Economic Impact of the Mineral Industry in Nova Scotia

- 2006 -

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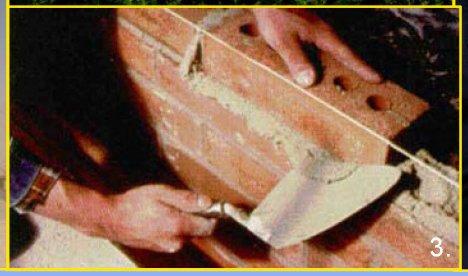

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Nova Scotia Department of Natural Resources
Open File Report ME 2008-1
May 2008

Economic Impact of the Mineral Industry in Nova Scotia

- 2006 -

Prepared by:

Gardner Pinfold Consulting and Conestoga-Rovers and Associates
under contract
for the
Nova Scotia Department of Natural Resources

Date:
May 2008

Nova Scotia Department of Natural Resources
Open File Report ME 2008-1

1.0 Introduction

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Mineral Industry Overview

- The industry plays a major role in the Nova Scotia Economy

- The economic impact of the industry stems from various activities including:
  - Mineral exploration
  - Mine development
  - Mineral production
  - Secondary processing
  - Provision of goods and services to the industry
  - Mine site rehabilitation

How was the analysis undertaken?

- Interviews were conducted with industry participants to collect expenditure data and to collect information for the initial baseline study.
- Various data sources taken primarily from the Department of Natural Resources were used to update production data.
- Statistics Canada and Natural Resources Canada data were used to analyze the mineral secondary processing industry.
- The Nova Scotia Department of Finance's Economic Impact Model was used to assess the spin-off impacts attributable to the industry for a baseline study.
- Impact ratios have been used to update the study to 2006.

2.0 Economic Impact Results

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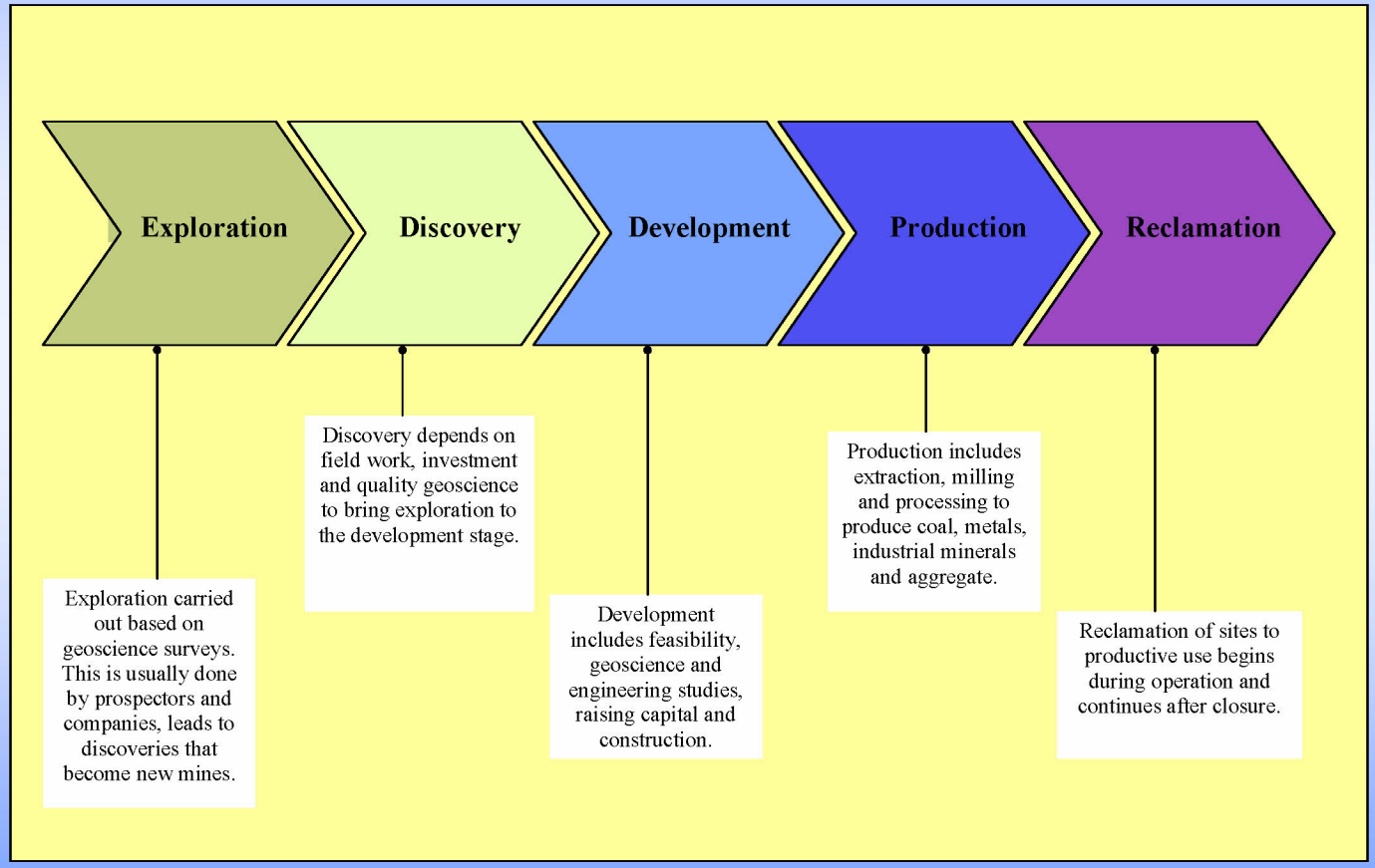
The direct economic impact of the industry stems from various activities including:



What are economic impacts?

- Primary direct economic impacts are those attributable to the individual mine operators, exploration companies or secondary processors. They are the expenditures they make on various goods (fuel, electricity etc) and services (accounting, legal etc.) including wages and salaries.
- Both capital and operating expenses have been included.
- The spin-off or multiplier effect include both indirect and induced impacts, these result to businesses that supply goods and services to the mining industry. Also they result from consumers spending the income they earn from both the direct and indirect stages.
- Impacts are reported both in terms of person-years of employment (py's) and gross domestic product (GDP).

Total Economic Impact Associated
including primary and processing activity

- Employment (py's)
  - Direct - 3,075
  - Spin-off - 3,265
  - Total - 6,340
- GDP ($'000,000)
  - Direct - $283.4
  - Spin-off - $205.2
  - Total - $488.6

10.

Impacts associated with mining activity

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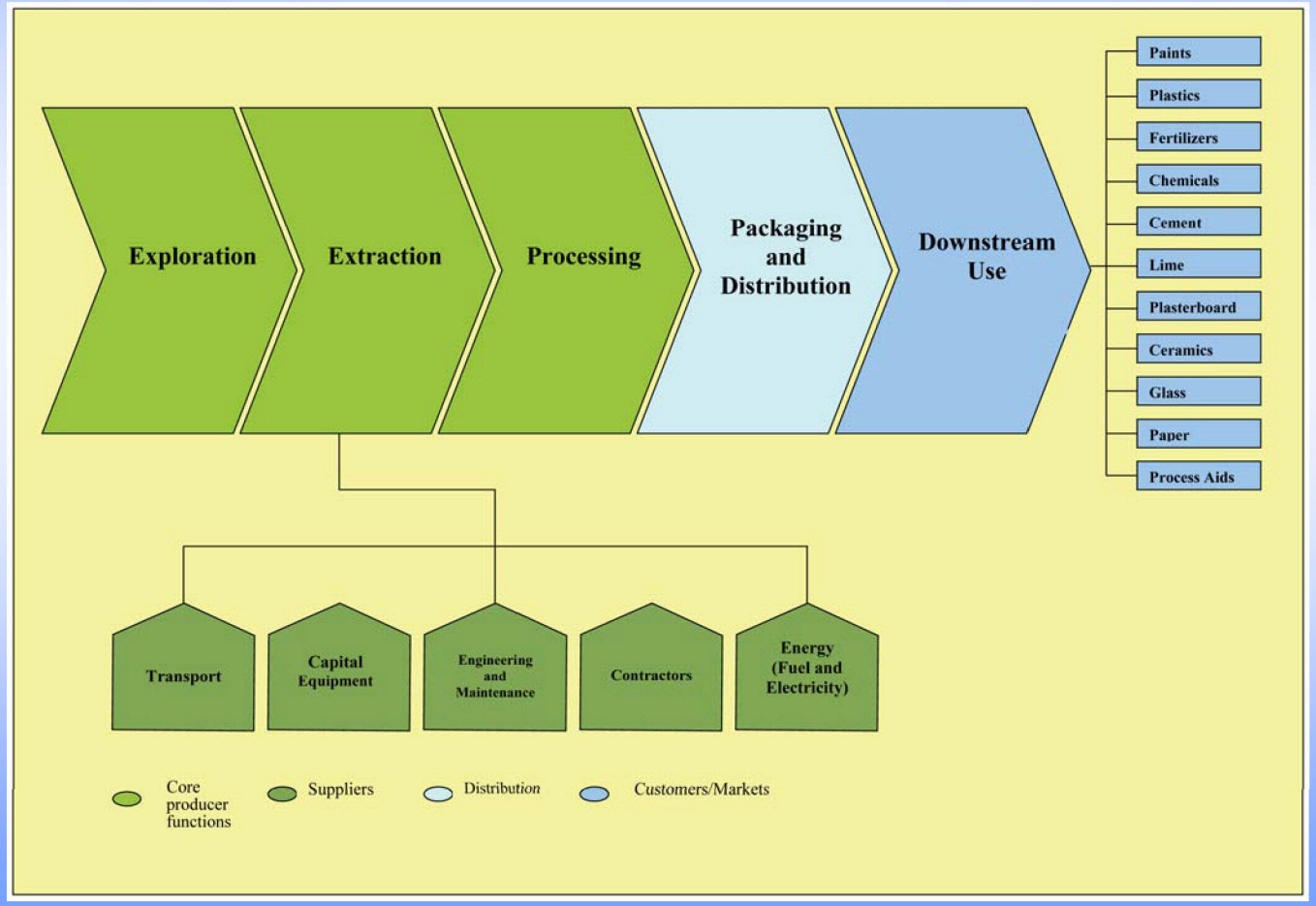
Primary Extraction

- Employment (py's)
  - Direct - 1,600
  - Spin-off - 1,750
  - Total - 3,350

- GDP ($'000,000)
  - Direct - $160.7
  - Spin-off - $109.6
  - Total - $270.3

In this analysis we have included all aspects of the industry shown below aside from the downstream uses.

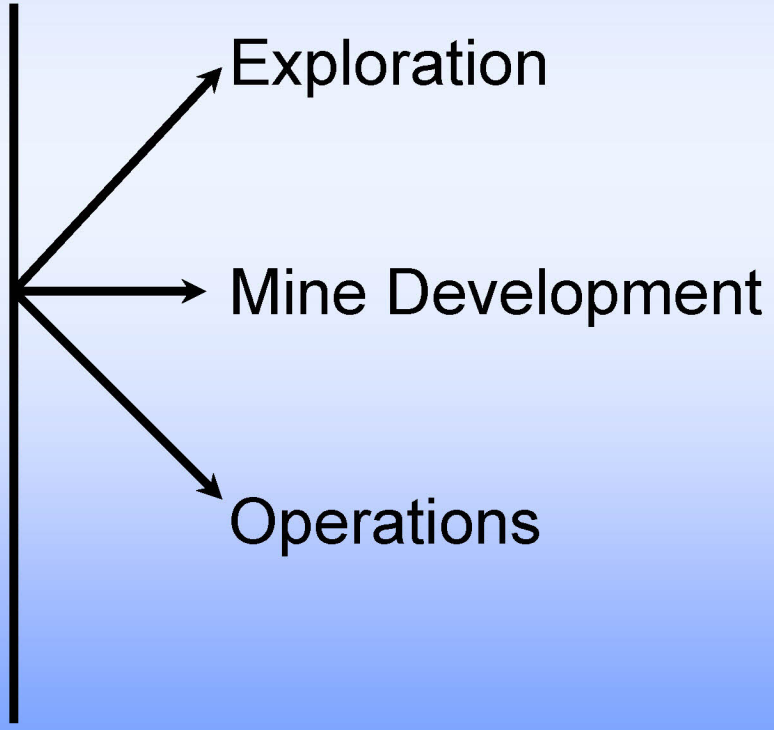


Services and goods supplied by the Nova Scotia economy to the Mineral Industry, these account for a significant share of the indirect economic impacts.

Services/goods to Industry

- Transportation
- Manufacturing
- Construction Services
- Business Services
- Wholesale and retail
- Government Services
- Financial Services
- Insurance Services
- Legal Services
- Communications
- Utilities
- Laboratory and testing services
- Accommodation/food services
- Technical Services
  - Engineering Design
  - Environmental Design
- Occupational Health and Safety
- Heavy Equipment Sales

Mineral Industry Activities



Indirect economic impacts (continued)

- The preceding breakdown is not exhaustive but rather illustrative.
- All phases of mineral production make use of these varied goods and services.
- Many are provided in their entirety by Nova Scotian firms.
- Transportation services are provided by trucking firms, rail lines and cargo vessels.
- Many of the specialized services come from engineering and other technical service companies, these are provided by highly qualified professionals.

Impacts associated with the processing of minerals into products:

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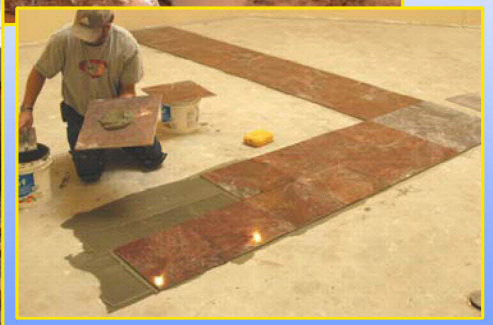

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Processing

- Employment (py's)
  - Direct - 1,475
  - Spin-off - 1,515
  - Total - 2,990
- GDP ($'000,000)
  - Direct - $122.7
  - Spin-off - $95.6
  - Total - $218.3

Mining Operations play an important role in the rural economy.

- At current production levels about 1,600 persons are employed on a fulltime basis. The majority of these jobs are located in the rural area.
- We estimate that the industry has a total payroll of about $96 million including wages and benefits.
- The primary industry also purchases a significant amount of other goods and services:
  - Fuel $42.0 million
  - Electricity - $9.6 million
  - Various goods/supplies - $29.3 million
  - Various services - $14.4 million
  - Municipal taxes - $1.9 million

A wide variety of processed mineral products are manufactured in Nova Scotia.

- Clay products
- Portland cement products
- Ready mix concrete
- Brick products
- Marble products
- Building stone and slate
- Gypsum wallboard
- Salt products

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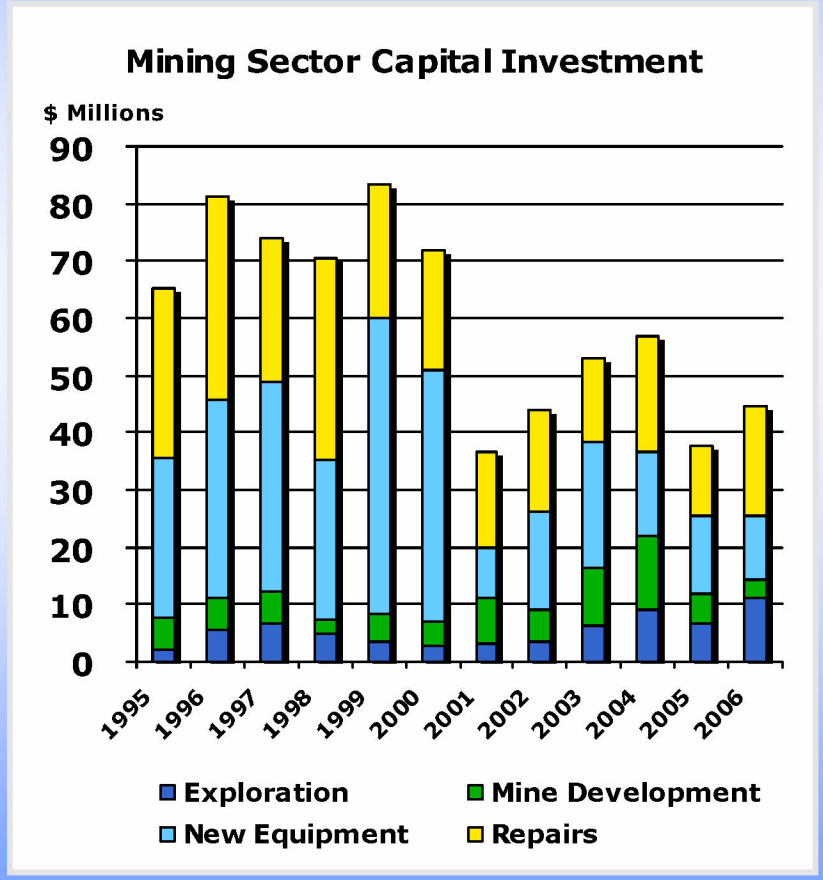
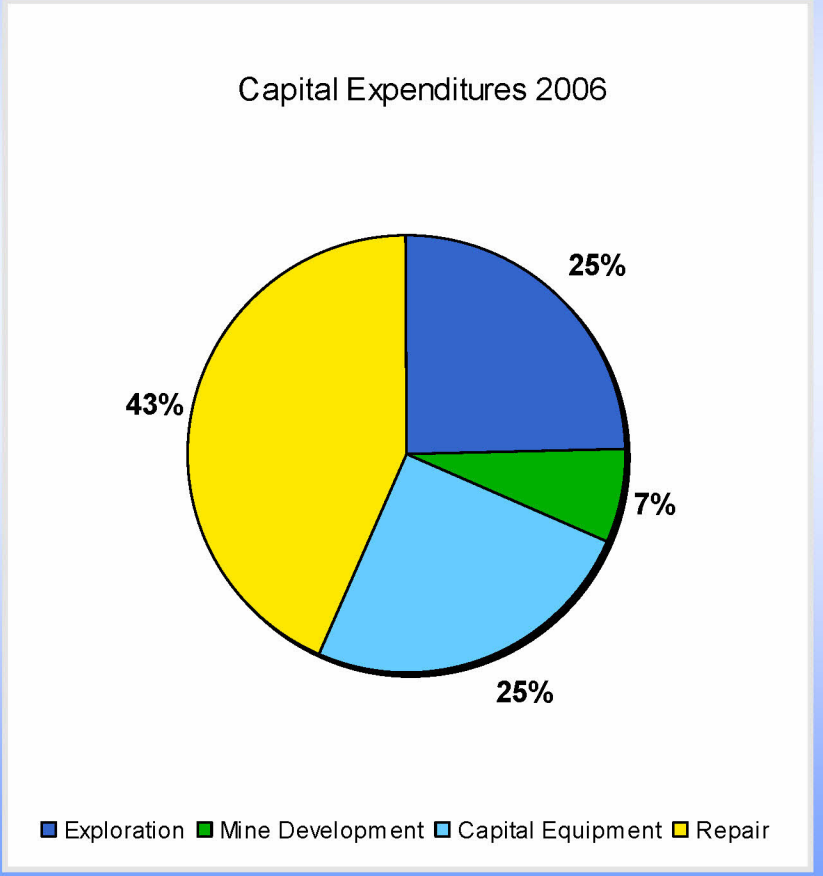
Each year the industry makes significant Capital Investment

- Over the past 10 years capital expenditures have ranged between $38 to $83 million.
- New equipment and repairs at existing establishments account for typically 70-80 % of all capital expenditures.

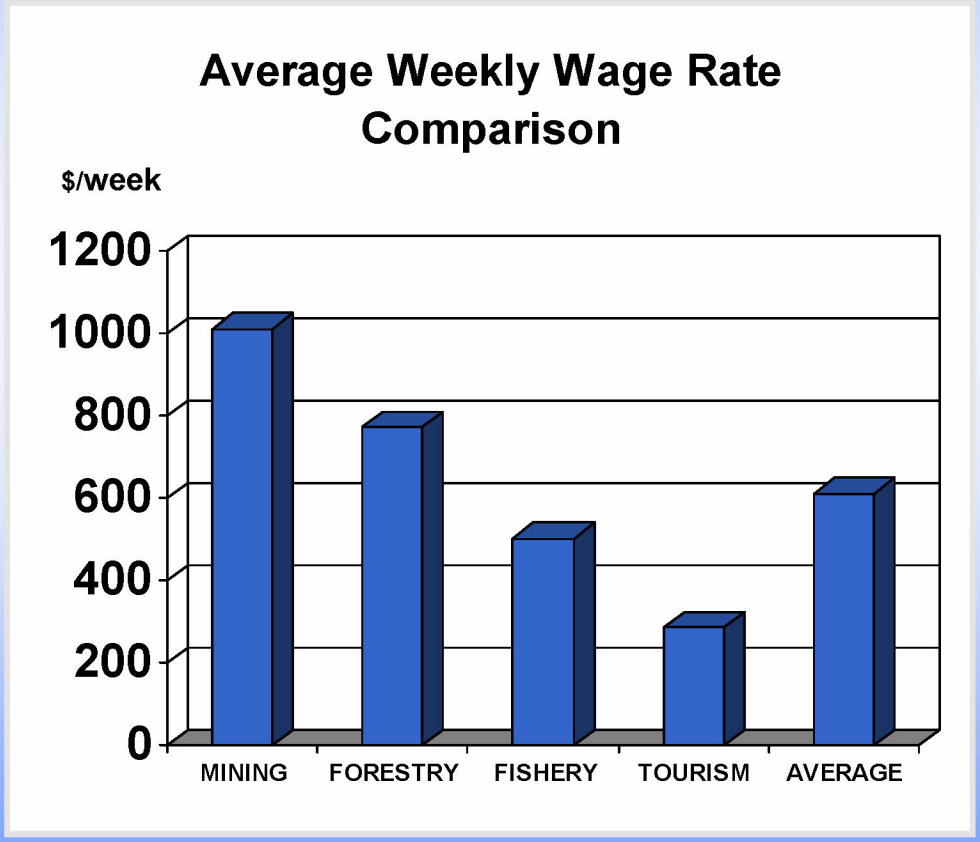


Capital Investment by the Mining Sector 2006

- In 2006 the mining sector invested in excess of $45 million in capital related expenditures.
- Repair and maintenance for operating mines accounted for 43% of investment.



The mining industry in Nova Scotia ranks “Number One” in terms of average weekly wages paid among the various resource sectors.

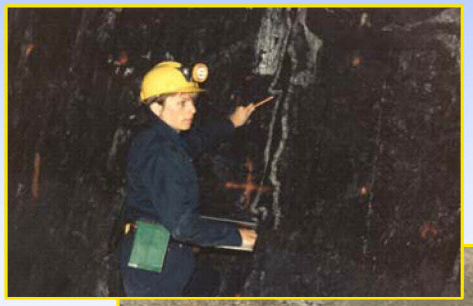


- Average wage in primary mining sector is over $1,000 per week.
- This is more than 40% higher than the average of all economic sectors.

Productivity has Improved by 28% over past twelve years.

- Industry productivity is a measure of efficiency. It can be defined as the ratio of the quantity of outputs over the quantity of inputs.
- According to national data the mining industry ranks among the top ten industries in the country in terms of productivity. Output has been increasing at the same time as employment has been decreasing.
- Productivity performance is used to determine if an industry can be considered dynamic.
- In examining the industrial minerals sector in Nova Scotia it is evident that its performance is consistent with national trends.
- In 1994 the average value of output in the industry was $142,000 per employee. By 2006 this average value had increased to $182,000 (adjusted for inflation).
- Over a 12 year period this represents an increase in productivity of 28%.
- The mining industry in this province is dynamic.

3.0 The Mining Sectors



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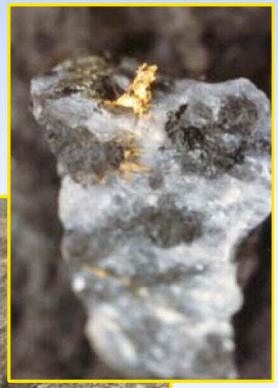

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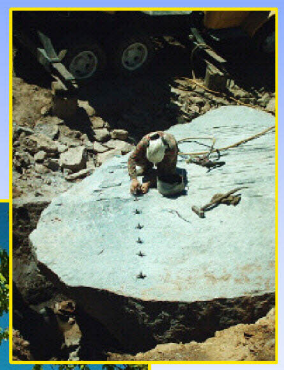

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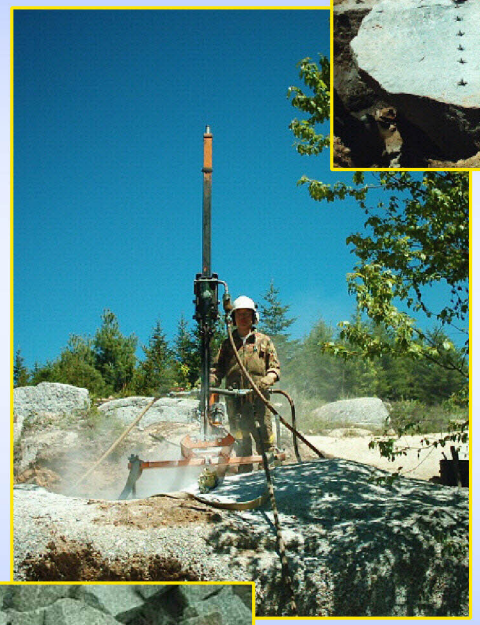

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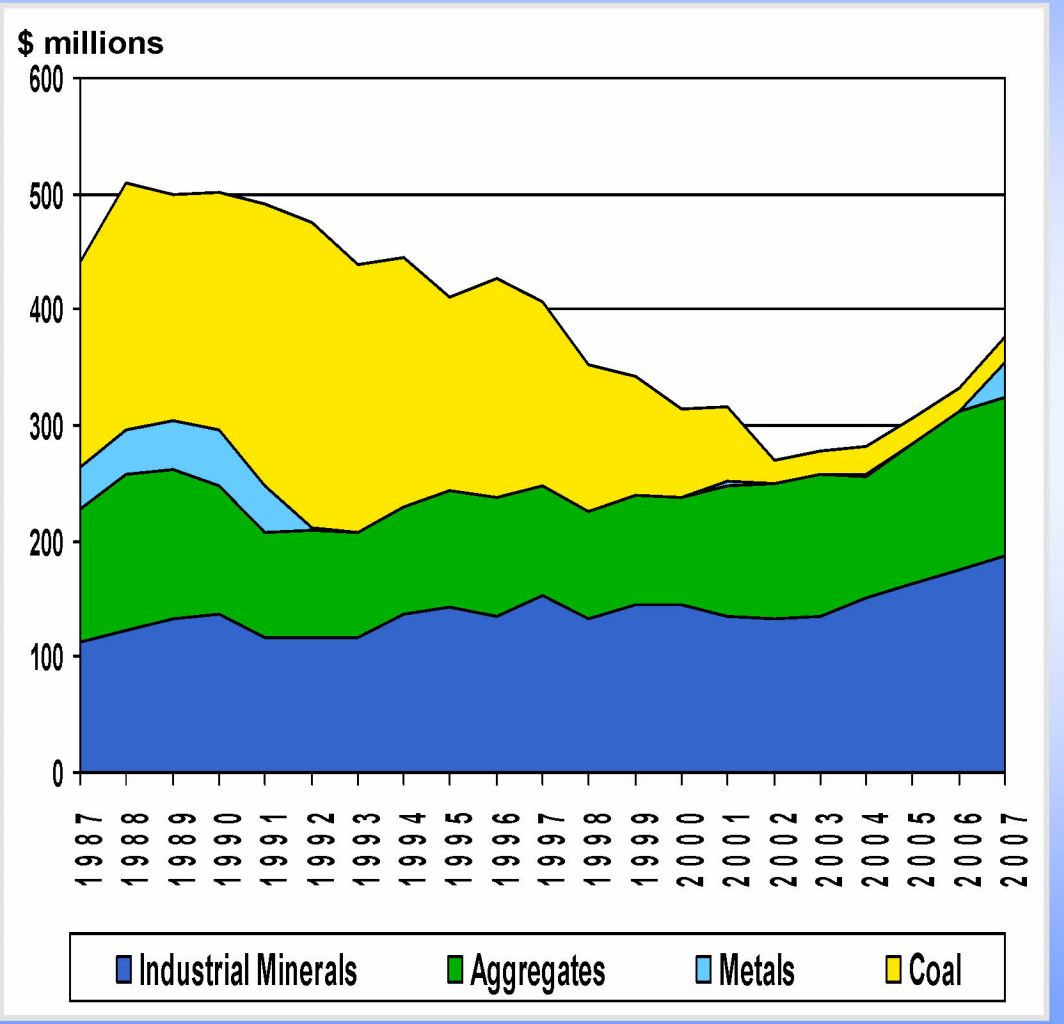
2006 Value of Primary Production
by Commodity
($,000)

Coal	$20,559	7.0%
Metals	$680	0.1%
Anhydrite	$2,038	0.7%
Gypsum	$108,525	37.2%
Limestone	$3,626	1.2%
Peat	$1,535	0.5%
Salt	$55,631	19.1%
Crushed Stone	$76,096	26.1%
Sand and Gravel	$10,800	3.7%
Other (includes: clay, barite, silica sand, dimension stone and limestone for cement)	$12,256	4.2%
Total Mineral Production	$291,746	100%

Value of Production 1987-2007 shows steady performance of Industrial Minerals and Aggregates

- Value of production fell from $410 million in 1995 to $377(1) million in 2007.
- Drop in coal production accounted for decline.
- Metal production has recently resumed in the province.
- Over the period 1995-2007 the value of industrial mineral production (including aggregates) has been steady with an increase in the past few years.



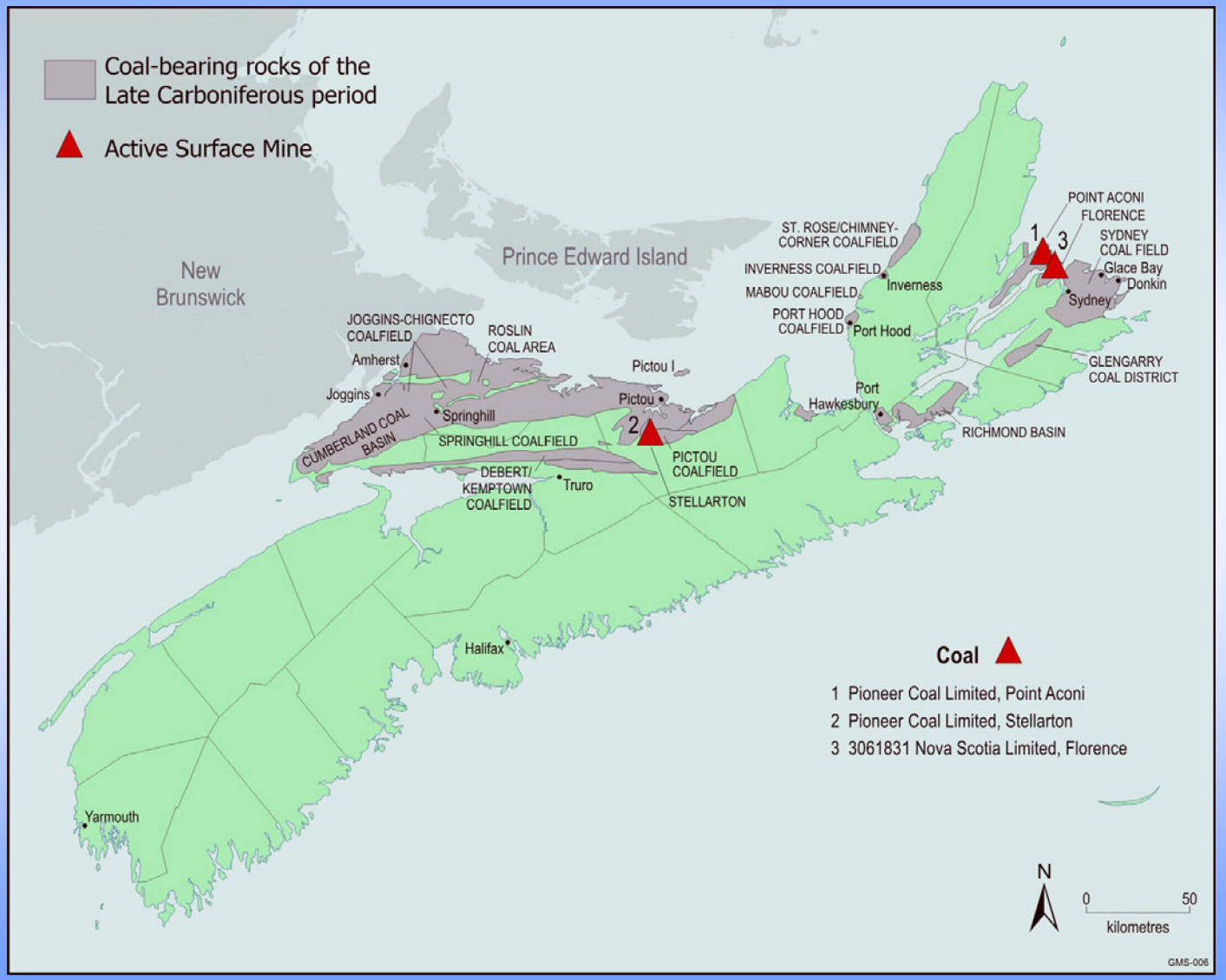
Note: 1. DNR includes some secondary production values in their annual estimate of overall value of mineral production. 2007 values are estimated.

The Department of Natural Resources collects revenues related to both exploration and mineral production activity.

In 2006 total revenue collected was $2.4 million.

Exploration	Number	Claims	Hectares	**Revenue**
New Licences	521	19,372	313,578	$96,860
Renewals	338	5,847	94,651	$135,135
Forfeits				$28,600
Other Revenue				
Mineral Lease Rentals				$79,109
Royalties				$654,268
Taxes on non-mineral production				$1,425,108
Total Direct Revenue				$2,419,080

Coal resources are found in both Cape Breton and Northern Nova Scotia



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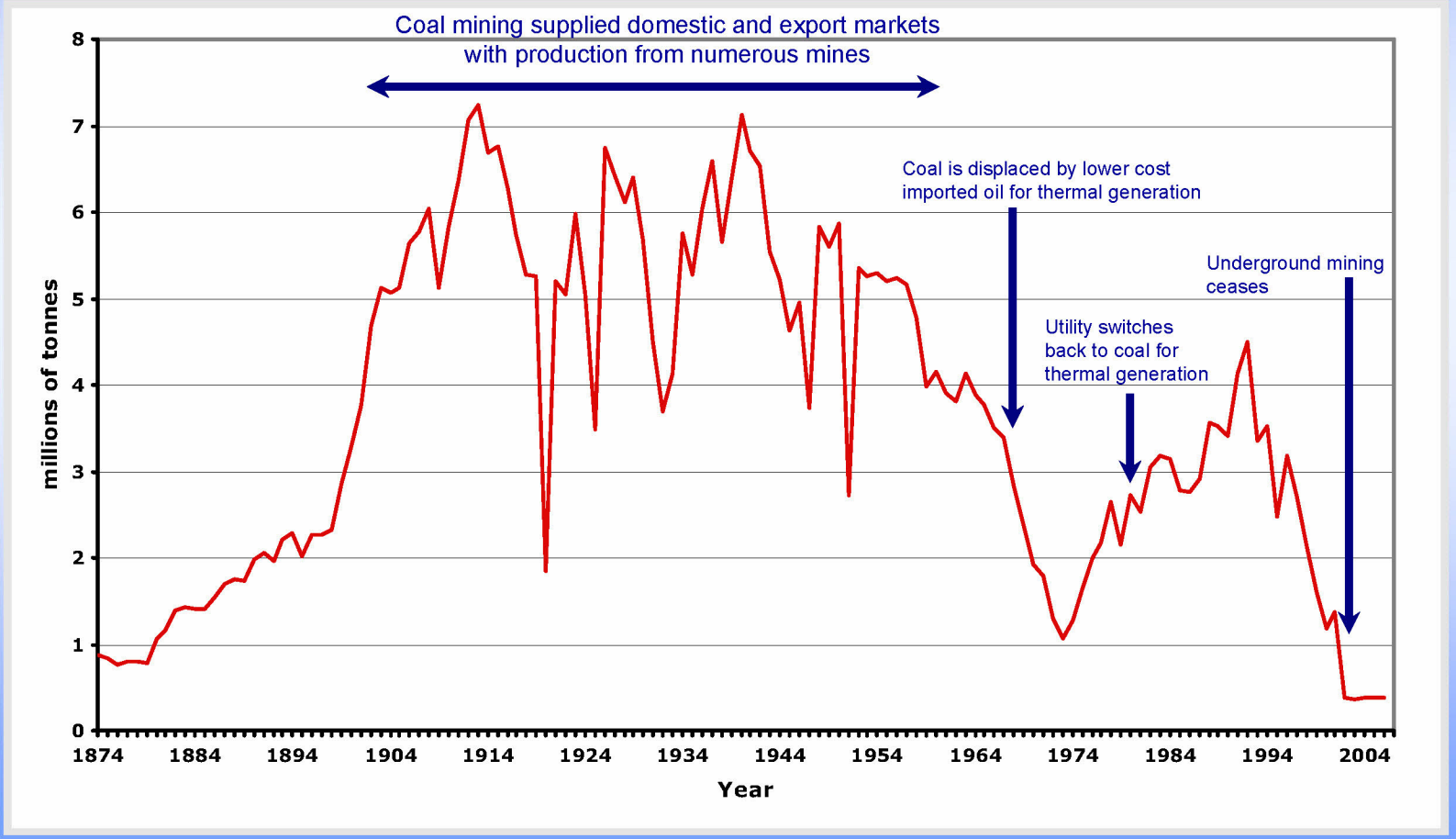
Nova Scotia Coal Production 1874 - 2006

Coal industry has played major role in economy over this period. Production has varied due to changing market requirements and depletion of resources.



Coal Comment

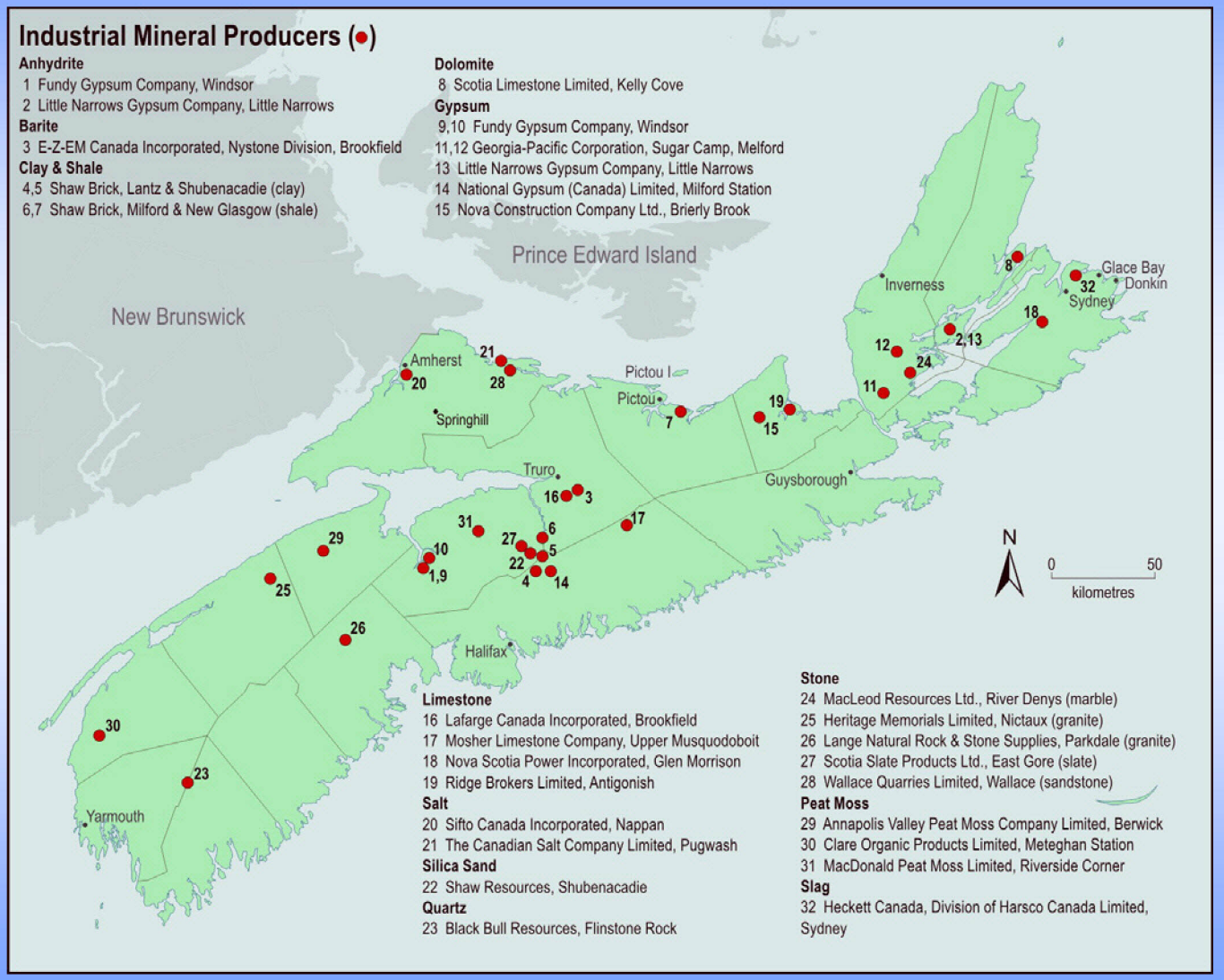
- Coal prices have more than doubled in the past number of years. Interest in coal projects has increased as a result.
- The development of new mines would reverse the recent trend of a declining contribution by the coal sector.
- Existing surface coal operations will produce in the range of 250,000 - 500,000 tonnes per year.
- Provincial thermal power generation consumes in the order of 2 million tonnes of coal per year which is now mostly imported.
- Donkin Submarine Coal Resource Block - annual underground production potential of 3 to 4 million tonnes per year. Feasibility study and development decision expected in 2008.

Donkin Project Summary

27.

- Consortium of companies currently conducting a detailed feasibility study of existing mine infrastructure and coal resources.
- Existing tunnels de-watered and underground resource evaluation and feasibility studies are ongoing.
- Potential to produce 3 – 4 million tonnes of coal per year with a value of several hundred million dollars for several decades.
- Approximately 200 people could be employed full time. Initial capital investment >$200 million expected if mine is constructed.

Industrial Minerals



Gypsum Production 1872 – 2006

A mainstay of the industry with almost continuous growth

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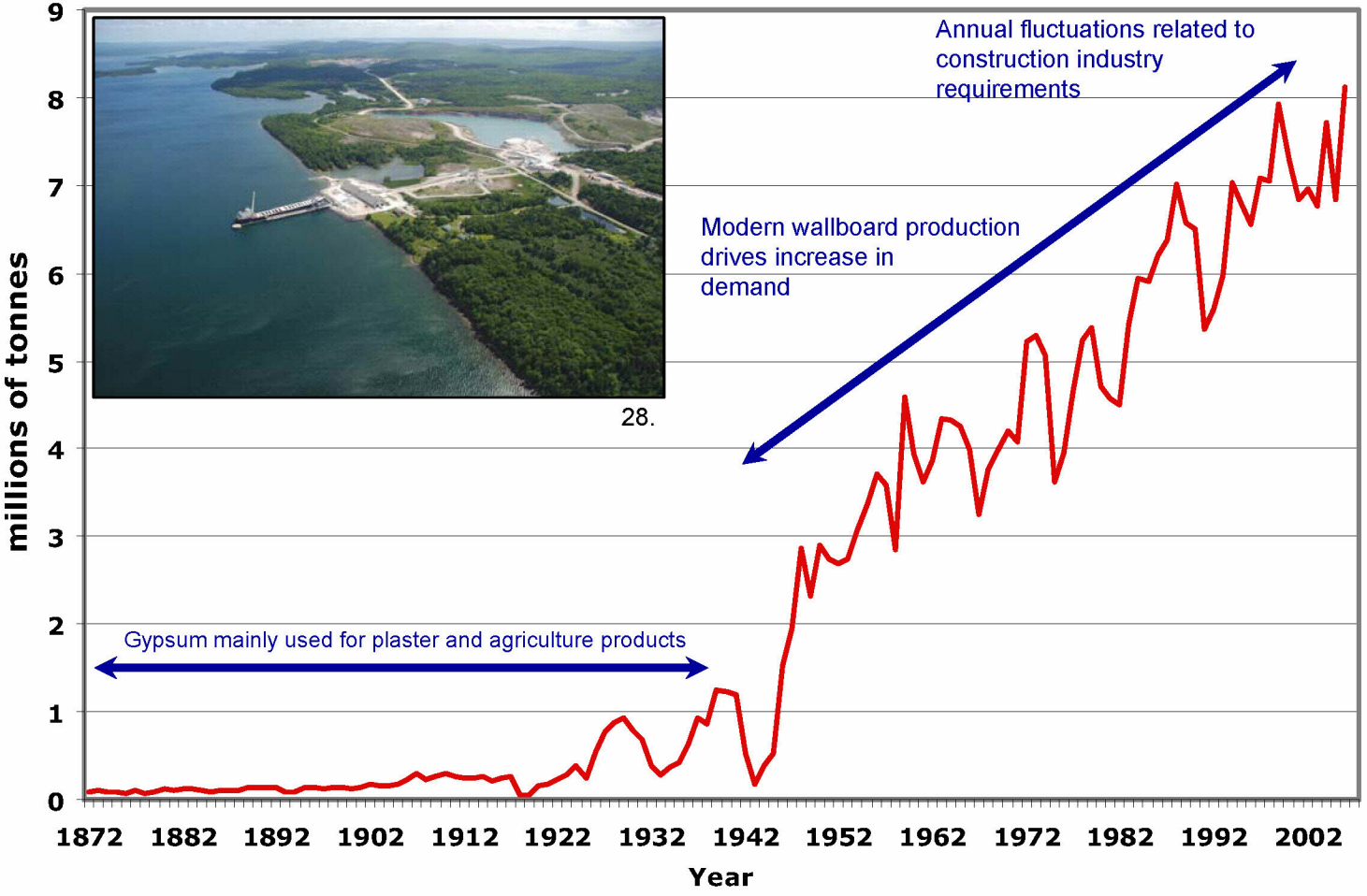
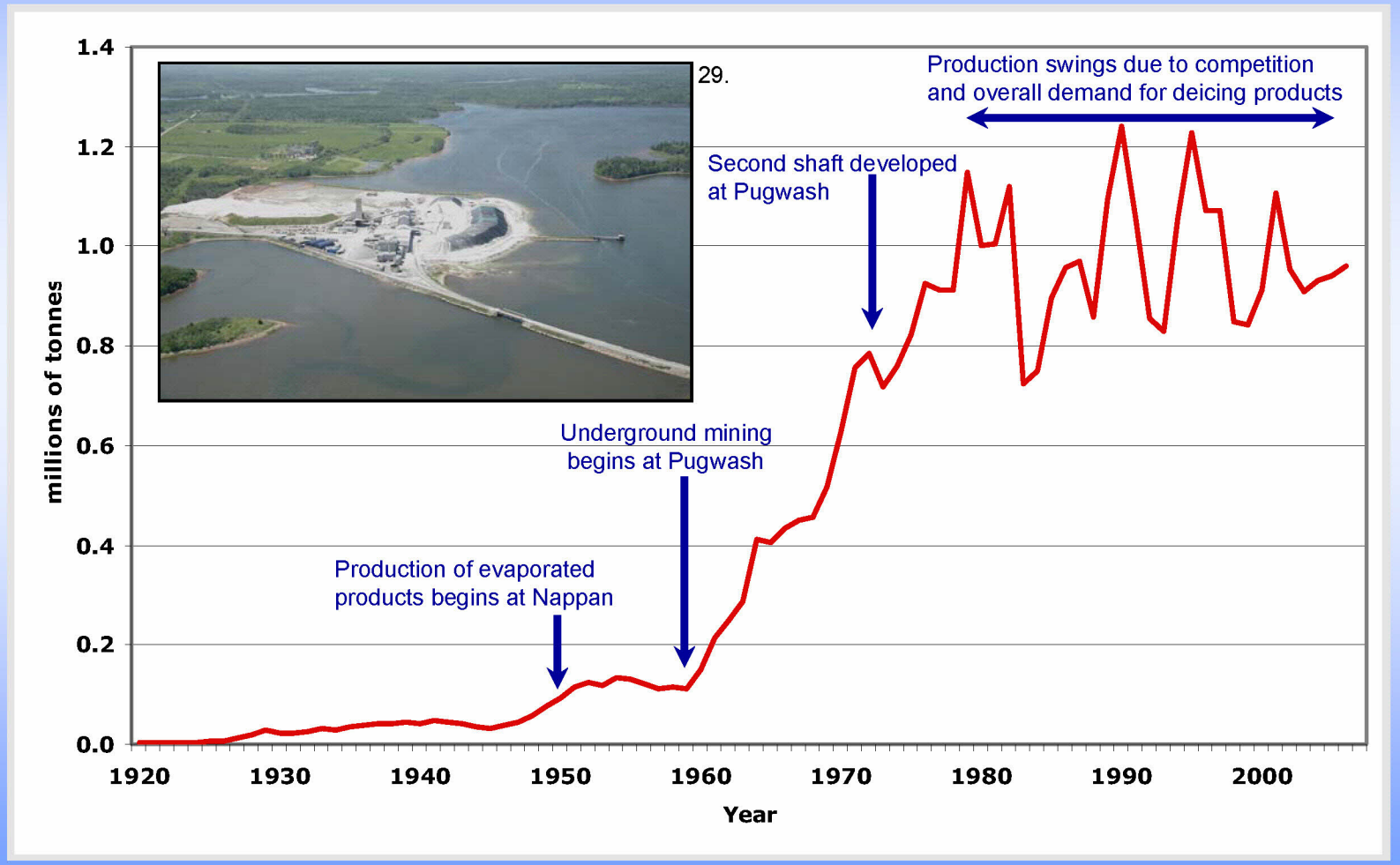
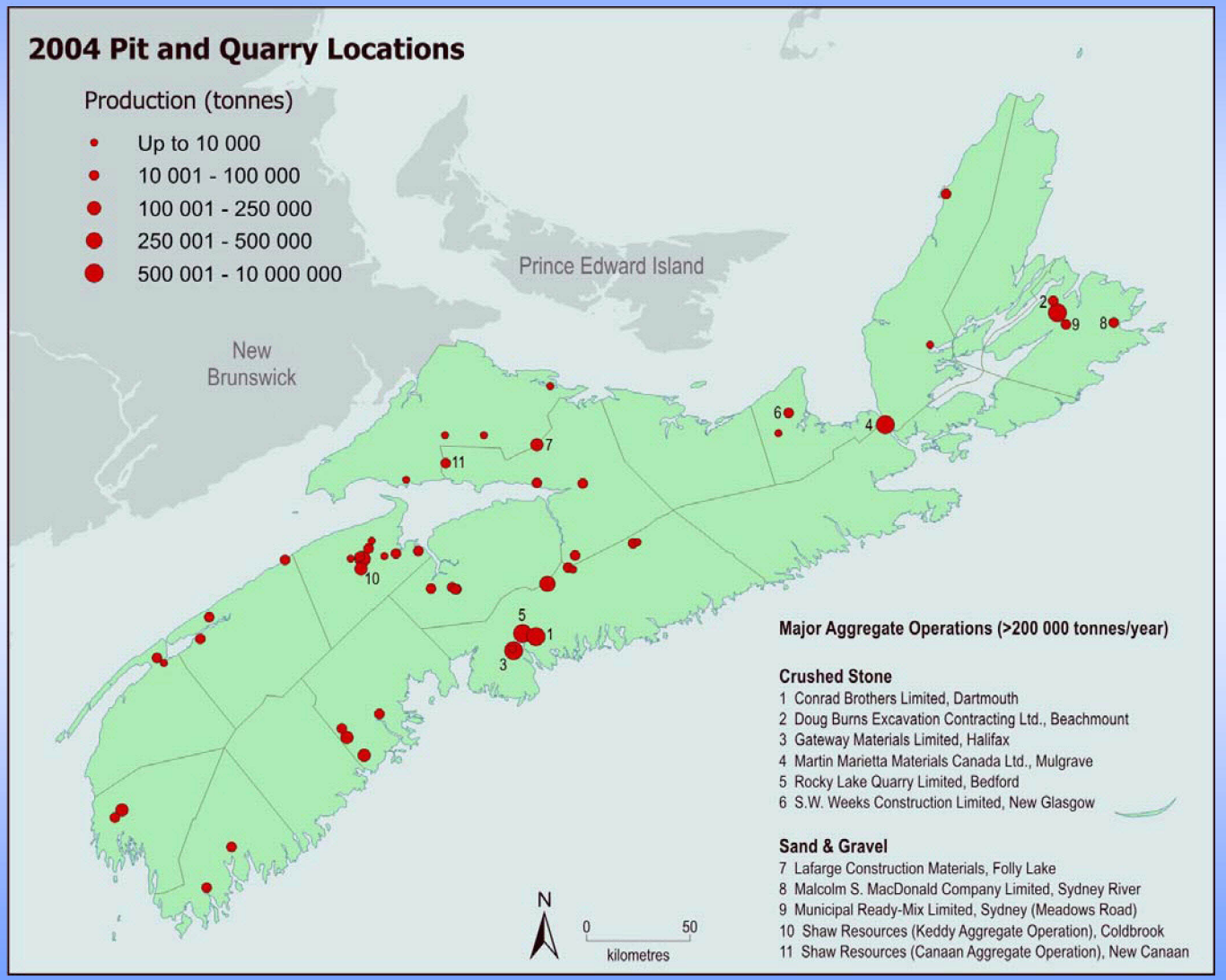


Salt Production 1920-2006

Has followed a similar trend to gypsum



Aggregate Pit & Quarry Locations
Locations dictated by markets and geology



Construction Aggregate Production 1925 - 2006

Has also followed a consistent upward trend

30.

Introduction of modern highway construction standards, the increased urbanization of Halifax Regional Municipality, and a developing export market has led to the increased production of aggregates

millions of tonnes

14
12
10
8
6
4
2
0

1925 1935 1945 1955 1965 1975 1985 1995 2005

Year

C1033-033

Metal Mining

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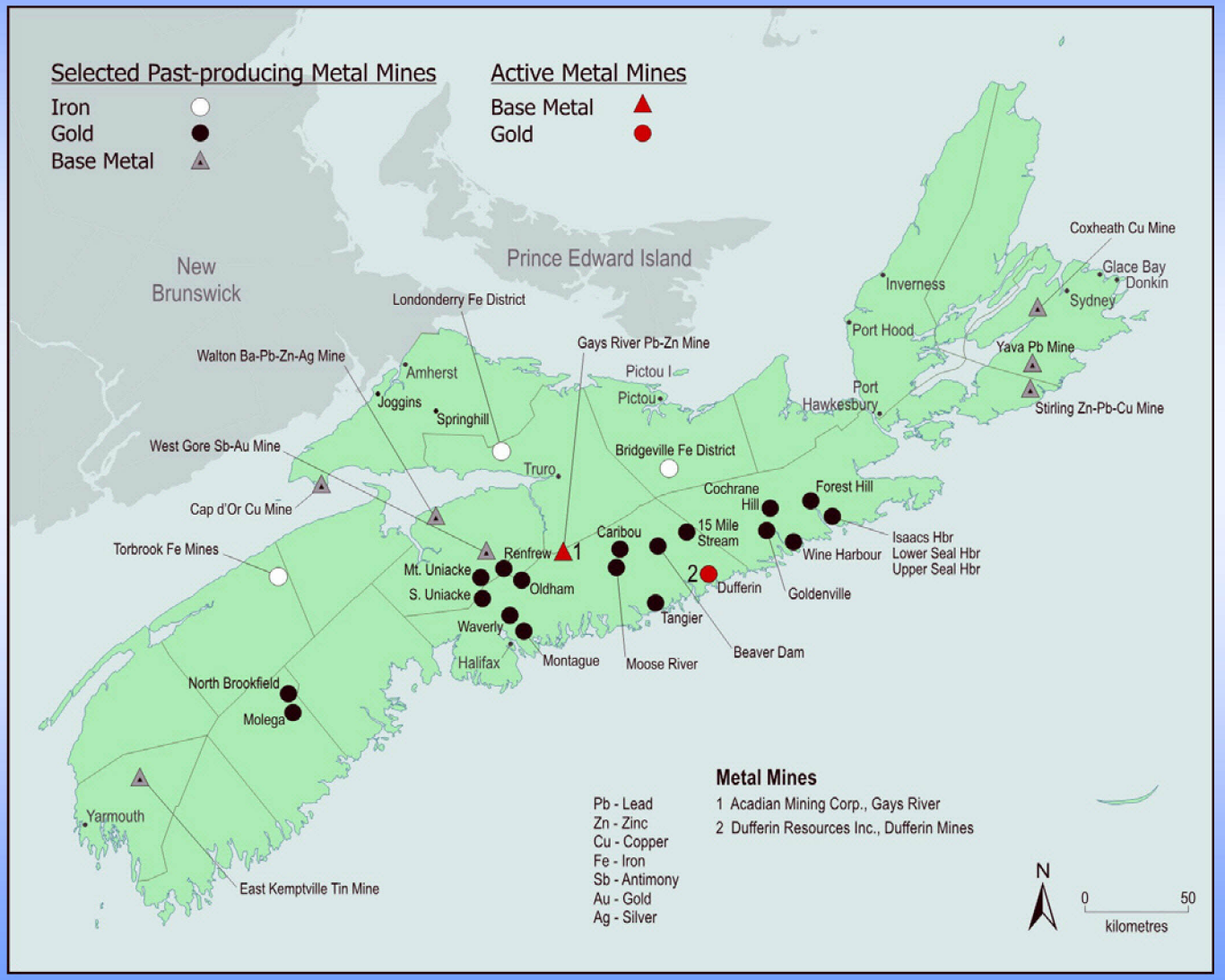
Metal Production Locations



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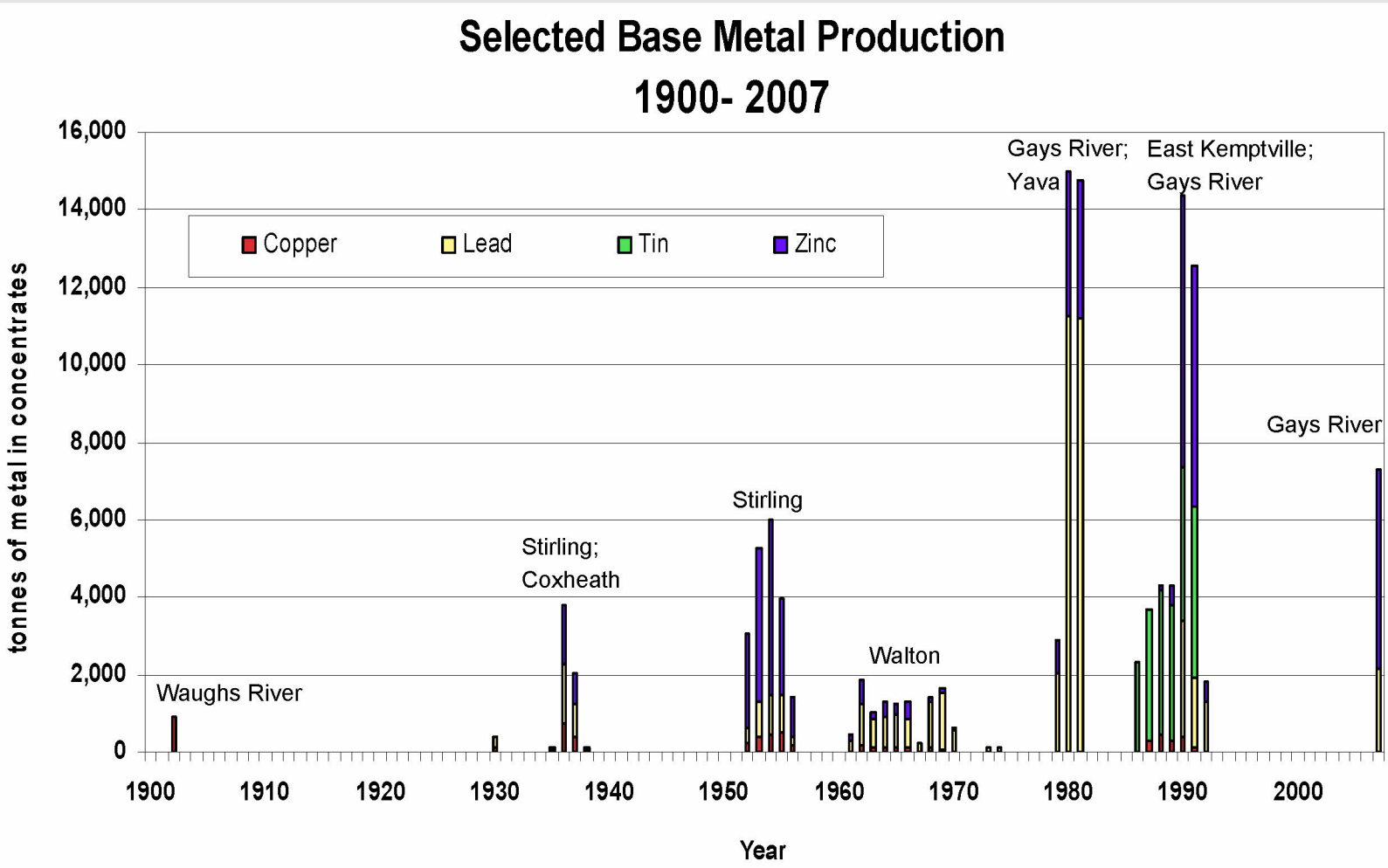
Base metals have been produced intermittently as deposits are located, mined and depleted



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Base Metals Comment

- Non-precious base metals have been produced in the province for over a century.
- Metals produced in significant quantities include iron, copper, zinc, lead, tin and antimony. Other metals have also been recovered throughout the province.
- Recent increases in metal commodity prices have resulted in more metal mineral exploration and the start up of a lead-zinc mining operation in Halifax County.
- These developments will improve the contribution of this sector.

Scotia Mine Project

36.

- The Scotia Mine was successfully brought into production in early May, 2007, ten months after acquisition. Initial investment requirement is approximately $20 million.
- Increased zinc and lead metal prices resulted in a decision to restart the mine and mill.
- Using a combination of surface and proposed underground mining methods the overall mine life is expected to be about eight years. Additional resource evaluations may extend the mine life by seven years.
- Approximately 112 people are employed full time at the mine and mill.

Gold Mining

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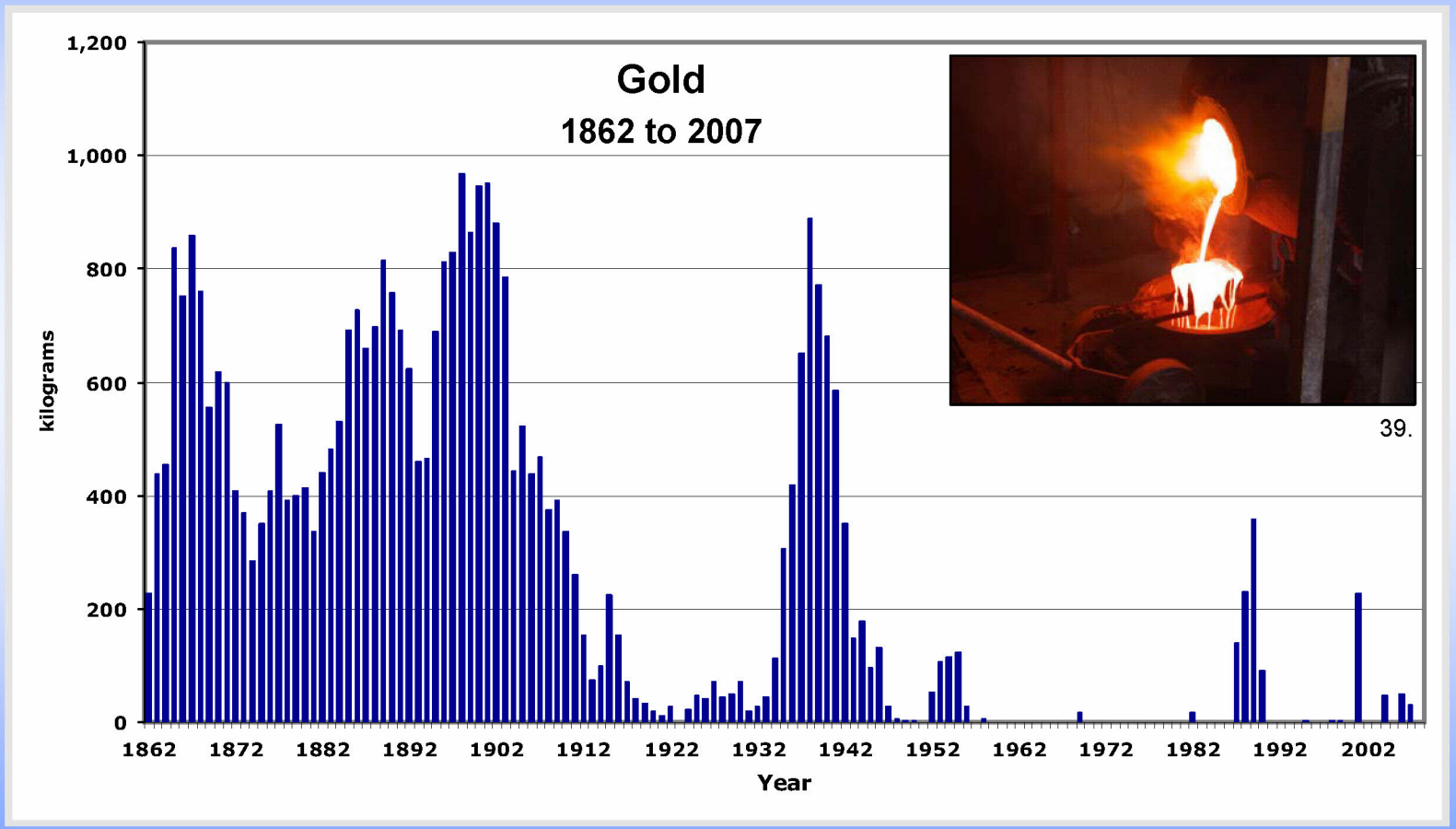
Nova Scotia has a long tradition of gold production.



Moose River Gold Project

- The Touquoy project incorporates a gold treatment plant with a 1.5 million tonne per annum throughput and a seven year mine life to produce approximately 90,000 ounces of gold per year.
- Project focused on lower grade, large tonnage mineralization.
- Capital investment of more than $80 million expected.
- 400 will be employed during a 12 month construction and development phase and a workforce of 170 persons will be required during the production phase.
- Project has been approved through the Environmental Assessment Process (Feb. 2008).

4.0 Exploration

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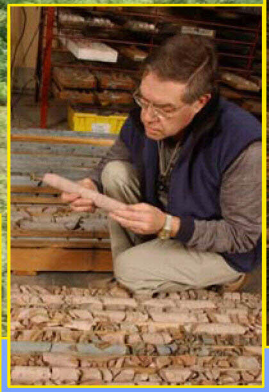

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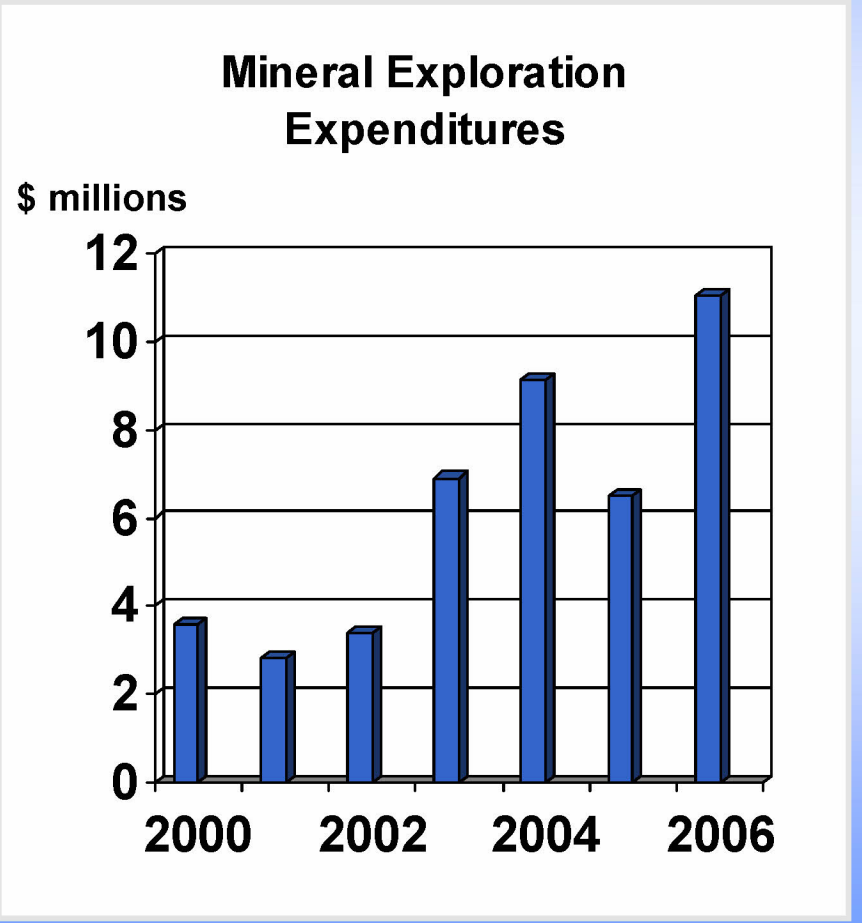
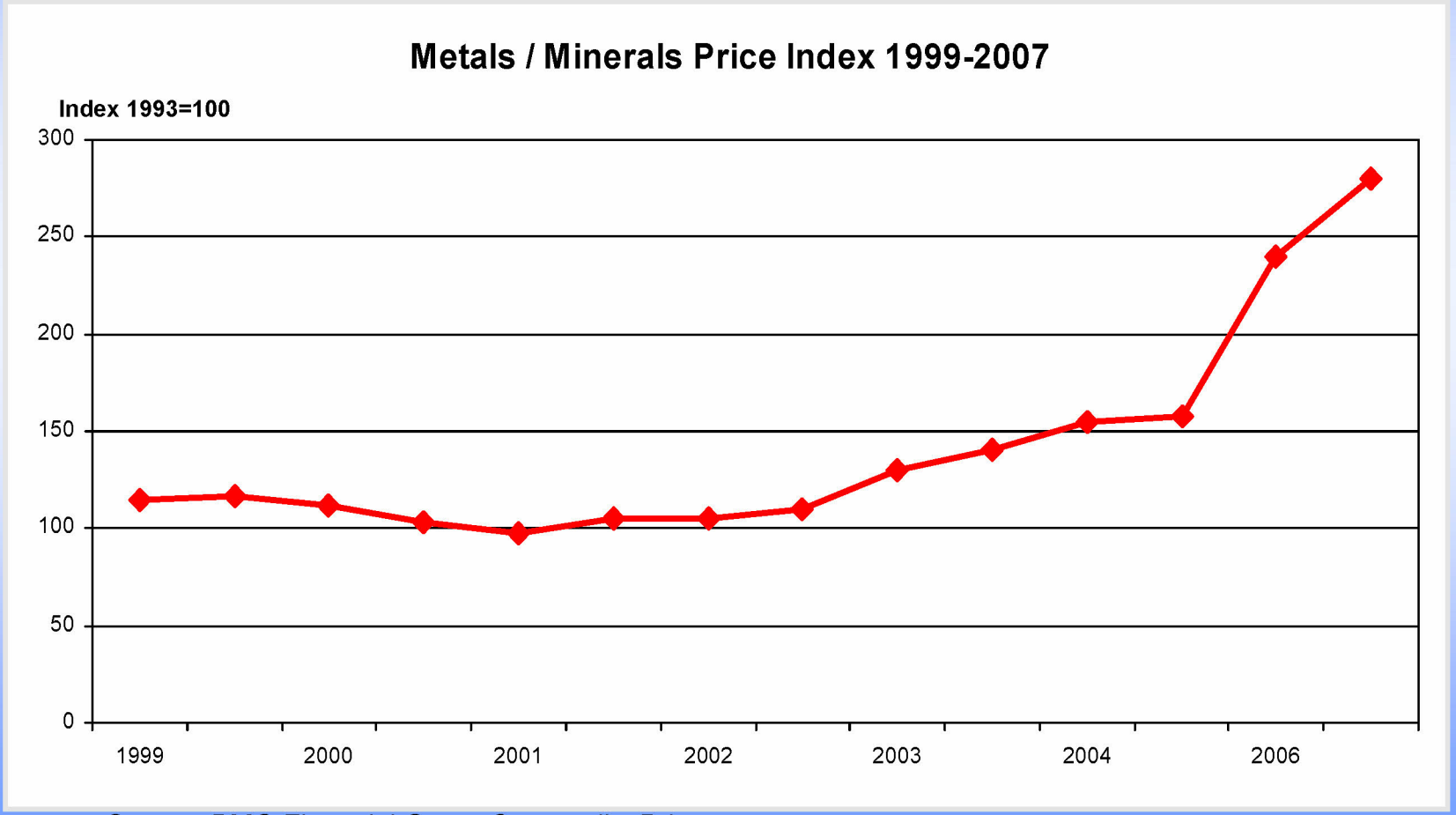
Increasing prices for gold and other metals has been the prime motivator behind recent increases in exploration activity in the province.

- Expenditures related to exploration are on the increase.
- Exploration expenditures are important to specialized technical service providers whose skills are required to evaluate feasibility, these account for one third of overall exploration expenditures.
- Much of the other expenditure related to exploration takes place in local communities.



Rise in metal prices is credited with rise in exploration activity

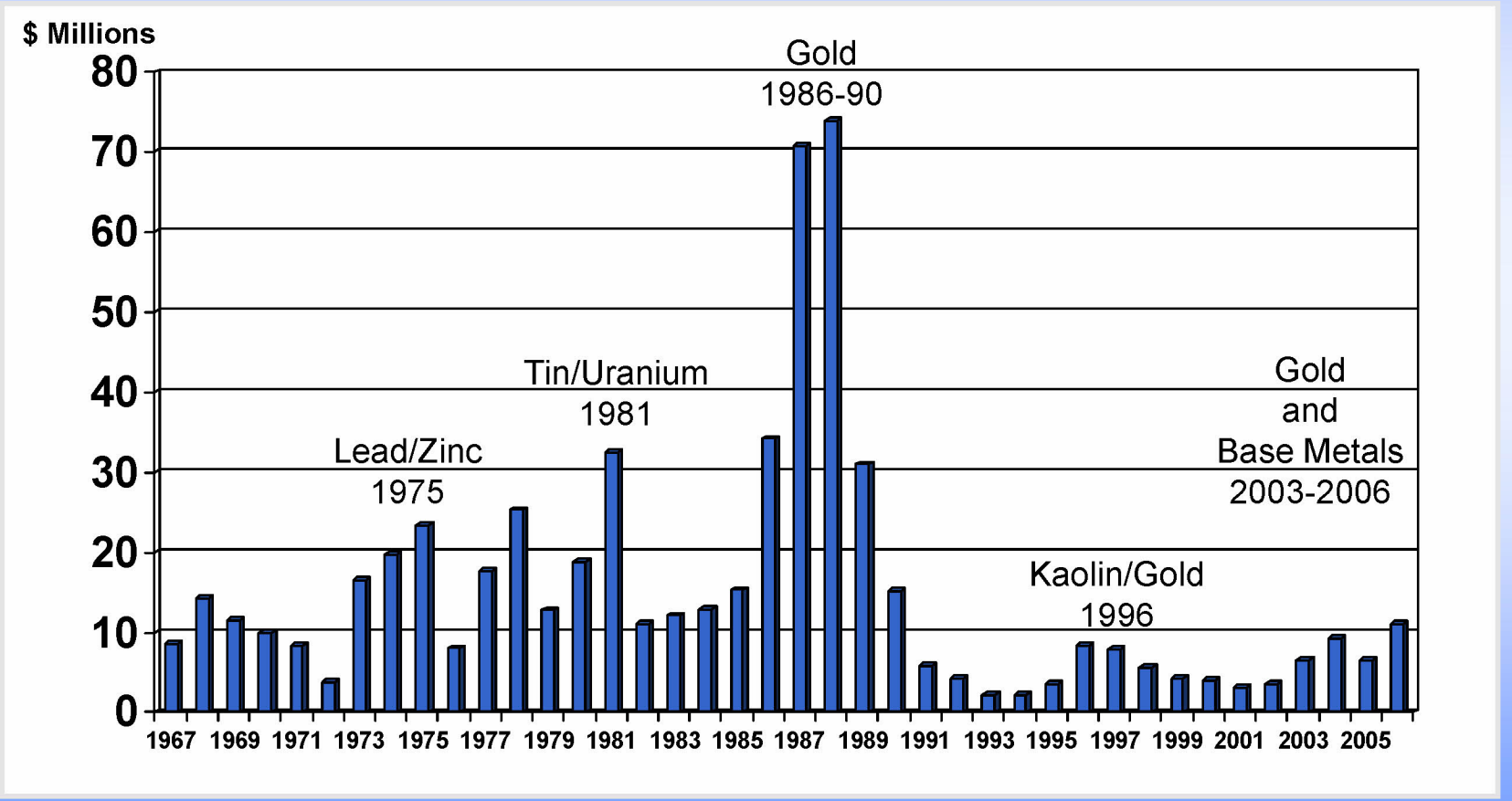
Up 200% between 2001 and 2007.



Source: BMO Financial Group Commodity Price

Exploration Expenditures

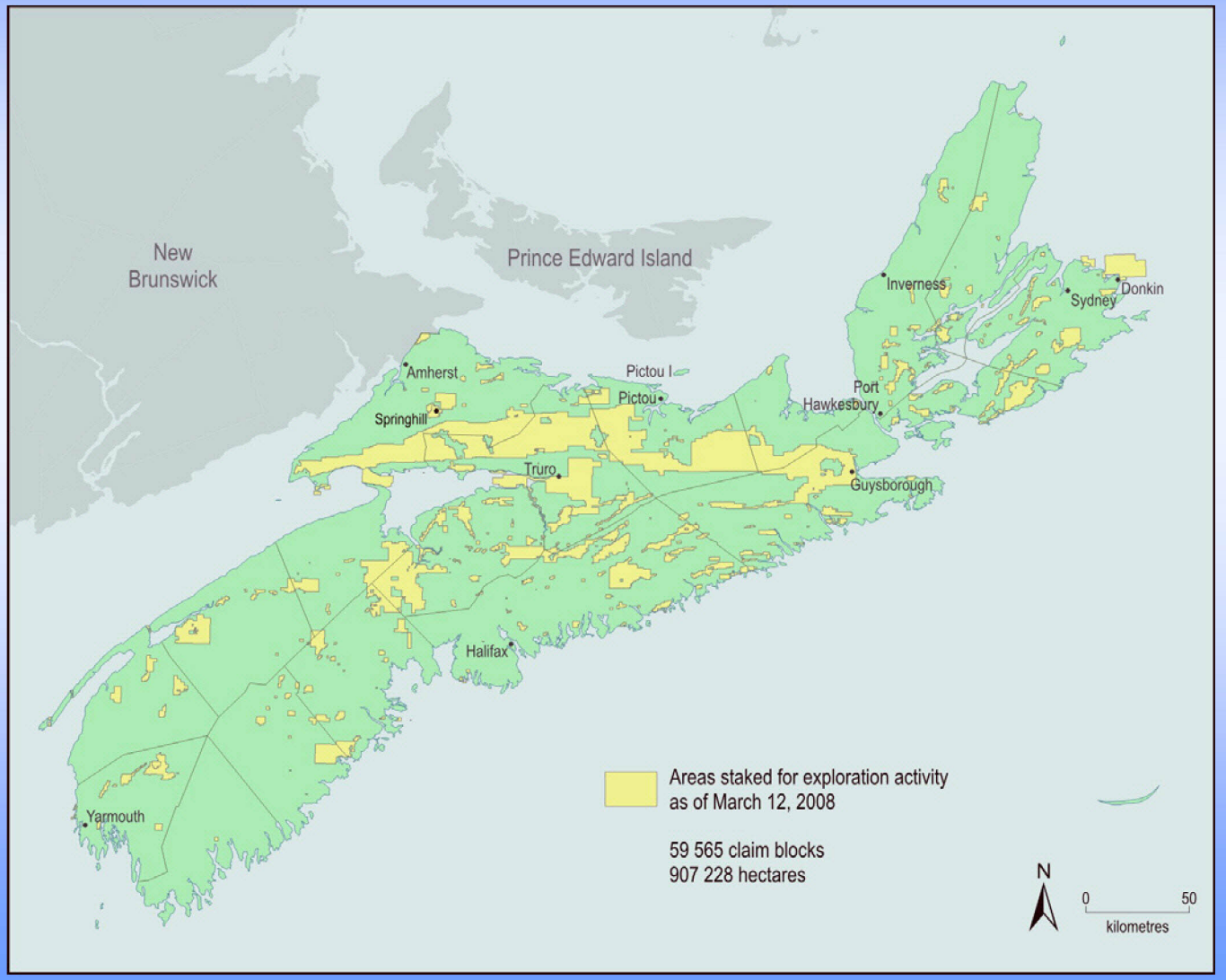
1967 - 2006 with Major Commodity Targets



Note: Adjusted for 2005 dollars

Exploration Staking Map

Areas of current interest



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Government Support for Exploration

- A 15% non-refundable tax credit is available through the federal government. The Investment Tax Credit for Exploration (ITCE) introduced in 2000 and has been extended a number of times, most recently till 2009.
- In the Atlantic Region both New Brunswick and Newfoundland provide financial incentive support to junior exploration companies and Prospectors Assistance.
- Nova Scotia does not currently offer similar programs as New Brunswick and Newfoundland although it did offer a Prospectors Assistance Program up until 2002.
- Quebec offers several tax incentives that significantly reduce the net cost of exploration. They also offer an enhanced Flow Through Share Program.
- Ontario also encourages mineral exploration by harmonizing their tax credits with the ITCE.
- Western Canadian provinces also offer a mix of exploration, tax incentive and prospector assistance programs. British Columbia has also streamlined regulations by an estimated 30%.

Government's Supporting Role during Mineral Exploration

- Discussions with industry revealed that the Department of Natural Resources geoscience and mapping services are of significance in supporting exploration activity in the province. The proportional land area (as a % of total provincial land mass) covered by these services is the most comprehensive in the country.

- The availability of a comprehensive provincial data-set is credited as part of the explanation as to why there is twice the national average spent on exploration per unit of land mass in the province.

Industry view of Nova Scotia's attractiveness for exploration has its strong and weak points.

- Fraser Institute surveys mining and exploration firms on an annual basis. They then rank provinces by various categories.
- In terms of overall policy attractiveness Nova Scotia ranked 7th best out of all provinces and territories.
- It also ranked strongly in terms of infrastructure to support the industry (roads, power and ports).
- Native land claims were not a major concern compared to other provinces.
- Nova Scotia did rank quite low in terms of overall mineral potential which, in part, is explained by fact many respondents come from the metals side of the industry.
- Land access and uncertainty related to provincial protected areas was also an area of concern.
- The province did not rank well on geological databases and ease of access to information. This assessment was anomalous given our direct discussions with active industry participants who saw this type of service as high quality. Again the metal industry impressions could, in part, explain the outcome.

5.0 Reclamation

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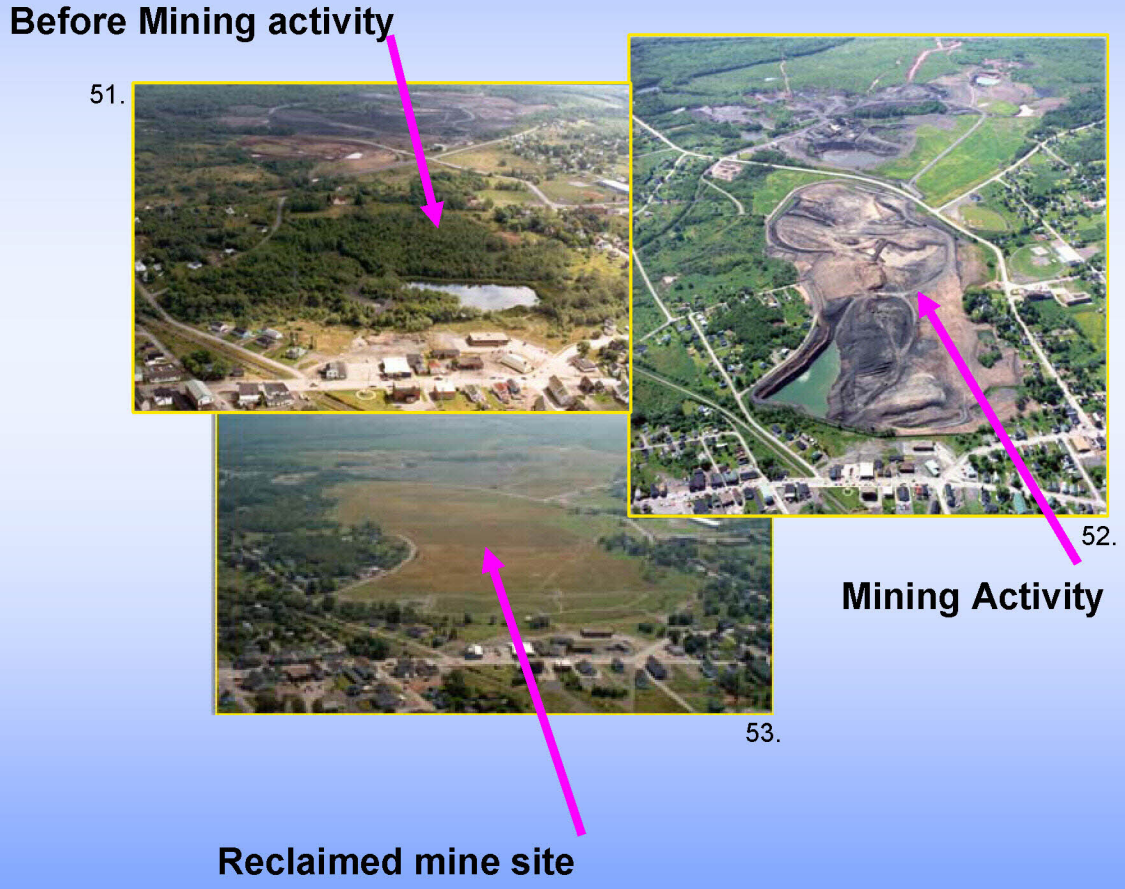
Economic Benefits Associated with Reclamation of Mines and Quarries

- In modern society, mines are developed with the intention that upon completion the site will be put to an alternative use.
- Many sites in North America are restored for innovative recreational purposes that provide many tangible and intangible benefits to communities.
- Other common sequential land-uses include wildlife habitat, forestry, farming, residential and/or industrial developments.
- Maximum benefits are derived when communities participate in the development of reclamation plans that compliment community core values and needs.
- Numerous examples exist both locally and in other jurisdictions, where the benefits of reclaimed mined lands are documented.

Reclamation of mine sites is required in Nova Scotia. This activity can create economic and commercial development opportunities.



- Reclamation identified as an integral component of mining.
- The former Westville open pit coal operation now provides a land base suitable for recreational or light commercial use.
- 10 acres of parkland has been created and donated to the community.

Benefits of Recreational Activities

- Benefits of active recreation
  (require facilities)
  - Increased investment
  - Improved community health
  - Higher quality of life
  - Community revitalization
  - Local economic growth
  - Increased property values
  - Tourism opportunities

- Benefits of passive recreation
  (no facilities but can include parks/trails etc.)
  - Natural resource protection
  - Restored ecosystem services
  - Restored animal and plant habitat
  - Local economic development
  - Tourism opportunities

The Stellarton open pit coal operation has developed landforms for municipal recreation and infrastructure uses such as the water tower and sports field shown below.

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C1033-054

"Natural capital - our raw materials like water, air, plants, animals, land and minerals - contributes to the appeal of our communities and fuels our economy. It makes perfect sense to use these resources wisely."

-Opportunities for Sustainable Prosperity 2006: An Updated Economic Growth Strategy for Nova Scotia

Photograph Index:

1. Gypsum Quarry - National Gypsum (Canada) Limited (Milford, Halifax County) - Worlds largest known gypsum producer
2. Construction Aggregates - Conrad Brothers Limited (Dartmouth, Halifax County)
3. Bricks and mortar locally produced - Shaw Brick (Lantz, Halifax County) and Lafarge Canada Inc. (Brookfield, Colchester County)
4. Quartz products - Black Bull Resources (Rushmere Lake, Shelburne Co.)
5. Slate Flagstone Patio - Scotia Slate Products (Kennetcook, Hants County)
6. Metal concentrates transportation - Acadian Mining Corporation (Gays River, Halifax County)
7. Crushed quartz stockpile - Black Bull Resources (Rushmere Lake, Shelburne County)
8. Quartz Mine - Black Bull Resources (Rushmere Lake, Shelburne County)
9. Gypsum wallboard plant - Federal Gypsum Co. (Port Hawkesbury, Richmond County)
10. First shipment of metal concentrates - Acadian Mining Corporation (Gays River, Halifax County)
11. Baled peat products - Clare Organic Products Ltd (Meteghan, Digby County)
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