Northern Policy Papers

LABRADOR
An Overview of Mining Activity in Labrador
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An Overview of Mining Activity in Labrador
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1.0 Introduction
In 2009 the contribution of mining to Newfoundland and Labrador (NL) GDP was estimated at $1,566 million (6.7%) second only to offshore oil extraction and support activities (27.5%) of industries in the goods producing sector (GNLDF 2011).

Mining in NL is dominated by iron ore production in western Labrador and nickel ore production at Voisey’s Bay on Labrador’s northeast coast (Figure 1). The forecasted Gross Value of Mineral Shipments (GVMS) for 2011 for NL as a whole is $4.7 billion of which approximately $3 billion will be from iron ore and $1 billion from nickel. Projected increases in shipments of iron ore and the opening of Labrador Iron Mines operation at the Québec/Labrador border near Schefferville in 2011, the end of the strike at Voisey’s Bay and a general increase in commodity prices are the main contributory factors that should see the highest GVMS on record (GNL 2011).

2.0 Mines and Mineral Development in Labrador

2.1 Iron Ore
Substantial iron ore deposits were discovered in 1892, but isolation and other factors prohibited mining in Labrador until the 1940s. The end of WWII saw an increase in the demand for metals and minerals and resulted in a new boom in exploration and mine development. Labrador was a remote and then largely unknown region, but advances in aviation and mineral exploration technologies emerging from WWII offered new cost-effective means of opening up the area.

Iron ore mining is concentrated in the Labrador Trough, a 1,600 km long and 160 km wide geological structure that extends south-southeast from Ungava Bay in the north through Québec and Labrador and southwest into central Québec. Mining began in the Knob Lake (now Schefferville) area on the Québec-Labrador border following the end of WWII. This included, starting in 1950, the construction of a 588km railway from Sept-Îles, Québec to Schefferville. Mining commenced in 1954 under the control of the Iron Ore Company of Canada (IOCC), a private company owned by a number of US and Canadian steel companies and operating on LME leases. Mining activity ceased in the Schefferville area in 1982. Today mining is concentrated around Labrador City and Wabush in western Labrador, and Fermont, Québec 14 km to the west. Currently exploration and development is taking place in the vicinity of Labrador City and Wabush and once again near Schefferville, 250 km to the north (Figure 1).
Currently the main industry players are:

1. **The Iron Ore Company of Canada** (IOC) began producing iron ore from its Carol Lake project in Labrador West in 1962. IOC is owned by Rio Tinto PLC, which operates within the Rio Tinto Iron Ore Group (58.7%), Mitsubishi Corp. (26.2%) and the Labrador Ore Royalty Income Fund (15.1%) (Schiller 2011).

   IOC is Canada’s largest iron ore pellet producer operating several pits, a concentrator and a pellet plant at Carol Lake, port facilities in Sept-Îles, Québec, and the 420 km rail line linking the mines and the port. Annual mine production is 35-38 million tonnes (mtpa) at an average grade of approximately 40% iron. Annual production capacity is 17 mtpa of concentrate of which approximately 13 mtpa are pelletized (GNL 2011).

   The rail link, the Québec North Shore and Labrador (QNS&L) railroad, is a common rail carrier. Because it crosses an inter-provincial boundary it comes under the jurisdiction of the federal government, and is obligated to permit the use of the rail line by other users (Schiller 2011).

   In May 2010 IOC restarted its proposed expansion plan that would see an investment of Can$435 million to increase annual concentrate capacity to 26 mtpa by 2013. In February 2011 a second phase investment of Can$289 million was announced that would further increase capacity to 23.3 mtpa by year-end 2012. Shipments are forecast to increase from 15.6 mtpa in 2010 to 16.4 mtpa in 2011 with employment remaining steady at 1,625 (GNL 2011).

   In August 2011 IOC announced a study to evaluate options to increase production to 50 mtpa. This may include new concentrators, mining pits, and related mine, rail, stock handling and port infrastructure (Rio Tinto 2011).

   Since 1986 IOC has also mined dolomite in Labrador West for making fluxed pellets. 2011 production is forecast to be 195,000 tonnes (GNL 2011).

2. **Wabush Mines**, now owned 100% by Cliffs Natural Resources Inc. of Cleveland, Ohio, started mining iron ore from the Scully Mine in Labrador West in 1965. Wabush Mines currently operates a mine and a concentrating plant at Wabush, and a pellet plant and shipping facilities in Pointe Noire, Québec. Ore is shipped via the QNS&L railway to Pointe Noire. In 2010 concentrate production was 3.76 mtpa, up from 2.6 mtpa in 2009, and is expected to increase to 4.4 mtpa in 2011. Employment is also expected to increase from 428 in 2010 to 439 in 2011.

   Wabush Mines plans new investment at the Scully Mine between 2010 and 2012 that could total Can$115 million and would see replacement of equipment, implementation of a manganese reduction project, equipment reliability improvements and environmental projects (GNL 2011).
3. **Labrador Iron Mines Holdings Ltd.**'s (LIM) project at the site of the former IOC operations near Schefferville is designed to mine and process high grade direct shipping iron ore (DSO). LIM has 20 iron ore deposits containing 150 million tonnes of DSO grading 56-58% Fe of hematite ore (Schiller 2011).

The first phase of LIM's Silver Yards processing plant has been commissioned and full-scale mining operations at the James Mine are underway. On June 29 2011 the first ore train left Silver Yards for Sept Îles, Québec via the Tshiuetin Rail Transportation Inc. (TRTI) and QNS&L railways, the first commercial ore train from the Schefferville area in almost 30 years (LIM 2011). Mine life expectancy is about five years but this could be extended to 15 years if other nearby deposits are developed. By 2015 production is expected to be about 5 mtpa and about 110 people will be employed (GNL 2011). The plant will operate seasonally for seven or eight months between April and November or December, depending on weather conditions. Overburden and waste mining and some ore mining will continue through the winter period.

4. **Tata Steel Minerals Canada Ltd.** with joint venture partner **New Millennium Capital Corporation** will mine and process high grade, DSO from the site of former IOC operations at Elross Lake, near Schefferville. NL released the project from further environmental assessment in January 2011. A phase two expansion plan into Québec remains under assessment. Project construction is expected to be complete by the end of 2012 and once operational will produce between 1.5 and 3 mtpa of iron ore during years 1 to 3 and result in about 188 direct jobs. Pre-feasibility studies of the Labrador DSO project indicate 64.1 million tonnes of proven and probable reserves and 15.3 million tonnes of measured and indicated resources (Schiller 2011; GNL 2011).

5. **New Millennium Capital Corporation**, in addition to its interest in the Elross Lake project, also holds an 80% interest in the 5-6 billion tonne Lab-Mag taconite iron ore deposit near Schefferville, and a 100% interest in the similar size KeMag deposit across the border in Québec.

Taconite is a low-grade iron ore containing a high percentage of magnetite, which can be concentrated to produce high-quality iron. Based on proven and probable reserves the project would have a life expectancy of 74 years at a production rate of 22 mtpa. Production is currently anticipated in 2015-2016 (Baird 2011).

6. **Alderon Resource Corp.** is in the pre-development phase of its Kamistiatusset, or Kami, project located 10km south of Wabush. Production is planned at a rate of 8 mtpa over a 21-year mine life. Proximity to existing operations mean that rail spurs or conveyors could readily connect the mine to the main rail line to Sept-Îles (Schiller 2011).
The rapid growth in iron ore exploration and development activity in Labrador could see a significant increase in total iron ore production in Labrador and in Quebec over the next several years. The expansion of IOC’s operations, Tata/New Millennium’s Elross Lake and Alderon’s Kami project would almost double current total Canadian production from 35 mtpa to more than 62 mtpa. Together with other developments in Quebec, and potentially Baffin Island, Canadian production could reach 100 mtpa by 2015 or soon thereafter.

Whether this will happen depends largely on continued growth of markets, particularly those in China, which in 2009 imported c. 66% of total world iron ore exports and produced 60% of the world’s pig iron – both of which are key indicators of consumption (USGS 2011). In 2009 new capacity in various countries added 75 mtpa to global production (Tabe 2011), and Brazil has indicated that it is anticipating increasing production from 372 mtpa in 2010 to 771.5 mtpa by 2015 (Spinetto 2011). Such increases will outstrip expected consumption if China’s growth slows and will place some planned projects at risk.

### 2.2 Nickel

The Voisey’s Bay nickel deposit on the northeast coast, southeast of Nain (Figure 1), was discovered in September 1993 and is considered to be one of the most substantial mineral discoveries in Canada in the last forty years. Drilling at the Discovery Hill site commenced in late 1994 and led to the discovery of high grade “Ovoid Zone”, a huge bowl-shaped accumulation of massive iron, nickel and copper sulphides that contains about 32 million tonnes of ore grading 2.83% nickel, 1.69% copper and 0.12% cobalt. Sitting just below the surface it can be easily mined by open-pit methods. The estimated mine-life of the ovoid is 14 years (Vale 2011).

Two other sub-surface sulphide zones, the Eastern Deeps and the Reid Brook Zone have since been identified. While the average grade of each of these is significantly lower than that of the Ovoid, the deposit as a whole is estimated to contain 141 million tonnes at 1.63% nickel, 0.85% copper and 0.09% cobalt. Including the sub-surface resources, the mine has expected life of 30 years. However, before an underground mining plan can be developed exploration and evaluation and other feasibility analyses need to be completed to establish probable underground mineable reserves and provide the information necessary to complete a mining plan and carry out financial evaluations. Should underground mining go ahead, it is anticipated to take place by 2018.

**Vale Newfoundland and Labrador Limited** (VNL), a unit of Vale, owns and operates the Voisey’s Bay mine, which came into production in 2005. Ore is currently shipped by sea and rail for processing at Vale’s Ontario and Manitoba operations.

In 2008 Vale announced that it would build a hydromet nickel processing facility at Long Harbour on the Isthmus of Avalon on the Island of Newfoundland. The project is expected to be complete in February 2013 (GNL 2011).
In 2010 42,000 tonnes of nickel, 33,000 tonnes of copper and 524 tonnes of cobalt were shipped. Production fell between August 2009 and January 2011 as a result of a strike by unionized employees. Current employment at the mine/mill operation is approximately 450. How many of those are of Aboriginal ancestry is not indicated (Vale 2011).

2.3 Uranium
Uranium was discovered near Makkovik more than 50 years ago. In the late 1970s development plans for two deposits were halted due to the collapse of uranium prices and concerns about the environmental impacts of mining. In 2005 uranium exploration picked up, resource estimates at previously known deposits were revised upwards and new discoveries made (GNLDNR 2009).

Aurora Energy Ltd. is a uranium exploration and development company active in the Central Mineral Belt of coastal Labrador and has identified significant uranium resources in six deposits. Of these the Michelin deposit is the most significant (Figure 1). Measured and indicated resource levels are estimated at 67.4 million pounds of \( \text{U}_3\text{O}_8 \) and an inferred resource of 35.5 million pounds. A Preliminary Economic Assessment indicated a potential 17-year life for the mine with an average annual production of 5.7 million pounds (Aurora 2009).

The project would be on lands that fall under the jurisdiction of the Nunatsiavut government. In 2008 the Nunatsiavut government imposed a three-year moratorium on uranium mining on part of these lands, to be reviewed after March 31 2011. The moratorium was designed to give the government time to develop environmental legislation and finalize its land use plan. There is currently no indication of when such a review will take place.

2.4 Mineral Exploration
The Voisey’s Bay discovery prompted a staking and exploration rush of unprecedented scale in Labrador. Between 1990 and 1995 annual exploration expenditures in Labrador ranged from $0.75 to $3.7 million. In 1995 expenditures were $61.5 million, rising to a peak of $81.4 million in 1996 before declining to $12 million in 2000.

A second exploration rush in Labrador, associated mainly with uranium and iron ore, has occurred since 2005, with expenditures in that year of over $30 million. Since then exploration expenditures have continued to rise reaching $98 million in 2008. The recession led to lower expenditures in 2009 ($35 million), but they have rebounded to an estimated $92 million in 2011 (GNLDNR 2011a).

3.0 Secondary Processing
The issue of the lack of secondary processing of mineral ores in the Province has been long-time concern. In the case of iron ore, beyond the production of concentrates and iron ore pellets there is no further processing of iron ore in Labrador. The economics of iron and steel production suggest that this is unlikely to change.
Crushing and screening operations are performed at the mine plant sites. Some ores then need to be upgraded before smelting, and concentration involves producing ore fractions richer in iron and lower in silica than the original material. Most concentration processes rely on density differences to separate light minerals from heavier ones so the ore is crushed and ground to release the ore minerals from the gangue. Magnetic techniques also are used.

The concentrate can then be agglomerated for blast furnace use by pelletizing. Moistened concentrates are first fed to a rotating drum or an inclined disc, the tumbling action of which produces soft, spherical agglomerates. These “green” balls are then dried and hardened by firing in air to a temperature in the range of 1,250° to 1,340° C and then slowly cooled. Finished pellets are round with diameters of 10 to 15 mm, making them almost the ideal shape for the blast furnace (Walker 2011). This represents the extent of iron ore processing.

Iron is produced from smelting the ore, and approximately 98 per cent of all iron produced is used to manufacture steel. While iron ore is the key raw material input, it is only one of a number of inputs required to produce steel. Integrated iron and steel plants are located wherever it is economically feasible to bring together large quantities of the raw materials required and at locations where the demand for steel is the greatest. Currently the world’s leading crude steel producers are the People’s Republic of China (44.5% in 2010), the European Union (12.2%) and Japan (7.7%), and the United States with 5.7%; Canada ranks 17th with 0.9% of world production (WSA 2011).

Canada’s largest steel plants were built at locations along the Great Lakes-St. Lawrence Seaway system, locations to which iron ores from northern Ontario, Québec, Labrador, Minnesota, Wisconsin and Michigan, and coal from Pennsylvania, West Virginia and Kentucky could be transported most economically. Also, they are the locations where the demand for steel has been the greatest due to the concentration of manufacturing industry. Labrador is an important source of raw material for the iron and steel industry, but does not meet the locational requirements for further processing.

The Voisey’s Bay discovery prompted requirements to ensure that a greater degree of primary processing would take place in NL. The Newfoundland and Labrador Mineral Act (RSNL M–12) as amended in 1998, now requires that a person holding a mineral lease in the Province complete primary production, in whole or in part, in the Province, subject to certain economic considerations. As a consequence the Voisey’s Bay Development Agreement (2002) required VBNC to build a Hydromet Plant or suitable alternate facility in the Province.

Traditionally the nickel industry has smelted concentrates produced from nickel, copper and cobalt sulphide ores to make an intermediate sulphide product called matte. Hydrometallurgy has been used for refining the matte to produce high purity nickel, copper and cobalt for the market. Thus, traditionally production of these metals has occurred in two steps: smelting and refining. The Vale hydrometallurgi-
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cal process will be able to process the nickel concentrate directly to metal products without first having to smelt the concentrate. This is seen as more economical and environmentally friendly and the process will also yield more of the cobalt that is lost to a great extent in the smelting process.

Nickel-cobalt-copper concentrate delivered from Voisey’s Bay will be processed to produce a nickel, cobalt and copper solution, which is then purified and the nickel, copper and cobalt separated. The copper and cobalt will be recovered as by-products. The nickel will be recovered by electrolysis as high quality electronickel product (99+% pure nickel) suitable for next stage production of stainless steel, nickel alloys, batteries, etc. (Vale 2011).

In agreeing to establish a processing plant in NL, Inco, then the owner, conducted a province-wide study of 15 potential sites in 1996 to locate a smelter-refinery complex. The former US Naval Base at Argentia was initially selected as the preferred site, but changes in processing options resulted in Long Harbour, on the Isthmus of Avalon, being selected as the site for the processing facility (VBNC 2007). Particular advantages over Labrador sites include that Long Harbour has an ice free port that can operate year-round and offers easy access to major North Atlantic shipping lanes. The latter will be of particular importance once the Voisey’s Bay resource is depleted and the plant relies on ore from elsewhere.

3.0 Provincial Minerals Policies

In the pre-confederation era the primary need was the opening up of the interior to provide economic development. Mining was seen as a frontier activity that would create jobs and provide infrastructure. Direct financial benefit through taxation and royalties was a secondary consideration. Particularly after 1934 and the period of the Commission of Government1 there was a growing tendency to award mineral rights by special agreement – the concession system – in which large tracts of land were awarded to selected companies or individuals for extended periods of time. The rationale was that this was the most effective manner in which to attract exploration and development capital for large-scale prolonged exploration surveys and then development in remote areas. All of the iron ore developments in western Labrador came into production under the terms of special agreements, which also determined the level of government royalties; royalties, however, continued to be a secondary consideration after jobs and development.

In the mid-1970s the concession system was replaced with one based on competitive claim staking, introduction of measures to encourage concession holders to surrender land that was not being explored, and changes to the mining tax legislation to provide for increased royalties (though these only applied to operations that came on stream after 1978). This revised legislative framework continued until the Mining Act of 1999, which has driven the regulation of the industry in recent years.

1 From 1934 to confederation with Canada in 1949 Newfoundland reverted to British colonial administration.
Mining and Mineral Rights Tax is imposed under the *Revenue Administration Act*. While referred to as taxes, they are essentially crown royalties, similar to the royalties from offshore oil. Operators are taxed in the range of 12-16% on net income, while others who receive rents, royalties or other payments from mine production are taxed at 20% of that income (GNLDNR 2011b).

Taxation for the mines operated by IOC and Wabush Mines operate under the terms of private statutes dating back to the mineral concession system. These vary in their terms, but involve payment of royalties based on the level of production and, in some cases, a percentage of profits. The government of NL has estimated that when overall fiscal burdens are considered (factoring in federal and provincial corporate income and capital taxes), compared with other jurisdictions the province is ‘mid-stream’ in terms of revenue generated and the fiscal burden on mining (GNLDNR 2011b).

The last review of mineral policy and legislation in NL was in the 1970s. This review marked a major change in the way the industry was managed, however, since then the industry has changed and new issues have emerged including developments in Aboriginal law, sustainability issues ensuring economic and community benefits and minimization of environmental impact. In the 2010 provincial Budget funds were allocated to develop a Minerals Strategy for the province. One of the preliminary objectives of that strategy is to maximize the value received from mineral resources to ensure that Newfoundlanders and Labradorians benefit from their development, while still providing a fair return to the mining companies (GNLDNR 2011b). Publication of the Strategy document is awaited.

### 4.0 Aboriginal Relations

The Labrador Inuit Land Claims Agreement (LILCA) provides for the establishment of the Labrador Inuit Settlement Area (LISA) consisting of approximately 72,520 km$^2$ of land and approximately 48,690 km$^2$ of adjacent tidal waters. Within the LISA approximately 15,800 km$^2$ is Inuit-owned land referred to as Labrador Inuit Lands (LIL). Within LIL Inuit also own 3,950 km$^2$ of specified materials (quarry materials) in Specified Material Lands. Any person wishing to explore for subsurface resources in LIL is required to submit a work plan for approval by the Government of Newfoundland and Labrador and the Nunatsiavut Government.

In accordance with the LILCA, Impacts and Benefits Agreements (IBAs) must be negotiated between the Nunatsiavut Government and developers before any developments may proceed in LIL and before any major development may proceed in the LISA outside LIL. The LILCA also provides for the continued designation of several areas as exempt mineral lands. Those areas designated as exempt mineral lands within LIL can not be changed prior to the date the land use plan comes into effect for the LISA without the written consent of the Nunatsiavut Government. As noted earlier, the Nunatsiavut Government imposed a moratorium on uranium mining in LIL in 2008 for a three year period, to allow completion of the land use plan, development of environmental legislation, and to gain a better understanding of issues associated with uranium mining.
The land claim of Innu Nation is under negotiation. Certain crucial elements relating to that land claim negotiation were agreed upon by Innu Nation and the Government of Newfoundland and Labrador as part of the New Dawn Agreement, which sets out various areas and types of lands that are proposed for inclusion in any final legally binding land claims agreement with Innu Nation (Figure 2). In Labrador West and northwest Labrador the rights applicable to the CIII area are limited to the right to harvest migratory species of wildlife without provincial licences and the right to harvest migratory birds, subject to the concurrence of the federal government.

Elements that relate to the land claim are now under review by the federal government for potential inclusion in a land claim Agreement-in-Principle that will provide the basis for a final legally binding land claims agreement (GNLDNR 2011b). Until that time, Innu Nation is consulted by the province, by various means, on developments that are proposed to occur in the Innu Claim Area. In addition, the establishment of IBAs between companies and Innu Nation are now standard practice before any development takes place.

The NunatuKavut Community Council Inc. (NCC), formerly known as the Labrador Métis Nation, has recently filed new land claim documentation with the federal government. Should the federal government accept that claim for the purposes of land claim negotiation, the province will then make its own independent decision on that matter. In the meantime, certain mineral activities can be referred by the province to the NCC for comment (GNLDNR 2011b).

There are also assertions of Aboriginal rights from various First Nations in Quebec to areas of Labrador. Also, various Quebec Innu First Nations have filed land claim documentation with the federal government in relation to areas of Labrador. While the province has not accepted any such land claims for the purposes of negotiation or any of the aforementioned assertions, these assertions may have implications for mineral exploration and development in certain areas of Labrador (GNLDNR 2011b).

Land Claims Agreements place greater decision-making power in the hands of aboriginal groups. Where lands are designated for other uses, or decisions on land uses are delayed, this may have a negative effect on corporate decisions regarding mineral exploration and development.

**5.0 Labour Market Challenges**

Labour market conditions in Newfoundland and Labrador have improved significantly over the past several years and are expected to continue to do so. A significant number of new jobs will be opening up between 2013 and 2015 as a result of major project developments. Overall, expansion demand is expected to increase over the next 10 years, which, together with a loss of workers from retirements could mean upwards of 15,000 replacement job openings (GNLDHRLE 2010).
These opportunities also represent a significant challenge. The impacts of downward population trends are more evident in NL than elsewhere in Canada. While most jurisdictions are facing slowing population growth, the Province’s population has sustained continued population decline over the past decade and now has one of the most rapidly aging populations in Canada.

Concerns over labour shortages have been escalating, especially in light of increasing competition for workers from other jurisdictions. Even during the recession of 2008-09, employers in NL continued to voice concerns over their ability to find and keep skilled workers. Temporary foreign workers are already being sought to fill positions in Labrador City. Labour supply pressures could negatively impact economic and firm growth in the absence of significant in-migration or complementary investment in capital improvements and workforce development by employers to maintain productivity growth.

While increases in participation rates across all age groups might also be expected over the next decade, the rapidly changing and increasingly competitive global marketplace and technological advancements will continue to increase skill demands and contribute to changing job duties. Current workforce literacy levels, particularly among older workers, will pose challenges in responding to these changing demands. These challenges are further exacerbated by the fact that NL continues to experience low participation rates in adult-learning courses among its working-age population and among the lowest levels of employer investment in workforce development and training (GNLDHRLE 2010).

Many of the skills required by the mining industry, particularly in the trades, are also required by other sectors. In addition, the mining industry faces shortages of qualified personnel in specific areas including geoscientists, mining engineers and miners. Recruitment into these professions is poor. Overall, the Canadian mining sector is anticipating a shortfall of 100,000 workers in the next decade (MIHRC 2010). Labrador will not be immune from these effects.

6.0 Environmental and Infrastructure Issues

**Tailings Management**

The use of natural water bodies to confine mine tailings is permitted under certain conditions by provincial and federal legislation (the *Metal Mining Effluent Regulations*, a 2002 amendment to the *Fisheries Act*), but this practice is strongly opposed by a number of NGOs and private citizens.

The use of natural water bodies for storage of chemically reactive tailings is a relatively inexpensive solution for mining companies. Environmentally, natural water bodies may reduce the rate of release of contaminants to the environment and offer stable basins that are safer for long-term storage than artificially constructed impoundments. These views are often disputed on the grounds that safety varies with circumstances and that other jurisdictions have mandated the use of constructed impoundments. In addition, use of natural water bodies involves the loss
of freshwater habitat and loss of biota. Federal regulations do require the creation of new habitat to offset losses, but reviews by the Auditor General and DFO publications point to a lack of success with habitat compensation (see, for example, Harper and Quigley 2005).

**Protected Areas**

Pristine areas, protected in perpetuity and excluded from mining exploration and development potentially protect places for future generations and help preserve biota in their original form. The 1994 *Whitehorse Mining Initiative* (WMI 1994) recognized the importance of completing protected area networks. However, NL is said, to lag behind most Canadian and many other international jurisdictions in efforts to complete a representative network of protected areas (MiningWatch Canada 2011).

A concern of the industry is that their designation reduces the amount of land available for exploration and access for mining companies While some land has been ‘lost’ to development in the recent past to alternative uses (e.g. Smallwood Reservoir, military reserves, parks), 82% of Labrador is still available to staking (GNLDNR 2011b). However, additional lands may become unavailable (e.g. Lac Joseph proposed protected area, traditional use lands under the Nunatsiavut Land Use Plans, Innu lands under the *New Dawn Agreement*, and designation as ecological reserves). One mining company has estimated that if all current proposed alternative uses were adopted it could reduce the estimated land available to staking in Labrador to 49% of the total area (Altius 2011).

**Exploration Regulations**

Risks associated with orphaned or abandoned sites associated with operating mines is now addressed through closure assurances posted by mine operators, but there are few regulations to address risks associated with exploration, where it is often assumed that there will be few or no environmental or social effects. Impacts on water, wildlife, quality of life and traditional practices can, however, occur and to address this the Nunatsiavut government has introduced comprehensive exploration regulations that can improve oversight and ensure remediation of exploration sites (Nunatsiavut 2009). Adoption of similar requirements has been suggested for NL as a whole.

**Environmental Monitoring**

Environmental monitoring is essential to ensure compliance, verify effects predictions and provide warning of unanticipated effects. Much of the required monitoring is carried out by the mining companies. Given the rapid growth in the mining sector there is concern that there are insufficient inspectors or budget to provide the necessary oversight (MiningWatch 2011). To address issues of communication and transparency, independent monitoring agencies have been established elsewhere in the country for major mineral developments (e.g. diamond mining in the NWT), and in the Province to monitor low-level military flying in Labrador. This approach has been suggested for mining activity in Newfoundland and Labrador.
Energy Supply and Demand
The 2010 Nalcor Energy Annual Report notes that “Churchill Falls sells 225 MW to Twin Falls to service the mining industry in Labrador West” (Nalcor Energy 2010). It is not known whether all of this power is utilized by the mining industry, nor whether the demands of the growing mining sector in Labrador West and northwest Labrador in particular, can be met from this source, from the 300 MW sold to Hydro for use in Labrador and as “recall energy,” or whether power from the proposed Muskrat Falls development would be used to provide power to Labrador mining projects.

Community Infrastructure/Community Development
Growth in iron ore mining has led to rapid urban growth in Labrador West in recent years. Lack of land for housing development in Labrador City in particular is driving up housing demand and associated costs and there is currently an almost zero vacancy rate for rental accommodations. The announcement that IOC is contemplating doubling production (Rio Tinto 2011) will place additional pressure on local housing infrastructure and local companies abilities to provide services for a growing population. Housing shortages are already having negative effects on low-income residents and potentially constraining development.

Since the 1970s it has become common practice to use fly-in/fly-out (FIFO) work arrangements and camps to accommodate workers at remote sites and in the absence of a local townsite (e.g. Voisey’s Bay). Similar arrangements are also used when, for example:

* insufficient infrastructure is available in nearby existing townsites (e.g. Fort McMurray);
* where the objective is to minimize the adverse effects of a large transient and temporary population, particularly during construction (e.g. the proposed Muskrat Falls hydroelectric generation project);
* at locations where operations employees are unwilling to relocate on a permanent basis (e.g. Millertown NL [Aur Resources 2006]); or
* where the life expectancy of the operation is short and investment in permanent infrastructure not justified.

Given proposed and potential mining developments in Labrador it seems likely that FIFO operations will become increasingly common in the future. While FIFO may be practical from the company perspective, when adopted for long-term mine operations it does little to promote community development while at the same time, in the absence of mechanisms to recover costs, it can prove costly to those communities whose infrastructure and services FIFO workers may utilize as they pass through.
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References


Figure 1 – Mining in Labrador
Appendix 1

Figure 2 – Innu Nation Land Claim

Legend
- UL (C) at 5,000sqmi
- CII at 9,000sqmi
- CIII at 13,000sqmi
- Economic Development Areas
- Under Review

SOURCE: GNL AND INNU NATION 2008