Mineral Production in 2022 and Exploration in 2023



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Cover photo

Lafarge Canada Inc.'s limestone operation, Pleasant Valley, Colchester County. For more information, please see p. 13.

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Nova Scotia Department of Natural Resources and Renewables

Honourable Tory Rushton Minister

Karen M. Gatien Deputy Minister

Message from the Director of Mineral Management

This report on mineral production and exploration highlights recent activities of the exploration and mining industry in Nova Scotia. The report includes exploration statistics for 2023 and mineral production information for 2022. The report also includes a summary of reclamation activities completed in 2022 and reclamation security amounts held over the past number of years, up to 2023. New to the report this year is a summary of the important work performed to reduce the risk associated abandoned mine openings in the province. The information was developed in cooperation with industry, and the data were provided by each of the companies surveyed. I would like to thank Nova Scotia's exploration and mining industry for its cooperation in the preparation of this report.

As a part of the highly competitive, global environment for mineral investment dollars, Nova Scotia is attuned to the challenges faced by the mining industry. The Mineral Management Division of the Nova Scotia Department of Natural Resources and Renewables is positioning the province to compete successfully for investment dollars within this global context by providing clear and effective regulations and policies that support sustainable mineral resource development.

The mineral industry in Nova Scotia maintained a high level of exploration activity in 2023, which included progress in both grassroots exploration and advanced exploration projects. The total number of claims under licence decreased from 2022 to 2023, but total exploration field expenditures increased significantly from 2022, estimated at \$57.6 million in 2023.

The gold sector continued to lead the province in value generation in 2022. Gold shipments decreased by 39% in 2022 compared to 2021, mainly due to reduced quantity of ore processed and a lower ore grade. Several gold companies continued to advance their gold exploration projects toward commercial production. The gypsum sector experienced a modest decrease in production, but value contribution was up due to price changes relative to 2021. Several new and former producers explored options to either restart or develop new gypsum mining operations. Salt and limestone producers in Nova Scotia experienced a slight decline in salt and limestone shipments.

Employment levels at active mine sites exceeded 700 employees in 2022, which is relatively consistent with the year prior. Approximately 40 per cent of the employees in Nova Scotia's mineral industry worked in the gold sector in 2022.

If you are interested in building a better future through sustainable mineral resource development and would like additional information, I invite you to contact us at <u>GMB@novascotia.ca</u>.

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2023 Exploration Highlights

The focus of exploration activities in 2023 appeared to be proving up existing prospects, including critical mineral potential, combined with the continued search for gold on existing properties. Mineral claim-staking activity in Nova Scotia decreased by 26 per cent in 2023 relative to 2022, with the total number of claims under licence decreasing to 45,000 from 57,000 in the previous year (Fig. 1). The number of claims under licence in 2023 still represents a trend of increased activity in the past half decade. Notably, the trend began with the proclamation of the new *Mineral Resources Act* in 2018, (exploration licences issued or renewed after December 18, 2018, are for two-year terms). The relative decrease from 2022 to 2023 is believed to reflect the unusual activity during the pandemic.

Field expenditures by the mineral exploration industry in 2023 are estimated at \$57.6 million. This represents a level that is increased, in part due to continued make-up of reduced work in 2020, attributable to the pandemic, as well as less than expected work completed in 2022.

There were 208 companies and individuals holding exploration interests (licences or options) in the province in 2023. Interest holders included one major (operating a mine), 13 junior (publicly traded companies not operating a mine), and 50 private companies, as well as 144 individuals. In addition, several mineral lease holders carried out exploration and development work on their leased areas, and exploration work for commodities that do not require staking (e.g., gypsum). Entities actively engaged in advanced exploration during 2023 included 1 major company, 11 junior and private companies, as well as 8 individuals. Prospecting and geological surveys were done by 77 licencees.

Figures 2a and 2b indicate the locations of exploration licences and mineral leases in the province in 2023 and 2022, respectively.

For an up-to-the-minute view of the number and distribution of mineral exploration licences in Nova Scotia, the reader is referred to https://novaroc.novascotia.ca, where the map button can be used to display a map showing the current mineral rights held throughout the province.



CLAIMS BY YEAR

Figure 1. Number of claims under licence by year, 2011–2023.









2022 Production Highlights

There were 13 producing mines in Nova Scotia in 2022 (Fig. 3), which operated under the authority of the *Mineral Resources Act*. In addition, five operations were under care and maintenance, awaiting improved market conditions to support a restart in production.

In 2022, the market value of the province's mineral production was approximately \$227 million. This amount reflects a decrease relative to 2021, but continues the upward trend of mineral production values in recent years due to a renewed demand in gypsum and an increase in gold prices.



Figure 3. Active mines, and care and maintenance mine sites in 2022.

Commodity	Production (Tonnes**)	Market Value***	Percentage of Total Market Value
Coal	135 724	\$20,826,000	9.2%
Gold (ounces)	50,509	\$105,895,000	46.7%
Gypsum	2 375 708	\$38,724,000	17.1%
Limestone	273 523	\$6,456,000	2.8%
Salt	575 584	\$54,572,000	24.1%
Silica Sand	6 999	\$344,000	0.2%
Total Mineral Production		\$226,817,000	100.0%

Table 1. Nova Scotia mineral production in 2022*.

* Note that construction aggregates data are not included in Table 1

** Tonnes shipped, except gold (ounces)

*** Market value of shipped products

Historical prices for individual commodities are available from the London Metal Exchange, 2024.



Figure 4. Salt production and market value of shipped salt and salt products.

Salt

Two operating salt mines in Nova Scotia produced 575 584 tonnes of salt during 2022. This represents a decrease of 44 692 tonnes (7%) relative to 2021 production. Salt production generated \$54.6 million in 2022, or 24.1 % of Nova Scotia's total value of mineral production (Fig. 4; Table 1). Since 1980, salt production has averaged roughly one million tonnes per year. A portion of annual production levels is directly related to winter weather in the region, which causes fluctuating demands for the de-icing of roads.

Pugwash, Cumberland County

The Pugwash underground salt mine has been in continuous production since 1959. It is operated by Windsor Salt Ltd. Salt is extracted by room-and-pillar mining. In the operation material is undercut, drilled, and blasted, then transported by trucks and conveyor belts to the production shaft, where it is hoisted to surface.

The mine produced 581 605 tonnes of finished product in the form of bulk and packaged salt during 2022, of which 467 788 tonnes were shipped for sale. Finished rock salt was distributed throughout eastern Canada via ships and trucks. Most of the finished product was sold in Atlantic Canada and used for de-icing roads.

Nappan, Cumberland County

The solution salt mine in Nappan (Fig. 5) has been in operation since 1947. It is operated by Compass Minerals Canada Corp. Wells are drilled into the salt formations, and water is used to create caverns and dissolve the salt, creating a brine solution. The brine is brought to the surface and sent through a processing plant, which evaporates the water and produces high-purity salt.

In 2022, 107 796 tonnes of salt were shipped from this operation. Salt produced is used in the food processing industry, and for domestic consumption as table salt. The plant also produces and packages salt for other purposes, such as water conditioning, agriculture, and de-icing. Salt is shipped in bulk and packaged form to markets in eastern Canada and northeastern United States.



Figure 5. Nappan Mine, Cumberland County.

Gold

There was one gold mine in production in 2022: the Touquoy mine in Halifax County. The Touquoy operation is an open pit mine at Moose River Gold Mines (Fig. 6).

In total, 50,509 ounces of gold were shipped in 2022 representing \$105.9 million or 46.7 % of Nova Scotia's total value of mineral production (Fig. 7; Table 1).



Figure 6. Touquoy Gold Mine, Halifax County.



Figure 7. Gold production in Nova Scotia (ounces produced and market value).

Touquoy, Halifax County

The Touquoy Mine is operated by Atlantic Mining NS Inc., a wholly owned subsidiary of St. Barbara Limited. St. Barbara acquired Atlantic Mining NS in 2019, through the acquisition of its parent company, Atlantic Gold Corporation. The company is mining a relatively low-grade disseminated gold deposit using open pit methods. Gold shipments were 50,509 ounces for the year.

In 2022, 2.1 million tonnes of ore were mined from the Touquoy pit, using a drill and blast mining method where broken ore is loaded with hydraulic excavators into haulage trucks for transport to the mill. Ore is crushed using a tertiary crusher circuit followed by a single stage ball mill. Gold is recovered using a carbon-in-leach circuit, and further refined in Ontario using an electrowinning process.

Atlantic Mining NS Inc. is also assessing options for development of projects at other locations in the province.

Gypsum

During 2022, gypsum production in Nova Scotia was 2.38 million tonnes and accounted for \$38.7 million in value. This represents 17.1% of the total value of Nova Scotia's mineral production (Fig. 8; Table 1). Total gypsum production in the province increased marginally (~3%) relative to 2021. There were two gypsum mines of varying scale in production in 2022. These operations are a relatively large gypsum quarry at East Milford, Halifax County, and smaller quarry operation at Brierly Brook, Antigonish County. The Brierly Brook Quarry produces gypsum used for both the cement industry and for the manufacturing of wallboard, whereas most of the East Milford production is shipped for wallboard manufacturing.

Gypsum production has been relatively steady at approximately 2 million tonnes per year since 2010, with volumes significantly lower than the peak production of 8.6 million tonnes that occurred in 2005. The financial crisis of 2007–08 resulted in a reduced demand for new home construction in North America. This significant decline in demand, combined with competition from synthetic gypsum (derived from pollution control equipment at coal-fired electric generating plants), resulted in a significant decline in demand for natural gypsum. While housing starts increased with recovery from the financial crisis, natural gypsum demand has not matched this upward trend in recent years. Despite this, the outlook for demand for natural gypsum is positive. The gradual phasing out of coal-fired power plants will result in a reduction in the availability of synthetic gypsum in the marketplace. This trend has already begun, with some wallboard plants having switched to natural gypsum due to a lack of locally available synthetic gypsum.

Several gypsum and anhydrite mines, including the Wentworth Creek, Miller Creek, and Little Narrows operations, remained on care and maintenance status while waiting for improved market conditions to enhance their viability. In particular, Little Narrows is planning a restart in the near future.



Figure 8. Gypsum production in Nova Scotia.

East Milford, Halifax County

Gold Bond Canada, Ltd. operates a gypsum quarry in East Milford, Halifax County (Fig. 9). In 2022, the mine produced 2.28 million tonnes of gypsum and has produced more than 140 million tonnes since it began continuous operation in 1954.

Mining at this operation involves drilling, blasting, and loading the gypsum onto trucks. It is then crushed and screened to remove fine particles and transported by train from East Milford to Wrights Cove, Dartmouth. Crushed rock is loaded on ships for wallboard manufacturing by its parent company in the United States, and for customers in Canada and the United States. The mine also sells products in Nova Scotia for agricultural use.



Figure 9. East Milford Gypsum Quarry, Halifax County.

Brierly Brook, Antigonish County

The Brierly Brook gypsum quarry is owned by Nova Construction Co. Ltd. The company shipped 95 629 tonnes of gypsum in 2022. The quarry operated consistently throughout 2022 after ending a period of care and maintenance in 2019.

Operations at Brierly Brook include drilling, blasting, and loading the gypsum onto trucks. The gypsum is then crushed, screened, and stockpiled for shipment. The mine supplies gypsum for the manufacturing of wallboard and cement in domestic markets.

Coal

During 2022, coal production in Nova Scotia totalled 135 724 tonnes, which accounted for \$20.8 million of total value. This represents 9.2% of the value generated from mineral production in Nova Scotia (Fig. 10; Table 1). In 2022, production was generated from two operations: the surface mine in Stellarton, Pictou County, and the Donkin underground mine in Cape Breton County, which resumed operations in 2022 following a period in care and maintenance. Coal from the Stellarton surface coal mine is used as a fuel for electrical power generation in the province, while coal from Donkin is also used for power generation, as well as other industrial purposes.





Figure 10. Coal production in Nova Scotia.

Stellarton, Pictou County

Pioneer Coal Limited has operated the Stellarton surface coal mine (Fig. 11) since 1996. In 2022, the operation produced 91 191 tonnes of coal from the Foord Seam, Cage Seam, and the Flemming/ MacGregor Seam. The coal seams in Stellarton are relatively thick, with the Foord Seam averaging over 12 m in thickness. Many of the coal seams were previously mined from underground workings, and therefore coal recovery is about 50 per cent of the original *in situ* reserves. Neither drilling nor blasting are conducted at this mine.

After overburden removal, excavators mine the coal and load it onto trucks for haulage to the crushing and sizing plant. Within the crushing/trans-shipment facility various coal qualities are blended and then shipped by truck to Nova Scotia Power's generating station in Trenton. Mining at Stellarton involves a series of open cuts, with overburden materials being placed into adjacent cuts as backfill or temporary stockpiles to allow for progressive reclamation. Once an area is backfilled and contoured, it is covered with a suitable growing material, limed, fertilized, seeded, and mulched.



Figure 11. Stellarton Coal Mine, Pictou County.

Donkin, Cape Breton County

The Donkin underground mine, operated by Kameron Coal Management Limited, was in a care and maintenance state for the majority of 2022. In the third quarter of 2022, following final approvals, production resumed at the Donkin Mine.

Shipments from the Donkin Mine in 2022 totaled 44 533 tonnes of coal, with the product being sold both domestically and internationally. A room-and-pillar mining method was employed to extract the coal, which was conveyed to a raw-coal stockpile on the surface. Coal extraction was carried out with the use of two continuous mining machines.

Limestone

In 2022, limestone production in Nova Scotia totalled 273 523 tonnes, coming from four operations. This production represents a total value of \$6.5M, or 2.8% of total mineral production value in Nova Scotia for 2022 (Fig. 12; Table 1). The largest market for limestone produced (~52%) was as a feedstock or raw material for Portland cement production. A further ~ 39% of the limestone produced was used for management of combustion gas emissions at a coal-fired power station. The remainder of the limestone products, and for other miscellaneous uses.

Brookfield, Colchester County

Lafarge Canada Inc. has operated a limestone quarry and a cement manufacturing plant in Pleasant Valley, 5 km west of Brookfield, Colchester County, since 1965.

In 2022, 330 934 tonnes of limestone were mined at the Brookfield Quarry, and an estimated 142 317 tonnes of calcium oxide equivalent were sold in the year. Mining limestone at this location involves removing the till and cap rock overburden, followed by drilling, blasting, and loading the rock onto trucks for haulage to a crushing plant. All the limestone from Brookfield is used in the manufacture of cement products.





Figure 12. Limestone production in Nova Scotia.

Glen Morrison, Cape Breton County

Production from the limestone quarry at Glen Morrison, Cape Breton County (Fig. 13), began in 1993. The quarry is owned by Nova Scotia Power Incorporated, and contractor Northern Contracting Limited operated the quarry in 2022. Limestone is mined by first removing the overburden, followed by drilling, and blasting the limestone, and hauling it by front-end loader to the primary crusher. The limestone is further crushed and processed at an on-site crushing and screening facility.

In 2022 all the 106 927 tonnes of limestone produced were shipped to Nova Scotia Power's fluidized-bed, coal and pet-coke fired generating station in Point Aconi, where it is used to reduce stack emissions.

Upper Musquodoboit, Halifax County

Mosher Limestone Company Limited operates several quarries near Upper Musquodoboit. In 2022 the company processed and sold approximately 14 682 tonnes of limestone. In 2022, this material was produced from a combination of the quarries and stockpiles.

Agricultural grade dolomite and limestone is produced at the company's grinding plant in Upper Musquodoboit. The product is sold throughout the Atlantic provinces in bagged or bulk form. The company produces both ground and pelletized limestone.

Southside Antigonish Harbour, Antigonish County

Antigonish Limestone Ltd. operates a small quarry at Southside Antigonish Harbour. In 2022, all the limestone produced was obtained from existing stockpiles. Limestone is crushed and sorted into three different sizes, each having its own application and markets. The company also operates a cage mill to produce a finely ground product for the agricultural market. In 2022, 9 597 tonnes of product were sold, with much of the limestone being used in the agricultural industry.



Figure 13. Glen Morrison Limestone Quarry, Cape Breton County.

Silica Sand

All of the silica sand produced in Nova Scotia in 2022 came from the West Indian Road Silica Pit at Nine Mile River, Hants County. During 2022, silica sand shipments totaled 6 999 tonnes. These shipments had an estimated value of \$0.3M, representing 0.2% of the total value of Nova Scotia's mineral production for the year (Fig. 14; Table 1).



Figure 14. Silica sand production in Nova Scotia.

Nine Mile River, Hants County

Shaw Resources, a member of The Shaw Group Limited, produces silica sand from a deposit located on the West Indian Road in Nine Mile River (Fig. 15). Sand is excavated from the pit and either stockpiled or trucked to the company's wash plant. The sand is then washed and screened into several products that are sold and shipped throughout the Atlantic provinces and Quebec.

In 2022, 6 999 tonnes of silica sand were processed and shipped. As well, the sand pit was operational during the year to supply the wash plant and replenish the stockpile. Once replenished, sand can be drawn from the stockpile for the next several years.



Figure 15. Nine Mile River Silica Quarry, Hants County.

2022 Reclamation Activity

In 2022 several mine sites in the province carried out activities aimed at reclaiming land that has been affected by mining activity (Fig. 16). These activities consisted of both progressively reclaiming areas that are no longer required for future production on active mine sites, along with steps toward final reclamation and closure of mine sites that are no longer producing.

Reclamation activities undertaken in 2022 across various sites included infrastructure removal projects, backfill of excavated pits, vegetation efforts and recontouring of sloped areas. Several operators also invested in studies and analyses to better inform future reclamation plans and work.

As part of the *Mineral Resources Act*, mine operators are required to submit updated reclamation plans every three years. The Mineral Management Division of the Department of Natural Resources and Renewables continued to review and provide commentary on new or updated reclamation plans, which were received throughout the year. Reviews of plans are completed in collaboration with the Nova Scotia Department of Environment and Climate Change. The Mineral Management Division strives to work collaboratively with industry and other government departments to ensure that regulatory requirements are met, and feedback is provided in a timely manner.



Figure 16. Aerial view of the reclaimed Coalburn Coal Mine, Pictou County..

Reclamation Security Table for Operating Mines

Reclamation securities for the past several years are illustrated below (Fig. 17), with the data broken into producing and non-producing mines, based on site status in a given year. The reclamation securities may be held by the Department of Natural Resources and Renewables and/or the Department of Environment and Climate Change, and are in the form of cash, letter of credit or surety bond, or combinations thereof. As part of ongoing and recurring reclamation plan reviews, the province works to ensure that security amounts held accurately reflect peak disturbance liability for mine sites, and updates them according to current information and understanding. For tax and royalty data please refer to the Natural Resources Canada website (Government of Canada, 2024).



Figure 17. Reclamation security (\$ millions) by mine status.

Remediation of Abandoned Mine Openings in 2023

There are more than 8,500 abandoned mine openings in the province of Nova Scotia, spread across approximately 800 current and former mining and exploration sites. These openings pose hazards to people, wildlife, and the environment. In 2001 the Abandoned Mine Openings Remediation Program was initiated with the primary goal of reducing the risk associated with abandoned mine openings. In 2023 this program continued and helped control the risk associated with seven abandoned mine openings and seven prospecting pits. The primary focus of the program is openings found on Crown land, which represent approximately 25% of total mine openings. Table 2 describes the location and type of work performed in 2023. The program is continuous in nature and planned work for the coming years is expected to be similar in scope and magnitude to that executed in 2023.

Central Region	Work performed in 2023
Oldham (Baker Mine)	An expanding foam cap was utilized to eliminate the hazard posed by a shaft which has collapsed repeatedly over the past 30 years. Additionally, three other mine openings were backfilled by a local contractor.
Oldham Village	A trench filled with hundreds of tonnes of domestic garbage was cleaned out and the edges stabilized.
Eastern Region	
Coalburn	One former production shaft, located adjacent to a well-used walking trail, was capped with an expanding foam.
Stellarton	One former production shaft, which is located within a residential area, was capped with an expanding foam.
Tobin Road (Sydney Mines)	A walking trail, impacted by both mine openings and underground mine workings, was repaired to the satisfaction of local municipal council. At least six former mine shafts were backfilled, and the trail was graded and rolled.

Table 2. Summary of work performed in 2023 on abandoned mine openings.

References

Government of Canada, 2024. *Extractive Sector Transparency Measures Act* Data Portal; Natural Resources Canada, <u>https://natural-resources.canada.ca/our-natural-resources/minerals-mining/services-for-the-mining-industry/extractive-sector-transparency-measures-act/links-estma-reports/18198, accessed January 2024.</u>

The London Metal Exchange, 2024. The world centre for industrial metals trading; <u>https://www.lme.com/</u>, accessed January 2024.

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