exempts companies from further environmental liability. It is expected that companies will have met their closure plan requirements and/or provide for any outstanding estimated rehabilitation costs. However, the Act is discretionary with respect to this matter mentioning only that companies must meet “such terms as are acceptable to the Minister.” If history and a review of current scientific literature on mining environmental impacts post-closure teaches us anything, it is that it is extremely difficult to predict what the geophysical and geochemical conditions of a mine site will be over time, and that any site that relies on engineered structures is likely to need constant monitoring and become more expensive over time than was predicted. Providing exit tickets in cases where perpetual care will be needed, or before it can be determined with a high degree of certainty that a site will not become acid generating, is guaranteed to increase public liability in Ontario.

Also note that while other jurisdictions provide the public with information about the level and type of security that exists for particular mines, Ontario has placed this information beyond the reach of an Access to Information request. The public has access to the estimated reclamation costs associated with the closure plan for a site but cannot evaluate whether the required bond is adequate to protect the public from liability. Furthermore, annual reports from the company have been replaced with audits that may only take place once every three years as there are only two full-time inspectors.⁵⁰ Fourteen mine closure inspectors had been employed by the ministry prior to the October 1995 budgetary reductions.

Public Expenditures Summary

Table 30 summarizes public expenditures on metal mining in Ontario for 1994/5 and 2000/1. In this analysis, we focus on the trend in expenditures over time. As the figures indicate, public expenditures on metal mining related to prospecting and exploration, development and operations, and mine closure, remediation and long-term care increased by 47% between 1994/5 and 2000/1, from \$51,039,488 (2000\$) to \$74,893,333 (2000\$). This increase in total public expenditures on metal mining in Ontario was accompanied by a general increase in tax and direct expenditures in the province. In the case of programmatic expenditures, expenditures on the Ontario Geological Survey and the Mines and Minerals Division declined between 1994/5 and 2000/1.

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To date, studies indicate that the aquifer discharges some distance offshore into Red Lake, as well as through seepage into a stream entering McNeely Bay and to a marshy area adjacent to Red Lake. The aquifer may also discharge into the mouth of McNeely Bay. Studies also estimate that the dissolved sulphate plume has migrated approximately 200 metres and will reach Red Lake in 10 to 20 years; the arsenic plume is estimated to reach Red Lake in 30 to 55 years. Continuing to place the tailings in the current impoundment area is expected to result in higher groundwater velocities, which in turn could mean faster migration of arsenic from the tailings into Red Lake. No response to the problem has yet been determined.

Arsenic stored underground is also a problem. Between 1975 and 1991, an estimated 20,000 tonnes of arsenic trioxide was air-blown into the underground workings at the Campbell Mine. Placer Dome has no detailed records and no plan for long-term control or containment of the arsenic trioxides.

Five years after filing the closure plan, Placer Dome indicated in 2000 that they were restarting their search for an environmental solution to the arsenic trioxide problem. Company representatives recounted how, after the closure plan was submitted, they realized they could not find a safe method for removing the chemical, and so decided to defer action for a period of time in the hopes that a better option would come along.

Source: MiningWatch Canada, The Boreal Below, December 2001.

Table 30: Ontario – Summary of Total Expenditures

Initiative	1994–1995	2000–2001
Prospecting and Exploration		
Direct Expenditures:		
OPA/OPAP	2,000,000	1,333,333
Grants for Research	1,231,600	n/a
Ontario Mineral Incentive Program	3,000,000	
Ontario Mineral Exploration Technologies	n/a	2,500,000
Ontario Treasure Hunt	n/a	9,400,000
Program Expenditures:		
Ontario Geological Survey	14,473,600	11,105,400
Tax Expenditures:		
Flow-Through Shares Tax Credit	*	*
Total Prospecting and Exploration (current\$)	20,705,200	24,338,733
Total Prospecting and Exploration (2000\$)	23,227,732	24,338,733
Development and Operations		
Program Expenditures:		
Mines and Minerals Division of MNM	8,992,400	8,354,600
Mineral Development Agreement	3,749,000	n/a
CAMESE	50,000	50,000
Tax Expenditures:		
New or Expanded Mine Tax Holiday	10,000,000	10,000,000
Remote Mines Tax Holiday	n/a	20,000,000
Basic Mining Profits Tax Exemption	2,000,000	2,000,000
Processing Allowance	*	*
Total Development and Operations (current\$)	24,791,400	40,404,600
Total Development and Operations (2000\$)	27,811,757	40,404,600
Closure, Remediation and Long-Term Care		
Program Expenditures:		
Abandoned Mines Rehabilitation Program	n/a	10,000,000
MIRARCO	n/a	150,000
Total Closure, Remediation, Long-Term Care (current\$)	0	10,150,000
Total Closure, Remediation, Long-Term Care (2000\$)	0	10,150,000
Total (current\$)	45,496,600	74,893,333
Total (2000\$)	51,039,488	74,893,333

n/a = initiative was not in place and thus is not associated with any expenditure
 * = the Government of Ontario does not have an estimate of expenditure on this initiative

Analysis to Remove Non-Metal Mining-Related Expenditures

As was stated earlier in the report, to the extent that the Mines and Minerals Division (including the OGS) is responsible for activities beyond those associated with just metal mining, by including the total budget for this department we will be overestimating public expenditures on metal mining in Ontario. To address this concern, we conduct analyses in which we attempt to account for the responsibilities of the department over metal mining versus non-metal mining. We do this by adjusting the expenditure figures consistent with the relative value of production for metal mining versus that of non-metal mining.

In addition, in some jurisdictions, mines departments and ministries carry out regulatory activities related to the protection of public goods (e.g., health, safety and environmental protection) as well as the provision of research and promotional and marketing services to the industry. In these cases efforts were made to disaggregate regulatory expenditures from other expenditures on the basis of budgetary or personnel allocations.

Mines and Minerals Division

The Mines and Minerals Division is responsible for both metal and non-metal (industrial minerals) mining. In 1994 the total value of metal and non-metal production in Ontario was \$4,834,660,000. The metal

portion of this figure was \$3,482,697,000, or 72% of the total value. This figure can be used to adjust the budget of the Mines and Minerals Division, which in 1994 was \$8,992,400.⁵¹ Taking 72% of this figure yields a value of \$6,477,768.

A similar methodology can be used to adjust the 2000 figures. In 2000, the value of metal constituted 65% of the total value of metal and non-metal production in Ontario. Sixty-five percent of the 2000 budget of the Mines and Minerals Division (\$8,354,600) is \$5,444,356.

Ontario Geological Survey

In this analysis, we adjust the budget figure for the Ontario Geological Survey (OGS) to account for only work related to metal mining. We use the same methodology employed above. The 1994 budget for the OGS was \$14,473,600. Seventy-two percent of the total value of metal and non-metal mineral production in Ontario is attributable to metal mining. Applying this figure to the total budget for the OGS yields a figure of \$10,426,206. The 2000 budget for the OGS was \$11,105,400. In 2000, metals constituted 65% of the total value, \$7,236,942, of metal and non-metal mineral production in Ontario.

Regulatory Versus Non-Regulatory Functions

Ontario's Mines and Minerals Division is composed of several components including the OGS; the Mining Lands Section; the Mines Group; and a Marketing Services Section. Excluding the OGS,⁵² there are a total of 136 staff working within the Mines and Minerals Division.⁵³ Employment in the various departments is as follows:

- Mining Land Section — 50 employees
- Mines Group — 18 employees
- Information and Marketing Services — 21 employees
- Assistant Deputy Minister and Assistant — 2 employees
- Administration and Operational Services Section — 9 employees
- Business Solutions Services — 9 employees

Excluding employment in the OGS, the Mines Group, which is primarily responsible for regulatory issues related to metal mining in Ontario, comprises approximately 13% of employment in the Mines and Minerals Division.

The total value figures calculated above for the Mines and Minerals Division (\$6,477,768 for 1994/5 and \$5,444,356 for 2000/1) can be further adjusted to eliminate the regulatory functions of the division, reducing these estimates by approximately 13% for each of 1994/5 and 2000/1.⁵⁴ Expenditure associated with the Mines and Minerals Division in 1994/5 then becomes \$5,635,658 and expenditure on the Mines and Minerals Division in 2000/1 becomes \$4,736,590.

Summary of Analysis to Remove Non-Metal Mining-Related and Regulatory Expenditures

Taking the above adjustments into account reduces our estimate for total public expenditures on metal mining by 16% in 1994 and 10% in 2000. Total public expenditures in 1994/5 are reduced from \$51,039,488 to \$42,733,301 (2000\$). In 2000, total public expenditure declines from \$74,893,333 to

Table 31: Ontario – Summary of Total Expenditures – Non-Metal Mining and Regulatory Expenditures Removed

Initiative	1994–1995	2000–2001
Prospecting and Exploration		
Direct Expenditures:		
OPA/OPAP	2,000,000	1,333,333
Grants for Research	1,231,600	n/a
Ontario Mineral Incentive Program	3,000,000	
Ontario Mineral Exploration Technologies	n/a	2,500,000
Ontario Treasure Hunt	n/a	9,400,000
Program Expenditures:		
Ontario Geological Survey	10,426,106	7,236,942
Tax Expenditures:		
Flow-Through Shares Tax Credit	*	*
Total Prospecting and Exploration (current\$)	16,657,806	20,470,275
Total Prospecting and Exploration (2000\$)	18,687,241	20,470,275
Development and Operations		
Program Expenditures:		
Mines and Minerals Division of MNDM	5,635,658	4,736,590
Mineral Development Agreement	3,749,000	n/a
CAMESE	50,000	50,000
Tax Expenditures:		
New or Expanded Mine Tax Holiday	10,000,000	10,000,000
Remote Mines Tax Holiday	n/a	20,000,000
Basic Mining Profits Tax Exemption	2,000,000	2,000,000
Processing Allowance	*	*
Total Development and Operations (current\$)	21,434,658	36,786,590
Total Development and Operations (2000\$)	24,046,060	36,786,590
Closure, Remediation and Long-Term Care		
Direct Expenditures:		
Abandoned Mine Site Inventory	2,875,000	n/a
Program Expenditures:		
Abandoned Mines Rehabilitation Program	n/a	10,000,000
MIRARCO	n/a	150,000
Total Closure, Remediation, Long-Term Care (current\$)	2,875,000	10,150,000
Total Closure, Remediation, Long-Term Care (2000\$)	3,225,264	10,150,000
Total (current\$)	38,092,464	67,406,865
Total (2000\$)	42,733,301	67,406,865
n/a = initiative was not in place and thus is not associated with any expenditure		
* = the Government of Ontario does not have an estimate of expenditure on this initiative		

\$67,406,865. After adjusting for this analysis, the increase in public expenditure between 1994/5 and 2000/1 is 58%. This increase is slightly more than the increase without the adjustment (47%). Public expenditures related to closure, remediation and long-term care represents only 8% of total expenditures in 1994/5 and 15% of total expenditures in 2000/1.

Even after conducting analyses to remove non-metal mining-related and regulatory expenditures, public expenditure on metal mining is substantial. Nonetheless, the expenditure figures do not compare to estimates for the outstanding liability in the province associated with abandoned exploration sites, abandoned mine sites and existing mine sites. The liability associated with abandoned sites has been conservatively estimated at \$300 million. Indications, however, are that the liability is more like \$450 million.⁵⁵ In addition, due to the recent ability of operating mines to self-assure, the province of Ontario is facing a potential additional liability of \$449.3 million from metal mines. Taken together the total outstanding liability associated with operating and abandoned mine and exploration sites in the province is \$899.3 million. Total public expenditure in 2000, as presented in Table 31, constitutes approximately 7% of this value.

This analysis indicates that increased government expenditures on metal mining are certainly not justified on the basis of increased metal production value. Are such expenditures justified, instead, by other benefits received by the provincial economy from the metal mining industry? In the section that follows, we explore the benefits received from the metal mining industry, placing these benefits in the context of public expenditures.

III. Benefits

Table 32 describes the benefits from metal mining in relation to other industries. It also presents trends in the benefits over time. Benefits considered in this analysis include employment, royalty payments and contribution to GDP.

The data in Table 32 demonstrate that the benefits associated with metal mining in Ontario diminished between 1994/5 and 2000/1. Metal mine employment between 1994/5 and 2000/1 declined by 20%. In contrast to this, all industry employment in Ontario increased by 15%. At the same time, between 1994/5 and 2000/1 the contribution of metal mine employment to all industry employment declined by 30%.

Between 1994/5 and 2000/1, provincial royalties from metal mines declined substantially — by 45% — while total tax revenue in the province during the same time period increased by 26%. In addition, royalties from metal mines contributed 57% less to total tax in 2000/1 than they did in 1994/5.

The contribution of the metal mining industry to Ontario GDP declined by 24% between 1994/5 and 2000/1. During the same time period, the contribution of all industries to Ontario GDP increased by 23%. The contribution of the metal mining industry to total industry GDP contribution declined by 39% between 1994/5 and 2000/1. Furthermore, the metal mining industry, while having a reputation for being a major contributor to the provincial economy, constituted less than 1% of the contribution of all industries to provincial GDP. It is also worth noting that the value of mining wages and salaries for metal mines in Ontario in 1994 was \$696,715,000. This represents just 26.5% of the metal mines' contribution to GDP in the same year.

In Table 33, we explore the relationship between benefits and public expenditures. We do this by presenting ratios of benefits (employment, royalty payments, and contribution to GDP) to total public expenditures. Of particular interest here is the trend in the ratios over time. In all cases, the ratio of benefits to public expenditures declined between 1994/5 and 2000/1. Put another way, the provincial government is getting less and less return in terms of employment, royalty payments, and contribution to GDP for every dollar it invests in the metal mining industry in Ontario.

In the case of employment, this means that for every job in metal mining, the Government of Ontario is spending more and more public money. Conversely, it means that for every dollar spent on metal mines in Ontario, fewer jobs in the metal mining industry are maintained. Indeed, while public expenditure per employee was \$3,472 in 1994/5, it increased by 97% to \$6,848 in 2000/1.

Table 32: Ontario – Metal Mining Benefits

Factor	1994-1995	2000-2001	% Change 94-00
Metal Mines Employment	12,308	9,844	-20
All Industries Employment	4,181,005	4,791,699	15
% of All Industries Employment	0.29	0.21	-30
Ontario Royalty Payments	96,718,843	52,740,099	-45
Total Provincial Tax Revenue	38,753,887,342	48,747,067,151	26
% of Total Revenue	0.25	0.11	-57
Contribution to GDP	2,634,058,784	1,995,402,496 ⁵⁶	-24
All Industries GDP	296,454,565,851	366,071,245,843	23
% of All Industries GDP	0.89	0.55	-39

Table 33: Ontario – Ratio of Benefits to Expenditures

Factor	1994-1995	2000-2001	% Change 94-00
Employment	0.00029	0.00015	-49
Ontario Royalty Payments	2.26330	0.78240	-65
Contribution to GDP	61.63950	29.60240	-52

Table 34: Ontario – Ratio of Royalties to Expenditures

Factor	1994-1995	2000-2001	% Change 94-00
Royalty Payments	96,718,843	52,740,099	-45
Total Public Expenditures	42,733,301	67,406,865	58
Royalties-to-Expenditures Ratio	2.2633	0.7824	-65

A similar conclusion is evident for both royalty payments and contribution to GDP. In both cases, the provincial government is getting less of a return in terms of benefits for every dollar invested. The ratio of contribution to GDP to public expenditures fell by 52% between 1994/5 and 2000/1, while the ratio of royalty payments to public expenditures fell by 65%. Furthermore, while royalty payments exceeded public expenditures in 1994 by a margin of 2.3 to 1, by 2000/1 the government was collecting less in royalty payments than it was paying in public expenditures. Table 34 summarizes total public expenditures and royalty payment information for the study period.

IV. Conclusions

Public expenditures on the metal mining industry in Ontario are substantial and increasing. While public expenditures to both the Ministry of Environment and the Ministry of Natural Resources declined substantially between 1994/5 and 2000/1, our analysis indicates substantial increases in expenditures associated with metal mining during the same period. Our conservative analysis indicates that in 1994/5 the provincial government spent \$42,733,301 (2000\$) to encourage, facilitate and manage metal mining in Ontario. By 2000/1 that figure had increased by over 58% to \$67,406,865 (2000\$). These figures do not include the outstanding liability associated with abandoned and operating mine and exploration sites in the province. We have shown such liability to be significant (up to \$888.95 million). Furthermore, there are several tax initiatives in place in Ontario for which the provincial government was unable to provide an estimate of expenditures; as such, estimated public expenditures on these initiatives is currently not included in the values for total public expenditures presented here.

Despite the substantial increase in public expenditures on metal mining in Ontario, our analysis reveals that the Government of Ontario is reaping diminishing returns in terms of the value of metal production, employment, royalty payments, and contribution to GDP. Between 1994/5 and 2000/1, public expenditures on metal mining in Ontario increased by 58%. During the same period the contribution of the metal mining industry to provincial GDP decreased by 24%, employment in metal mining declined by 20%, and royalty payments from the metal mine industry declined by 45%.

An investigation of the benefit-to-expenditure ratios associated with metal mining in Ontario leads to a number of important observations. The benefits of metal mining in terms of employment, royalty payments, and contribution to GDP per dollar spent by the provincial government on metal mining in the province declined substantially between 1994/5 and 2000/1 — by 49%, 65% and 52% respectively.

In the following discussion, we place the above expenditures (not including outstanding liabilities) in the context of trends in metal production over the same time period. Between 1994 and 2000, public expenditures on the metal mining industry in Ontario increased by 58%. During the same period, the value of metal production in the province increased by only 7%.⁵⁷ In 1994, the ratio of the value of production to public expenditures was approximately 81:1, while in 2000 it was 55:1. That represents a 32% decline in the value of production relative to public expenditures. This implies that the provincial government is getting less value per dollar invested and that the effectiveness of the provincial government in influencing the growth and success of the metal mining industry is questionable.

In an attempt to increase the value of metal production in the region, government expenditures on mining initiatives such as those described above distort market signals for metals in Ontario. However, the effectiveness of such policies in influencing the value of metal production in the province appears to be compromised by the influence of global markets for metals. Such markets are essential in determining the price of metals in Ontario and Canada alike. Consider that between 1994 and 2000, the average price of copper in Canada fell by almost 15%. During that same period, production of copper in Ontario declined by 9.5% and the value of production declined by over 49%. This is despite the 58% increase in public expenditures on metal mining in Ontario during the same time period.

The trends described above indicate the strong relationship between the global price of metals and the value of production in a region. In turn, the strength of this relationship implies that, despite the best efforts of the Ontario government — specifically, a 58% increase in public expenditures on metal mining — its ability to influence the value of metal production in Ontario is limited.

Chapter Endnotes

¹ Ministry of Northern Development and Mines, Ontario – A World Leader in Mining: Explore the Opportunities, (Ontario: Ministry of Northern Development and Mines, 2000).

² Minerals and Mining Statistics Division, Minerals and Metals Sector, Natural Resources Canada, Canadian Minerals Yearbook, 2000, Statistical Report, (Ottawa: Natural Resources Canada).

³ Mark Winfield and Greg Jenish, Ontario's Environment and the Common Sense Revolution: A Four Year Report. (Toronto: Canadian Institute for Environmental Law and Policy, September 1999), pp. 5-1 - 5-5.

⁴ Ibid.

⁵ Ibid.

⁶ The Lands for Life process was established in April 1997 to determine the future uses of public lands in central and northern Ontario, an area encompassing 47% of the province's land area.

⁷ In a joint letter dated March 15, 2002, the Ontario Ministers of Natural Resources and Northern Development and Mines indicated that no further mineral exploration will be permitted within parks and conservation reserves; a process to address issues related to mineral tenures that pre-date the establishment of the Lands for Life. Parks and conservation reserves will be established; and MNDM and the mining industry will participate in future land-use planning through the identification of significant mineral potential areas using a new framework. (Partnership for Public Lands "Open Memorandum Regarding Mining Exploration and Development in Ontario Parks and Conservation Reserves," March 19, 2002. However, in July 2002 it was reported that the Ministry of Natural Resources was prepared to issue a permit for a quarry within the Mellon Lake Conservation Reserve. See M., Mittelstaedt, "Ontario nature reserve to be opened to mining," The Globe and Mail, July 4, 2002.

On August 9, 2002, the Partnership for Public Lands issued a press release stating that the Ontario Ministry of Natural Resources had informed them the quarry proponent had been sent a letter denying the application.

- ⁸ Ministry of Northern Development and Mines, Ontario – A World Leader in Mining: Explore the Opportunities, (Ontario: Ministry of Northern Development and Mines, 2000).
- ⁹ Ontario Public Accounts 1995 and 2001. In 1997/8 the ministry's operating budget reached its lowest point at \$142 million (a 45% reduction from 1994/5), but has recovered somewhat since then, particularly in the aftermath of the May 2000 Walkerton water tragedy.
- ¹⁰ Ontario Fair Tax Commission, Fair Taxation in a Changing World, (Toronto: University of Toronto Press, 1994), Chapter 23.
- ¹¹ There are no charges for water takings under the *Ontario Water Resources Act* or other provincial legislation.
- ¹² See, for example, Ontario Ministry of Municipal Affairs and Housing, 1997 Provincial Policy Statement, Part III, Policy 2.2.
- ¹³ Ministry of Northern Development and Mines, personal communication, December 4, 2001.
- ¹⁴ Ibid.
- ¹⁵ Committee of Provincial Geologists, Provincial Geologists Journal, Vol. 12, 1994, p. 25.
- ¹⁶ Ministry of Northern Development and Mines, personal communication, December 4, 2001.
- ¹⁷ Committee of Provincial Geologists, Provincial Geologists Journal, Vol.12, 1994, p. 25.
- ¹⁸ Ibid., p. 30.
- ¹⁹ Ontario Ministry of Finance, personal communication, January 20, 2002.
- ²⁰ Ontario Ministry of Northern Development and Mines, Ontario Mineral and Exploration Statistics, (Ontario: Queen's Printer for Ontario, 2001).
- ²¹ Ministry of Northern Development and Mines, personal communication, December 4, 2001.
- ²² Ibid. This includes \$1 million for conducting a water-quality study with Environment Canada.
- ²³ Ministry of Northern Development and Mines, personal communication, December 4, 2001.
- ²⁴ Ontario Ministry of Northern Development and Mines, Ontario Mineral and Exploration Statistics, (Ontario: Queen's Printer for Ontario, 2001).
- ²⁵ The Ontario Fair Tax Commission reported in 1994 that given the design of the exemption, expenditure on it in 1991 was \$2 million. Since the exemption has not changed since that time, we estimate expenditure on the initiative to have remained essentially the same.
- ²⁶ The Ontario Fair Tax Commission reported expenditure on this initiative as \$10 million. We assume that, since the design of the initiative has not changed since that report, the expenditure has remained essentially the same.
- ²⁷ The 2000 Ontario budget indicated in the budget impact summary that the 2000 mining tax initiatives, which included the remote mining tax holiday and the reduced mining tax rates, would benefit taxpayers by \$20 million.
- ²⁸ The 2000 Ontario budget indicated in the budget impact summary that the 2000 mining tax initiatives, which included the remote mining tax holiday and the reduced mining tax rates, would benefit taxpayers by \$20 million.
- ²⁹ Ontario Ministry of Northern Development and Mines, Ontario Mineral and Exploration Statistics, (Ontario: Queen's Printer for Ontario, 2001).
- ³⁰ Ministry of Northern Development and Mines, personal communication, December 4, 2001.
- ³¹ MIRARCO, personal communication, March 20, 2002.
- ³² Ministry of Northern Development and Mines, personal communication, February 26, 2002.
- ³³ W.R. Cowan, "Mine Rehabilitation in Ontario, Canada: Ten Years of Progress," in D. Goldsack, P. Yearwood and G. Hall (eds.), Sudbury '99 Mining and Environment II, Vol. 3, p. 1041.
- ³⁴ Ministry of Northern Development and Mines, personal communication, February 26, 2002.
- ³⁵ Interministerial Abandoned Mining Lands Committee, Abandoned Mine Hazards in Ontario: A Report by the Interministerial Abandoned Mining Lands Committee, (Toronto: Ontario Ministries of Environment and Energy, Northern Development and Mines, Natural Resources, Labour, Municipal Affairs, and the Ontario Mining Association, December 1993), p. 45.
- ³⁶ Ibid.
- ³⁷ Ministry of Northern Development and Mines, personal communication, May 8, 2002.
- ³⁸ Ministry of Northern Development and Mines, personal communication, February 26, 2002.
- ³⁹ Ibid.

⁴⁰ Interministerial Abandoned Mining Lands Committee, Abandoned Mine Hazards in Ontario: A Report by the Interministerial Abandoned Mining Lands Committee, (Toronto: Ontario Ministries of Environment and Energy, Northern Development and Mines, Natural Resources, Labour, Municipal Affairs, and the Ontario Mining Association, December 1993), p. 3.

⁴¹ W.R. Cowan, "Mine Rehabilitation in Ontario, Canada: Ten Years of Progress," in D. Goldsack, P. Yearwood and G. Hall (eds.), Sudbury '99 Mining and Environment II, Vol. 3, p. 1037.

⁴² *Ibid.*, p. 1041; Interministerial Abandoned Mining Lands Committee, Abandoned Mine Hazards in Ontario: A Report by the Interministerial Abandoned Mining Lands Committee, (Toronto: Ontario Ministries of Environment and Energy, Northern Development and Mines, Natural Resources, Labour, Municipal Affairs, and the Ontario Mining Association, December 1993) p. 3.

⁴³ Northern Development and Mines, personal communication, March 26, 2002.

⁴⁴ For a detailed discussion of the evolution of the mine closure and financial assurance provisions of the *Ontario Mining Act* see R. Nadarajah and M. Winfield, "Submission by the Canadian Environmental Law Association and Canadian Institute for Environmental Law and Policy to the Ministry of Northern Development and Mines Regarding Part VII of the *Mining Act* and the Mine Rehabilitation Code," (Toronto: CELA and CIELAP, October 1999).

⁴⁵ W.R. Cowan, "Mine Rehabilitation in Ontario, Canada: Ten Years of Progress," in D. Goldsack, P. Yearwood and G. Hall (eds.), Sudbury '99 Mining and Environment II, Vol. 3, p. 1039.

⁴⁶ Figures provided by Ministry of Northern Development and Mines, March 26, 2002.

⁴⁷ *Ibid.*, May 23, 2002. This number includes mills and tailings facilities.

⁴⁸ *Ibid.*, March 28, 2002.

⁴⁹ This estimate is based on what it would cost mining companies to borrow the required funds for posting financial assurances with the cost of capital assumed to be at a prime interest rate of 4%.

⁵⁰ Ministry of Northern Development and Mines, personal communication, February 26, 2002.

⁵¹ Note that this figure does not include expenditures associated with the Ontario Geological Survey.

⁵² Because the Ontario Geological Survey is not concerned with regulatory functions, expenditure on it does not need to be adjusted in this part of the analysis.

⁵³ This figure does not include the Minister of Northern Development and Mines or any associated staff.

⁵⁴ To the extent that the portion of the Mines and Minerals Division that is responsible for regulatory functions changed between 1994/5 and 2000/1, the revised estimate for public expenditures will be associated with a degree of uncertainty.

⁵⁵ Ministry of Northern Development and Mines, personal communication, indicated that the actual costs would be up to 50% higher than the outdated estimate of \$300 million.

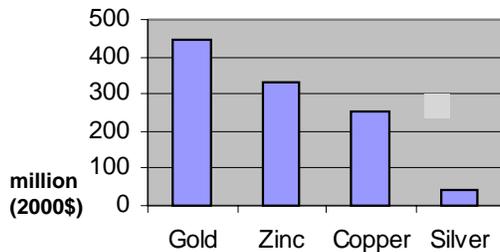
⁵⁶ Between 1994 and 2000 Statistics Canada altered its industry classification system from Standard Industrial Classifications (SICs) to North American Industry Classifications (NAICs). Thus, GDP figures from Statistics Canada for 1994 are not directly comparable to 2000 figures. To maintain comparability between 1994 and 2000, we used the 1994 GDP figure to estimate a figure for 2000. The estimate is based on the increase in the value of metal production that took place between 1994 and 2000.

⁵⁷ Minerals and Mining Statistics Division, Minerals and Metals Sector, Natural Resources Canada, Canada's Mineral Yearbook, 1994, Statistical Report, (Ottawa: Natural Resources Canada, 1995).

V. Quebec

I. Introduction

Figure 6: Value of production 2000 (estimate) millions\$



Includes quantities sold domestically, exported or used.

Source : *L'industrie minière du Québec 2000.*

The Metal Mining Industry in Quebec

The Quebec mining industry has a long history. It officially began in 1862 with small gold mines in the Beauce region. Quebec is also famous for the mining of asbestos and, more recently, for the use of asbestos mine tailings to produce magnesium. The Quebec government still favours the asbestos mining industry, even though hundreds of workers in the province have died from asbestosis. In the 1920s mines started to open in Abitibi Témiscamingue and in the 1950s iron mines opened in the Côte Nord region. The most recent opening was in 1998 of a nickel mine in Nunavik.

Table 35: Operating Mines in Quebec 2002

Mine	Owner
Niobec	Cambior inc. (50%), Mazarin (50%)
Jeffrey	Mine Jeffrey inc.
Bouchard-Hébert	Ressources Breakwater
Bousquet 2	Société Aurifère Barrick inc.
Doyon	Cambior inc.
Francoeur	Mines Richmond inc.
Kiena	Les mines Mc Watters inc.
Laronde	Mines Agnico Eagle Itée.
Louvicourt	Aur Ressources inc. (30%), Novicourt
Mouska	(45%) et Teck Corporation (25%)
Sigma	Cambior inc.
Témisca	Les mines Mc Watters inc.
Lac Ti	Témisca inc.
Mont Wright	QIT Fer et Titane inc.
Bell Allard	Compagnie minière Québec Cartier inc.
Géant Dorman	Noranda inc. (Division Matagami)
Gonzague	Cambior (50%) et Mines Aurizon (50%)
Langlois	Ressources Breakwater Itée.
Raglan	Société minière Raglan du Québec Itée.
Selbaie	Billiton Metals Canada Inc.
Troilus	Corporation minière Inmet
Seleine	Société canadienne de sel Itée.
Bell	Mazarin inc.
Black Lake	Lac d'amiante du Québec (Lab Chrysotile
Luzenac	inc. et Opérations Black Lake)
Stratmin Graphite	Luzenac inc.
Unimin	Imerys inc.
Produits Mica	Unimin Canada Itée.
Suzorite	Zemex Corp.

Source: MRN.

In 2000, the Quebec metal mining industry generated sales of over \$3.6 billion dollars.¹ This industry is associated with major environmental impacts, particularly through the generation of mine tailings and acid mine drainage. The land area occupied by mine sites in Quebec has doubled since 1980.²

This chapter provides an assessment of the public expenditures in support of the metal mining industry in Quebec, as well as the economic benefits generated by the sector in terms of employment, mineral royalties, and contributions to provincial Gross Domestic Product (GDP).

The most important minerals in the Quebec metal mining sector are gold, zinc, copper and silver.

Metal mines currently operating in Quebec include those listed on Table 35.³

Legislative and Institutional Framework for Metal Mining in Quebec

The key government agency in charge of metal mining in Quebec is the Ministry of Natural Resources, or ministère des Ressources naturelles (MRN).

The MRN administers three pieces of legislation relevant to the metal mining industry in Quebec:

- The *Mining Act (Loi sur les mines)*;
- The *Mining Duties Act (Loi concernant les droits sur les mines)*; and
- *SOQUEM Act (Loi sur la société québécoise d'exploration minière)*.

Mining Laws and Regulations in Quebec

Other legislation is indirectly relevant to the sector. The main piece of legislation is the *Quebec Environmental Quality Act (La loi sur la qualité de l'environnement)*. Article 22 of the *Environmental Quality Act* requires that any proponent who wants to build or modify the environment in any way obtain a certificate of approval from the Quebec Environment Ministry. Directive 19, established under the *Environmental Quality Act*, sets criteria for environmental impact studies to accompany applications for certificates of approval under the Act, and also sets standards on the ways different types of mines should operate. The directive is not, however, legally binding.

Like other provincial jurisdictions in Canada, the province of Quebec substantially reduced its budget for environmental protection and conservation over the study period. At the beginning of the 1990s, the overall budget for environmental protection and conservation was \$600 million per year, shared between two ministries: the ministère de l'environnement du Québec (MENVIQ); and the Ministère des loisirs chasse et pêche (MCLP). MCLP's most important mandate was to manage provincial parks. Spending on environmental protection peaked in 1996/7 with an overall budget of \$800 million. Total spending in 1994/5 was \$750 million, falling to \$400 million for 2000/1.⁴

Chapter Overview

In this chapter we have documented the public expenditures in support of the metal mining industry in Quebec for the years 1994/5 and 2000/1. This includes direct expenditures by the provincial government to the industry, provincial program expenditures, tax initiatives, infrastructure support and equity investments in the sector. On the benefits side we examine the trends over this period in terms of the mining industry's contribution to employment, provision of royalties to the province, and contribution to the provincial GDP.

Data Limitations and Qualifications

Several limits to this study warrant mention. First, some governmental expenditures are not well documented. Expenditure on infrastructure, such as roads, bridges and rail lines tends to help the industry expand into new areas, or to support the operation of individual mines, tend to occur on a one-off basis, rather than through formally structured programs with fixed annual budgets. Other forms of support are also difficult to document. The industry, for example, is provided access to water resources at no cost in Quebec. In addition, while aggregate totals of governmental expenditures in support of the mining sector from the province were available through the public accounts, in many cases it was not possible to establish the value of specific programs.

Metal Mining Versus Non-Metal Mining Expenditures

Expenditures related to the asbestos sector have been removed from the analysis. This constitutes the major mining sector, other than metal mining, in which spending by MRN occurs. Data was not available to disaggregate regulatory and non-regulatory expenditures related to the mining sector by MRN.

II. Public Expenditures on Mining in Quebec

Stage 1: Prospecting and Exploration

In this section we describe provincial public expenditures in support of prospecting and exploration in Quebec. The province introduced several new programs in 2001 to support exploration by prospectors, as well as for mining companies directly. Key program initiatives in place in 1994/5 and 2000/1 are described in Tables 36 and 37.

Tax Expenditures and Credits for Prospecting and Exploration

Tax initiatives to support prospecting and exploration are described in Table 37. They include tax deductions for individuals who invest in the mining sector by buying certain types of shares. Mining companies can also benefit from tax credits with a 40% deduction for companies without revenues and 20% for companies with revenues. Other tax credits are available to companies with some losses or to companies that have not yet started their mining operations. Finally, a special tax provision is available for companies doing exploration or mining above the 50th parallel.

Table 36: Quebec – Direct and Program Expenditures – Prospecting and Exploration

Initiative	Time Span	Description
L'Entente auxiliaire Canada–Québec sur le développement minéral	1992-1998	Financial assistance for exploration, development, restoration and research. Financed: Quebec (50%), Canada (50%).
Programme d'exploration minière du Moyen-Nord (PEM)	1995-ongoing	Promote exploration in the James Bay and Côte Nord regions. Funding is up to \$100,000 per project.
Programme d'assistance à l'exploration minière du Québec (PAEM)	1997-ongoing	Support for exploration. Independent prospectors can get up to \$4,000 for prospecting outside a claim and up to \$15,000 for advanced prospecting (\$50,000 for companies). As of 1999, it includes the PEM.
PAEM: Native Mining Entrepreneurship Development Program in the Quebec Near and Far North Regions	1997-2002	Aims to support native communities in Near and Far Northern Quebec in developing the mining industry in those areas. It offers exploration funds to promote mining potential; educate and train the workforce; support prospecting and exploration; and support financially and technically the creation of exploration corporations. The program allocates maximum financial assistance of up to \$300,000 per fund per year. Two funds are presently active. ⁷
PAEM: Assistance aux forages profonds et à l'exploration avancée dans la sous-province de l'Abitibi	1998-ongoing	Aims to increase mining reserves in the volcanic belt of Abitibi. Offers financial assistance to deep drilling activity (over 400 metres) and to advanced exploration in which over \$500,000 has already been invested. Activities covered by the program are sinking in exploration levels; geochemistry and geophysics analysis; scraping; excavation trench; sampling; drilling; and chemical and mineral analysis. Ineligible operations are those that obtained financing through flow-through shares and all operations that already receive public assistance. The fund covers 50% of drilling costs for depths of 400 to 1000 metres, and 75% of drilling costs for depths of over 1000 metres, up to a maximum of \$50,000. Up to 35% of advanced exploration costs can be covered to a maximum of \$500,000. ⁸
PAEM: Assistance program for junior exploration companies	2000-2001	Financial support for exploration juniors. Activities covered are scraping, blasting, line cutting, sampling, drilling, analysis, geochemistry, and aerial, land and drilling geophysics. Flight costs are also covered when operating in areas without access roads. Ineligible operations are underground exploration; operations that obtain financing through flow-through shares; and all operations that already receive public assistance. The fund covers 80% of exploration costs to a maximum of \$350,000, and a maximum of \$150,000 in working capital. ⁹
Explor-Action	Created in 1998, ongoing	Aims to develop and promote mining exploration in Quebec. The MRN commits to pay an equivalent amount to that offered by the Quebec Prospector Association (QPA) to a maximum of \$200,000.
Programme de soutien à l'investissement minier (previously named "Programme du soutien à l'exploration minière")	1995-1996	Aims to maintain a certain level of mining exploration by small- and medium-sized Quebec mining companies and to support mines in their preliminary stage of development (<i>mise en valeur préliminaire au sein des PME minières du Québec</i>).
SIGEOM system	Created in 1995, ongoing	This information system on geological and mining data contains 10 billion pages of structured data available in five of the eight offices of the Minister of Natural Resources around the province.

Table 37: Quebec – Tax Expenditures – Prospecting and Exploration

Initiative	Time Span	Description
Flow-through shares for exploration work	1995-2003	A flow-through share is a security issued by a resource company that renounces its deductions for exploration costs on behalf of an investor. The <i>Quebec Taxation Act</i> enables an individual investor to take advantage of a significant fiscal deduction used when calculating taxable income. Quebec's regime allows a deduction equivalent to 100% of the cost of flow-through shares. The individual may deduct 25% more when the exploration costs are committed within Quebec by a company that is not mining a mineral resource. There is an additional deduction of 50% when the exploration is conducted from the surface, bringing the total deduction to 175% of the cost of investment. The company can also renounce its deductions for the costs of issuing flow-through shares, in which case the individual can claim them, up to a value of 15% of the cost of investment within the same year. The excess is deductible over five further years. When the share is sold, Quebec's fiscal regime also allows an exemption for adjusted capital gains, i.e., the part of the sales price between the cost of acquiring the shares and their adjusted base price, which is equivalent to zero.

Table 38: Quebec – Public Equity Investments – Prospecting and Exploration

Initiative	Time Span	Description
Programme de stimulation à l'investissement minier (PSIM)	1991-1995 (as of March 31, 1995)	Equity investments in junior exploration companies. ¹⁴
Société de développement des entreprises minières et d'exploration (Sodémex)	1996-2001	Equity investments. Replacing the PSIM, Sodémex aims to support the stock price of junior mining exploration companies. It cannot own more than 10% of outstanding shares of one company. MRN committed a \$10 million initial investment in 1996 and \$1 million annually until 2001.
Diversification of Exploration Investment Partnership (SIDEX)	2001	Equity investments. Promote exploration for mineral substances that have been neglected in the past and acts as a lever for raising additional investment from private partners and investors. SIDEX invests initial capital of \$50 million for a period of five years in capital shares in small companies involved in exploration in Quebec.
Société générale de financement (SGF)	1999-ongoing	Equity investments. Investment in metals (including aluminum smelters) and mines. ^{14a}
Fonds régionaux de solidarité	1997-ongoing	Equity investments in mining companies. These funds belong to the Fonds de solidarité.
Fonds de solidarité, mining portfolio	1996-ongoing	Equity investments in mining companies, some of which are junior exploration companies. This labour-sponsored fund is increasingly targeting exploration companies.

Public Equity Investments in Support of Prospecting and Exploration

Quebec is unique among Canadian provinces and territories in that it provides direct equity investments in the mining industry. These programs, as they relate to prospecting and exploration include those outlined in Table 38.

Direct, program and tax expenditures related to prospecting and exploration in Quebec are summarized in Table 39.

Stage 2: Mine Development and Operation

There are currently 27 mines operating in Quebec. At the operation stage, the support and subsidy structure changes and becomes more substantial. There has been a dramatic drop in funding to support mine operations between 1994/5 and 2000/1. However, it still constitutes the largest amount of funding support provided to the metal mining industry, accounting for \$58 million of the province's total expenditure of \$108 million in 2000/01. This support takes many different forms. It includes loan guarantees, training for miners, technical and technological support, and assistance with the commercialization of mineral products.

Program Expenditures on Mine Development and Operation

Program expenditures in support of mine development and operation include those outlined in Table 40.

Tax Measures for Mine Development and Operation

Tax initiatives that provide support to mine development and operation include those outlined in Table 41.

Infrastructure Support for Mine Development and Operation

Infrastructure support for mine development and operation includes the program described in Table 42.

Direct, program and tax expenditures related to metal mine development and operation in Quebec is summarized in Table 44. The summary excludes expenditures on the asbestos industry, the primary non-metal minerals sector under the jurisdiction of MRN.

Table 39: Quebec – Summary of Expenditures – Prospecting and Exploration

Initiative	1994–1995	2000–2001
Direct Expenditures:		
MRN	2,359,000	11,510,000
Total Direct Expenditure	2,359,000	11,510,000
Program Expenditures:		
MRN	8,059,000	17,053,000
Total Program Expenditure	8,059,000	17,053,000
Tax Expenditures:		
Flow-through shares (100% deduction)	6,000,000	7,000,000
Flow-through shares (25% + 50% deduction)	3,000,000	3,000,000
Total Tax Expenditure	9,000,000	10,000,000
Equity³²		
SOQUEM	3,411,291	6,769,000
Sodémex and Sodémex II primary market ³³	0	2,072,400
Sodémex and Sodémex II secondary market	0	2,175,000
Total Equity	3,411,291	11,016,400
Total	22,829,291	49,579,400
Total Prospecting and Exploration (2000\$)	24,515,191	49,579,400

Source: Ministry of Finance, Public Accounts 1994/5 and 2000/1.

Stage 3: Closure, Remediation and Long-Term Care

In this section we provide a brief description of the legislative framework and some financial programs related to mine closure or mine site remediation in Quebec. It is very difficult, however, to get a clear estimate of the total public liabilities for abandoned mine site remediation in Quebec.

Legislation, Permitting Practices and Regulatory Authorities

The *Quebec Mining Act* regulates mine site rehabilitation and restoration requirements, and the payment of securities.²² Reclamation plans and criteria under the *Mining Act* are reviewed by the ministère des Ressources naturelles (MRN) and the ministère de l'Environnement.

Acceptable Forms of Reclamation Securities

The forms of securities accepted under the *Mining Act* include a cheque; a guaranteed bond issued by the government or municipality; guaranteed investment certificate; letter of credit; security or guarantee policy issued on behalf of the government; an immovable hypothecation provided by a third party; or a trust.

Financial guarantees must correspond to 70% of the estimated costs of rehabilitation of the “accumulation” areas (i.e., sites for accumulation of mineral substances, overburden, concentrates or tailings).²³ Annual payments are established based on the type and anticipated duration of activity.²⁴

Equity Financing for the Mining Industry in Quebec

The government and institutional investors that manage public savings have had dedicated capital to support mining in Quebec. The SOQUEM was the first initiative of this sort. The SGF (mainly government-owned) and the Caisse de dépôt et placement du Québec are two large investors in the Quebec mining sector. The Solidarity Fund, a labour-sponsored fund, also has a dedicated mining portfolio, but was not included in this study since it does not represent public spending per se.

SOQUEM Inc.

Société québécoise d'exploration minière (SOQUEM) was created in 1965 as a state company. In 1998, it became fully owned by SGF Minéral inc., a subsidiary of Société générale de financement (SGF). SOQUEM and its partners invest over \$10 million yearly on mining exploration in Quebec (this represents about 10% of all money spent on exploration in the province). SOQUEM invests 60-70% of the capital while its partners pay the rest (<http://www.soquem.qc.ca>). SOQUEM's portfolio as of February 2002 included the following:

Ashton Mining of Canada Ltd.
 Baskatong quartz inc.
 Cambior inc.
 Cameco Corporation
 Cogema Canada Ltée.
 Corner Bay Silver inc.
 Corporation minière INMET
 Eastmain Resources inc.
 Explorateurs-Innovateurs de Québec inc.
 Exploration Graphicor inc.
 Explorations Minières du Nord Ltée.
 Falconbridge Ltd.
 Freewest Resources Canada Inc.
 Graniz Mondale inc.
 Hope Bay Gold Corporation Inc.
 INCO Ltd.
 Jonpol/Perrex/Bradshaw
 Mazarin Inc.
 Métaux Billiton Canada inc.
 Minerais Bruneau Inc.
 Mines Cancor Inc.
 Mines d'Or Virginia inc.
 Mines Jeffrey inc.
 Mines Lyon Lake Ltée.
 Mines McWatters inc.
 Exploration diamantifère Oasis Inc.
 Société d'Exploration minière Vior inc.
 Southern Africa Minerals Corporation

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Table 40: Quebec – Program Expenditures – Development and Operations

Initiative	Time Span	Description
Fonds pour l'accroissement de l'investissement privé et la relance de l'emploi, volet minier (FAIRE)	1997- 2003	Supports the efforts of enterprises seeking to bring an ore body into production, to ensure greater processing of mineral substances, to increase production capacities, and to improve and modernize mining operations. The financial assistance can take one of the following forms: <ul style="list-style-type: none"> • a repayment guarantee of not more than 70% on the net loss associated with a loan, line of credit, or letter of credit; • the payment of interest on a loan; • a refundable contribution or a grant for staff training; • a loan, refundable contribution or a grant; • an exchange rate guarantee. To obtain financial assistance, the enterprise must make an investment of more than \$2,000,000. This investment must also result in the creation or preservation of at least 50 jobs. ¹⁵
Financial assistance program for technical-economic studies and technological innovation	Start date not available.	Encourages carrying out studies and work necessary for the preparation of investment projects in the mining and primary mineral processing industries that may impact on the productivity of the mining industry. Promotes technological innovation in mining and primary mineral processing activities through research, development and experimentation activities. Supports the commercialization of mineral substances on new markets. The financial assistance consists of refunding 50% of eligible expenses, with a maximum of \$250,000 per application.
Educational Grant Fund	Start date not available.	MRN grant to mining student (\$1000 grants given to three students in 1998). ¹⁶
Ministry of Regions, MRN, Conseil régional de concertation et de développement	May 2000	Similar to FAIRE.
Financial assistance program: appraisal works on mineral deposits	Start date not available.	Ensures or accelerates carrying out appraisal work on mining properties in Quebec where a mineral deposit has already been identified. The financial assistance corresponds to 20% of the total cost of certain appraisal expenses incurred within the framework of the project, with the exception of the works dealing with the installation of equipment and the construction of buildings. ¹⁷

Table 41: Quebec – Tax Expenditures – Mine Development and Operation

Initiative	Time Span	Description
Credit for allocation of resources	1997-2003	Under <i>la Loi sur les impôts du Québec (Taxation Act)</i> , companies need to pay 9.04% of their income. Mining, forest, and oil companies can deduct 25% of this taxable rate, therefore paying 6.78% of income. There are no numbers for what this costs the government. All mining companies are eligible.
Credit for bringing an ore body into production from small- and medium-sized mining firms	1996-2001	The credit on duties for the cost of bringing an ore body into production such as expenses for roads, buildings and equipment. This credit on duties can amount to a subsidy representing 12% of certain costs (e.g., road, building, equipment) up to a maximum of \$3 million. Available to small- and medium-sized mining firms that have discovered a promising ore body. Firms must have their head office in Quebec or carry out their activities principally in Quebec; assets of less than \$50 million or net shareholders' equity of less than \$40 million; and ownership amounting to at least 30% of the depreciable property used to bring the ore body into production. ¹⁸
Allowance — equipment to treat mine tailings	1998-ongoing	Allowance to encourage the processing of tailings to recuperate mineral resources; 15% of the cost of the equipment used in recapturing the mineral can be deducted from taxable income for 10 years after the beginning of the operation. No company has yet used this allowance. ¹⁹
Capital tax deduction	1996-2001	A mining company can reduce its capital taxes by 33.33%.
Credit on duties refundable for losses	Since before 1990	<p>The Government of Quebec assists the operator with exploration, mineral deposit evaluation and mine development expenses by reimbursing part of the expenses incurred in the form of a credit on duties refundable for losses. Under the <i>Mining Duties Act</i>, this credit provides, throughout Quebec, a reimbursement equivalent to 12% of the lesser of the annual loss or the exploration, mineral deposit evaluation and mine development expenses. The reimbursement increases to 15% if the expenses are incurred in Quebec's Near North and Far North. The credit on duties refundable for losses is non-taxable and does not reduce the exploration expenses the mining company can claim under the <i>Mining Duties Act</i> and the <i>Taxation Act</i>. The credit must be claimed within six months of the end of the fiscal year.</p> <p>Various allocations can reduce the taxable revenue (development expenses, treatment, investment), meaning that some companies that are profitable receive a credit (as they can lower their profits to a loss). The credit is in fact a subsidy. The credit was of 18% until 1995, and then was lowered to 12%. Before 1995, depreciation of assets could also lower the taxable revenue, making many companies eligible to receive the credit.</p> <p>Those eligible for the credit are companies engaged in exploration (companies and individual prospectors) and development. Quebec is the only province with a credit on duties refundable for losses.¹¹</p>
Fiscal incentive for starting mining company	1972-ongoing	The tax on capital payable by a mining company that has not reached the production stage is equal to \$250, regardless of its paid-up capital. As of November 2001, to enable corporations to benefit fully from the new deduction of up to \$1 million in calculating their paid-up capital, the minimum amounts of \$250 and \$125 of tax on capital payable by corporations have been eliminated. In addition, a mining company that has not reached the production stage will no longer have to pay the tax on capital, regardless of its paid-up capital. These changes will apply regarding taxation years of a corporation ending after December 31, 2002. ¹²
Fuel tax reimbursement	1978-ongoing	Mining, forestry and agricultural companies can be reimbursed for the taxes they pay on fuel for vehicles used within their operation.

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Teck Cominco Ltd.
 Tiomin Resources inc.
 Thundermin Resources inc.
 Westmin Resources Ltd.
 Ressources Metco inc.
 Ressources Minérales Mistassini
 Ressources Minières Normabec Ltée.
 Noranda inc.
 Nimsken Corporation inc.
 Norsk Agri (Norsk Hydro)
 Northern Abitibi Mining Corp.
 Pangea Goldfields inc.
 Provenor inc.
 Ressources Orient Inc.
 Ressources Plexmar Inc.
 Ressources Sirios Inc.
 Ressources Strateco inc.
 Ressources Appalaches inc.
 Ressources Campbell inc.
 Ressources Itaminéraque inc.

SGF

The Société générale de financement du Québec (SGF) is a provincial crown corporation that aims to promote the long-term economic development of Quebec. In 2001, the SGF had total assets of over \$3 billion. SGF Minéral inc., a division of SGF, manages its metals and mine portfolio (including aluminum smelters) that was worth \$798.6 million in assets in 2001. This includes wholly owned SOQUEM as well as 50%-owned Sodémex I.

SGF owns, among others,

- Soquem inc. (100%)
- Explo-Zinc inc. (100%)
- Métallurgie Magnola inc. (20%)
- Société de développement du Magnésium inc. (33.3%)
- Sodémex, L.P. (50%)

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Table 42: Quebec – Infrastructure Support – Mine Development and Operation

Initiative	Time Span	Description
Financial assistance program on mining infrastructures	Start date not available.	Promotes or accelerates activities for bringing into production an ore body located in Quebec, as well as the setting up, expansion or modernization of existing mining facilities, by supporting the construction of mining infrastructures. Mining infrastructures refer to regional infrastructures, such as access roads, railway lines, ports and airports, power lines, gas pipelines and other energy plants and to certain surface and mining development infrastructures, such as transportation, aqueduct and sewer networks on mining sites, facilities for workers, mine water sedimentation basins and tailing confinement areas, site preparation work, shafts, drifts, ramps, raises and other similar works. Financial assistance is limited to the lesser of 20% of the total cost of the project or 100% of the cost of eligible infrastructures. Any legally constituted enterprise or organization respecting the objectives of the program is eligible for this MRN program. ²⁰

Table 43: Quebec – Research Support – Mine Development and Operation

Initiative	Time Span	Description
Centre de recherche minérale	Start date not available.	Technical and scientific services to the mining industry.
COREM	Start date not available.	A mining research organization created by the MRN, COREM's board includes mainly industry representatives as well as two MRN and one Minister of Research, Science and Technology representative.

Table 44: Quebec – Summary of Expenditures – Development and Operation

Initiative	1994–1995	2000–2001
Direct Expenditures:		
MRN	0	1,238,000
Total Direct Expenditure	0	1,238,000
Program Expenditures:		
MRN	23,725,000	13,373,000
Total Program Expenditure (minus spending on asbestos which was \$1 million in 2000)	23,725,000	13,373,000
Tax Expenditures:		
Tax deduction of a third of investment	3,000,000	9,000,000
Tax deduction for fuel expenses ²¹	22,155,498	20,631,200
MRN — Credit for reimbursable mining rights for loss	30,022,000	11,842,000
Total Tax Expenditure	55,177,498	41,473,200
Equity³²:		
Sodémex and Sodémex II primary market ³³	0	597,600
Sodémex and Sodémex II secondary market	0	1,450,000
Total Equity	0	2,047,600
Total	78,902,498	58,131,800
Total Development (2000\$)	84,732,064	58,131,800

The financial assistance program on mining infrastructures would be included in the total MRN budget figures but it was not possible to disaggregate them from the total figures.

Source: Ministry of Finance, Public Accounts 1994/5 and 2000/1.

Ensuring the Security Is Adequate and Can Be Used in a Timely Manner

The required amount of a financial guarantee may be increased or decreased by the MRN to maintain a security sufficient to cover the costs of the reclamation plan.²⁵ The rehabilitation plan is reviewed every five years unless a shorter time frame is set out by the MRN.²⁶

The guarantee is refundable only when the work described in the rehabilitation plan has been completed. A certificate of release is issued by MRN to verify that the operator has been released from further obligations. The amount may be refunded in part or increased following re-evaluation of the cost of work required.

Where an operator does not carry out rehabilitation work within the specified time, the government may carry out the work and recover costs from the defaulter.²⁷

Mine Site Closure

Over the past 25-30 years, 11 major mining sites have been given back to the Quebec government.

The 1998 amendments to the *Mining Act* included the addition of a provision that renders leases un-renewable if the title holder has defaulted on royalty payments or has not produced reports required by the minister. At the same time, royalty payments were reduced.²⁸

Abandoned Mine Programs

In Quebec, there are 74 orphaned mine sites, with a total liability estimated at \$75 million.²⁹ Of these, \$40 million would be needed to remediate the top 15 priority sites.³⁰ There are no specific programs or tax deductions for closure and remediation in Quebec. The MRN spent around \$2 million yearly in remediation over the last 10 years. This number was included in its spending under mining development.

Using Ontario's estimates of abandoned mine remediation costs for its province and taking into account the economic size of the metal mining industry in Quebec relative to Ontario would suggest a figure for Quebec between the range of \$250-\$300 million.³¹

Public Expenditures Summary

Table 45 summarizes expenditures by the Quebec government in support of the metal mining industry in 1994/5 and 2000/1 by type of expenditure.

Table 46 summarizes expenditures by the Quebec government in 1994/5 and 2000/1 by each stage of the mining process.

New Expenditures

Although not captured in our analysis for 2000/1, the refundable tax credit for resources, introduced in the March 2001 budget, will significantly increase tax expenditures in support of the mining industry over the next three years.

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Sodémex

The Société de développement des entreprises minières et d'exploration was created in 1996 by SOQUEM and Capital d'Amérique (a subsidiary of the Groupe Participation of the Caisse de dépôt et placement du Québec, now known as CDP Capital) who contribute equally. By 2001 Sodémex will have invested \$17 million.

Sodémex II was founded in August 1997 by CDP Capital. By 2001, Sodémex II will have invested \$15 million.

CDP Capital

The Caisse de dépôt et placement du Québec (CDP Capital) is an investment fund manager founded by the Quebec government in 1965 to manage public sector pension funds. It now also manages the funds of the Régime de rentes du Québec, a pension savings plan to which all workers in Quebec must contribute. CDP Capital has \$133 billion in assets under management.

CDP Capital owns, among others, Sodémex, L.P. (50%).

SIDEX

The Société de développement des entreprises minières et d'exploration was created in September 2001 with a commitment of \$35 million by the MRN and \$15 million by the Fonds de solidarité to be invested in mining companies over five years. The yearly contribution is thus \$7 million from MRN and \$3 million from Fonds de solidarité.

Table 45: Quebec – Metal Mining Expenditures – Expenditure Type

Type Of Expenditure	1994-1995	2000-2001	% Change
Direct Expenditure to Industry	2,533,290	12,748,000	403.00
Program Expenditure	34,132,302	30,426,000	-11.00
Tax Expenditures	68,919,135	51,473,200	-25.00
Infrastructure Support	0	0	0.00
Equity Investment	3,663,328	13,064,000	257.00
Total Cost without Equity	105,584,728	94,647,200	-10.40
Total Cost	109,248,056	107,711,200	-1.41

The program is expected to cost \$15 million in 2001/2, \$28 million in 2002/3, and \$34 million in 2003/4.

Other new programs introduced in 2001, outlined in Table 46b include tax holidays for new mines in the Near and Far North of Quebec, and a refundable tax credit for mining exploration expenses to replace the flow-through share system.

Table 46: Quebec – Metal Mining Expenditures – Mine Stage

Mining Activity	1994-1995	2000-2001	% Change
Prospecting and Exploration	24,515,991	49,579,400	102.23
Development and Operation (including asbestos)	84,732,065	58,131,800	-31.39
Closure, Remediation and Care	n/a	n/a	n/a
Total Cost	109,248,056	107,711,200	-1.41

III. Benefits

Benefits from the metal mining sector in Quebec in 1994/5 and 2000/1 and trends in benefits are outlined in Tables 47, 48 and 49.

Table 46b: Quebec – New Expenditures

Initiative	Time Span	Description
Refundable corporate tax credit for mining exploration expenses	For exploration expenses incurred by companies in Quebec after March 30, 2001	The tax credit will gradually replace the flow-through share system. It will cover the same exploration work as did the flow-through share. For producers it is equal to 20% of allowed exploration expenses; this is increased to 25% if the work is carried out in the Near or Far North. For junior companies, the tax credit is 40% and 45% respectively. Additionally, producers and juniors may deduct up to 60% of these expenses from their taxable income. This new credit will cost the government \$15 million the first year and \$30 million in subsequent years. This tax benefit is granted to foreign companies as well as Quebec based ones.
Refundable tax credit for resources	2001-2004	This was intended to replace flow-through shares; however, when the program was extended, this credit was maintained. The credit is equal to 20% of mining expenses for companies with revenues; and 40% of mining expenses for companies without revenues. It was introduced in March 29, 2001 budget and will cost the government \$77 million over three years (2001/2: \$15 million; 2002/3: \$28 million; 2003/4: \$34 million). ¹⁰ It is administered by the Minister of Revenue.
Tax holidays	2001-ongoing	At 12%, Quebec has one of the lowest tax rates in Canada (MRN 2000). For all work begun in March 2000, mining companies exploring in the Near and Far North (over the 50 th parallel) of Quebec get a tax holiday for the first 10 years of exploitation. This was introduced in the 2001/2 Quebec budget. No company has yet taken advantage of this holiday as all companies are still at the exploration stage and have not started production. ¹³
PAEM: Financial assistance for individual prospectors	2001-2002	Subsidy for scraping, blasting, line cutting, analysis, sampling, geochemistry, geophysics, drilling, consultant fees, and transport. Funding of \$5,000 for basic prospecting and \$15,000 for advanced prospecting. ⁵
PAEM: Assistance for regional exploration funds	2001-2002	Financial support to five regional funds that support prospectors. Funding can be up to \$200,000 per fund per year. Additional support of \$50,000 is available for particular regional requirements. ⁶
PAEM: Financial assistance for exploration companies	2001-2002	Eligible expenditures are stripping, blasting, drilling, sampling, line cutting, assaying, geological and geochemical surveys, and downhole, ground or airborne geophysics. This financial assistance represents 50% of exploration costs incurred by the exploration company, up to a maximum of \$50,000 per project. Financial assistance may reach \$75,000 if the project is located in the Near North or Far North regions.

IV. Conclusions

Quebec provides the highest level of financial and fiscal support to the metal mining industry among all of the provinces and territories studied, with its 2000/1 spending being 1.6 times that of Ontario, despite the fact the sector is only two-thirds as large as it is in Ontario.

Total support to the metal mining sector in Quebec has fallen very slightly (1.4%) over the study period, from \$109 million in 1994/5 to \$108 million in 2000/1 (2000\$). However, total support will rise significantly over the next three years as a result of the introduction of a refundable tax credit for resources in the province's March 2001 budget.

There have been major structural shifts within the province's spending patterns with respect to the metal mining industry over the past seven years. Program expenditures have been reduced significantly, with operating budget of MRN related to mine development and operation falling from \$23.7 million in 1994/5 to \$13.4 million in 2000/1. This includes the bulk of the ministry's regulatory oversight functions. Reimbursable tax credits for losses against mining rights royalties also declined significantly, from \$30 million in 1994/5 to \$12 million in 2000/1, in part due to changes in the structure of this program.

At the same time, there have been major increases in spending related to prospecting and exploration. These have been focused in three areas:

- MRN's own operating budget in this area has risen substantially, from \$8 million in 1994/5 to \$17 million in 2000/1;
- Direct grants to the industry have risen dramatically from \$2.4 million in 1994/5 to \$11.5 million in 2000/1; and
- Following an approach unique to Quebec, the government's own equity investment in junior (exploration) mining companies has also risen dramatically, up from \$3.4 million in 1994/5 to \$11 million in 2000/1. In addition, equity investments of \$2 million were made in 2000/1 in more advanced operations (i.e. mine development and operation).

Table 47: Quebec – Metal Mining Benefits

Factor	1994-1995	2000-2001	% Change 94-00
Metal Mine (MM) Employment	8,294	6,992	-15.7
All Industries Employment in Quebec	2,596,089	3,437,700	32.4
MM % of Total Employment	0.32	0.20	-36.3
Quebec Metal Mine Royalties	\$20,038,000	\$ 26,771,000	33.6
Total Tax Revenue	70,263,000,000	98,586,000,000	40.3
MM % of Total Tax Revenue	0.029	0.027	-4.8
Metal Mine Contribution To GDP	1,185,181,000	1,465,000,000	23.6
Total All Industries GDP	141,482,800,000	198,263,000,000	40.1
MM % of Total All Industries GDP	0.84	0.74	-11.8

Table 48: Quebec – Ratio of Benefits to Expenditures

Factor	1994-1995 (%)	2000-2001 (%)	% Change 94-00
Employment	0.00759	0.0065	-14.5
Quebec Royalty Payments	18.34000	24.9000	35.5
Contribution to GDP	1085.00000	1360.0000	25.4

Table 49: Quebec – Ratio of Royalties to Expenditures

Factor	1994-1995	2000-2001	% Change 94-00
Royalty Payments	20,038,000	26,771,000	33.60
Total Public Expenditures	109,248.056	107,711,200	-1.41
Royalties-to-Expenditures Ratio	18.34%	24.9%	35.50

Ouje-Bougoumou Cree

The Ottawa Citizen, 23 Oct. 2001

Cree community more polluted than 'Love Canal': Study on ground water, environment finds high levels of arsenic, cyanide, lead, mercury

QUEBEC CITY – A study by a U.S. expert on ground water and environmental contamination has found high levels of arsenic, cyanide, lead, mercury and other heavy metals in the water, fish and human beings of the Ouje-Bougoumou Cree nation of northern Quebec.

"What I found is staggering," said Christopher Covell, from his home in Lyndeborough, New Hampshire, yesterday.

"It makes the Love Canal look like a dirty back yard," he added, comparing the contamination in Ouje-Bougoumou, a Cree settlement of about 700, to a residential area of Niagara Falls, New York, where polychlorinated biphenyls (PCBs) were dumped with the result that residents developed a high incidence of cancer.

Mr. Covell said his study, which was done for the Cree to find out why the fish they depend on for food have deforming mutations, looked for traces of contaminants near three mining sites.

He said the problem dates back to the 1950s when the mines started, dumping their waste tailings into Lac Dore and Lac Chibougamau. "To this day they (the tailings) are leaching contaminants," he added.

There are another 27 mines in northern Quebec, Mr. Covell said, and all of them should be studied. As well, epidemiological studies of the Cree should be carried out to establish a clear link between the contaminants and the deaths they have caused.

"I don't think it takes a scientist to know that arsenic and cyanide are lethal," he said. He speculated that a full study would conclude that the contaminants from the mining industry are affecting the environment of the whole region, all the way to James Bay.

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Quebec has been spending approximately \$2 million per year on abandoned mines remediation work. However, these expenditures will end with the current fiscal year. The province has identified 74 orphaned mine sites in need of remediation, with total remediation costs estimated at \$75 million. Using Ontario's estimates of abandoned mine remediation costs for its province and taking into account the economic size of the metal mining industry in Quebec relative to Ontario would suggest a figure for Quebec between the range of \$250-\$300 million.³¹ Quebec's current practice is to only require financial assurances of 70% of estimated rehabilitation costs.

Employment in the metal mining sector in Quebec fell 15.7% over the study period. Mining rights payments (i.e., royalties) rose 33%³⁴, although growth in overall tax revenues in the province has been greater than that in mining rights payments, with the result that the metal mining sector's contribution to total provincial revenues has declined 4.8%. Similarly, while the sector's contribution to GDP rose 23.6%, the contribution of all industries rose 40%, with the result that the sector's contribution to total provincial GDP fell by 11.8%.

Even in the context of the slight decline in overall spending by the province in support of the metal mining industry, given the decline in employment in the sector, the ratio of employment to provincial support declined by 14%. However, unlike the other jurisdictions studied, in Quebec the rise in royalties and contributions to GDP in combination with the decline in total spending results in an increase in the ratio between these benefits and expenditures over time.

Chapter Endnotes

¹ Jean Francois Doyon, "L'évolution de la perspective environnementale de l'industrie minière," *Vecteur Environnement*, 34, numéro 3 (mai 2000), p. 20.

² Marcotte Réal, "La restauration des sites minières au Québec," *Vecteur Environnement*, 34, (mai 2001), p. 28.

³ <http://www.mrn.gouv.qc.ca/4/40/400/princmin.asp#08> (accessed April 2002).

⁴ Yves Corriveau, "La dérèglementation en environnement," conférence présentée en mars 2001 à l'institut des sciences de l'environnement de l'UQAM dans le cadre d'un colloque sur la mondialisation.

⁵ <http://www.geologie-quebec.gouv.qc.ca/aide/index.htm>.

⁶ Ibid.

⁷ Ibid.

⁸ Ibid.

⁹ Ibid.

¹⁰ MRN personal communication.

¹¹ MRN personal communication and MRN website.

¹² Additional information on the *Budgetary Measures 2002-2003 BUDGET*, November 1, 2001.

¹³ MRN, *L'industrie minière du Québec 2000*.

¹⁴ <http://www.soquem.com>.

^{14a} <http://www.sgfqc.com/en>.

¹⁵ http://www.mrn.gouv.qc.ca/4/43/432/faire_ang.asp.

¹⁶ <http://www.mrn.gouv.qc.ca/4/46/460/1998/980226.asp>.

¹⁷ http://www.mrn.gouv.qc.ca/4/43/432/amas_ang.asp.

¹⁸ MRN http://www.mrn.gouv.qc.ca/4/43/432/pme_ang.asp. According to André Jean of MRN, no company was given any subsidy under this credit in 1994 or 2000. However, one company received a subsidy in 2001, the amount of which he could not disclose.

¹⁹ MRN personal communication.

²⁰ http://www.mrn.gouv.qc.ca/4/43/432/infrastructures_ang.asp.

²¹ The estimated value of this tax expenditure is based on the following calculation: The Canada's Emissions Outlook reports the following 1997 emissions in Quebec Megatonnes of greenhouse gases in CO₂ equivalent

Farm gasoline 3088.21

Mining combustion 5847

Forestry combustion 701

Mining proportion using emissions from mining combustion only: $5847 / 9636.21 = 60.7\%$

This would indicate that of the \$34 million in subsidy for all three sectors, \$20.63 goes to mining. A weakness with this estimate is that some of the emissions are greenhouse gases other than CO₂ and may come from other sources than burning fuel for transportation.

²² Quebec *Mining Act*, Section 232, 1991.

²³ *Ibid*, Section 237.

²⁴ *Ibid*.

²⁵ *Ibid*.

²⁶ *Ibid*, Section 232.

²⁷ *Ibid*.

²⁸ *Ibid.*, 1998 amendments.

²⁹ MRN, personal communication, April 2001.

³⁰ *Ibid*.

³¹ The Quebec mining industry is approximately two-thirds the size of the Ontario industry. Based on Ontario estimates of \$450 million, this would suggest a figure in the range of \$300 million.

³² Only the yearly equity investments have been included as opposed to total assets in those funds. Even though these investments as well as their performance vary from year to year, yearly investments gives an indication of public support through this mechanism. Only the equity investment by SOQUEM, Sodémex and Sodémex II have been included as they specifically target the metal mining sector. The investments by CDP Capital have not been included because they do not focus on supporting the mining sector and sector-specific information was unavailable. However, if CDP yearly investments in the mining sector were included, this may significantly increase the equity investments as the 2001 market value of CDP Capital's Canadian gold and precious metals stocks increased by \$123 millions in 2001 (Rapport d'activités 2001, Caisse de dépôt et de placement du Québec). The investments of the Solidarity Fund in mining, which receives a tax credit as a labour-sponsored fund, were also left out as data is unavailable.

³³ Calculations to obtain yearly Sodémex and Sodémex II investments:

Exploration

Sodemex: \$1.42M (of which 72% is in exploration)

Sodemex II: 1.25 of which 84% is exploration

Production

Sodemex: \$1.42M (of which 28% is in production)

Sodemex II: 1.25 of which 16% is in production

Source : MRN 2000

³⁴ It is important to note that the apparent increase in royalties is partially explained by changes in the province's royalty regime.

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In examining sediments in Lac Dore, where the Cree fish, Mr. Covell found 101 milligrams of arsenic per kilogram. The Canadian environmental quality guideline for arsenic is 5.9 milligrams per kilogram. In Lac Chibougamau the arsenic level was 243 milligrams per kilogram, or 41 times the allowable limit. The level of cyanide in Lac Dore water was 40 times the allowable limit.

His study also found high levels of heavy metals in fish caught in the lakes and in hair samples from Ouje-Bougoumou residents. He found that all the metals detected are toxic to human health and are known to cause cancers of the kidney, liver, lung and skin and have other negative effects on human health.

VI. Yukon Territory

I. Introduction

The Metal Mining Industry in the Yukon

As Tables 50 and 51 indicate, metal mining in the Yukon Territory is currently focused on mining gold and silver. Between 1995 and 1998, lead and zinc were also important metals to the Yukon mining industry.

Table 50: Yukon – Metal Output (000 kg)

Metal	1994	1995	1996	1997	1998	1999	2000	94-00 %
Gold	3	5	5	7	6	4	4	33.3
Silver	1	35	113	38	14	2	1	0.0
Lead	0	27,068	80,709	26,625	8,413	0	0	0.0
Zinc	0	42,293	146,190	38,057	14,984	0	0	0.0

Table 51: Yukon – Metal Production (1000\$)

Metal	1994	1995	1996	1997	1998	1999	2000	94-00 %
Gold	56,406	81,239	76,791	98,150	80,546	58,219	51,602	-8.5
Silver	194	8,033	25,699	8,270	3,789	423	339	74.7
Lead	0	23,414	95,516	23,004	7,380	0	0	0.0
Zinc	0	59,844	204,374	71,163	22,776	0	0	0.0
Total	56,600	172,530	402,446	200,587	114,491	58,642	51,942	-8.2

The figures in the tables demonstrate the “boom-and-bust” cycles that are characteristic of the YT economy. As metal prices rise and fall over time, metal mines in the Yukon open and close and the local economy expands and contracts. The Faro mine in the Yukon provides a good example of a mine that has opened and closed several times in response to changes in metal prices. Mine production began at Faro in 1970 and was operating until 1982 when production was suspended due to low metal prices.¹ In 1985, three years later, the mine was reactivated and produced until the

Faro pit was depleted in 1992. Another deposit came into production in 1992, but financial problems stopped operations in April 1993. Two years later the mine was reactivated only to have production suspended in January 1998 due to low metal prices.

Legislative and Institutional Framework for Metal Mining in the Yukon

Although mineral, land and water resources are primarily administered in the Yukon by the federal government through the Department of Indian Affairs and Northern Development (DIAND), the YT government is playing an increasing role in managing and facilitating metal mining in the Yukon through the Minerals Planning and Development Division of the Department of Energy, Mines and Resources. This division manages the Yukon Geology Program, the Yukon Mining Incentive Program and the Yukon Mineral Exploration Tax Credit. Mining exploration and development is carried out in accordance with the provisions of the federal *Yukon Placer Mining Act* and *Yukon Quartz Mining Act*. Other relevant federal legislation includes the *Yukon Waters Act* (YWA) and the *Territorial Lands Act* (TLA).

Territorial Devolution

Negotiations for the transfer of regulatory responsibilities for mining activities to the Yukon government are presently underway and will result in the devolution of these responsibilities in the near future. The Devolution Transfer Agreement negotiations were initiated in September 2001 by the federal, territorial and First Nations government. The devolution agreement is now signed and the transfer will take place April 1, 2003.²

As a result of the pending devolution of powers, mining legislation in the Yukon is currently “under construction.” Examples of this construction include the following:

- Amendments to the *Yukon Quartz Mining Act* (YQMA) in 1996 provided authority to develop regulations concerning quartz mine development, production, and reclamation. The YQMA also provides authorization to create regulations to govern many aspects of the application, issuance and enforcement of the licence. These regulations have not yet been developed.³
- As of December 2001, eight of 14 Yukon First Nations had reached land claim agreements under the *Umbrella Final Agreement and Settlement* legislation. Negotiations on the remaining six agreements are continuing.⁴
- In 1992, the Yukon Mining Advisory Committee reported to DIAND that the YQMA should provide for a mining licence. The report of this committee made provisions for a maximum licence of 25 years, as well as for amendments, renewals and a certificate of closure, but provided no other guidance on development or production regulations. In 1996, the YQMA was amended to include Part II “Land Use and Reclamation.” This section came into force on December 16, 1998 when the *Yukon Quartz Mining Land Use Regulations* (YQMLUR) were proclaimed. It became mandatory for all hard rock mines to be permitted for production or development through the Mining Land Use and Reclamation Office on June 16, 1999. Existing operations were not grandfathered. However, regulations to govern these operations have yet to be developed. In the meantime, DIAND issued a “guidance paper” for industry in August 2000 entitled “Yukon Quartz Licensing under the *Yukon Quartz Mining Act*.”

Chapter Overview

This chapter assesses the benefits of and public expenditures on the metal mining industry in the YT for the years 1994/5 and 2000/1. On the benefits side, we quantify employment in the metal mining industry, metal mining mineral royalties, and the sector’s contribution to territorial Gross Domestic Product (GDP). On the public expenditure side we identify and quantify public expenditures on metal mining in YT. Three types of expenditures — direct expenditures, program expenditures and tax expenditures — are considered for each of the three stages of mining — prospecting and exploration; mine development and operation; and mine closure, remediation and long-term care. Examples of the types of infrastructure support provided to the metal mining industry in the YT are also provided, along with a discussion of current public liabilities for abandoned mine rehabilitation.

Public expenditure on metal mining takes many forms, including program expenditures, tax credits, tax exemptions and support in the form of the creation and existence of formal government divisions responsible for fostering and managing the mining industry in the territory. Public expenditures on metal mining in the YT are described in detail in Part II of this chapter. For each of the expenditure initiatives, we provide a description and year of implementation or time span of the initiative, as well as figures for expenditures in 1994/5 and 2000/1 where relevant and/or possible. Examples of one-off expenditures to provide infrastructure support to the industry are also provided.

Benefits attributable to the metal mining sector are described in Part III. Here we also discuss the benefits in the context of the expenditures, providing benefit-to-expenditure ratios and considering trends over time.

Data Limitations and Qualifications

There are several limits to this study that warrant mention. First, while we have identified several public expenditures related to infrastructure support for the metal mining industry, because we do not have a comprehensive data set related to such expenditures, we have not included them in our total expenditure estimates. Also, we have not included expenditures by ministries or divisions other than those with direct authority over metal mining. Instead, we include in our analysis the budgets of the Yukon Mineral Resources Division and the Yukon Geology Program. These divisions, however, do not deal exclusively with metal mining in the territory. To a certain extent they are also concerned with industrial minerals. Including the total budget of these sectors may overestimate total expenditures. To address this issue, we conduct analyses in which we scale down the total budget figures in proportion to the relative value of metal mining versus industrial mineral mining in the YT.

II. Public Expenditures on Mining in the Yukon Territory

Stage 1: Prospecting and Exploration

In this section of the chapter, we describe and quantify public expenditures related to metal prospecting and exploration in the YT. Public expenditure is categorized as direct expenditures, program expenditures and tax expenditures.

Table 52: Yukon – Direct Expenditures – Prospecting and Exploration

Initiative	Time Span	Description
Yukon Mining Incentives Program (YMIP)	Began in 1989	YMIP promotes and enhances mineral prospecting, exploration and development activities in the Yukon. It provides prospectors and junior mining companies with a portion of the risk capital required to locate and explore mineral deposits. <i>Expenditure on this program was \$833,000 in 1994/5⁵ and \$763,000 in 2000/1.⁶</i>

Table 52 describes the key direct expenditure initiative (Yukon Mining Incentive Program) in place in the Yukon to encourage prospecting and exploration in the territory.

In addition to the above, several program initiatives are in place in the Yukon to facilitate and increase prospecting and exploration in the province (see Table 53). These initiatives include the Yukon Mineral Resources Division, the Yukon Geology Program, the Regional Mineral Development Program and Mineral Resource Assessments.

Total program expenditures related to prospecting and exploration in 1994/5 were \$3,388,139. In 2000/1, total program expenditures related to prospecting and exploration were \$3,911,000.

The key tax initiative in place in the Yukon for encouraging mineral exploration in the territory is described in Table 54.

Direct, program and tax expenditures related to prospecting and exploration in the YT are summarized in Table 55.

Between 1994/5 and 2000/1 public expenditures related to prospecting and exploration in the YT increased substantially — by 55% — from \$3,719,143 (2000\$) to \$5,752,949 (2000\$). This increase is the result of two factors: First, there has been an increase in programmatic expenditures in the territory. This is not surprising given the pending shift in government powers for resource development from the federal government to the territorial government. One would expect to see such a devolution accompanied by a general increase in funds dedicated to managing and facilitating the mining industry in the territory. The second factor contributing to the increase in public expenditures seen above is the Yukon Mineral

Table 53: Yukon – Non-Metal Mining and Regulatory Expenditures Removed – Prospecting and Exploration

Initiative	Time Span	Description
Yukon Mineral Resources Division	Established in 1994, ongoing	This branch of the Department of Economic Development administers, in partnership with DIAND, the Yukon Geology Program; funds and administers the Yukon Mining Incentives Program; provides information on the Yukon Mineral Exploration Tax Credit; provides information on Yukon's mineral potential and mining investment opportunities; assists mining companies through the regulatory process by providing advice on contacts, processes and timing requirements; and provides funding to the Mining Environment Research Group. <i>The annual budget of this division was \$239,000 in 1994/5⁸ and \$512,000 in 2000/1.</i>
Yukon Geology Program	Began in 1995	The Yukon Geology Program is the de facto Yukon Geological Survey consisting of two integrated and jointly managed offices with different administrative structures. The Yukon Geology Program is funded by the Yukon government and DIAND. Federal funding is provided through the Exploration and Geological Services Division of DIAND, while the territorial and cost-shared funding comes through the Mineral Resources Branch of the Department of Economic Development. <i>YT support for this program was \$2,316,130 in 1994/5⁹ and \$1,535,000 in 2000/1.¹⁰</i>
Regional Mineral Development Program	Began in 2001/2	The purpose of this program is to develop comprehensive regional mining information packages for four key metal belts in the Yukon and to help market Yukon metallogenic belts worldwide via the Internet and advertising. <i>Funding for this program was \$551,000 in 2000/1.¹¹</i>
Mineral Resource Assessments	Implemented in 1997/8	Resource Assessments were developed to conduct preliminary assessments of the potential for mineral resource development and to assist in the selection of areas for territorial parks, special management areas, and/or land claims selections. <i>Expenditure on this program was \$550,000 in 2000/1.¹²</i>

Table 54: Yukon – Tax Expenditures – Prospecting and Exploration

Initiative	Time Span	Description
Yukon Mineral Exploration Tax Credit	This is a temporary tax credit in place from January 26, 1999 to 2003	This is a 22% refundable corporate and personal income tax credit for eligible mineral exploration expenditures incurred after April 1, 1999 by individuals and corporations conducting off-site mineral exploration in Yukon. In January 2000 the tax credit was increased from 22% to 25%. <i>Expenditure on this tax credit was \$1,841,949 in 2000/1.¹³</i>

Table 55: Yukon – Summary of Expenditures – Prospecting and Exploration

Initiative	1994–1995	2000–2001
Direct Expenditures:		
Yukon Mining Incentives Program	833,000	763,000
Program Expenditures:		
Yukon Geology Program	2,316,139	1,535,000
Yukon Mineral Resources Division	239,000	512,000
Regional Mineral Development Program	n/a	551,000
Mineral Resource Assessments	n/a	550,000
Total Program Expenditure	3,388,139	3,991,000
Tax Expenditures:		
Mineral Exploration Tax Credit	n/a	1,841,949
Total Prospecting and Exploration (current\$)	3,388,139	5,752,949
Total Prospecting and Exploration (2000\$)	3,719,143	5,752,949
n/a = initiative was not in place and thus is not associated with any expenditure		

Exploration Tax Credit, which was implemented in 1999.

Stage 2: Mine Development and Operation

In this section of the chapter, we describe and quantify public expenditures related to metal mine development and operations in the YT. Public expenditure is categorized as program expenditures or tax expenditures.

In addition to facilitating and encouraging exploration and prospecting in the YT, there are also initiatives in place in the YT associated with mine development and operations. Table 56 describes such expenditures for 1994/5 and 2000/1.

While these initiatives are not explicitly designed to encourage metal mining in the Yukon, they are intended to encourage and facilitate the development and operations of the metal mining industry in the region.

Public expenditure on programs related to mine development and operations totalled \$2,223,000 in 1994/5 and \$136,000 in 2000/1. This sharp decline in public expenditures is the result of the termination of the Mineral Development Agreement in place in 1994/5 but not in 2000/1.

Table 57 describes the key tax initiatives in place in the YT related to mine development and operations.

Table 56: Yukon – Program Expenditures – Development and Operation

Initiative	Time Span	Description
Mining Facilitators	Implemented in 1993/4	The primary function of mining facilitators in the YT is to promote and facilitate the development of the mining industry in the Yukon. <i>Expenditure on mining facilitators in 1994/5 was \$73,000.¹⁴ In 2000/1, expenditure was \$111,000.¹⁵</i>
Canada-Yukon Mineral Development Agreement (MDA)	1991-1996	This federal-territorial agreement has three elements: geoscience, technology and information. <i>In 1994/5 the YT government provided \$2,150,000 in funds to the Canada-Yukon MDA.¹⁶</i>
Mining Environment Research Group Program (MERG)	Began in 1998	While MERG is not a government program, the Yukon government provides funding to MERG to help promote and disseminate the results of technical research on mining environmental issues to Yukon communities, First Nations and the general public. <i>The YT government provides \$25,000 annually to MERG.¹⁷</i>

Table 57: Yukon – Tax Expenditures – Development and Operation

Initiative	Time Span	Description
Fuel tax exemptions	Implemented in 1985. ¹⁸	Fuel tax exemptions for all off-road activities in the mining sector. <i>Expenditure on this initiative is estimated at \$893,961 for 1994/5¹⁹ and \$1,004,034 in 2000/1.^{20, 21}</i>

Tax expenditures on this initiative totalled \$893,961 in 1994/5 and \$1,004,034 in 2000/1.

Program and tax expenditures related to mine development and operations in the YT are summarized in Table 58.

Program and tax expenditures related to metal mining development and operations in YT totalled \$3,421,472 (2000\$) in 1994/5 and \$1,140,034 (2000\$) in 2000/1. This decline is due mainly to the termination of the MDA in place in 1994/5 and not in 2000/1. Indeed, if we exclude the MDA from our 1994/5 total expenditure figure, total expenditure for that period becomes \$1,061,428 (2000\$).

Initiative	1994–1995	2000–2001
Program Expenditures:		
Yukon Mining Facilitators	73,000	111,000
Mineral Development Agreement	2,150,000	n/a
Mining Environmental Research Group	n/a	25,000
Total Program Expenditure	2,223,000	136,000
Tax Expenditures:		
Fuel Tax Exemption	893,961	1,004,034
Total Tax Expenditure	893,961	1,004,034
Total Development and Operations (current\$)	3,116,961	1,140,034
Total Development and Operations (2000\$)	3,421,472	1,140,034
n/a = initiative was not in place and thus is not associated with any expenditure		

Infrastructure Support

The Yukon government provides substantial infrastructure support to the metal mining industry related to mine development and operations. These expenditures do not occur as part of structured programs, and are therefore not included in the estimates of total annual expenditures. However, the following examples of expenditures incurred by the YT government to support infrastructure related to metal mining are provided to give an impression of the type and scope of support provided:²²

- Recently the Yukon government committed approximately \$1 million to replace one bridge, strengthen another bridge and rehabilitate Nahanni Range Road (converting it from its current unmaintained summer-only status to year-round, all-weather operation) so as to assist resumption of mine production at Tungsten, NWT by North American Tungsten Corporation Ltd.
- On Nansen Road, to assist mine development and production at Mt. Nansen by BYG Natural Resources, Community & Transportation Services (C & TS) strengthened one bridge, installed a new major culvert, widened and straightened the road at several locations and carried out an extensive brush-clearing program. In total the direct “capital” assistance amounted to about \$307,000. In addition, the change in status of this road from summer-only to year-round maintenance has led to average direct operation and maintenance annual costs increasing from nearly \$24,000 a year for the three years preceding mine operation to \$117,000 a year over the three years of mine operation. Annual direct operation and maintenance charges are currently averaging about \$74,000 a year.
- Under the Yukon Industrial Support Policy (YISP) the Yukon government assisted mine development and production at Brewery Creek by providing about \$2,500,000 to Loki Gold Corp./Viceroy Resources Corp. to erect

Faro Mine

A lead-zinc mine at Faro in the Yukon was opened in 1968 by Cyprus Anvil. The mine was bought by Dome Canada in 1981 and was closed in 1982 due to low metal prices. The federal government funded an overburden stripping program in 1983 and 1984 to help make the property more attractive to potential buyers. Early in 1985 Dome announced its intentions to mothball the mine.

The property was sold to Curragh Resources in late 1985. It reopened with the support of a tri-partite agreement amongst Curragh and the federal and territorial governments. The purchase price was effectively zero as the federal and territorial governments contributed millions in direct grants, and tens of millions in the form of loan guarantees, second mortgages, road building and other incentives. The deal provided for subsidized electricity through the Northern Canada Power Commission, at approximately 80% of the generated cost. When in full operation, the mine consumed 30-40% of Yukon's total electricity. Later bankruptcies left the utility as a major creditor. In 1992 Curragh went bankrupt, partly stemming from their involvement in the Westray disaster, and the Faro mine was closed the following year. In 1994, a receiver sold the mine to Anvil Range. Commercial production began again in November 1995 and continued until January 1997 when mining ceased. The mill continued to process stockpiles until March 1997 when it too was shut down. Anvil Range declared bankruptcy in April 1998.

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a new steel bridge over the North Klondike River and to reconstruct approximately 13.2 kilometres of North Fork Road. In addition, C & TS still provides \$17,000 annually to Viceroy to maintain this road year round.

- In 1995, when the Anvil Range Mining Corp. (ARM) was reopening (and briefly operated) the Faro area mines, the Yukon government agreed with ARM to take over responsibility for resurfacing, drainage repairs and summer maintenance responsibilities on the mine access road from Faro to the mill site gate (approximately 20 kilometres). Under this agreement ARM paid for the cost to produce crushed gravel surfacing (approximately \$155,000). Over the years 1995/6 to 1997/8 C & TS incurred total direct costs of about \$261,000 to fulfill its obligations under this agreement. Prior to this agreement with ARM this road had always been the sole responsibility of the current mine operators. As a result of this agreement the Faro Mine Access Road became and remains a Yukon government responsibility.

In addition to the above, the Yukon government, initially with funding from the Government of Canada, provided via the Resource Transportation Access Program (RTAP) assistance for the improvement or new development of roads to mining ventures. Selective examples of major RTAP projects that took place between the late 1980s and early 1990s include the following:

- Canamax Resources Inc. for construction and reconstruction of Ketz River Mine access road (Phase 1) in support of mine development and production: \$250,000.
- Mount Skukum Gold Corp. for upgrading the Wheaton River Road in support of mine development and production: \$150,000.
- Canamax Resources Inc. for construction and reconstruction of Ketz River Mine access road (Phase 2) in support of mine development and production: \$184,000.
- Curragh Resources Inc./Mt. Hundere Joint Venture for construction of a new access road to Sa Dena Hes mine in support of mine development and production: \$500,000.
- Western Copper Holdings for upgrades to an existing access road to Williams Creek/Carmacks Copper deposits in support of advanced exploration: \$29,000.

Stage 3: Closure, Remediation and Long-Term Care

Because of current federal government authority over metal mines in the Yukon, the YT government is not responsible for activities related to mine closure, remediation and long-term care. Program expenditures during this mining stage in the YT is covered by DIAND's Mineral Land Use and Reclamation Division. The YT government does not have a formal division or ministry for managing mine closure in the territory. Likewise the YT government does not have any tax initiatives related to mine closure, remediation and long-term care. Thus, in this section of the chapter, we explore expenditures by the federal government related to mine closure, remediation and long-term care in the YT.

There are numerous sites in the Yukon for which the federal government currently recognizes financial responsibility: Faro, United BYG Mount Nansen, and Ketza River, and “contingent liability” for United Keno Hill Mines, Clinton Creek, Viceroy Brewery Creek, Minto, depending upon whether these mines become abandoned. The federal government currently estimates total remediation costs for Faro, Mt. Nansen and Ketza at \$220 million.²³ However, a budgetary source for this money has yet to be identified.²⁴

In addition to the above, there are many sites for which liability has been estimated but for which the federal government has yet to take formal responsibility. In 1994, DIAND started a review of inactive and potentially abandoned mines in the Yukon, which included both exploration sites and past small-scale producers. The Abandoned Mines Project used records from the Mining Recorder’s Offices to compile information in reports for 98 sites and completed additional research at the sites.²⁵ DIAND’s Arctic Environment Strategy Program inherited these reports in 1996 and identified 42 sites that appeared most in need of further assessment.²⁶ More in-depth assessments have now been done on these sites, some of which have acid mine drainage problems, as well as problems with fuel storage on site and health and safety concerns. In 2001/2, the Yukon received an additional \$500,000 to conduct further assessments of contaminated sites from the Federal Contaminated Sites Assessment Initiative (Treasury Board).

The remediation estimate for 42 minor sites is \$4.5 million.²⁷ DIAND would like to deal with these sites and is currently trying to build an abandoned mines team for that purpose, but the question of who are the responsible parties for these sites is a complicating factor, and DIAND considers them to be “contingent liabilities”.²⁸ In addition, there are other metal mine sites the federal government considers to be “contingent liabilities” in the Yukon: Arctic Caribou, Big Thing, Crest, Hart River, Hayes, Hoey, Peso, Runer, Silver Hart, Slate Mountain, Tintina, Venus Mine, Vera and UKHM. Total estimated remediation costs for these sites are \$45 million.²⁹

Responsibility for many sites will be determined as part of the Yukon Devolution Transfer Agreement of October 29, 2001.³⁰ This agreement provides an inventory of waste sites that currently fall under federal jurisdiction.³¹ These are not entirely reliable in terms of the location of mines or in terms of the classification of sites. Some sites not currently classified as mine sites are mining related, such as camps, and may have exploratory shafts associated with them.³² Some sites classified as “waste sites” are exploration sites. While many of these mine sites do not receive much attention, the department estimates between \$250,000 and \$1.5 million per site to remediate them.³³

This inventory also categorizes Type I sites (6) and Type II (7) sites, some of which are currently producing and some of which are closed or abandoned. These sites have been thoroughly assessed and environmental issues identified but no costs are stated in the reports. Upon devolution on April 1, 2003 the federal government will be released of responsibility for Type I sites, but will remain financially responsible for Type II sites that are now abandoned or may become abandoned in the future. These Type II sites are Faro, United Keno Hill Mines, BYG, Mt. Nansen, Ketza River, Clinton Creek, Viceroy Brewery Creek, and Minto. Of these all are metal mines with the exception of Clinton

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Environmental issues associated with the site include relocation of tailings in the Rose Creek valley, treatment of drainage and waste water, and general site restoration. Current environmental liability, including perpetual water treatment, has been estimated at over \$100 million.

When Curragh took over the mine in 1985, the Yukon Territory Water Board required a security deposit of \$500,000, and a trustee environmental sinking fund was initiated to accrue the balance of the reclamation funds. Curragh agreed to make fund contributions of \$0.25 per wet tonne of mineral concentrate shipped, and their contributions were to be capped at \$7.5 million. The annual contribution rate was, however, extremely low and the fund accrued just over \$868,000 between 1988 and 1993.

With Anvil Range, the federal government negotiated to establish a reclamation security trust (RST) to provide funds for reclamation on a sliding scale based on the price of zinc, with minimum payment of \$175,000 per quarter if the company had a positive cash flow. The RST amalgamated what Curragh put in, plus \$1.5 million in trusts stemming from water licences. When, in 1990, Curragh began to develop the Vangorda and Grum deposits at the Faro mine, Yukon Territory Water Board required them to provide a \$943,700 security and \$560,000 annually as a fixed contribution to the trust fund for these mines. When Curragh went bankrupt in 1993, DIAND seized the security deposits and quickly spent all of the money on remediation work at the site.

When Anvil Range shut down in 1998, there was \$11.5 million accumulated in the trust fund, but current environmental liability is estimated at \$124 million.

Source: MiningWatch Canada, The Boreal Below, December 2001.

Creek, which is an asbestos mine site. The federal government also remains responsible for any Newly Discovered Sites that are abandoned mines in need of remediation.

Additionally, the federal government will set aside the equivalent of \$2 million a year for 10 years for a total of \$20 million to remediate waste sites other than Type II sites. This may include exploration sites, as some exploration sites have been classified as waste sites in the inventory. A budgetary source for this money has yet to be determined.³⁴

The figures presented above indicate the magnitude of the liability associated with abandoned mine sites in the Yukon. In summary, the federal government currently estimates total remediation costs for Faro, Mt. Nansen and Ketza at \$220 million. Estimated costs of completing remediation at the 42 sites identified by the Arctic Environment Strategy Program as most in need of further assessment are estimated at \$4.5 million. The “contingent liabilities” associated with numerous other sites (Arctic Caribou, Big Thing, Crest, Hart River, Hayes, Hoey, Peso, Runer, Silver Hart, Slate Mountain, Tintina, Venus Mine, Vera and UKHM) are estimated at \$45 million. And finally, as part of the devolution of powers to the Yukon government the federal government will set aside \$20 million for remediation at sites other than Type II sites. The total value of this liability is \$269.5 million and, because it only includes remediation of a certain number of sites in the territory, it is likely a conservative estimate. Furthermore, it does not include the liability associated with any exploration sites in the territory, as no such estimates exist.³⁵

The ongoing lack of progress on developing the necessary regulations under the *Yukon Quartz Mining Act* (YQMA) is lessening certainty with respect to securities, reclamation and closure standards. As long as the regulations are not developed under the YQMA, securities cannot be collected under its authority. With devolution nearing, DIAND is continuing the public consultation process on the regulations under the YQMA but not pushing to complete the process, as there is an expectation that these regulations may be reviewed again under the new situation.³⁶

Currently, mining companies are under no legislative obligation to provide securities for reclamation. The Yukon Water Board (YWB) has exercised its authority to require securities for reclamation as part of the Water Use Licence. However, the YWB sets the securities lower than DIAND recommends because the YWB tends to accept company predictions of reclamation costs based on the premise that the company will complete the work, thereby excluding administration costs and reclamation costs if the work has to be done by a third-party contractor.³⁷ Furthermore, as the security amount may take into account the ability of the applicant to pay the full costs up front, or his past performance, the full amount of the expected reclamation costs is frequently not requested at the start of a mine, leaving the public exposed to liability, as was the case for Faro.

The securities that have been collected to date in the Yukon have clearly not been sufficient to protect the public from substantial remediation liabilities from past and current mining operations. In many of these cases, costs to the public continue to accrue in the form of yearly maintenance costs for

unremediated sites. Furthermore, even those abandoned mines that have already benefited from remediation by the federal government, continue to need yearly maintenance assuring ongoing public costs into the foreseeable future. To date, there has not been a closure plan successfully implemented in the Yukon: “The major concern is that under at least three Acts (lands, water, minerals) there are requirements for closure of the site. None of this legislation however, provides any specific guidance as to what reclamation and closure standards the operation will have to meet.”³⁸

Public Expenditures Summary

Table 59 summarizes public expenditures on metal mining in the YT for 1994/5 and 2000/1. In this analysis we focus on the trend in expenditures over time. As the figures indicate, public expenditures on metal mining related to prospecting and exploration, development and operations, and mine closure, remediation and long-term care remained relatively stable between 1994/5 and 2000/1, declining only 3%. This decline in expenditures is largely due to the termination of the MDA, which constituted a large portion of the total budget in 1994/5. Excluding the MDA from the 1994/5 figures, drops total expenditures by 33% to \$4,780,570 (2000\$).

Initiative	1994–1995	2000–2001
Prospecting and Exploration		
Direct Expenditures:		
Yukon Mining Incentives Program	833,000	763,000
Program Expenditures:		
Yukon Geology Program	2,316,139	1,535,000
Yukon Mineral Resources Division	239,000	512,000
Regional Mineral Development Program	n/a	551,000
Mineral Resource Assessments	n/a	550,000
Tax Expenditures:		
Temporary Mineral Exploration Tax Credit	n/a	1,841,949
Total Prospecting and Exploration (current\$)	3,388,139	5,752,949
Total Prospecting and Exploration (2000\$)	3,719,143	5,752,949
Development and Operations		
Program Expenditures:		
Yukon Mining Facilitators	73,000	111,000
Mineral Development Agreement	2,150,000	n/a
Mining Environmental Research Group	n/a	25,000
Tax Expenditures:		
Fuel Tax Exemption	893,961	1,004,034
Total Development and Operations (current\$)	3,119,961	1,140,034
Total Development and Operations (2000\$)	3,421,472	1,140,034
Total Public Expenditure (current\$)	6,505,100	6,892,983
Total Public Expenditure (2000\$)	7,140,614	6,892,983
n/a = initiative was not in place and thus is not associated with any expenditure		

Note also that the figures presented in Table 59 do not include the liability associated with either operating or abandoned mines in the YT. After devolution of powers over metal mining in the Yukon takes place in 2003, the Yukon government will be increasingly responsible for such liabilities.

Analysis to Remove Non-Metal Mining-Related Expenditures

As was stated earlier in the report, to the extent that the Yukon Mineral Resources Division and the Yukon Geology Program are responsible for activities beyond those associated with just metal mining, by including the total budgets for these departments we will be overestimating public expenditures on metal mining in the YT. To address this concern, we conduct an analysis in which we attempt to account for the responsibilities of these departments over metal mining versus non-metal mining. We do this by comparing the value of production for metal mining with that of non-metal mining and adjusting the expenditure figures accordingly.

Yukon Mineral Resources Division

The Yukon Mineral Resources Division is responsible for both metal and non-metal (industrial minerals) mining in the Yukon. In 1994 the total value of metal and non-metal production in the YT was \$63,610,000. The metal portion of this figure was \$56,600,600, or 89% of the total value. This figure can be used to adjust the budget of the Yukon Mineral Resources Division. The total budget for the Yukon Mineral Resources Division in 1994 was \$312,000.³⁹ Taking 89% of this figure yields a value of \$227,617. A similar methodology can be used to adjust the 2000 figures. In 2000, the value of metal constituted 94% of the total value of metal and non-metal production in the Yukon. Ninety-four percent of the 2000 budget of the Yukon Mineral Resources Division⁴⁰ (\$1,724,000)⁴¹ is \$1,627,643.

Yukon Geology Program

The Yukon Geology Program relates not just to metals but to non-metals as well. In this analysis, we adjust the budget figure for the Yukon Geology Program to account for only work related to metal mining using the method

described above. The total value of production of metal and non-metal mining in the Yukon in 1994 was \$63,610,000. Metals constituted 89% (\$56,600,600) of the total value. Eighty-nine percent of the 1994 total budget of the Yukon Geology Program (\$2,316,139) is \$2,060,894. Metals constituted 94% of the total value of production (metal and non-metal) of minerals in the Yukon in 2000. Ninety-four percent of the 2000 total budget of the Yukon Geology Program (\$1,535,000) is \$1,449,206.

Summary of Analysis to Remove Non-Metal Mining-Related Expenditures

Taking the above adjustments into account reduces our estimate for total public expenditures on metal mining by 4% in 1994 and 3% in 2000. Total public expenditure in 1994/5 is reduced from \$7,140,614 to \$6,822,691 (2000\$). In 2000, total public expenditure declines from \$6,892,983 to \$6,710,832. After adjusting for the above analysis, the decline in total public expenditures between 1994/5 and 2000/1 is 2%. This decline is slightly less than the decrease without the adjustment to remove non-metal mining-related expenditures (3%). Table 60 summarizes public expenditures related to metal mining by the YT government after correct-

Table 60: Yukon – Summary of Total Expenditures – Non-Metal Mining and Regulatory Expenditures Removed

Initiative	1994–1995	2000–2001
Prospecting and Exploration		
Direct Expenditures:		
Yukon Mining Incentives Program	833,000	763,000
Program Expenditures:		
Yukon Geology Program	2,060,894	1,449,206
Yukon Mineral Resources Division	212,662	483,383
Regional Mineral Development Program	n/a	520,204
Resource Assessments-Minerals	n/a	519,260
Tax Expenditures:		
Temporary Mineral Exploration Tax Credit	n/a	1,841,949
Total Prospecting and Exploration (current\$)	3,106,566	5,577,002
Total Prospecting and Exploration (2000\$)	3,410,050	5,577,002
Development and Operations		
Program Expenditures:		
Yukon Mining Facilitators	64,955	104,796
Mineral Development Agreement	2,150,000	n/a
Mining Environmental Research Group	n/a	25,000
Tax Expenditures:		
Fuel Tax Exemption	893,961	1,004,034
Total Development and Operations (current\$)	3,108,916	1,133,830
Total Development and Operations (2000\$)	3,412,641	1,133,830
Total Public Expenditure (current\$)	6,215,471	6,710,832
Total Public Expenditure (2000\$)	6,822,691	6,710,832
n/a = initiative was not in place and thus is not associated with any expenditure		

ing for activities related to non-metal mining in the territory.

III. Benefits

Table 61 describes the benefits of metal mining in relation to other industries. It also presents trends in the benefits over time. Benefits considered in this analysis include employment, Yukon placer export royalties,⁴² and contribution to GDP.

The data in Table 61 reveal some striking points. First, between 1994/5 and 2000/1 estimated metal mine employment declined by 8%. In contrast, all industry employment in the YT increased by over 23%. At the same time, the contribution of metal mine employment to all industry employment declined between 1994/5 and 2000/1 by over 25%.

Metal mine contribution to GDP declined by over 25% between 1994/5 and 2000/1 while the contribution of all industries to GDP increased by over 17%. Furthermore, the contribution of metal mining to total industries GDP declined between 1994/5 and 2000/1 by almost 37%.

Royalties from the metal mining industry reveal a similar trend. Royalties from placer exports declined substantially — by over 40% — between 1994/5 and 2000/1 while total tax revenue in the territory during the same time period declined by much less — 25%. In addition, royalties from metal mines contributed 20% less to total tax in 2000/1 than they did in 1994/5.

The above data reveals the benefits of the metal mining industry, at least in terms of employment, royalties and contribution to GDP have been recently declining. In Table 62, we explore the relationship between government expenditures on metal mining and the economic benefits being provided by the sector. We do this by investigating the relationship between the benefits and public expenditures (using the adjusted public expenditure figures presented in the analysis to remove non-metal mining-related expenditures section above) through use of ratios of benefits (employment and contribution to GDP) to total public expenditures. Of particular interest here is the trend in the ratios over time. In all cases, the ratio of benefits to public expenditures declined between 1994 and 2000. In other words, the territorial government is getting less and less return in terms of employment, royalties and contribution to GDP for every dollar it invests in the metal mining industry in the Yukon.

In the case of employment, this means that for every job in metal mining, the YT government is spending more and more public money. Conversely, it means that for every dollar spent on metal mines in the YT, fewer jobs in the

Table 61: Yukon – Metal Mining Benefits

Factor	1994-1995	2000-2001	% Change 94-00
Metal Mine (MM) Employment ⁴³	1,804	1,656	-8.23
All Industries Employment in the YT	12,072	14,897	23.40
MM % of Total Employment	15	11	-25.63
Yukon Placer Export Royalties	\$43,704	\$28,691	-40.19
Total Tax Revenue	\$79,866,081	\$59,791,000	-25.14
MM % of Total Tax Revenue	0.06	0.048	-20.11
Metal Mine Contribution to GDP ⁴⁴	\$40,395,170	\$30,100,000	-25.49
Total All Industries GDP	\$957,628,979	\$1,124,000	17.37
MM % of Total All Industries GDP	4	3	-36.52

Table 62: Yukon – Ratio of Benefits to Expenditures

Factor	1994-1995	2000-2001	% Change 94-00
Employment	0.00026	0.00025	-7
Royalties	0.00700	0.00400	-39
Contribution to GDP	5.92000	4.49000	-24

Table 63: Yukon – Ratio of Royalties to Expenditures

Factor	1994-1995	2000-2001	% Change 94-00
Royalty Payments	47,973	28,691	-40
Total Public Expenditures	6,822,691	6,710,832	-2
Royalties-to-Expenditures Ratio	0.007	0.004	-39

metal mining industry are maintained. Indeed, while public expenditure per employee was \$3,782 in 1994/5, it increased by 7% to \$4,054 in 2000/1. A similar message is revealed for both royalty payments and contributions to GDP. The territorial government is getting less of a return in terms of benefits for every dollar invested.

The ratio of royalties to public expenditures declined by 39% between 1994/5 and 2000/1 while that of contribution to GDP to public expenditures fell by 24% during the same time period. Furthermore, public expenditures on metal mining in the Yukon far outweighs the value of the metal mine royalties collected in the territory.

Table 63 summarizes total public expenditure and royalty payment information for the study period.

IV. Conclusions

Public expenditures related to metal mining in the YT declined slightly between 1994/5 and 2000/1. After conducting analyses to remove non-metal mining-related expenditures, total public expenditure in 1994/5 was \$6,822,691 and in 2000/1 it had declined by 2% to \$6,710,832. This decline, which is accompanied by a general increase in tax expenditures between 1994/5 and 2000/1, is primarily due to the termination of the MDA. Removing public expenditure on the MDA from the 1994/5 expenditure figures reduces total expenditure in that year by 35%. Similarly, after eliminating the MDA from 1994/5 expenditure estimates, public expenditures between 1994/5 and 2000/1 show an increase of 50%. These figures clearly indicate the extent to which expenditures associated with the MDA influence the total expenditure figure for 1994/5.

We consider the estimates for public expenditures presented in this chapter to be conservative for several reasons. We have not included the budgets of agencies other than those most directly linked to metal mining in the Yukon, though other government departments, such as Natural Resources Canada and Environment Canada, do play a role in the territory

The territory is unusual in that significant spending continues to occur on infrastructure for resource development, such as roads and bridges for mine access, although this takes place on a one-off rather than program basis. In the past, these types of expenditures were structured through the federal-territorial Resource Transportation Access Program.

There is no formal territorial program for abandoned mine remediation. The allocation of responsibility between the federal and territorial governments for abandoned mines is part of devolution negotiations currently taking place. Total remediation costs associated with abandoned mines in the territory are estimated at \$269.5 million. Current federal expenditures for the maintenance of abandoned mines in the Yukon Territory are between \$8-10 million per year.

Economic activity in the metal mining sector in the Yukon is extremely cyclical. Output and production rose dramatically in the mid-1990s before falling off by 2000. Overall employment, royalty payments to the territorial government, and contributions to territorial GDP fell over the 1994/5 to 2000/1 period, in both absolute terms and relative to other sectors. Total employment in the sector declined by 8%, royalty payments by 40% and contribution to GDP by 25.5%. The sector's contributions to total employment fell by 25.6%, to total territorial revenues by 20% and to total territorial GDP by 36.5% between 1994/5 and 2000/1.

Even with the slight overall reduction of spending in support of the mining industry by the Yukon government, the ratio of benefits to public spending on the sector has declined over the 1994/5 to 2000/1 period, falling by 7% in terms of the generation of employment, 39% with respect to royalty payments and 24% in terms of contribution to territorial GDP. The sector's public cost per employee has risen by 7%, from \$3,782 in 1994/5 to \$4,054 in 2000/1.

Chapter Endnotes

¹ <http://www.emr.gov.yk.ca/Mining/DepositsandProduction/MiningHistory/YukonMiningHistory.htm>

² D.S. Emond, L.H. Weston and L.L. Lewis (eds.), *Yukon Exploration and Geology 2001*, (Whitehorse: Yukon Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada, 2002).

³ DIAND, January 17, 2001. Towards Regulations Regarding Quartz Mine Development, Production, and Reclamation in the Yukon. http://www.ainc-inac.gc.ca/yt/min_e.html.

⁴ D.S. Emond, L.H. Weston and L.L. Lewis (eds.), *Yukon Exploration and Geology 2001*, (Whitehorse: Yukon Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada, 2002).

⁵ Yukon Territory Government, personal communication, February 5, 2002.

⁶ Ibid.

⁷ Estimated from information received from Yukon Territory Government, personal communication.

⁸ Yukon Territory Government, personal communication, February 5, 2002.

⁹ Committee of Provincial Geologists, *Provincial Geologists Journal*, Vol. 12, 1994, p. 31.

¹⁰ Yukon Territory Government, personal communication, February 5, 2002.

¹¹ Ibid.

¹² Ibid.

¹³ Yukon Territory Government, personal communication, January 21, 2002.

¹⁴ Yukon Territory Government, personal communication, February 5, 2002.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ The first year that expenditure on this initiative was measured was 2000.

¹⁹ Estimate is based on expenditure in 2000 and is projected back to 1994/5 by correlating the 2000 figure with metal production and using the 1994/5 production value accordingly.

²⁰ This figure does not include smaller mines that qualify for a refund. No tax is paid on heating fuel.

²¹ Yukon Territory Government, personal communication, January 25, 2002.

²² Examples from Transportation Engineering, Yukon Territory Government, personal communication, February 6, 2002.

²³ DIAND, Contaminated Sites Program, personal communication, March 19, 2002.

²⁴ DIAND, Contaminated Sites Program, personal communication, April 4, 2002.

²⁵ DIAND, Waste Management Program, personal communication, March 20, 2002.

²⁶ Ibid.

²⁷ DIAND, Contaminated Sites Program, personal communication, March 23, 2002.

²⁸ Ibid.

²⁹ DIAND, Contaminated Sites Program, personal communication, April 4, 2002.

³⁰ Yukon Northern Affairs Program Devolution Transfer Agreement 2001.

³¹ These are broken down into remediated sites (including one mine site), sites not requiring remediation (including 37 mine sites), sites requiring assessment (143, some of which may be mines), sites requiring remediation (91, of which 42 are mines), and contained sites (three, of which two are mines).

³² DIAND, Waste Management Program, personal communication, March 20, 2002.

³³ Ibid.

³⁴ DIAND, Contaminated Sites Program, personal communication, April 4, 2002.

³⁵ DIAND, personal communication, February 26, 2002.

³⁶ Ibid.

³⁷ Ibid.

³⁸ DIAND, January 17, 2001. Towards Regulations Regarding Quartz Mine Development, Production, and Reclamation in the Yukon.

³⁹ This figure includes expenditure on mining facilitators in 1994/5.

⁴⁰ Includes expenditure on mining facilitators, the Regional Mineral Development Program, and Mineral Resource Assessments.

⁴¹ The budget of the Mineral Resources Division is substantially expanded with the gradual shift in authority from the federal government to the territorial government.

⁴² Other metal mine royalties are collected by the federal government.

⁴³ Includes employment in Northwest Territory. Statistics Canada does not provide metal mine employment in the Yukon due to confidentiality issues.

⁴⁴ GDP estimates are not available at the territorial level for metal mining. The 1994 estimate is thus based on GDP for mining in the Yukon, extrapolating sand and gravel according to the relative value of sand and gravel production. The 2000 estimate is based on the change in the value of metal production in the Yukon between 1994 and 2000.

VII. Federal Government

I. Introduction

The Metal Mining Industry in Canada

The most important metals produced in Canada, in terms of the value of production, are nickel, gold, copper and zinc. Figure 7 shows the value of production associated with these metals from 1994 to 2000. While the value of gold production in Canada was the highest in 1994, in 2000, the value of nickel exceeded that of all other metals.

Table 64 provides a provincial comparison of metal production in Canada for 2000. The most important provinces in terms of metal production in Canada are Ontario, Quebec and British Columbia.

Institutional and Legislative Arrangements

The Government of Canada regulates and manages metal mining in Canada through Environment Canada, the Department of Fisheries and Oceans, the Department of Indian Affairs and Northern Development (DIAND) and Natural Resources Canada (NRCan). The main division responsible for metal mining in the provinces is the Minerals and Metals Sector of NRCan. In the case of the territories, each territory has a division within DIAND that manages and regulates mining.

In addition to the above, Environment Canada regulates activities that impact on fish and fish habitat through the *Fisheries Act* and the *Metal Mining Liquid Effluent Regulations* that were promulgated under the *Fisheries Act* in 1977 and are currently being updated. Projects subject to the *Canadian Environmental Assessment Act* are overseen by the Canadian Environmental Assessment Agency under Environment Canada. NRCan regulates the use of explosives in mining. The federal government also has authority over projects that impact on transboundary waters, navigable waters, and the transboundary movement of hazardous waste, which may impact on mining projects. The above regulatory powers may be brought to bear on particular mine exploration projects and closure requirements.

Tax Treatment of the Mining Industry

Taxation of the mining industry in Canada has been the topic of substantial discussion in the last decade. Studies completed for the Canadian Council of Ministers of the Environment (CCME) in the mid-1990s, concluded that,

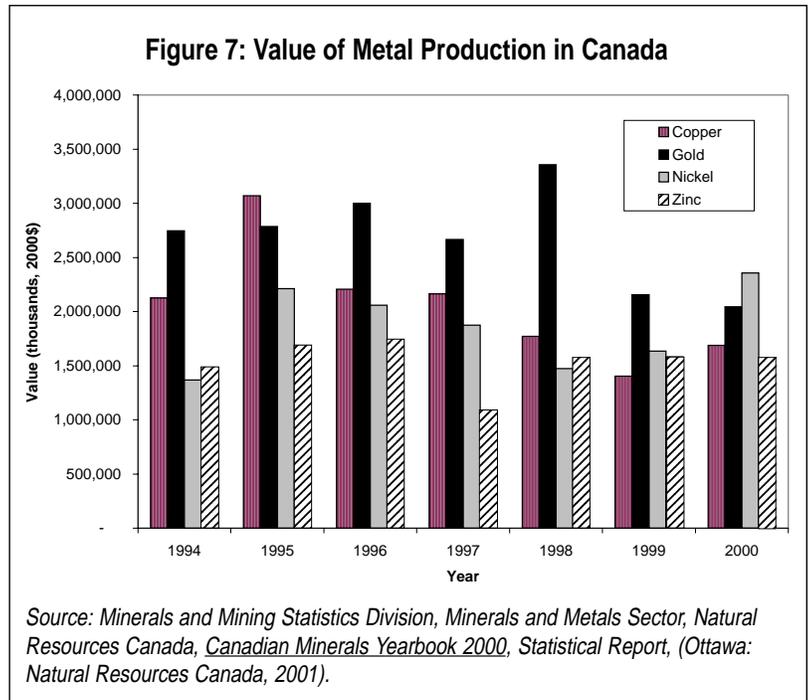


Table 64: Value of Metal Production in Canada, 2000

Province	000\$	% of Total
Newfoundland	996,624	9.0
New Brunswick	522,973	1.7
Quebec	2,248,183	20.3
Ontario	2,715,804	33.5
Manitoba	1,014,484	9.2
Saskatchewan	513,682	4.6
Alberta	256	0.0
British Columbia	1,572,066	14.2
Yukon Territory	51,942	0.5
Northwest Territory	58,396	0.5
Nunavut Territory	384,464	3.5
Total	11,078,873	100.0

Source: Minerals and Mining Statistics Division, Minerals and Metals Sector, Natural Resources Canada, *Canadian Minerals Yearbook 2000, Statistical Report*, (Ottawa: Natural Resources Canada, 2001).

**Dynamic Earth gets \$2M boost:
Money from federal government puts
Science North one step closer to
creating a 'big attraction'**

Sudbury Star, February 15, 2002

Financing for Sudbury's Dynamic Earth was given a major boost Thursday with the announcement that Cultural Spaces Canada is making a \$2-million grant to the facility. Dynamic Earth, an interactive, hands-on showcase of Sudbury's mining heritage, is being built by Science North on the site of the former Big Nickel Mine at a cost of \$12.85 million.

“there is a potential bias in the tax system towards the use of virgin materials relative to recycled materials.”¹ The results of one analysis revealed that, on average, recycled products are taxed at a higher rate than virgin materials.² More recently, the Technical Committee on Business Taxation identified the mining industry, along with the oil-and-gas industry, as receiving favourable tax treatment relative to other sectors of the economy.³ This conclusion was based on a comparison of tax rates across sectors and included consideration of provisions of corporate income, capital and sales taxes on capital inputs, and payroll taxes. Indeed, the net impact of the various tax incentives available to mining and oil and gas (Accelerated Capital Cost Allowance for mines and oil sands projects, flow-through shares to finance exploration and development costs, and the resource allowance) is that these two sectors now have the lowest effective corporate tax rates of all major sectors in Canada. The OECD has recommended that favourable treatment of these sectors be terminated on both environmental and economic grounds.⁴

Largely in response to the lower effective tax rates experienced by the oil-and-gas sector and the mining industry, the 2000 federal budget indicated that on January 1, 2001 the general corporate income tax rate would be reduced by 1% from 28% to 27%.^{4b} The government plans to continue to reduce the corporate income tax rate to 21% over a period of five years. At present, the oil-and-gas and mining sectors benefit from an effective federal tax rate of 21%. Because of this, oil-and-gas and mining sectors (along with the manufacturing and processing sectors) were not eligible for the reduced corporate income tax rate.

However, the major tax and program expenditures in support of the mining sector remain in place, and new initiatives continue to be added. The October 2000 Economic Statement and Budget Update, for example, announced a 15% credit for grassroots exploration expenses. In addition, funding for the Targeted Geoscience Initiative — an initiative to create mineral potential maps on under-explored areas with high mineral potential — was provided for in the February 2000 federal budget. These and other initiatives are discussed in more detail below.

Chapter Overview

In this study we assess the benefits and public expenditure on the metal mining industry in Canada for the years 1994/5 and 2000/1. With respect to benefits, metal mining's contribution to Gross Domestic Product (GDP) and employment in the metal mining industry are quantified. A note is also made of federal royalties from metal mining in the territories, although these figures are too erratic over time to be considered in the analysis. Public expenditure on metal mining by the federal government is identified and quantified. Here, three types of expenditures — direct expenditures, program expenditures, and tax expenditures — for three stages of mining — prospecting and exploration; mine development and operation; and mine closure, remediation and long-term care — are considered.

Public expenditures on metal mining take many forms including program expenditures, tax credits, tax exemptions, and support in the form of the creation and existence of formal government divisions solely responsible for fostering and managing the mining industry. Public expenditures on metal mining in

Canada are described in detail in Part II of this chapter. For each of the expenditure initiatives, we provide a description and year of implementation or time span of the initiative, as well as figures for expenditures in 1994/5 and 2000/1 where relevant and/or possible.

Benefits attributable to the metal mining sector are described in Part III. Here we also discuss the benefits in the context of the costs, providing benefit-to-expenditure ratios and considering trends over time.

Data Limitations and Qualifications

There are several limits to this study that warrant mention. First, due to data limitations, we have not included public expenditures related to infrastructure support for metal mining in the Canada. Including such information would increase total expenditures on the metal mining industry. In addition, the federal government was unable to provide us with estimates for public expenditures on a number of tax items including the Canadian Exploration Expense, Canadian Development Expense, Earned Depletion, Resource Allowance, Accelerated Capital Cost Allowance (ACCA), and the deduction for reclamation fund contributions. Expenditures on all of these items were estimated except the ACCA and the deduction for reclamation fund contributions. Those estimates were based on historical figures for expenditures and are discussed in more detail later in this report. Including an estimate for expenditures on the ACCA and the deduction for reclamation fund contributions would increase total public expenditures on the metal mining industry in Canada.

The above limitations imply that we have underestimated total expenditures on metal mining. However, in our analysis we include the entire budgets of the Minerals and Metals Sector of Natural Resources Canada, the Canadian Geological Survey and the relevant divisions of DIAND. These divisions do not deal exclusively with metal mining. To a certain extent they are also concerned with industrial minerals and coal mining in Canada and with other stages of the mineral industry, such as smelters. Including the total budgets of these divisions may result in an overestimate of total expenditures. To address this issue, an analysis was conducted in which the total budget figures were scaled down in proportion to the relative value of metal mining versus those activities (industrial mineral mining for example) for which the division is also responsible.

II. Federal Government's Public Expenditures on Mining

Stage 1: Prospecting and Exploration

In this section of the chapter, we describe and quantify federal public expenditures related to metal prospecting and exploration in Canada. Public expenditure is categorized as direct expenditures, program expenditures and tax expenditures.

The key initiative in place federally to encourage prospecting and exploration in the country is the Targeted Geoscience Initiative (TGI). The TGI was established to support projects that will provide geological data on areas with a high potential of mineral deposits. As part of this initiative, the Geological

Federal Subsidies Continue: Federal Support For Voisey's Bay

*Government Of Canada News Release,
11 June 2002*

Government of Canada Supports Aboriginal Investment and Technology Opportunities For Voisey's Bay

St. John's, Newfoundland and Labrador. The Government of Canada welcomes significant economic and skills development opportunities, especially for Aboriginal people, offered by the start-up of the Voisey's Bay nickel mine in Labrador. Government of Canada investment in this project could involve \$150 million in support for research and development, technology and Aboriginal training and skills development.

Inco Limited and the Province of Newfoundland and Labrador have successfully negotiated an agreement for a mining lease at Voisey's Bay. Inco has also reached tentative agreements on impacts and benefits with the Labrador Inuit Association and the Innu Nation. The project involves the development of the nickel deposit as well as construction of a hydrometallurgical processing plant on the Avalon Peninsula.

Inco has applied for a strategic research and development repayable investment under Industry Canada's Technology Partnerships Canada program to support the research and development of its innovative hydrometallurgical processing technology, including construction of a pilot plant in Argentina for processing the nickel concentrate from the Voisey's Bay mine.

A variety of existing programs in Human Resources Development Canada, the Atlantic Canada Opportunities Agency, and Indian and Northern Affairs Canada will also provide possible sources of funding for Aboriginal people for training and business development.

Table 65: Federal Government – Direct Expenditures – Prospecting and Exploration

Initiative	Time Span	Description
Targeted Geoscience Initiative (TGI)	Funding for the TGI was provided for in the 2000 federal budget	The Government of Canada's TGI led by Natural Resources Canada's GSC was established to produce new geological maps and data on under-explored areas with a high potential of mineral deposits and to make this information publicly accessible through the Internet. <i>Funding for this initiative in 2000/1 was \$5,000,000.</i> ⁵

Table 66: Federal Government – Program Expenditures – Prospecting and Exploration

Initiative	Time Span	Description
Geological Survey of Canada (GSC)	Established in 1942	The GSC is responsible for Canada's geoscientific information and research. <i>Federal expenditure on geological surveys in 1994/5 was \$81,272,000. The annual budget of the GSC in 2000/1 was \$65,425,000.</i> ⁶
DIAND's Exploration and Geological Services Division - Yukon Territory	Not in place in 1994/5	In partnership with the Government of Yukon through the Yukon Geology Program, the division carries out applied geological research including bedrock mapping, mineral potential studies, reclamation and environmental studies, and mineral and placer deposit studies. With assistance from the GSC, airborne geophysical surveys and geochemical studies are also undertaken. <i>The annual budget for this division in 2000/1 was \$194,100.</i> ⁷
Canada-Nunavut Geoscience Office (C-NGO)	Established in 1999	The objective of creating this office was to build the geoscience capacity needed in the new territory. It is managed by GSC on behalf of the three sponsoring departments: Natural Resources Canada, DIAND, and the Nunavut Department of Sustainable Development. <i>Federal funding for C-NGO in 2000/1 was \$9,018,000.</i> ⁸

Survey of Canada (GSC), the division responsible for leading this project, encouraged additional investment from other federal sources and provincial agencies. In 2000, an additional \$3,124,000 in federal funds was made available for projects funded as part of the TGI.

Total expenditure on the initiatives described in Table 65 in 2000/1 was \$5,000,000.

In addition to the above, several program initiatives are in place in Canada to facilitate prospecting and exploration. While such initiatives do not necessarily entail direct expenditures to the metal mining industry, they are nonetheless designed to facilitate and increase metal exploration and prospecting in the country. The federal government, through

DIAND, plays a substantial role in managing and facilitating metal mining in the three territories. Expenditure associated with the relevant divisions of DIAND is included in the cost figures presented in this report. One such initiative, DIAND's Exploration and Geological Services Division, is described in Table 66.

Total program expenditure related to prospecting and exploration in 1994/5 was \$81,272,000. In 2000, total program expenditure related to prospecting and exploration was \$79,637,100.

Key federal tax initiatives in place in Canada designed to encourage mineral exploration in the country are described in Table 67 and include the Canadian Exploration Expense, Earned Depletion, and the Investment Tax Credit for Exploration (ITCE). The recently introduced ITCE was established to address the problem of declining mineral exploration activity in Canada.

Tax expenditure on the CEE, Earned Depletion and the ITCE combined totalled \$86,537,682 in 1994/5 and \$117,297,238 in 2000/1.

Direct, program and tax expenditures related to prospecting and exploration in Canada are summarized in Table 68. Between 1994/5 and 2000/1 there was an increase in government expenditures related to prospecting and exploration in the country. Public expenditures on prospecting and exploration increased by 5% between 1994/5 and 2000/1. This increase was accompanied by a reduction in programmatic expenditures and an increase in tax expenditures related to prospecting and exploration in Canada.

Stage 2: Mine Development and Operation

In this section of the chapter, we describe and quantify public expenditures related to metal mine development and operations in Canada. Public expenditure is categorized as program expenditures or tax expenditures.

In addition to facilitating and encouraging exploration and prospecting in Canada, there are also several initiatives in place associated with mine development and operations. Table 69 describes expenditures in 1994/5 and 2000/1 on several items related to mine development and operations in Canada. While these initiatives are not explicitly designed to encourage metal mining, they are designed to manage and facilitate the development and operations of the metal mining industry in the country.

Public expenditures on programs related to mine development and operations totalled \$47,487,000 in 1994/5 and \$39,937,725 in 2000/1.

Table 67: Federal Government – Tax Expenditures – Prospecting and Exploration

Initiative	Description	
Canadian Exploration Expense (CEE)	In April 1983 it became possible for investors to deduct exploration expenses against any income	This is a 100% Canadian exploration expense deduction fully claimable in the year incurred. CEE may be carried forward indefinitely and drawn down as required. CEE includes all pre-production development expenses. <i>Finance Canada no longer tracks expenditure on this initiative. Based on expenditure figures from the Federal Public Accounts for 1991/2, we estimate expenditure on this initiative to be \$47,360,970.33 in 1994/5 and \$34,780,438.81 in 2000/1.</i> ⁹
Earned Depletion	Pre-1994/5	The deductions for earned depletion are generally limited to 25% of the taxpayer's annual resource profits, although mining exploration depletion can be deducted against non-resource income. Earned depletion is an additional deduction from taxable income of certain exploration and development expenditures and other resource investments. The earned depletion was designed to encourage company taxpayers to undertake more exploration and development than they otherwise would. <i>Estimated expenditure on this initiative for 1994/5 is \$39,176,712 and for 2000/1 is \$44,516,799.</i> ¹⁰
Investment Tax Credit for Exploration (ITCE) in Canada – Flow-Through Shares	October 2000 to December 2003	The ITCE is a 15% federal exploration tax credit for flow-through shares. ITCE was established to address the problem of declining mineral exploration activity in Canada ¹¹ . The ITCE is designed to assist junior mining companies to raise equity through flow-through shares. The ITCE can be carried back three years and forward seven years. <i>Expenditure on this item was \$38,000,000 in 2000/1.</i> ¹²

Table 68: Federal Government – Summary of Expenditures – Prospecting and Exploration

Initiative	1994–1995	2000–2001
Direct Expenditures:		
Targeted Geoscience Initiative	n/a	5,000,000
Total Direct Expenditure	0	5,000,000
Program Expenditures:		
Geological Survey of Canada	81,272,000	65,425,000
DIAND's Exploration and Geological Services	n/a	194,100
C-NGO	n/a	9,018,000
Total Program Expenditure	81,272,000	79,637,100
Tax Expenditures:		
Canadian Exploration Expenses	47,360,970	34,780,439
Earned Depletion	39,176,712	44,516,799
Investment Tax Credit for Exploration	n/a	38,000,000
Total Tax Expenditure	86,537,682	117,297,238
Total Prospecting and Exploration (current\$)	167,809,682	196,934,338
Total Prospecting and Exploration (2000\$)	186,729,404	196,934,338
n/a = initiative was not in place and thus is not associated with any expenditure		

Table 69: Federal Government – Program Expenditures – Development and Operation

Initiative	Time Span	Description
Minerals and Metals Sector (MMS) of Natural Resources Canada	Pre-1994/5	MMS is the federal government's primary source of scientific and technological knowledge and policy advice on Canada's mineral and metal resources and on explosives regulation and technology. <i>Expenditure on the Mining Division¹³ of Natural Resources Canada (NRCan) was \$25,762,000 in 1994/5.¹⁴ The annual budget for the MMS of NRCan in 2000/1 was \$38,900,000.¹⁵</i>
DIAND's Mineral Resources Department -Yukon Territory	Not in place in 1994/5	DIAND's Mineral Resources Department administers the mineral resources of the Yukon Territory. The department has four operating divisions: Mineral Rights Division; Exploration and Geological Services Division; Mining Land Use and Reclamation Division; and Mining Inspections Division. <i>Annual expenditure for the Mineral Resources Department was \$132,400 in 2000/1.¹⁶</i>
DIAND's Mineral Rights Division - Yukon Territory	Not in place in 1994/5	Activities of the Mineral Rights Division include the issuance and renewal of placer claims, placer prospecting leases, Yukon quartz mineral claims and leases, coal permits, licences and leases, and dredging leases, as well as the sale of claim maps and publications. <i>The annual budget of this division in 2000/1 was \$277,900.¹⁷</i>
DIAND's Mining Inspections Division - Yukon Territory	Not in place in 1994/5	The Mining Inspections Division is responsible for ensuring Yukon's placer mining industry complies with all of the relevant legislation, through education, encouragement and enforcement. <i>The annual budget of this division in 2000/1 was \$452,800.¹⁸</i>
Mineral Development Agreement (MDA)	1991 to 1996	This is a joint federal-provincial agreement to strengthen and diversify the province's mineral sector. The MDA has five sectors: geoscience, technological development, economic development, public information and evaluation, and administration. <i>Federal expenditure on MDA in 1994/5 was \$21,700,000.¹⁹</i>
Canadian Association of Mining Equipment and Services for Export (CAMESE)	Established in 1981	CAMESE is a trade association made up of Canadian member companies offering products and services to the mining industry. It was established in 1981 for the purpose of assisting members in exporting their goods and services. <i>Federal expenditure on CAMESE was \$25,000 in 1994/5 and \$174,625 in 2000/1.</i>
Mining Environment Research Group (MERG)	Established in 1998	Although MERG is not a government program, the federal government provides funding to MERG to help promote and disseminate the results of technical research on mining environmental issues to Yukon communities, First Nations and the general public. <i>Annual funding from the federal government is \$25,000.²⁰ This funding is included in the budget of the Mineral Resource Department above.</i>

Federal Infrastructure Support for Mine Development

Inmet

Inmet's Izok project to benefit from government funding of infrastructure feasibility study

TORONTO, Aug. 20 /CNW/ – On August 16, 2001, the Department of Indian Affairs and Northern Development announced that the Federal Government of Canada has agreed to provide \$3 million as part of the funding to determine the feasibility of constructing a road and port in the Kitikmeot region of Nunavut. The Government of Nunavut and the private sector will contribute a further \$3 million. It is anticipated that the proposed road would extend approximately 295 kilometres from a port site on the Bathurst Inlet to Inmet Mining Corporation's Izok zinc and copper deposit.

The initiatives described in Table 69 mostly relate to managing and facilitating the development and operations of metal mines in Canada. In contrast to this, two of the tax initiatives described in Table 70 are designed to provide incentive to increase mine development and operations in the country. These initiatives include the Canadian Development Expense (CDE) and Accelerated Capital Cost Allowance (ACCA) for Class 41 assets associated with a new mine or a major mine expansion. Also included in Table 70 is the federal Resource Allowance. This initiative is not designed explicitly to encourage metal developments and operations in the country; however, it does have the effect of countering provincial mining royalties that may otherwise provide a disincentive to mining developments and operations.

Tax expenditures on those initiatives for which data is available totalled \$185,621,714 in 1994/5 and \$201,489,212 in 2000/1.

Table 70: Federal Government – Tax Expenditures – Development and Operation

Initiative	Time Span	Description
Canadian Development Expense (CDE)	Revised in 1992	The CDE is calculated on a 30% declining balance basis and includes cost of acquiring mine property. Other significant costs covered by the CDE are haulage ways and overburden removal after the start of production. A special provision introduced in 1992 allows certain development expenses to be treated as Canadian Exploration Expenses (CEE) in the hands of a flow-through share investor, to assist flow-through share financing by junior oil-and-gas companies. Consequently, a flow-through share investor is entitled to a 100% write-off for CEE rather than only a 30% write-off for CDE. <i>Finance Canada no longer tracks expenditure on this initiative. Given expenditure figures for 1991/2 from the Federal Public Accounts, we estimated that expenditure on this initiative was \$58,089,013.45 in 1994/5 and \$56,572,822.87 in 2000/1.</i> ²¹
Accelerated Capital Cost Allowance (ACCA)	Pre-1994/5	Class 41 assets generally qualify for a 25% capital cost allowance. However, certain buildings, machinery and equipment acquired for use at a new mine or for a major mine expansion, may qualify for an accelerated capital cost allowance of up to 100%. ²² <i>Finance Canada does not estimate expenditure on this initiative.</i> ²³
Resource Allowance	Came into effect in 1976	The resource allowance provides an annual deduction to mining and oil-and-gas producers. It is calculated as 25% of a taxpayer's annual resource profits, computed after operating costs and capital cost allowances, but before the deduction of exploration expenses, development expenses, earned depletion, and interest expenses. The resource allowance is intended to have the effect of offsetting provincial mining royalty payments made by mining companies. <i>Estimated expenditure on this initiative for 1994/5 is \$127,532,701 and for 2000/1 is \$144,916,389.</i> ²⁴

Program and tax expenditures related to mine development and operations in Canada are summarized in Table 71.

After correcting for inflation, program and tax expenditures related to metal mining development and operations in Canada totalled \$259,390,583 (2000\$) in 1994/5 and \$241,426,937 (2000\$) in 2000/1. That is a decline in expenditure of 7%. These figures do not include estimated expenditures on ACCA for Class 41 assets associated with new mine developments or major mine expansions. The federal government does not track expenditures on this initiative.

As was the case with prospecting and exploration, programmatic expenditures associated with development and operations are declining while tax expenditures are increasing. Thus, while the federal government is spending less money managing the metal mines industry in Canada, they continue to spend substantial money providing tax incentives for mine development and operations.

Table 71: Federal Government – Summary of Expenditures – Development and Operation

Initiative	1994–1995	2000–2001
Program Expenditures:		
Minerals and Metals Sector of Natural Resources Canada	25,762,000	38,900,000
DIAND's Mineral Rights Division	n/a	410,300
DIAND's Mining Inspection Division	n/a	452,800
Mineral Development Agreements	21,700,000	n/a
CAMESE	25,000	174,625
Total Program Expenditure	47,487,000	39,937,725
Tax Expenditures:		
Resource Allowance	127,532,701	144,916,389
Canadian Development Expenses	58,089,013	56,572,823
Accelerated Capital Cost Allowance	*	*
Total Tax Expenditure	185,621,714	201,489,212
Total Development and Operations (current\$)	233,108,714	241,426,937
Total Development and Operations (2000\$)	259,390,583	241,426,937
n/a = initiative was not in place and thus is not associated with any expenditure		
* = the Government of Canada does not have an estimate of expenditure on this initiative		

Giant and Con Mines

The Yellowknife mining camp, one of Canada's major gold mining districts, has two major operating mines – the Con and Giant Mines. Since opening in 1938, the Con Mine has produced more than 156 million grams of gold; the Giant Mine commenced production about 10 years later, and has produced an estimated 201 million grams of gold.

However, the ore mined in the Yellowknife area is associated with arsenopyrite, and therefore releases a considerable amount of arsenic when processed. Both historic and more recently deposited tailings have been found to contain extremely high levels of arsenic: up to 25,000 ppm in the Con Mine tailings, 4,800 ppm in the Giant Mine tailings, and 12,500 ppm in the historic Negus Mine tailings. Comparatively, soil samples set background range of arsenic in the Yellowknife area as between 4 and 70 ppm. Surface water samples show arsenic concentrations that exceed Canadian drinking water standards, which set the limit at 25 ppm. Popular recreational Kam Lake showed up to 1,570 ppm. In general, lake sediments have high concentrations of arsenic, presumably from historic and recent mining operations, and the arsenic is remobilizing into local surface waters.

But arsenic in the water is not the only trouble left behind as a legacy of 70 years of gold mining. The Giant Mine has more than a quarter-million tonnes of arsenic trioxide, a highly toxic byproduct of roasting ore to extract gold, placed underground in mined-out stopes.

When the mine's owner, Royal Oak, went into receivership – not before making the mine famous with a bitter strike in 1992 – the federal government became responsible for the property. A series of deals in recent years have arrived at an arrangement where the taxpayers bear all of the environmental liabilities, including cost of cleanup of the site and the arsenic trioxide stockpiles, but also some of the operating costs, while Miramar Mining Corporation continues to mine at the Giant. Additional expenses assumed by the federal government in a new deal made in the summer of 2001 include environmental monitoring, and treating arsenic-contaminated water pumped from the areas of the mine where Miramar is working.

Source: MiningWatch Canada, *The Boreal Below*, December 2001; Sunny Munroe, *Encompass Magazine*, Volume 3, Number 5; and files from the Canadian Arctic Resources Committee.

Stage 3: Closure, Remediation and Long-Term Care

In this section of the chapter, we describe and quantify public expenditures related to metal mine closure, remediation and long-term care in Canada.

In Table 72 we describe several direct expenditure initiatives by the federal government related to mine closure, rehabilitation and long-term care. These expenditures, while incurred by the federal government, actually relate to mine closure, remediation and long-term care for metal mining in the territories.

Total direct expenditures on these initiatives were \$14,553,418 in 2000/1.

Table 72: Federal Government – Direct Expenditures – Closure and Remediation

Initiative	Time Span	Description
Abandoned mine site inventories and assessments	Post-1994/5	The federal government is spending substantial funds on the first phase of a project that involves generating inventories and ongoing assessments of abandoned mine sites by third-party consultants. Funds for this initiative are made available from the Federal Contaminated Sites Assessment Initiative. <i>Direct expenditure on these inventories and assessments was \$1,925,000 in 2000/1.</i> ²⁵
Ongoing monitoring and maintenance of abandoned mine sites	Post-1994/5	Federal costs associated with maintenance of abandoned mines in the Yukon are between \$8-10 million a year. ²⁶ These funds come from DIAND's Contaminated Sites Management Program. ²⁷ This maintenance cost estimate includes the court-mandated costs for Faro through bankruptcy proceedings in Ontario in which DIAND was ordered by the Ontario court to commit \$10.1 million (for 2001 and 2002) to the care and maintenance of the Faro mine site. ²⁸ <i>A conservative estimate of expenditure on the monitoring and maintenance of abandoned sites in the Yukon is \$8,000,000 in 2000/1.</i>
Metals in the Environment Research Network	Founded in July 1998	The Metals in the Environment Research Network was established to better understand and control the impact of metals on the environment. <i>Federal funding for this initiative in 2000/1 was 1,167,000.</i> ^{29, 30}
Centre for Environmental Research in Minerals, Metals and Materials (CERM3)	Funding was announced in 2000	Federal funds for CERM3 were used to create five interdisciplinary research laboratories to work on environmental problems in the mining industry. The laboratories are housed at the University of British Columbia. <i>Federal funds for CERM3 in 2000/1 were \$3,400,000.</i>
Mining Innovation, Rehabilitation, Applied Research Corporation (MIRARCO) owned by Laurentian University	1998	MIRARCO is a non-profit applied research and technical service company formed through collaboration between Laurentian University and the private and public sectors. MIRARCO promotes mining innovation and provides a bridge between knowledge providers, researchers, and knowledge users, and entrepreneurs and private-sector companies. MIRARCO comprises several mining research centres. <i>Federal funds received by MIRARCO in 2000/1 totalled \$61,418.</i> ³¹

In Table 73, we describe and quantify public expenditures on DIAND's Mining Land Use and Reclamation Division.

There is one tax initiative in place in Canada that relates to metal mine closure, remediation and long-term care — a deduction for contributions to qualifying mine reclamation trusts. This initiative is described in Table 74.

Expenditure on the above initiative was less than \$2.5 million in both 1994/5 and 2000/1. As such, the specific value is not reported in the public accounts of the federal government.³⁴

Table 75 summarizes the public expenditures associated with metal mine closure, remediation and long-term care. Note that none of the initiatives captured in this analysis were in place in 1994/5; the expenditure is all fairly recent. This substantial increase in expenditure demonstrates the growing recognition of the need for policies and programs related to mine closure, remediation and long-term care.

Table 75's figures do not account for the public liability associated with abandoned and operating mines and exploration sites in Canada. Federal jurisdiction over the Northwest, Yukon and Nunavut Territories exposes the federal government to liability for abandoned mines in these regions. The extent of this exposure is to some degree a matter of definition and negotiation. In the Yukon, where owners can still be linked to mines, the government only recognizes a "contingent liability" that is dependent on several factors, including whether the owner is going to default or declare bankruptcy, the amount of security that is available to offset federal costs when an owner declares bankruptcy, and whether the site may be mined by a new owner. As is

Initiative	Time Span	Description
DIAND's Mining Land Use and Reclamation Division - Yukon Territory	Established after 1994	The Mining Land Use and Reclamation Division administers the <i>Mining Land Use Regulations</i> , which govern the reclamation of land-based exploration activities on mineral claims and placer mining operations following recent changes to the <i>Yukon Quartz and Placer Mining Acts</i> . <i>The annual budget on this division in 2000/1 was \$132,800.</i> ³²

Initiative	Time Span	Description
Deduction for mine reclamation trust fund contributions	Amended in the February 1994 budget	A deduction is permitted for contributions to qualifying mine reclamation trusts made after February 22, 1994 pursuant to a statutory obligation to make such contributions. Income earned in such trusts will be subject to tax each year. All withdrawals from the trust will be included in computing the recipient's income for tax purposes. Reclamation costs will continue to be fully deductible at the time incurred. <i>The federal government was unable to provide an estimate for expenditure on this initiative.</i> ³³

Initiative	1994–1995	2000–2001
Direct Expenditures:		
Abandoned Mine Site Inventories and Assessments	n/a	1,925,000
Monitoring and Maintenance in the Yukon	n/a	8,000,000
CERM3	n/a	3,400,000
Metals in the Environment Research Network	n/a	1,167,000
MIRARCO	n/a	61,418
Total Direct Expenditure	0	14,553,418
Program Expenditures:		
DIAND Mining Land Use and Reclamation	n/a	132,800
Tax Expenditures:		
Deduction for Reclamation Fund Contributions	*	*
Total Closure, Remediation, Long-Term Care (current\$)	0	14,686,218
Total Closure, Remediation, Long-Term Care (2000\$)	0	14,686,218
n/a = initiative was not in place and thus is not associated with any expenditure		
* = the Government of Canada does not have an estimate of expenditure on this initiative		

discussed in the Yukon Territory chapter, the exact sum of federal liability and ongoing responsibility for abandoned mines in the Yukon is currently a point of negotiation in the devolution process ongoing in the Yukon. Federal liability is also linked to how comprehensive and accurate are the inventories of abandoned sites and their assessments.

Currently the federal government recognizes an estimated liability of \$220 million for Ketz, Faro, and Mt. Nansen in the Yukon. For the Northwest Territories the federal government recognizes an estimated liability of \$370 million for numerous mines in the territory: Port Radium/Eldorado Mine (uranium and silver), Silver Bear Mines, Crestaurum Mine, Giant Mine, Hidden Lake Mine, Indore Gold Mine/Hottah Lake, Liten Mine/Old Parr # 2, North Inca Mine, Old Parr # 1, Pensive Mine, Ribb/Duke Mine, Ruth Gold Mine, Sun-Rose Claim Group, Tundra-Taurcanis Mine, Viking Yellowknife Gold Mine, West Bay/Black Ridge Gold Mine, Colomac Mine, Contact Lake.³⁵ The budgetary source for the \$590 million liability associated with these mines has yet to be determined.³⁶ In addition, the estimated reclamation costs for sites the federal government considers “contingent liabilities” is \$2 million in the Northwest Territories³⁷ and \$49.5 million in the Yukon.

Consultants hired by the federal government to review remedial options for the approximately 237,000 tonnes of arsenic-trioxide dust stored underground at the Giant Mine arrived at four alternatives ranging in price from \$39 million to \$409 million.³⁸ The lowest price option is to leave the arsenic-trioxide dust where it is and freeze the surrounding ground so that the dust will not dissolve in groundwater and make its way into Baker Creek and Great Slave Lake. This option is estimated to cost \$39-\$69 million and is deemed less risky than more expensive options aimed at extracting and neutralizing the waste. However, this option includes perpetual care and maintenance costs, the risks associated with system failure, and, ultimately, the costs associated with finding a more permanent solution.

Public Expenditures Summary

Table 76 summarizes public expenditures on metal mining in Canada for 1994/5 and 2000/1. Public expenditures on metal mining related to prospecting and exploration, development and operations, and mine closure, remediation and long-term care increased between 1994/5 and 2000/1, from \$446,119,987 (2000\$) to \$453,047,493 (2000\$). This increase was accompanied by a general decline in programmatic expenditures and an increase in tax expenditures for both prospecting and exploration and for development and operations.

Note that the figures presented in Table 76 do not include the liability associated with either operating or abandoned mines in Canada’s territories. Were the federal government to remediate such mine sites, total expenditures in Canada associated with metal mines would increase substantially. Consider that the federal government recognizes liability associated with several mines in the Yukon Territory (\$269.5 million) and the Northwest Territory (\$370 million). Total recognized liability in these two territories is \$639.5 million. Adding this to the figures above would essentially double current public expenditures. Yet despite the significance of these recognized liabilities, not to men-

tion the unrecognized liabilities, current expenditures associated with mine closure, remediation and long-term care are a fraction (3%) of the total expenditures on metal mines by the federal government. Furthermore, these figures do not include the remediation costs associated with the Giant Mine, which range from \$39-\$409 million.

Analysis to Remove Non-Metal Mining-Related and Regulatory Expenditures

As was stated earlier in the report, to the extent that the Minerals and Metals Sector (MMS), the Canadian Geological Survey and DIAND's Mineral Resources Department - Yukon Territory are responsible for activities beyond those associated with just metal mining, by including the total budgets for these departments we will be overestimating public expenditures on metal mining in Canada. To address this concern, we conduct an analysis in which we attempt to account for the responsibilities of the various departments over metal mining versus non-metal mining and mineral fuel mining. We do this by comparing the value of production for metal mining with that of non-metal mining and mineral fuel mining, and adjusting the expenditure figures accordingly.

Minerals and Metals Sector of Natural Resources Canada

The Minerals and Metals Sector (MMS) of Natural Resources Canada (NRCan) is responsible for both metal and non-metal (industrial minerals for example) mining. The total value of metal and non-metal production in Canada in 1994 was \$14,942,066,000. The metal portion of this figure was \$9,749,519,000, or 65% of the total value. This figure

Table 76: Federal Government – Summary of Total Expenditures

Initiative	1994–1995	2000–2001
Prospecting and Exploration		
Direct Expenditures:		
Targeted Geoscience Initiative	n/a	5,000,000
Program Expenditures:		
Geological Survey of Canada	81,272,000	65,425,000
DIAND's Exploration and Geological Services	n/a	194,100
C-NGO	n/a	9,018,000
Tax Expenditures:		
Canadian Exploration Expense	47,360,970	34,780,439
Earned Depletion	39,176,712	44,516,799
Investment Tax Credit for Exploration	n/a	38,000,000
Total Prospecting and Exploration (current\$)	167,809,682	196,934,338
Total Prospecting and Exploration (2000\$)	186,729,404	196,934,338
Development and Operations		
Program Expenditures:		
Minerals and Metals Sector of Natural Resources Canada	25,762,000	38,900,000
DIAND's Mineral Rights Division	n/a	410,300
DIAND's Mining Inspection Division	n/a	452,800
Mineral Development Agreements	21,700,000	n/a
CAMESE	25,000	174,625
Tax Expenditures:		
Resource Allowance	127,532,701	144,916,389
Canadian Development Expense	58,089,013	56,572,823
Accelerated Capital Cost Allowance	*	*
Total Development and Operations (current\$)	233,108,714	241,426,937
Total Development and Operations (2000\$)	259,390,583	241,426,937
Closure, Remediation and Long-Term Care		
Direct Expenditures:		
Abandoned Mine Site Inventory and Assessments		1,925,000
Abandoned Mine Monitoring and Maintenance YT		8,000,000
CERM3	n/a	3,400,000
Metals in the Environment Research Network	n/a	1,167,000
Program Expenditures:		
DIAND Mining Land Use and Reclamation	n/a	132,800
MIRARCO	n/a	61,418
Tax Expenditure:		
Deduction for Reclamation Fund Contributions	*	*
Total Closure, Remediation, Long-Term Care (current\$)	0	14,686,218
Total Closure, Remediation, Long-Term Care (2000\$)	0	14,686,218
Total Expenditure (current\$)	400,918,396	453,047,493
Total Expenditure (2000\$)	446,119,987	453,047,493
n/a = initiative was not in place and thus is not associated with any expenditure		
* = the Government of Canada does not have an estimate of expenditure on this initiative		

can be used to adjust the budget of the MMS of NRCan. The total budget for the MMS in 1994 was \$25,762,000. Taking 65% of this figure yields a value of \$16,809,396. A similar methodology can be used to adjust the 2000 figures. In 2000, the value of metal constituted 73% of the total value of metal and non-metal production in Canada. Seventy-three percent of the 2000 budget of the MMS (\$38,900,000) is \$28,588,597.

Explosives Regulatory Division and Canadian Explosives Research Laboratory

The Explosives Regulatory Division and the Canadian Explosives Research Laboratory are housed within the MMS of NRCan. The responsibilities of these divisions extend significantly beyond matters solely related to metal mining in Canada. As such, it is necessary to remove public expenditures associated with these divisions from total public expenditure figures. The MMS of NRCan has 514 full-time equivalent employment positions. The Explosives Regulatory Division employs approximately 30 full-time equivalents while the Canadian Explosives Research Laboratory employs approximately 20 full-time equivalents. Taken together these two divisions account for 10% of the total employment within the MMS of NRCan. This figure can be used to reduce the total expenditure figures for the MMS. Reducing the 1994/5 figure above (\$16,809,396) by a further 10% yields a value of \$15,174,241. The 2000/1 expenditure estimate (\$28,588,597), after being reduced by 10%, is \$25,807,605.

Canadian Geological Survey

The mandate of the Canadian Geological Survey (CGS) extends beyond metals and includes work related to non-metals and mineral fuels. In this analysis, we adjust the budget figure for the CGS to account for only work related to metal mining. The total value of production of metal, non-metal and mineral fuels in Canada in 1994 was \$41,150,919,000. Metals constituted 24% (\$9,749,519,000) of the total value. Twenty-four percent of the total budget of the CGS in 1994 (\$81,272,000) is \$19,255,048. Metals constituted 14% of the total value of production (metal, non-metal and mineral fuels) of minerals in Canada in 2000. Fourteen percent of the total budget of the CGS in 2000 (\$65,425,000) is \$8,973,724.

DIAND's Mineral Resources Division - Yukon Territory

In 2000 the value of metal production in the Yukon (\$51,942,000) was 95% of the total value of metal and non-metal mineral production (\$55,017,000). Adjusting the total budget of the Minerals Resources Division (made up of Exploration and Geological Services, Mineral Rights Division, Mining Inspection Division and Mining Land Use and Reclamation Division [\$1,190,000]) yields a value for the total budget of \$1,123,489.

In addition to the above analyses to remove non-metal mining-related expenditures, it is also useful to adjust public expenditure figures to reflect only expenditures associated with facilitating and promoting metal mining in the province, thus excluding pure regulatory functions of mine ministries and divisions. Within DIAND's Mineral Resources Division, the Mining Inspections Division is responsible for ensuring the mining industry complies with all of

the relevant mining legislation. Because this division is solely responsible for regulatory activities related to metal mining, for the purposes of this analysis we exclude it from our total expenditure figures.

Summary of Analysis to Remove Non-Metal Mining-Related and Regulatory Expenditures

Taking all of the above adjustments into account reduces our estimate for total public expenditures on metal mining by 18% in 1994 and 15% in 2000. Total public expenditures in 1994/5 are reduced from \$446,119,987 to \$365,329,449 (2000\$). In 2000, total public expenditures decline from \$453,047,493 to \$383,009,818. After adjusting for the above analysis, the increase in public expenditures between 1994/5 and 2000/1 is 5%. This increase is slightly more than the increase without the adjustment to remove non-metal mining-related and regulatory expenditures (2%). The larger increase is mainly due to the fact that the Minerals and Metals Sector was adjusted downward by less in 2000 than in 1994 (because metal mining constituted a relatively greater portion of the total value of metal and non-metal mineral production). Note that expenditures associated with closure, remediation and long-term care represents less than 4% of total expenditures in 2000/1.

III. Benefits

The metal mining industry, along with the mining industry more generally, has often been touted as a sector that built Canada. While historically this may have been the case, the data in Table 78 indicate that, at least in recent years, the contribution of the metal mining industry to the Canadian economy is declining.

Table 77: Federal Government – Summary of Total Expenditures – Non-Metal Mining and Regulatory Expenditures Removed

Initiative	1994–1995	2000–2001
Prospecting and Exploration		
Direct Expenditures:		
Targeted Geoscience Initiative	n/a	5,000,000
Program Expenditures:		
Geological Survey of Canada	19,255,048	8,973,724
DIAND's Exploration and Geological Services	n/a	183,251
C-NGO	n/a	9,018,000
Tax Expenditures:		
Canadian Exploration Expense	47,360,970	34,780,439
Earned Depletion	39,176,712	44,516,799
Investment Tax Credit for Exploration	n/a	38,000,000
Total Prospecting and Exploration (current\$)	105,792,730	140,471,213
Total Prospecting and Exploration (2000\$)	117,720,344	140,471,213
Development and Operations		
Program Expenditures:		
Minerals and Metals Sector of Natural Resources Canada	15,174,241	25,807,605
DIAND's Mineral Rights Division	n/a	387,368
DIAND's Mining Inspection Division	n/a	0
Mineral Development Agreements	21,700,000	n/a
CAMESE	25,000	174,625
Tax Expenditures:		
Resource Allowance	127,532,701	144,916,389
Canadian Development Expense	58,089,013	56,572,823
Accelerated Capital Cost Allowance	*	*
Total Development and Operations (current\$)	222,520,955	227,858,810
Total Development and Operations (2000\$)	247,609,106	227,858,810
Closure, Remediation and Long-Term Care		
Direct Expenditures:		
Abandoned Mine Site Inventory and Assessments		1,925,000
Abandoned Mine Monitoring and Maintenance YT		8,000,000
CERM3	n/a	3,400,000
Metals in the Environment Research Network	n/a	1,167,000
Program Expenditures:		
DIAND Mining Land Use and Reclamation	n/a	125,378
MIRARCO	n/a	61,418
Tax Expenditures:		
Deduction for Reclamation Fund Contributions	*	*
Total Closure, Remediation, Long-Term Care (current\$)	0	14,678,796
Total Closure, Remediation, Long-Term Care (2000\$)	0	14,678,796
Total Expenditure (current\$)	328,313,685	383,009,818
Total Expenditure (2000\$)	365,329,449	383,009,818
n/a = initiative was not in place and thus is not associated with any expenditure		
* = the Government of Canada does not have an estimate of expenditure on this initiative		

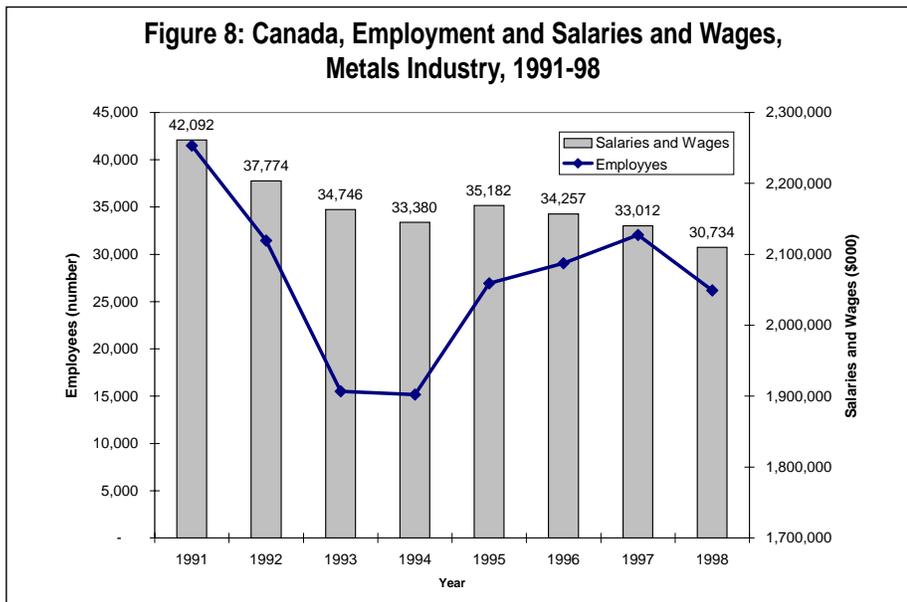
Table 78 describes the benefits from metal mining in relation to other industries. It also presents trends in the benefits over time. Benefits considered in this analysis include employment and contribution to GDP.

The data in Table 78 reveal that metal mine employment declined between 1994/5 and 2000/1 by 12%. In contrast, all industry employment in Canada increased by 15%. At the same time, the contribution of metal mine employment to all industry employment declined between 1994/5 and 2000/1 by 24%. The decline in employment is depicted in Figure 8. Also shown here is the trend in salaries and wages in the metal mining industry over time.

Factor	1994-1995	2000-2001	% Change 94-00
Metal Mine (MM) Employment	33,380	29,248	-12%
All Industries Employment	10,650,909	12,199,592	15%
MM % of All Industries Employment	0.3134%	0.2397%	-24%
Contribution to GDP	4,886,175,000	4,476,440,000	-8%
All Industries GDP	733,161,195,019	892,932,875,023	22%
MM % of All Industries GDP	0.6665%	0.5013%	-25%

The value of salaries and wages for the metal mining industry has declined over time. The large dip in the number of employees relative to the value of salaries and wages in the early 1990s indicates that those jobs that are most vulnerable in the metal mining industry are associated with relatively lower salaries and wages. This implies that it is the low-skilled workers in the metal mining industry that are most vulnerable during times of financial hardship. It is also interesting that the decline during 1993-1995 is associated with a major expansion of Canadian exploration internationally.

The contribution of the metal mining industry to GDP in Canada declined by 8% between 1994/5 and 2000/1. During the same time period, the contribution of all industries to federal GDP increased by 22%. The contribution of the metal mining industry to all industries GDP contribution declined by 25% between 1994/5 and 2000/1. The metal mining industry, while having a reputation for being a major contributor to the national economy, constituted less than 1% of the contribution of all industries to national GDP.



Furthermore, it is worth noting that the value of mining wages and salaries for metal mines in Canada in 1994 was \$1,902,362,000. This represents just 38.9% of the metal mines' contribution to GDP in 1994. This trend is indicative of the entire study period.

Further, it is worth noting that the value of mining wages and salaries for metal mines in Canada in 1994 was \$1,902,362,000. This represents just 38.9% of the metal mines' contribution to GDP in 1994. This trend is indicative of the entire study period.

A third indication of the benefits of metal mining in Canada is royalty payments collected by the government from metal mining operations in the territories. We have not included such payments in the above analysis because between 1994/5 and 2000/1 substantial fluctuations in the amounts of royalties collected from the territories occurred as mines opened and closed. Figure 9 demonstrates the lack of trend in royalty payments over the study period.

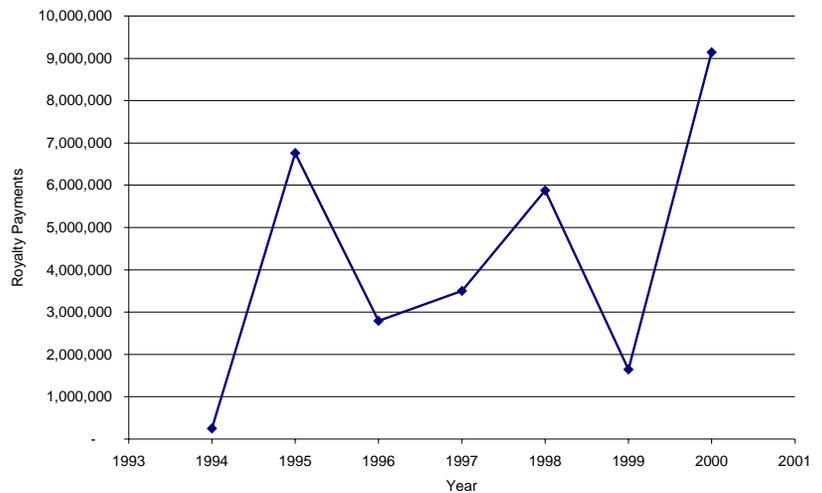
While mining may have been a sector that built Canada historically, as the above discussion reveals, the benefits of the metal mining industry, at least in terms of employment and contribution to GDP have been recently declining. In Table 79, we explore the relationship between the benefits and public expenditures by presenting ratios of benefits (employment and contribution to GDP) to total public expenditures. Of particular interest here is the trend in the ratios over time. For both employment and GDP the ratio of benefits to public expenditures declined between 1994/5 and 2000/1. This means the benefits received per dollar of expenditures are declining. In other words, the federal government is getting less and less return in terms of employment and contribution to GDP for every dollar it invests in the metal mining industry in Canada.

In the case of employment, this means that for every job in metal mining, the Government of Canada is spending more and more public money. Conversely, it means that for every dollar spent on metal mines in Canada, fewer jobs in the metal mining industry are maintained. Indeed, while public expenditure per employee was \$10,945 in 1994/5, it increased by 20% to \$13,095 in 2000/1.

A similar message is revealed for contribution to GDP. The federal government is getting less of a return in terms of benefits for every dollar invested. The ratio of contribution to GDP to public expenditures fell by 13% between 1994/5 and 2000/1.

These ratios would be even more extreme were we to include the recognized liability associated with various mines in the Yukon and Northwest Territories. Indeed, adding such figures to public expenditures in 2000 would result in total public expenditures of \$973,009,818. This is equal to a full 22% of metal mine contribution to GDP and includes only a portion of the abandoned mine sites in the territories for which the federal government may ultimately be responsible.

Figure 9: Federal Government Royalties from Territorial Metal Mining



The growth in federal mineral royalties from 1999 onwards from the territories is due to the coming on stream of the Ekati diamond mine, rather than increased activity in the metal mining sector.

Source: Department of Indian Affairs and Northern Development, personal communication.

Table 79: Federal Government – Ratio of Benefits to Expenditures

Factor	1994-1995	2000-2001	% Change 94-00
Employment	0.00009	0.00008	-16
GDP	13.37500	11.68800	-13

IV. Conclusions

Public expenditure on the metal mining industry in Canada is substantial. Our conservative analysis indicates that in 1994/5 the federal government spent \$365,329,449 (2000\$) to encourage, facilitate and manage metal mining in the country. By 2000, that figure was \$383,008,818 (2000\$). We consider these estimates to be conservative for several reasons. First, we have not included any of the budgets of ministries or divisions beyond the Mineral and Metals Sector of Natural Resources Canada, the Canadian Geological Survey or the Mineral Resources Division of DIAND. Other ministries, for example Environment Canada, do, however, have limited responsibilities for metal mining in the country. We have not included expenditures on infrastructure in the form of roads, bridges or ports incurred in support of metal mining in the country. In addition, there are tax initiatives (Accelerated Capital Cost Allowance and deductions for contributions to reclamation funds) in place to support the metal mining industry for which we were unable to obtain estimates of expenditures. Such expenditure is likely to be significant. Indeed, initiatives such as the Accelerated Capital Cost Allowance, flow-through shares, credits for exploration and development, and the Resource Allowance make mining one of the two sectors (along with oil and gas) with the lowest effective corporate tax rates for all major sectors in Canada..

In addition, and perhaps most importantly, we have not fully accounted for the public liability associated with operating or abandoned mine and exploration sites in the territories for which the federal government has responsibility. While the federal government has recognized \$590 million worth of liability in the Yukon and Northwest Territories, the true value of the liability in Canada's north is likely to be substantially higher.

Chapter Endnotes

¹ J. Mintz, A Comparison of Tax Incentives for Extraction and Recycling of Basic Materials in Canada, (Winnipeg: CCME, 1995).

² Duanjie Chen, Jack Mintz, Kim Scharf and Sergio Traviza, Taxation of Virgin and Recycled Materials: Analysis and Policy, (Toronto: University of Toronto, 1995).

³ Technical Committee on Business Taxation, Report, (Ottawa: Department of Finance, 1998).

⁴ OECD, Economic Surveys: Canada, (Paris: OECD, August 2000), p. 155.

^{4b} Budget 2000: Budget Plan, (Ottawa, Department of Finance, February 2002), Chapter 4; and Economic Statement and Budget Update, (Ottawa: Department of Finance, October 2000), pg.8.

⁵ Natural Resources Canada, personal communication, February 15, 2002

⁶ Canadian Geological Survey Annual Review, (Ottawa: Natural Resources Canada, 1994-5 and 2000-1).

⁷ DIAND, personal communication, March 19, 2002.

⁸ Natural Resources Canada, personal communication, February 15, 2002.

⁹ Estimate is based on government expenditure on this initiative in 1991/2 correlated with exploration expenditure in that same year and extrapolated to 1994/5 and 2000/1 taking exploration expenditure in 1994/5 and 2000/1 into account.

¹⁰ Estimate is based on correlation between value of metal production and expenditure on this initiative in 1996. Correlation is then used to estimate expenditure for 1994/5 and 2000/1.

¹¹ See Natural Resources Canada, Memorandum to the Minister Re: Mining Day on the Hill, March 22, 2001.

¹² Finance Canada, Tax Expenditure and Evaluations, (Ottawa: Department of Finance, 2001).

- ¹³ In 1994/5 there was a Mining Division of Natural Resources Canada instead of what is now called the Minerals and Metals Sector of Natural Resources Canada.
- ¹⁴ Natural Resources Canada, personal communication, April 5, 2002.
- ¹⁵ Natural Resources Canada, NRCan 2000-2001 Estimates: A Report on Plans and Priorities, (Ottawa: Natural Resources Canada, 2000), p. 11.
- ¹⁶ DIAND, personal communication, March 19, 2002.
- ¹⁷ Ibid.
- ¹⁸ Ibid.
- ¹⁹ Public Accounts of Canada, 1995-97, (Ottawa: Treasury Board Secretariat, 1997), p. 11.25.
- ²⁰ DIAND, personal communication, March 27, 2002
- ²¹ Estimate is based on expenditure on this initiative in 1991/2 correlated with development expenditure in that same year and extrapolated to 1994/5 and 2000/1 taking development expenditures in 1994/5 and 2000/1 into account.
- ²² G. New, ed., Canadian Mining Taxation 2001 Edition, (Toronto: PricewaterhouseCoopers, 2000).
- ²³ Finance Canada, Tax Expenditure and Evaluations, (Ottawa: Department of Finance, 2001).
- ²⁴ Estimate is based on a correlation between value of metal production and value of expenditure on this initiative in 1996. The correlation is then used to estimate figures for 1994/5 and 2000/1.
- ²⁵ DIAND Contaminated Sites Program, personal communication, April 4, 2002.
- ²⁶ DIAND Contaminated Sites Program, personal communication, March 19, 2002.
- ²⁷ DIAND Contaminated Sites Program, personal communication, April 4, 2002.
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- ²⁹ NSERC is providing an investment of \$3.5 million over three years.
- ³⁰ <http://www.mite-rn.org>.
- ³¹ MIRARCO, personal communication, March 20, 2002.
- ³² DIAND, personal communication, March 19, 2002.
- ³³ In any given year the value of the tax expenditure on this initiative is the amount of tax relief that is effectively provided by allowing payments to be deducted from income when contributions are made to the trust. This tax expenditure could be positive or negative depending upon the amount of contributions to and withdrawals from these trusts in a particular year (Finance Canada, Tax Expenditure and Evaluations, 2000).
- ³⁴ Finance Canada, Tax Expenditure and Evaluations, (Ottawa: Department of Finance, 2000 and 2001).
- ³⁵ DIAND Contaminated Sites Program, personal communication, March 21, 2002.
- ³⁶ DIAND Contaminated Sites Program, personal communication, April 4, 2002.
- ³⁷ Ibid.
- ³⁸ Steffen Robertson and Kirsten (Canada) Inc., Study of the Management Alternatives for Giant Mine Arsenic Trioxide Dust, May 2001, p. v prepared for DIAND.

VIII. SUMMARY AND ANALYSIS

Summary of Key Findings

The major findings of the jurisdictional studies in terms of changes in total expenditures in support of the metal mining industry, employment, royalties and contributions to GDP as well as the ratio of expenditures to benefits between 1994/5 and 2000/1, are presented in Table 87 (page 120). Total expenditure figures are in 2000\$. The key results for each jurisdiction are presented below.

British Columbia

Total Public Expenditures

- Public expenditures in support of the metal mining sector increased by 17% in British Columbia between 1994/5 and 2000/1, from \$13.2 million to \$15.4 million.
- This is almost certainly an underestimate of the increase in support over the study period, as it was not possible to estimate the value of the New Mine Allowance introduced in 1995.
- Provincial expenditures in support of the sector will increase dramatically as a result of BC Mining Flow-Through Share Tax Credit and the Sales Tax Exemption for Mining Equipment and Machinery introduced in the province's July 2001 budget.
 - The sales tax exemption alone, which is intended to replace the Manufacturing and Processing Tax Credit, is expected to provide \$12.5 million in additional tax relief to the sector in 2001/2.
 - Taking this initiative into account, total spending in 2001/2 will be \$27.8 million, a 111% increase over 1994/5.

Trends in Public Expenditures

- The bulk of the increase in expenditures between 1994/5 and 2000/1 is related to tax measures, specifically the introduction of the Manufacturing and Processing Tax Credit, and the Mining Exploration Tax Credit. The Introduction of the mineral rights compensation system through the 1998 *Mining Rights Amendment Act* has also been a factor.
- The increasing importance of tax expenditures is highlighted by the fact that total expenditures have risen while program spending by the Ministry of Energy and Mines on the metal mines aspects of its activities has fallen from \$5.2 million in 1994/5 to \$3.5 million in 2000/1. The Exploration Tax Credit, introduced in April 1998, for example, has replaced direct expenditures to the industry to support exploration activities through the Explore BC program.
- The Mineral Rights Compensation system under the 1998 *Mining Rights Amendment Act* is unique to British Columbia. Under this regime compensation is payable to the holder of mineral title when that title is expro-

priated for the creation of parks. Just under \$1 million in total compensation was provided through this system in 2000/1.

- The value of flow-through share tax credit for exploration announced in the July 2001 budget is unknown at this point, but is likely to be significant.

Mine Closure and Remediation: Expenditures, Liabilities and Risks

- There is a striking lack of expenditures on abandoned mine remediation in British Columbia relative to other jurisdictions, and no estimate has been developed of remediation costs for the 1,170 “historic” metal mining sites that have been identified.
- The level of mining activity in the province, which is approximately 42% that of Ontario, would suggest a figure in the range of at least \$190 million for the remediation of abandoned sites.¹ The province’s share of the remediation of the Britannia Mine site alone has been budgeted in the range of \$30-\$45 million.
- The estimated shortfall in financial assurances held by the province for operating mines relative to closure costs is \$85 million. The assumption of this risk by the Crown provides an estimated annual savings to the industry of \$3.4 million per year in avoided capital costs.²

Benefits

- As indicated in the summary table, employment in the British Columbia metal mining sector fell by 6% and mineral royalty payments from the sector declined by 29.9% between 1994/5 and 2000/1. At the same time, the sector’s contribution to provincial GDP rose by approximately 8%.
- Relative to the other sectors, the metal mining sector’s contribution to total employment fell by 15.4%, to total provincial tax revenues fell by 40.4% and the sector’s contribution to total GDP declined by 12%.

Benefits Versus Public Expenditures

- The increase in expenditures by the province in support of the metal mining sector, in combination with the decline in the sector’s economic contribution, result in a fall in the ratio of benefits from the industry to public expenditures. This decline is particularly noteworthy with respect to employment (-19%) and royalty payments (-40%). However, it is also evident with respect to the sector’s contribution to total provincial GDP, falling by 7%. This is despite the increase in the sector’s nominal contribution to provincial GDP.

Table 80: Trend Summary – British Columbia 1994/5 to 2000/1

Factor	1994/5 to 2000/1 Trend
Public Expenditures	Increased 17% ³
Employment	Decreased 6%
Ratio: Employment to Expenditures	Decreased 19%
Royalty Payments	Decreased 30%
Ratio: Royalties to Expenditures	Decreased 40%
GDP Contribution	Increased 8%
Ratio: GDP Contribution to Expenditures	Decreased 7%
Liability	\$85 million unsecured on operating mines; 1,170 “historic” sites identified, but remediation costs unknown. Likely in range of \$190 million on basis of Ontario experience. Britannia Mine remediation alone is budgeted at \$30-\$45 million.

- The public cost of the sector per employee in BC has risen by 20% from \$3,701 in 1994/5 to \$4,591 in 2000/1.

Table 80 summarizes the trends in benefits and costs of metal mining in British Columbia for the study period.

Ontario

Total Public Expenditures

- Public expenditures in support of the metal mining industry have risen dramatically, going from \$42.7 million in 1994/5 to \$67.4 million in 2000/1, an increase of 58%.

Trends in Public Expenditures

- The increase in expenditure flows from three major sources:
 - The Operation Treasure Hunt geological survey program announced as part of the March 1999 Lands for Life initiative;
 - New tax initiatives related to the Ontario mining tax, including reduced mining tax rates and a Remote Mines Tax Holiday announced in the May 2000 budget; and
 - The initiation of an Abandoned Mines Rehabilitation Program in 1999. This is the most significant program of its kind among the jurisdictions examined.
- The increases in expenditures are all the more striking given the overall reductions in expenditures related to environmental protection that occurred in the province following the June 1995 election. This included major reductions to the Ministry of Northern Development and Mines' own regulatory activities related to mine closure.

Mine Closure and Remediation: Expenditures, Liabilities and Risks

- The Crown's liability for abandoned mines rehabilitation in Ontario is uncertain, but the Ministry of Northern Development and Mines itself has estimated the costs to be potentially in the range of \$450 million.
- The self-assurance arrangements introduced under the 1996 Bill 26 amendments to the *Mining Act*, through which mine owners or operators are no longer required to post realizable financial securities against their mine closure plans, now cover \$449.3 million in potential closure costs for metal mines and mills. The assumption of this risk by the Crown provides an estimated annual saving to the industry of \$18 million in avoided costs of capital.⁴ A further \$23.81 million in approved financial assurances have yet to be collected in any form.

Benefits

- Employment, mineral royalty payments and contributions to provincial GDP in Ontario from the metal mining sector have all fallen dramatically in both absolute terms and relative to the contributions of other sectors of

the economy over the study period. Between 1994/5 and 2000/1, total employment in the sector declined by 20%, royalty payments by 45% and contribution to GDP by 24%. The sector's contributions to total employment fell by 30%, to total provincial revenues declined by 57% and to total provincial GDP dropped by 39%.

Benefits Versus Public Expenditures

- As indicated in Table 81, the growth in provincial expenditures in support of the industry, in combination with the dramatic decline in benefits being provided by the sector, has resulted in a pronounced decline in the ratio of benefits to government spending on the mining sector. The ratio of benefits to expenditures fell by 49% in terms of the generation of employment, 65% with respect to royalties and 52% in relation to GDP over the 1994/5 and 2000/1 period.
- The sector's public cost per employee has risen by 97%, from \$3,472 in 1994/5 to \$6,848 in 2000/1.

Table 81 summarizes the trends in benefits and costs of metal mining in Ontario for the study period.

Factor	1994/5 to 2000/1 Trend
Public Expenditures	Increased 58%
Employment	Decreased 20%
Ratio: Employment to Expenditures	Decreased 49%
Royalty Payments	Decreased 45%
Ratio: Royalties to Expenditures	Decreased 65%
GDP Contribution	Decreased 24%
Ratio: GDP Contribution to Expenditures	Decreased 52%
Liability	Up to \$450 million on abandoned sites; \$449.3 million unsecured closure and remediation costs on operating mines.

Quebec

Total Public Expenditures

- Quebec provides the highest level of support to the metal mining industry among all of the provinces and territories studied. Quebec's 2000/1 spending was 1.6 times that of Ontario, despite the fact the Quebec sector is only 60% as large as Ontario's.
- Total support to the metal mining sector in Quebec has fallen very slightly (1.4%) over the study period, from \$109 million to \$108 million (2000\$).
- Total support will rise significantly over the next three years as a result of the introduction of a Refundable Tax Credit for Resources in the province's March 2001 budget. The program is expected to cost \$15 million in 2001/2, \$28 million in 2002/3, and \$34 million in 2003/4. In addition, tax holidays have been introduced for new mines in the Near and Far North.

Trends in Public Expenditures

- There have been significant structural shifts within the province's spending patterns with respect to the metal mining industry.
- There has been a major decline in program expenditures, with the operating budget of Ministère des ressources naturelles (MRN) related to mine development and operation falling from \$23.7 million to \$13.4 million.

This includes the bulk of the ministry's regulatory oversight functions. Reimbursable tax credits for losses against mining rights royalties also declined significantly, from \$30 million to \$12 million, in part due to changes in the structure of this program.

- At the same time, there have been major increases in spending related to prospecting and exploration. These have been focused in three areas:
 - MRN's own operating budget in this area has risen substantially, from \$8 million to \$17 million;
 - Direct grants to the industry have risen dramatically from \$2.4 million in 1994/5 to \$11.5 million in 2000/1.
 - Quebec is unique among the jurisdictions studied in that it has established a number of entities for the specific purpose of making equity investments in the mining sector, particularly junior (exploration) companies. These investments rose substantially between 1994/5 and 2000/1 rising from \$3.4 million to \$11 million. In addition, equity investments of \$2 million were made by the province in more advanced mine operations in 2000/1.

Mine Closure and Remediation: Expenditures, Liabilities and Risks

- Quebec has been spending approximately \$2 million per year on abandoned mines remediation work. However, these expenditures will end with the current fiscal year.
- The province has identified 74 orphan mine sites in need of remediation, with total remediation costs estimated at \$75 million.
 - Using Ontario's estimates of abandoned mine remediation costs for its province and taking into account the economic size of the metal mining industry in Quebec relative to Ontario suggests a figure for Quebec between the range of \$250-\$300 million.⁵
 - Quebec's current practice is to only require financial assurances for 70% of estimated rehabilitation costs on operating mines.

Benefits

- Employment in the metal mining sector in Quebec fell 15.7% over the 1994/5 to 2000/1 period.
- However, mining rights payments (i.e., royalties) have risen 33%, although growth in overall tax revenues in the province has been greater, with the result that the metal mining sector's contribution to total provincial revenues has declined 4.8%.¹⁵
- Similarly, while the sector's contribution to GDP rose 23.6%, all industries' contribution rose 40%, with the result that the sector's contribution to total provincial GDP fell by 11.8%.

Benefits Versus Public Expenditures

- Even in the context of the slight decline in overall spending by the province in support of the metal mining industry, given the decline in employment in the sector, the ratio of employment to provincial support declined by 14%.

- Unlike the other jurisdictions studied, the rise in royalties and contributions to GDP, in combination with the small decline total spending, results in an increase in the ratio between these benefits and expenditures over time. However, these ratios are likely to fall significantly with the large increases in support to the sector introduced in the province's 2001 budget.

Table 82 summarizes the trends in benefits and costs of metal mining in Quebec for the study period.

Factor	1994/5 to 2000/1 Trend
Public Expenditures	Decreased 1.4% ⁶
Employment	Decreased 16%
Ratio: Employment to Expenditures	Decreased 14%
Royalty Payments	Increased 33%
Ratio: Royalties to Expenditures	Increased 35%
GDP Contribution	Increased 24%
Ratio: GDP Contribution to Expenditures	Increased 25%
Liability	Quebec government acknowledges 74 orphan sites and remediation costs of \$75 million. Total unknown, but likely in the range of at least \$270 million based on Ontario's experience. Total current unsecured liabilities unknown.

Yukon Territory

Total Public Expenditures

- It is important to note that the federal government has assumed responsibility for the principal regulatory functions related to the mining sector through the Department of Indian and Northern Affairs, as well as providing promotional support to the sector in the Yukon Territory. As a result, the territorial government's expenditures on metal mining have been focused on promotional and support activities. Federal regulatory responsibilities with respect to the mining industry are to be devolved to the territorial government as of April 1, 2003 as a result of the devolution agreement signed between the federal government, territorial government and First Nations in September 2001.
- Total public expenditures in support of the metal mining industry by the territorial government have fallen slightly from \$6.8 million to \$6.7 million (2%) over the 1994/5 to 2000/1 period.

Trends in Public Expenditures

- Among other things, the decline in total expenditures reflects the expiry of the federal-territorial Mineral Development Agreement that was in place in the mid-1990s. The agreement was a major source of funding for the territory's mining-related operations.
- In fact, mining-related program spending by the Yukon Territory's Department of Economic Development has fallen significantly. These reductions have been partially offset in terms of total spending by the increase in expenditures flowing from the \$1.8 million per year Temporary Mineral Exploration Tax Credit introduced in January 1999.
- The territory is unusual in that significant spending continues to occur on infrastructure for resource development, such as roads and bridges for mine access, although this takes place on a one-off rather than program basis. In the past, these types of expenditures were structured through the federal-territorial Resource Transportation Access Program.

Mine Closure and Remediation: Expenditures, Liabilities and Risks

- There is no formal territorial program for abandoned mine remediation. The allocation of responsibility between the federal and territorial governments for abandoned mines is part of devolution negotiations currently taking place.
- Total remediation costs associated with abandoned mines in the territory are estimated at \$269.5 million. Current federal expenditures for the maintenance of abandoned mines in the Yukon Territory are between \$8-10 million per year.

Benefits

- Economic activity in the metal mining sector in the Yukon is extremely cyclical. Output and production rose dramatically in the mid-1990s before falling off by 2000. Overall employment, royalty payments to the territorial government, and contributions to territorial GDP fell over the 1994/5 to 2000/1 period, in both absolute terms and relative to other sectors. Total employment in the sector declined by 8%,⁷ royalty payments by 40% and contribution to GDP by 25.5%.
- The sector's contributions to total employment fell by 25.6%, to total territorial revenues by 20% and to total territorial GDP by 36.5%.

Table 83: Trend Summary – Yukon Territory 1994/5 to 2000/1

Factor	1994/5 to 2000/1 Trend
Public Expenditures	Decreased 2%
Employment	Decreased 8%
Ratio: Employment to Expenditures	Decreased 7%
Royalty Payments	Decreased 40%
Ratio: Royalties to Expenditures	Decreased 39%
GDP Contribution	Decreased 25%
Ratio: GDP Contribution to Expenditures	Decreased 24%
Liability	\$269.5 million for abandoned sites.

Benefits Versus Public Expenditures

- Even with the slight overall reduction of spending in support of the mining industry by the Yukon government, the ratio of benefits to public spending on the sector has declined over the 1994/5 to 2000/1 period, falling by 7% in terms of the generation of employment, 39% with respect to royalty payments and 24% in terms of contribution to territorial GDP.
- The sector's public cost per employee has risen by 7%, from \$3,782 in 1994/5 to \$4,054 in 2000/1.

Table 83 summarizes the trends in benefits and costs of metal mining in the Yukon for the study period.

Government of Canada

Total Public Expenditures

- Total federal expenditures in support of the metal mining sector, including Natural Resources Canada (NRCan) programs and Department of Indian and Northern Affairs resource management activities in the Territories increased by 5% between 1994/5 and 2000/1, from \$365 million to \$383 million.

Trends in Public Expenditures

- Much of the federal spending is in the form of long-standing tax expenditures, such as the Canadian Exploration Expense (CEE), Canada Development Expense (CDE) and the Resource Allowance, and program activities of NRCan, such as the Geological Survey of Canada.
- The federal government was unable to provide estimates of the value of its key tax expenditures to the industry, including the CEE, Earned Depletion (exploration), CDE, and the Resource Allowance. Given the significance of these programs, estimates of these expenditures were developed by the project team on the basis of historical data and current economic activity within the sector. At an estimated total of \$282 million in 2000/1, together these tax expenditures constitute the most significant source of support to the sector from the federal government.
- NRCan's Mines and Minerals Division has virtually no regulatory functions except for the administration of the *Explosives Act*. Almost all of its activities take the form of direct or indirect services to the industry.
- Expenditures by the federal government have declined in certain areas. These result from
 - The expiry of the federal/provincial/territorial Mineral Development Agreement that was in place between the late 1980s and early 1990s;
 - Reductions in departmental operating budgets due to the 1995 program review, with the Geological Survey of Canada being affected significantly; and
 - Fluctuation in the costs of certain tax expenditures, although these flow from changes in industry activity rather than in policy.
- These reductions have been offset by a number of new initiatives:
 - The most significant of these is the \$38 million a year Investment Tax Credit for Exploration introduced in the October 2000 budget.
 - In addition, there have been increases in the operating budget of NRCan's Mines and Metals Division.
 - New expenditures are also beginning on abandoned mine inventories, and monitoring and maintenance by DIAND, although these are very modest relative to the estimated costs of remediation.
- There has been considerable discussion at the federal level regarding the need to reduce the variations among tax rates for different industries, and in particular to bring the non-renewable resource sectors (i.e., mining and oil and gas) into line with other industries, especially following the publication of the report of the Technical Committee on Business Taxation in 1998.
- This direction was reflected in the February 2000 budget indicating an intention to reduce corporate tax rates for sectors other than the non-renewable resource sectors to levels comparable to those applicable to the mining and oil-and-gas sectors.⁸ However, the federal government has continued to introduce new supports to the mining sector, including the Investment Tax Credit for Exploration and the Targeted Geoscience Initiative. Significant federal support to the proposed Voisey's Bay mine in Labrador was announced in June 2002 on a one-off basis.

Mine Closure and Remediation: Expenditures, Liabilities and Risks

- Federal liabilities for abandoned mine restoration are concentrated in the Yukon and Northwest Territories and under discussion with the territorial governments as part of the wider devolution negotiations taking place.
 - Total liabilities for abandoned metals mines are estimated at \$269.5 million in Yukon, and \$370 million in the NWT, for a total of \$639.5 million. However, the NWT figure does not fully account for key mines, such the Giant Mine in Yellowknife. Estimates of the potential remediation costs for that mine alone range from \$39-\$409 million.
 - The federal government is currently spending between \$8-\$10 million on abandoned mine maintenance in the Yukon. In the NWT \$15 million is estimated to be needed for these purposes.

Benefits

- The Department of Indian and Northern Affairs collects mineral royalties from the three Canadian territories. These royalties fluctuate substantially over time as mines open and close; for this reason they were not included in the trend analyses.⁹
- At the national level, employment in the metal mining sector to fell by 12% between 1994/5 and 2000/1. The sector's contributions to GDP fell by 8%. The decline of the sector's contributions to total employment and GDP are even more dramatic, with the mining industry accounting for 24% less of total employment, and 25% less of total GDP in 2000/1 relative to 1994/5.

Benefits Versus Public Expenditures

- As is the case at the provincial and territorial levels, declining employment and contributions in the sector, and increasing public expenditures in support of the industry have combined to produce a significant decline in the ratio of benefits to federal expenditures on the sector. The ratio of benefits to federal expenditures fell by 16% in generating employment benefits, and 13% in generating contributions to GDP between 1994/5 and 2000/1.
- Federal expenditures per employee increased by 20%, from \$10,945 in 1994/5 to \$13,095 in 2000/1.

Table 84: Trend Summary – Federal/National 1994/5 to 2000/1

Factor	1994/5 to 2000/1 Trend
Public Expenditures	Increased 5%
Employment	Decreased 12%
Ratio: Employment to Expenditures	Decreased 16%
GDP Contribution	Decreased 8%
Ratio: GDP Contribution to Expenditures	Decreased 13%
Liability	\$370 million for abandoned sites plus unknown amounts for Giant Mine in the NWT; \$269.5 million for Yukon.

Table 84 summarizes the trends in benefits and costs of metal mining for the Government of Canada for the study period.

Analysis and Discussion

Public Spending in Support of the Metal Mining Industry in Canada

Overall, there has been significant rise in support to the metal mining industry over the study period particularly in Ontario, but also in British Columbia and at the federal level. Total public expenditures fell marginally in Quebec and the Yukon Territory between 1994/5 and 2000/1. However, support to the metal mining industry will increase significantly in Quebec between 2001/2 and 2003/4 as a result of the Refundable Tax Credit for Resources introduced in March 2001. Similarly, support will grow dramatically in British Columbia as a result of the Sales Tax Exemption for Mining Equipment and Machinery introduced in July 2001, as well as the BC Mining Flow-Through Share Tax Credit.

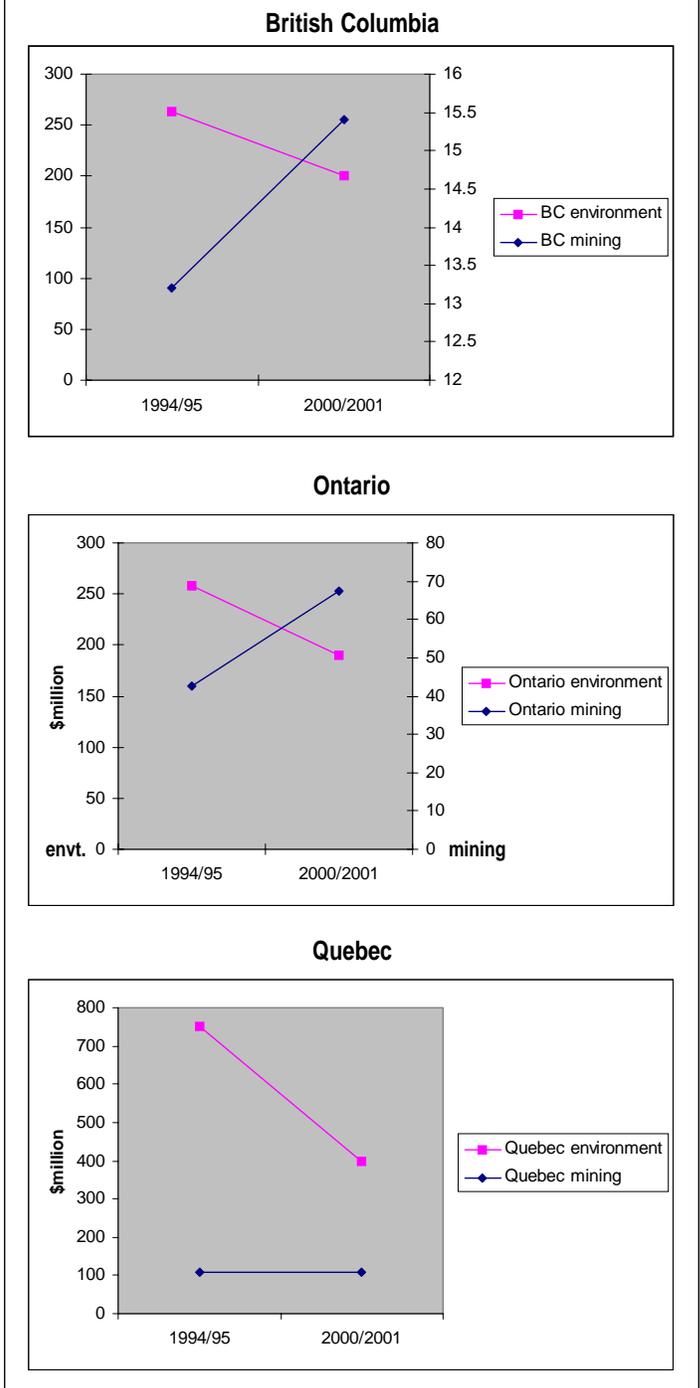
The key increases in support to the industry have tended to be in tax expenditures and credits rather than direct or program expenditures. The introduction of flow-through share provisions for exploration activities in most jurisdictions, the mining tax reductions in Ontario, provincial Sales Tax Exemption for Mining Equipment and Machinery in British Columbia, and Quebec Tax Credit for Resources are particularly important in this context. In Ontario, program funding for geological survey work and abandoned mine remediation projects has increased significantly as well.

These increases in support to the sector have occurred in the context of major reductions in spending by provincial governments for environmental protection, both within mine ministries themselves and more broadly among agencies charged with the protection of the environment. These trends in spending are outlined in Figure 10.

The Province of Quebec is unique in having a number of programs designed to provide direct equity investments in the sector, particularly junior exploration companies. These programs have undergone major growth over the past few years.

The federal government's support to the industry is very large but more evenly distributed over time. Much of the federal support occurs through the services provided by Natural Resources Canada, the Geological Survey, and long-standing tax expenditures, such as the CEE and CDE. The federal government has otherwise moved to reduce tax rates for other sectors relative to the non-renewable resource sectors, but has not reduced its current tax expenditures in support of the non-renewable sectors. The

Figure 10: Trends in Spending on Environmental Protection Versus Support to the Mining Industry 1994/5 to 2000/1^{9b}



removal of these measures has been recommended by the OECD. In fact, new tax and program initiatives were introduced to support the mining sector, notably the Investment Tax Credit for Exploration and the Targeted Geoscience Initiative in the February 2000 budget and October 2000 budget update.

The federal government is in the process of devolving its operational responsibilities with respect to mining in the territories to the territorial governments. The precise division of responsibility that will occur between the federal and territorial governments for abandoned sites remains under negotiation.

Jurisdiction	Program
British Columbia	<ul style="list-style-type: none"> • BC Mine Flow-Through Share Tax Credit (introduced 2001) • New Mine Allowance (introduced 1995) • Investment Allowance
Ontario	<ul style="list-style-type: none"> • Flow-Through Share Tax Credit (introduced 2001)
Quebec	<ul style="list-style-type: none"> • Tax credit for bringing an ore body to production
Federal	<ul style="list-style-type: none"> • Canadian Exploration Expense • Canada Development Expense • Earned Depletion (exploration) • Resource Allowance (Estimated total value of these expenditures: \$282 million in 2000/1)

Information Gaps

The expenditure figures provided in this study are likely underestimates as governments were unable to provide expenditure figures for a number of new or otherwise significant tax initiatives. Some key examples of these expenditures are included in Table 85.

It is also important to consider that this analysis has not taken into account the full range of forms of support provided by governments to the sector. This includes issues of whether the mineral royalties realized by governments reflect the true underlying value of the re-

source, the provision of access to water and energy resources at no or reduced cost, and the preferred status granted mineral development and extraction in land-use planning processes.

Mine Closure and Remediation: Expenditures, Liabilities and Risks

There is growing recognition across Canada of the significance of the issue of liability for abandoned mine remediation. However, current estimates of the total costs of remediation of abandoned mines are incomplete and are likely below the actual costs of cleanup when undertaken. The federal and Ontario governments have made significant progress in documenting and estimating the extent of this problem in Ontario and the territories. The British Columbia government has identified abandoned “historic” sites, but has not developed estimates of their potential remediation costs and there are no plans to undertake this work in the future.

Throughout Canada, governments continue to require inadequate or insecure financial assurances for operating mines. Ontario, for example, relies on self-assurance requirements for \$449.3 million in potential closure and remediation costs on operating metal mines and mills. British Columbia “accepts” a risk of \$85 million in unsecured closure liabilities on operating mines, while Quebec has a policy of only requiring that 70% of closure and rehabilitation costs be covered through financial assurances. These practices not only expose taxpayers to significant financial risks, but are also a major indirect subsidy to the industry in terms of the avoided costs of the capital needed to post financial securities.

The figures we have obtained from the federal and provincial governments, and the estimates we have developed for those jurisdictions that could not supply figures, suggest a total accumulated liability for abandoned mines in the jurisdictions under study to be in the range of \$2 billion. However, this figure is almost certainly an underestimate as, among other things, it does not include the estimates for certain individual abandoned mines, such as the Giant Mine in the NWT, which have major liability costs associated with them.¹⁰ The assumption of these liabilities by the federal, provincial and territorial governments is also a significant source of indirect support to the industry.

Benefits from Metal Mining

As illustrated in Table 86, the benefits from the metal mining sector are in decline in terms of employment, royalties, and contribution to GDP, in both absolute and relative terms. Employment in the sector has fallen in all jurisdictions studied, and 12% nationally between 1994/5 and 2000/1. The sector's contribution to national GDP fell by 8% over the same period, although there is considerable variation in this trend among jurisdictions, with increases occurring in BC and Quebec.

The decline in the importance of the sector is even more striking when compared to the performance of the rest of the economy, where both employment and contributions have grown significantly. The industry's contribution to total employment at the national level has declined by 24% and its contribution to total GDP by 25%. This decline in the sector's

	British Columbia	Ontario	Quebec	Yukon Territory	National
% Change in Employment in Sector	-6.0	-20	-15.7	-8.0 ¹¹	-12
% Change in Metal Mining Contribution to Employment from All Industries	-15.4	-30	-36.3	-25.6	-24
% Change in Revenues from Sector	-30.0	-45	+33.6	-40.0	n/a
% Change in Metal Mining Contribution to Total Jurisdictional Revenues	-40.0	-57	-4.8	-20.0	n/a
% Change in Contribution to GDP	+8.0	-24	+23.6	-25.5	-8
% Change in Metal Mining Contribution to Jurisdictional GDP from All Industries	-12.0	-39	-11.8	-36.5	-25

contribution to employment and GDP relative to other sectors is evident in all of the jurisdictions studied. A similar result is seen with respect to the sector's relative contribution to total revenues for each jurisdiction. In other words, contribution of metal mining to the economy is shrinking relative to other sectors.

Employment in the metal mining sector has declined even where its contributions to GDP have risen, as has been the case in British Columbia and Quebec.

The combination of the rise in expenditures and decline in economic contributions in the provinces of Ontario and BC and at the federal level highlights the declining ratio of benefits to government expenditures in support of the sector.

Consistent with the outcomes seen in other provinces, the ratio of employment to expenditures in Quebec has decreased. However the ratio of mineral royalty payments and contributions to GDP to expenditures has increased. This result is unique to Quebec, and requires further investigation to be fully explained. The ratio of benefits to expenditures will likely fall significantly as a result of the major new supports to the mining industry introduced in the province's March 2001 budget.

A number of other factors need to be considered when assessing the benefits derived from government expenditures in support of the sector. As noted earlier, new and proposed mines in Canada tend to have much shorter operating lives than has been the case in the past (see sidebar "Short-Lived New Mines" on page 4). This means that their benefits in terms of employment, revenues and contributions to GDP are becoming increasingly transitory.

Table 87: Summary of Changes in Expenditures, Benefits and Ratio of Benefits to Expenditures 1994/5 to 2000/1

	British Columbia	Ontario	Quebec	Yukon Territory	Federal Government
% Change in Total Expenditure	+17.00 ¹²	+ 58	-1.4 ¹³	- 2.00	+5
% Change in Employment	-6.00	-20	-15.7	-8.23 ¹⁴	-12
% Change in Employment to Expenditures Ratio	-19.00	-49	-14.5	-7.00	-14
% Change in Royalties	-29.89	-45	+33.6	-40.00	n/a
% Change in Royalty Payments to Expenditures Ratio	- 40.00	-65	+35.5	-39.00	n/a
% Change in Contribution to GDP	+8.00	-24	+23.6	-25.49	-8
% Change in Contribution to GDP to Expenditures Ratio	-7.00	-52	+25.4	-24.00	-10
Liabilities	\$85 million unsecured on operating mines; 1,170 "historic" sites identified, but remediation costs unknown. Likely in the range of \$190 million based on Ontario's experience. Britannia Mine remediation alone is budgeted at \$30-\$45 million.	Up to \$450 million abandoned sites; \$449.3 million unsecured closure and remediation costs on operating mines.	Quebec government acknowledges 74 orphan sites and remediation costs of \$75 million. Total unknown but likely in the range of at least \$270 million based on Ontario's experience. Total current unsecured liabilities unknown.	\$269.5 million for abandoned sites.	\$370 million for abandoned sites plus unknown amounts for Giant Mine in the NWT; \$269.5 million for abandoned sites in the YT.

In addition, the ability of individual governments to generate benefits from the industry through interventions to reduce the local costs of production, relative to the impacts on the fortunes of local operations of world commodities prices, is limited. This is demonstrated in the sidebar “Economic Impacts” on page 40 on the impact of world metal prices on the fortunes of British Columbia’s mining industry.

Chapter Endnotes

- ¹ Based on the Ontario estimate of remediation costs of \$450 million.
- ² Based on the cost of capital being at the prime interest rate of 4%.
- ³ Spending in 2001/2 will be up by more than 111%, considering the impact of the Sales Tax Exemption for Mining Equipment and Machinery (\$16.8 million) and the unknown value of the BC Mining Flow-Through Share Tax Credit.
- ⁴ At a prime interest rate of 4%.
- ⁵ The Quebec mining industry is approximately 60% the size of the Ontario industry. This would suggest a figure, based on the Ontario estimates of \$450 million, in the range of \$270 million.
- ⁶ Expenditures will increase significantly from 2000/1 to 2003/4 as a result of the introduction of the Refundable Tax Credit for Resources in the province’s March 2001 budget.
- ⁷ This estimate also includes total employment in the NWT as well as the YT, as Statistics Canada does not provide metal mine employment in the Yukon due to confidentiality issues.
- ⁸ The general corporate income tax rate would fall from 28% to 21% for sectors other than the non-renewable resource sectors.
- ⁹ Revenues were less than \$500,000 in 1994, rose to over \$7 million in 1995, fell again to less than \$2 million 1999, and rose to \$9 million in 2000.
- ^{9b} These figures are based on the following provincial agencies in charge of protecting the environment: the Ontario Ministry of the Environment; BC Ministry of Lands Environment and Parks; and Ministère de l’environnement du Québec (MENVIQ) and the Ministère des loisirs chasse et pêche (MCLP) and successors.
- Ontario environment spending versus spending in support of the mining industry — Ontario MoE operating budget down 26.2% (MoE Operating 1994/5 \$258 million; 2000/1 \$190 million) while spending on mining up 58% over 1994/5 to 2000/1 period (\$42.7 million to \$67.4 million).
 - BC MELP budget (1994/5 \$263 million; 2000/1 \$201 million) versus spending in support of the mining industry (+17% (\$13.2 million to \$15.4 million).
 - Quebec MRN mine spending (1994/5 \$109 million, 2000/1 \$108 million) versus environmental protection spending (1994/5 \$750 million; 2000/1 \$400 million).
- ¹⁰ Estimates of the remediation costs for the Giant Mine, for example, range from \$39 million to \$409 million.
- ¹¹ Includes employment in the NWT.
- ¹² Spending in 2001/2 will be up by more than 111%, considering the impact of the Sales Tax Exemption for Mining Equipment and Machinery (\$16.8 million) and the unknown value of the BC Mining Flow-Through Share Tax Credit.
- ¹³ Expenditures will increase significantly from 2000/1 to 2003/4 as a result of the introduction of the Refundable Tax Credit for Resources in the province’s March 2001 budget.
- ¹⁴ Includes employment in the NWT.
- ¹⁵ It is important to note that the apparent increase in royalties is partially explained by changes in the province’s royalty regime.

IX. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

There have been significant increases in direct and indirect expenditures in support of the metal mining industry in Canada, between 1994/5 and 2000/1, particularly in Ontario, but in British Columbia and at the federal level as well. Although expenditures by Quebec have declined slightly over the study period, they are expected to increase significantly from 2001/2 onwards as a result of announcements made in the province's 2001 budget. Similarly, expenditures in British Columbia will grow dramatically as a result of the Sales Tax Exemption for Mining Equipment and Machinery introduced in July 2001.

This growth in support to the sector has occurred in the context of the declines in overall government expenditures in Canada that took place over the 1994/5 to 2000/1 period, and in spending on environmental protection in particular, including the environmental protection, health and safety functions of mine ministries and departments.

This spending pattern is perverse from a number of perspectives:

- It contradicts international commitments¹ and policy advice² to reduce expenditures that support unsustainable consumption patterns, with a particular focus on the mining industry;
- It undermines efforts to promote sustainable patterns of production and consumption by reducing the costs of newly extracted resources relative to secondary materials, or redesigning products and services to reduce their material intensity;³
- It tends to reallocate capital to the sector, rather than to those that may have better prospects for economic and employment growth, particularly less capital-intensive knowledge-based sectors, which are critical to innovation;⁴ and
- It reinforces the Canadian economy's dependency on commodity exports, with adverse effects on the value of the Canadian dollar and other economic factors due to the volatility of world commodity prices.⁵

At the same time, the benefits being generated by the industry are shrinking in absolute and relative terms. The metal mining sector is in decline as a source of employment. This is evident in all of the jurisdictions studied. Even where the sector's nominal contribution to jurisdictional GDP has risen, as in British Columbia and Quebec, employment levels have fallen.

Table 88: Total Expenditures in Support of the Metal Mining Industry

Jurisdiction	Total Expenditures 1994/5 (millions 2000\$)	Total Expenditures 2000/1 (millions 2000\$)
British Columbia	\$13.2	\$15.4
Ontario	\$42.7	\$67.4
Quebec	\$109.2	\$107.7
Yukon Territory	\$6.8	\$6.7
Government of Canada	\$365.0	\$383.0
Total	\$536.9	\$580.2

The total is not a national total but rather just the sum of the jurisdictions included in this analysis.

The situation with respect to the sector's contribution to GDP is similar. In the aggregate, by 2000/1 the sector's contribution to national GDP had fallen by 8% relative to 1994/5. The decline is even more striking in terms of the contribution of the sector relative to other industries, where it accounts for 25% less of total GDP in 2000/1 than in 1994/5. This decline in the relative economic contribution of the sector is evident in all jurisdictions studied, even British Columbia and Quebec, where the sector's contribution to jurisdictional GDP rose in absolute terms. The sector's relative contribution to total revenues for each jurisdiction has also fallen. This is even seen in Quebec, where total royalty payments increased substantially.

Moreover, the sector does not provide sustainable social and economic development in areas where new mines are established. The typical lifetime of new mines is becoming shorter, and is now less than 15 years for new mines in Canada (see sidebar "Short-Lived Mines" on page 4).

The question of the effectiveness of efforts to sustain employment by reducing the local costs of production for commodities that are traded on world markets also has to be considered. As demonstrated by the British Columbia case (see sidebar "Economic Impacts" on page 40), such efforts may be futile, as shifts in international commodity prices, which individual national and sub-national governments have little capacity to influence, have a far larger impact on the viability of local operations.

In all jurisdictions studied except Quebec, the overall result seen in this study is a declining ratio of benefits in terms of employment, royalties and contributions to GDP relative to expenditures in support of the sector. In other words, the provision of support to the metal mining sector appears a less and less effective means of generating public benefits.

In addition to their adverse impacts on transitions to less material-intensive patterns of production and consumption, and long-term environmental sustainability, certain forms of support involve the assumption of major financial costs and risks on the part of the public. This is particularly true with respect to the assumption of remediation liabilities for abandoned mines, and risks of closure and remediation costs for operating mines.

The estimates of the support provided by Canadian governments to the metal mining sector in this study are incomplete, due to the inability of governments to provide estimates of the value of a number of key tax measures targeted at the industry. In the case of the federal government, our estimates of the value of these tax expenditures indicate that they are the Government of Canada's most significant source of financial support to the industry, totalling \$282 million in 2000/1.

It is also important to consider that this analysis has not taken into account the full range of forms of support provided to the sector by governments. This includes issues related to the price of access to the resource itself, access to water and energy resources at no or reduced cost, and the preferred status granted mineral development and extraction in land-use planning processes.

Nor has this assessment taken into account the full range of social and environmental costs associated with the industry. Rather, it has focused on those costs that were most readily identified and documented. The remediation costs associated with abandoned mines provide a proxy for some of the industry's long-term environmental costs, particularly with respect to surface disturbances and surface and groundwater quality. However, other costs, such as the health impacts of air and water pollution associated with the industry, permanent changes to surface and groundwater flows and supplies, and the social impacts of the industry's cyclical and transitory patterns of development have yet to be estimated. It is far from inconceivable that these costs could rival the industry's contributions to GDP.

Recommendations

Removal of Subsidies for Extractive Metal Mining

The findings of this study indicate that the provision of additional support to the metal mining industry cannot be rationalized, and that the existing supports being provided need to be seriously reconsidered. The February 2000 federal budget and October 2000 budget update moved in the direction of reducing the tax incentives to investment in the sector relative to other sectors. In particular, steps were taken to reduce the general corporate income tax rate from 28% to 21% for all sectors except mining and oil and gas. The 21% level is the rate that effectively applies to the non-renewable resource sectors when the existing measures to reduce the tax payable by the sectors are taken into account. However, the key federal tax measures and institutional supports for the metal mining sector remain in place, and new measures are being added at the federal, provincial and territorial levels.

Recommendations

New Subsidies: Flow-Through Shares

1. The tax credit programs for flow-through shares in the mining sector introduced in 2000 and 2001 at the federal level and in Ontario, British Columbia and Quebec should be terminated.

Federal Tax Measures

2. The federal government should not reduce the general corporate tax rates for the mining sector to those provided to sectors other than mining and oil and gas in the February 2000 budget, unless the federal tax measures specific to the mining sector identified in this report, such as the Canada Exploration Expense, Canada Development Expense, and Resource Allowance, are removed. The removal of these programs would be consistent with the recommendations of the OECD to the Government of Canada.⁶

Provincial Tax Measures

3. Provincial and territorial governments should move to bring corporate tax levels for the mining sector into line with those for other sectors. Tax expenditures and credits specific to the sector, such as British Columbia's recently introduced sales tax exemption for the sector, and the exploration tax credits provided in British Columbia, Yukon, and Quebec, should be removed.

Mining Royalty Regimes

4. Canadian governments should ensure that their mining royalty regimes realize the full value of the resource to the public. Mining tax "holidays" and exemptions for new or remote mines, such as those offered in Ontario and Quebec, should be removed. Mining royalty systems should be reviewed to make certain that they do not provide access to resources below their true value.

The Role of Mine Ministries and Departments

In addition to the supports provided through the tax system, mine ministries and departments provide a range of services to the metal mining industry through their program activities.

Recommendation

5. The federal and provincial governments should seek to re-orient the activities of mines departments to better serve the needs of the broader public interest rather than those of the mining industry alone. This could include, for example, re-directing the work of geological surveys away from the identification of mineral resources and towards the investigation, understanding and protection of renewable resources, such as groundwater.

Other Forms of Support: Infrastructure, Water, Energy, and Land

Canadian governments provide support to the metal mining sector in a number of ways in addition to tax initiatives and the program activities of mine ministries and departments. These include the provision of capital infrastructure to support specific mining operations, access to water and energy resources at no or reduced cost, and the preferred status granted mineral development and extraction in land-use planning processes.

Recommendations

6. The provision by governments of infrastructure to support the development of new mines, as the federal government has recently done in the case of the proposed Voisey's Bay mine in Labrador, should be ended. Mine operators should be required to internalize the costs of providing the capital infrastructure, such as roads and rail lines, needed to support their operations.

7. The mining industry is a major consumer of water resources. The practice of permitting industrial users almost unlimited access to public water resources at no cost, as has been the case in Ontario and Quebec, should be terminated. Measures should be adopted to ensure that levels of water use are sustainable, and that charges are introduced on industrial water use to encourage efficiency and conservation.
8. In some provinces and territories, such as British Columbia and the Yukon, mines have been provided access to electricity from public utilities at reduced cost. These practices should be ended, as they encourage the inefficient use of energy, and increase costs to other consumers.
9. In light of the need to consider the full range of environmental, social and economic factors in land-use decisions, the overriding priority granted non-renewable resource development, such as mining, in provincial land-use planning systems and policies, as is the case in Ontario, should be removed. Similarly, British Columbia's compensation regime for changes in land use for lands on which mining claims have been established should be terminated.

Resource Re-Allocation Towards Environmental, Social and Economic Sustainability

The termination of some current government expenditures and activities in support of the metal mining sector will release resources for other purposes. These investments should address the following themes.

Recommendations

Repairing the Legacy of the Past

10. The accumulated public liabilities for abandoned mines should be retired through the remediation of these sites within a reasonable time frame.

Economic Strategies for Mine-Dependent Communities

11. Economic strategies for communities and workers that have been mine dependent, but for whom mining is declining as a source of employment and economic activity, should be developed and implemented.

Preventing Future Damage and Liabilities

12. Regulatory frameworks, with adequate staffing and budgets to prevent environmental damage from operating mines, and the accumulation of future environmental liabilities on the public's account, should be established and implemented.

Investing in Materials Sustainability

13. Investments should be made in strategies for waste reduction and materials sustainability, including the design of products and production processes to facilitate the reuse and recycling of materials, including metals, and the research, development and expansion of capacity to process and utilize secondary materials within the Canadian economy.

Financial Assurances

This study has identified significant gaps in the financial assurances held by governments against the risk of abandonment and closure costs of operating mines.

Recommendation

14. Governments must ensure the provision of adequate and realizable financial securities against the risk of abandonment and closure for operating mines. Policies of self-assurance or acceptance of unassured risks by the Crown should be terminated. Information on closure and long-term care costs and financial assurances held by the Crown should be made available to the public.

Information

Tax Expenditures

Governments were unable to provide estimates of the value of a number of important tax measures introduced to support the industry. This represents a significant gap in terms of understanding the significance of these supports, and more broadly with respect to fiscal policy and accountability for the use of public funds.

Recommendation

15. The Government of Canada and the governments of the provinces and territories should adopt policies of providing clear estimates of costs of tax measures when they are introduced in jurisdictional budgets in terms of the likely forgone revenues or refundable tax credits to be provided.
16. Jurisdictions should report annually on the costs of tax measures in their public accounts, broken down by program, sector and activity.

Abandoned Mine Inventories

A number of jurisdictions have yet to complete inventories of abandoned mines, or estimates of the costs of remediating these sites.

Recommendation

17. British Columbia should complete an estimate of the costs of remediating “historic” sites on the basis of thorough chemical and physical site assessments of existing, closed and abandoned mines and exploration sites. This information for all jurisdictions should be updated and made available to the public on a regular basis.

Unaccounted Environmental and Social Costs

Significant gaps remain in understanding the full social and environmental costs of metal mining in Canada.

Recommendations

18. The exemption for the extraction phase of mining from the National Pollutant Release Inventory should be removed. This would be an important step in understanding the environmental costs of mine operations.
19. A pilot study of the full social and environmental costs of mineral development, mine operation and closure should be initiated in selected communities.

Final Observations

In the longer term, Canada’s fiscal policies need to move towards the internalization of externalized environmental and social costs associated with economic activities. Although this would require a more detailed investigation of these costs, the implementation of the initial measures outlined in this report would be important first steps in moving Canada down a path of greater economic and environmental sustainability. The need for action on materials sustainability to reduce the social, economic and environmental costs of extractive mining is increasingly recognized internationally and domestically. This report outlines the first steps that need to be taken in this regard in Canada.

As this study makes clear, despite growing government efforts to support the metal mining sector, the sector’s contribution to Canada’s economy is in decline. At the same time, the sector continues to generate major social and environmental costs, and to expose the public to long-term risks of liability in relation to damage that is often only remediable at extraordinary cost, if at all.

As illustrated in Table 88 (page 122) the public resources committed to support the sector approached \$600 million in 2000/1. The support provided to the sector is expected to expand even further over the next few years, particularly as new initiatives in British Columbia and Quebec come into effect.

This is a substantial expenditure of public resources, and one that has grown in a context of major reductions in government spending in other areas, including environmental protection. These reductions have, among other things, been identified as significant factors in major public health disasters in two provinces.⁷ The evidence gathered through this study indicates that, not even

considering the alternative uses to which the support provided to the sector might have been put, Canadian governments' expenditures in support of the metal mining industry are an increasingly poor investment, as the economic contribution from the sector continues to diminish.

This leads to the conclusion that the public resources being used to support the industry would be better employed elsewhere, including the restoration and protection of environmental and social assets affected by metal mining. More broadly, Canadian governments should move towards the promotion of forms of economic development that are less vulnerable to shifts in international economic conditions, and that will provide economic, social and environmental benefits to Canadian society that are sustainable over the long term.

The mining industry, for its part, needs to follow the path being taken by a number of leading firms in the fossil-fuel industry. In that sector, firms are reconceptualizing their roles from being focused on the identification and extraction of conventional energy resources, to being providers of energy services. Similarly, the metal mining sector needs to focus on its role as a provider of materials and materials strategies, rather than as a discoverer and remover of new resources from the Earth in a way that cannot be sustained in the long term.

Chapter Endnotes

¹ See, for example, the Rio Declaration, Principle 8.

² OECD, Economic Surveys: Canada, (Paris: OECD, August 2000), p. 155.

³ J.E. Young and A. Sachs, The Next Efficiency Revolution: Creating a Sustainable Materials Economy, Worldwatch Paper 121, (Washington: Worldwatch Institute, 1994).

⁴ See for example, Technical Committee on Business Taxation, Report, (Ottawa: Department of Finance, 1998), p. 3.3; J. Mintz, Most Favoured Nation: Building a Framework for Smart Economic Policy, (Toronto: C.D. Howe Institute, 2001), pp. 95–96.

⁵ D. Laidler and S. Aba, Productivity and the Dollar: Commodities and the Exchange Rate Connection, Commentary 158, (Toronto: C.D. Howe Institute, 2002), p. 2 and 13.

⁶ OECD, Economic Surveys: Canada, (Paris: OECD, August 2000), p. 155.

⁷ See the Hon. D.R. O'Connor, Commissioner, Report of the Walkerton Inquiry/Part I: The Events of May 2000 and Related Issues, (Toronto: Queen's Printer for Ontario, 2002), esp. Chapter 11; and The Hon. R.D. Laing, Commissioner, Report of the Commission of Inquiry into Matters Related to the Safety of the Public Drinking Water in the City of North Battleford, Saskatchewan, (Saskatoon: The Commission, 2002), Part VI.



MiningWatch Canada
Mines Alertes

880 Wellington Street, Suite 508
Ottawa, Ont., K1R 6K7
Telephone (613) 569-3439
Fax (613) 569-5138
canada@miningwatch.ca
www.miningwatch.ca



Holistic and practical solutions for a sustainable world.

124 O'Connor Street, Suite 505
Ottawa, Ont., K1P 5M9
Telephone (613) 235-6288
Fax (613) 235-8118
info@pembina.org
www.pembina.org