

# **Mineral Production in 2018 and Exploration in 2019**



Limestone quarry and cement plant in Brookfield, Colchester County.

## **Report ME 2020-001**

*Mineral Management Division*



**Energy and Mines**

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**Note**

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**Nova Scotia Department of Energy and Mines**

Honourable Derek Mombourquette  
Minister

Simon d'Entremont  
Deputy Minister

## Message from the Director of Mineral Management

This report highlights activities of the exploration and mining industry in Nova Scotia. The report includes exploration highlights for 2019 and mineral production data for 2018. The information was developed in cooperation with the industry, based on data provided by each of the companies surveyed. This report also includes information on reclamation securities for mines operating in the province. I'd like to thank the representatives of Nova Scotia's exploration and mining industry for their 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 Energy and Mines is positioning the province to compete successfully for investment dollars within this global context by providing clear and effective laws and policies that support sustainable mineral resource development.

A new *Mineral Resources Act* came into force in 2018. The new legislation reduces administrative fees and burden for industry, and creates a business environment in which industry can focus more resources on finding and developing mineral deposits and less on administration.

The mineral industry in Nova Scotia experienced an increase in activity in 2019 that included progress in grassroots exploration, advanced exploration projects, and mine development work. Exploration activity in the province increased by 8% in terms of claims under license, and exploration expenditures totalled an estimated \$15.6 million. Global interest in the province's mineral resources was demonstrated by St. Barbara Limited's \$800 million acquisition (including debt) of Atlantic Gold Corporation in July 2019. Four gold development projects moved forward in 2019, including Atlantic Gold's Beaver Dam, Fifteen Mile Stream, and Cochrane Hill projects, as well as Anaconda Mining's Goldboro project.

The gold sector continues to lead the trend, with expanding gold production and multiple gold exploration projects under development. The coal sector also experienced a significant increase in output, with the ramp up in production at the Donkin Mine.

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.



George MacPherson  
Director, Mineral Management



## 2019 Exploration Highlights

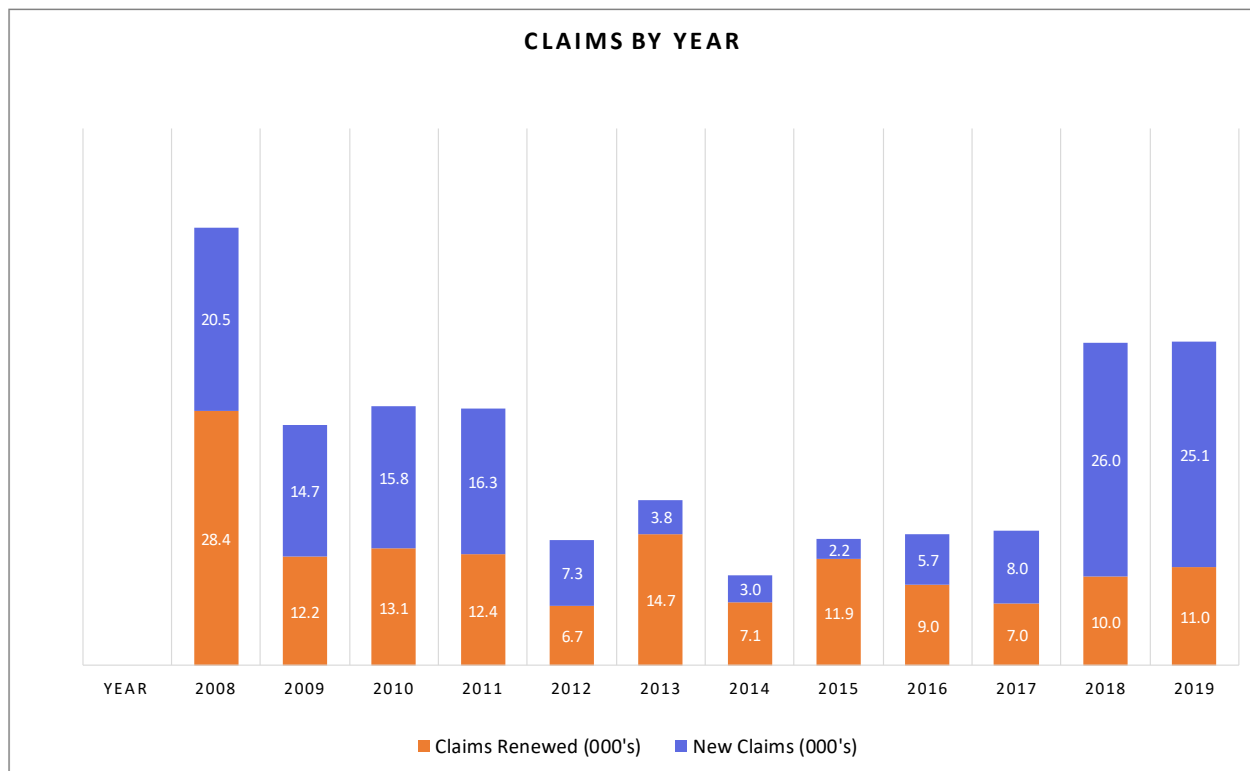
Mineral claim-staking activity in Nova Scotia remained steady in 2019 relative to 2018, with the total number of claims under licence increasing slightly to 36,343—up from 36,000 in 2018 (Fig. 1).

Field expenditures by the mineral exploration industry in 2019 are estimated at \$15.6 million, compared with an estimated \$25.3 million in 2018, and \$18.2 million in 2017.

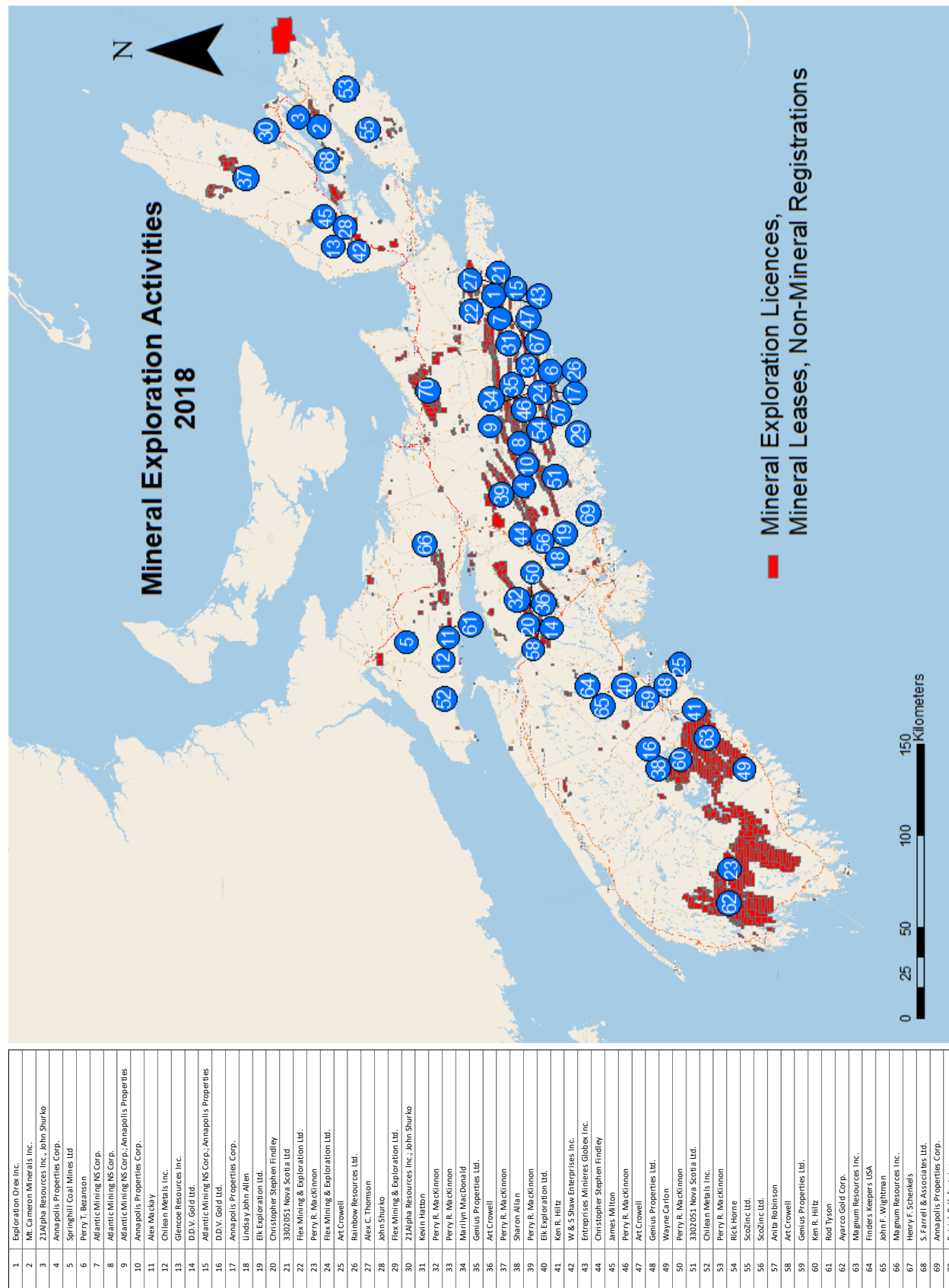
Approximately 262 companies and individuals held exploration interests (licences or options) in the province in 2018, including 2 major, 9 junior, and 61 private companies, as well as 190 individuals. In addition, several mineral-lease holders carried out exploration and development work on leases or areas where commodities did not require staking (e.g., limestone and gypsum). Entities actively engaged in exploration during 2019 included 5 junior, and 24 private companies, as well as 45 individuals.

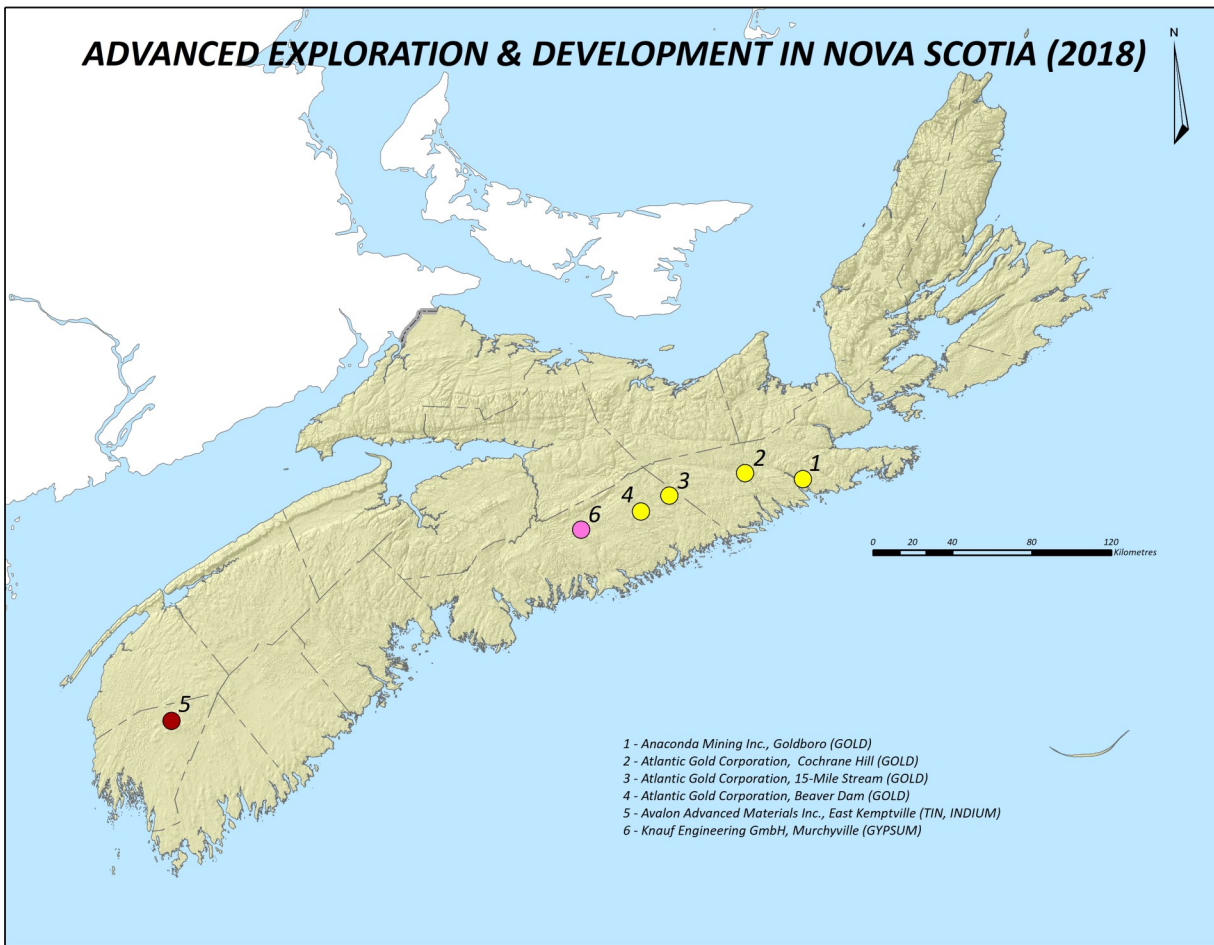
Figures 2 and 3 show the locations of exploration activities and advanced mineral exploration and development sites where preliminary economic assessments have been completed and efforts are being made to advance projects into production.

For an up-to-the minute view of the number and distribution of mineral exploration licences in the province, the reader is referred to <https://novaroc.novascotia.ca>, and select the map button.



**Figure 1.** Number of claims under licence by year, 2008 to 2019.





**Figure 3.** Advanced exploration and development projects.

## 2018 Production Highlights

There were twelve producing mines in Nova Scotia in 2018. In addition, five operations were kept under care-and-maintenance, awaiting favourable market conditions to restart production.

The province's 2018 mineral production was valued at \$327 million\* (Table 1). The value of production increased significantly from \$125.8 million in 2017, and also set a new record for the province. The increase was largely the result of production from the Touquoy Gold Mine, and also benefited from increased production of coal at the Donkin Mine.

## Salt

Two operating salt mines in Nova Scotia shipped 1 055 843 tonnes of salt in 2018 (Fig. 4). Salt accounted for \$63.9 million (19.5%) of the value of Nova Scotia's mineral production in 2018. Since about 1980, production has averaged about one million tonnes per year. Annual fluctuations are directly related to the severity of winter weather in the region, and 2018 production was consistent with that tonnage.

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



**Table 1.** Nova Scotia mineral production in 2018.

Commodity	Production (Tonnes*)	Market Value**	Percentage of Total Market Value
Coal	702 989	\$ 75,848,000	23.2%
Gold (ounces)	92,898	\$ 147,175,000	45.0%
Gypsum	2 214 332	\$ 24,446,000	7.5%
Limestone	517 996	\$ 14,532,000	4.4%
Salt	1 055 843	\$ 63,872,000	19.5%
Silica Sand	16 257	\$ 1,018,000	0.3%
<b>Total Mineral Production</b>		<b>\$ 326,891,000</b>	<b>100.0%</b>

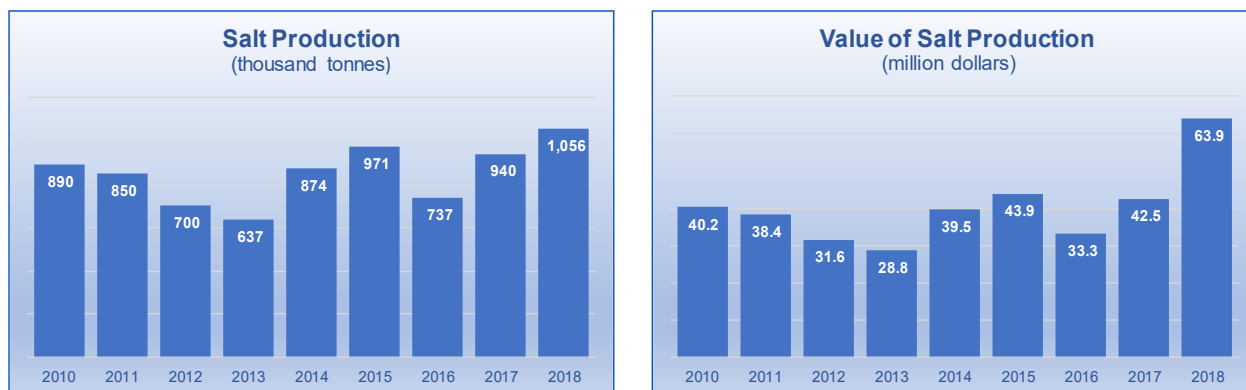
\* Tonnes shipped, except gold (ounces)

\*\* Market value of shipped products

### Pugwash, Cumberland County

The Pugwash underground salt mine (Fig. 5) has been in continuous production since 1959. It is operated by K+S Windsor Salt Limited. Salt is extracted by room-and-pillar mining. It 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 853 574 tonnes of finished product in the form of bulk and packaged salt during 2018 and shipped 945 883 tonnes. Finished rock salt was distributed throughout eastern Canada via ships and trucks. Most of the finished product was sold in Nova Scotia for de-icing roads and other surfaces.

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





**Figure 5.** Pugwash Mine.

### **Nappan, Cumberland County**

The solution salt mine in Nappan 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.

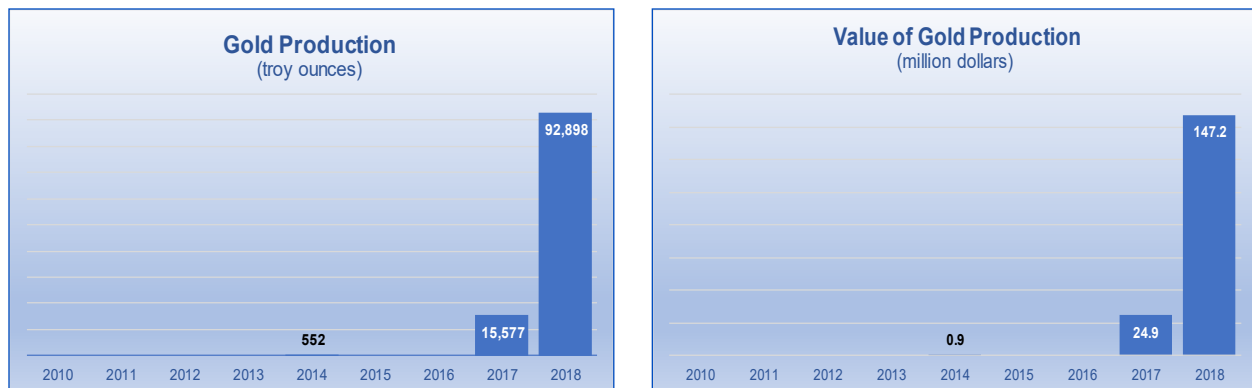
In 2018, the plant shipped 109 960 tonnes of salt. About half of the production is sold to the food-processing industry and used as table salt. The plant also produces and packages salt for other purposes, such as water conditioning, agriculture, and de-icing. Salt is shipped in bulk and packaged form to locations in eastern Canada, northeastern United States, and the Caribbean.

## **Gold**

There were two gold mines in production in 2018, both located in Halifax County. The Touquoy project is an open pit mine at Moose River Gold Mines, and the Dufferin underground project is near Port Dufferin. Including the gold recovered from a bulk sample at Tangier, a total of 92,898 ounces of gold was produced in 2018, representing a market value of \$147.2 million, and 45% of the value of the province's mineral production (Fig. 6; Table 1).

### **Touquoy, Halifax County**

The Touquoy project (Fig. 7) is operated by Atlantic Mining NS Corp., now a wholly-owned subsidiary of St. Barbara Limited. The company is mining a relatively low-grade, disseminated gold deposit by open-pit methods.



**Figure 6.** Gold production in Nova Scotia (ounces produced and market value).



**Figure 7.** Touquoy Gold Mine, Halifax County.

In 2018, 3.34 million tonnes of ore were mined at the Touquoy Mine, using an open pit mining method. The ore is drilled, blasted, and loaded with hydraulic excavators into haul trucks for transport to the mill. For the year, 2.1 million tonnes of ore were processed, producing 90,000 ounces of gold. The company is developing projects at Fifteen Mile Stream, Beaver Dam, and Cochrane Hill as well.

### **Dufferin, Halifax County**

The Dufferin Gold Mine is an underground operation located on the Eastern Shore of Nova Scotia in Halifax County. It was operated by Maritime Dufferin Gold Corp., a subsidiary of Resource Capital Gold Corp. A total of 16 659 tonnes of ore was mined in the first half of 2018, and 19 346 tonnes of



Dufferin Mine ore were processed through the mill. Gold production from the Dufferin Mine was 2,325 ounces. All gold bars were shipped to Ontario for refining. The company suspended production in mid-2018 and the mine was placed under care and maintenance later in the year.

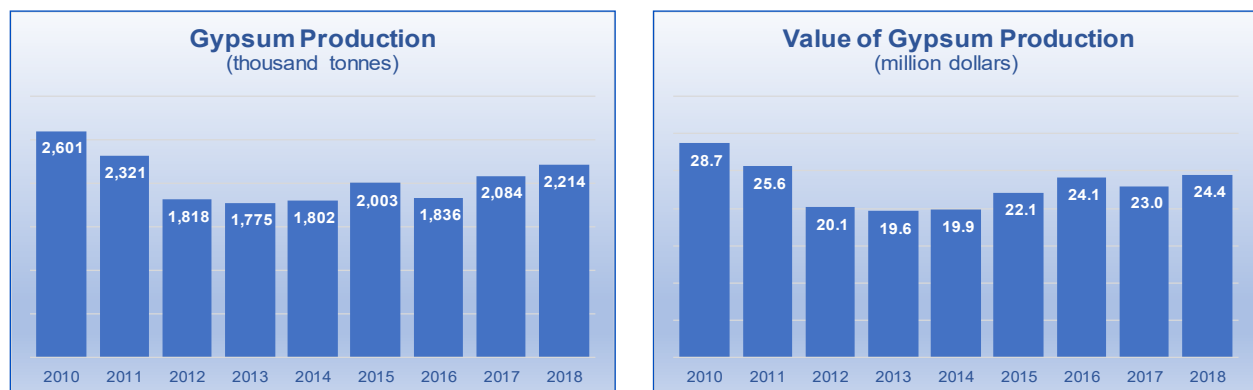
The mine workings are accessed by an underground ramp, and the ore is trucked to surface and the mill. Ramp and haulage drifts are 4.0 m wide by 4.0 m high, increasing to 5.0 m high for truck loading zones and truck dumps. The mining method for ore development is drifting on the ore zones, including overcut and undercut drifts, with some long-hole stoping. Ore was processed in the mill between January and August of 2018. The Dufferin mill also processed a 7,600 tonne bulk sample from the Tangier property, recovering 573 oz. of gold.

## Gypsum

During 2018, gypsum production of 2.21 million tonnes accounted for \$24.4 million (7.5%) of the value of Nova Scotia's mineral production (Fig. 8; Table 1). This represented a 6% increase in the value of gypsum production from 2017. The total tonnage produced was also up by 6%. One large-scale gypsum mine at East Milford and one small-scale mine at Dean Settlement, both in Halifax County, operated during the year. Gypsum from Dean Settlement was processed into an agricultural product and marketed in the Maritimes, while the bulk of the East Milford production was shipped for manufacturing wallboard. No anhydrite was produced in 2018.

Annual gypsum production has been relatively steady at around 2 million tonnes since 2013, and volumes remain significantly lower than the peak production of 8.6 million tonnes in 2005. The financial crisis of 2007–08 resulted in a reduced demand for new home construction in the United States, from 1.5 million to less than 0.5 million units per year. This significant decline in demand, combined with competition from synthetic gypsum (derived from pollution-control equipment at coal-fired electric generating plants), resulted in an unprecedented decline in demand for natural gypsum. Since that time, US housing starts have rebounded, and were up 2.2% from 2017, to 1.31 million units. While natural gypsum demand has not matched this upward trend, it has been higher, and the prospect of increased 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 to occur, with some wallboard plants having switched to natural gypsum due to a lack of locally available synthetic gypsum.

Several gypsum and anhydrite mines, including Melford, Wentworth Creek, Miller's Creek, and Little Narrows, remained on a care-and-maintenance status in 2018, waiting for improved market conditions to restart.



**Figure 8.** Gypsum production in Nova Scotia (tonnes and market value of shipped products).



**Figure 9.** East Milford Gypsum Mine.

### **East Milford, Halifax County**

National Gypsum (Canada) Ltd. operates a gypsum mine in East Milford, Halifax County (Fig. 9). The mine has produced more than 136 million tonnes since it began operation in 1954. The mine produced 2.21 million tonnes in 2018.

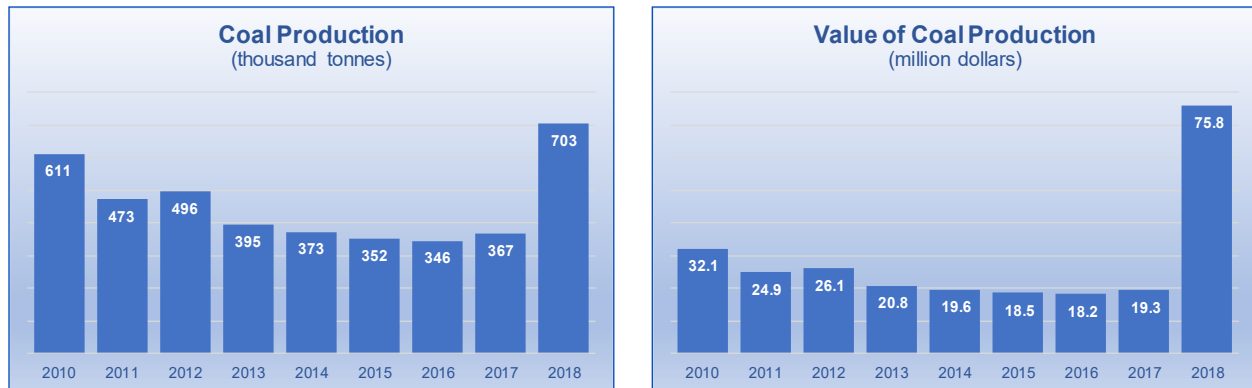
Mining involves drilling, blasting, and loading the gypsum onto trucks. It is then crushed and screened to remove impurities, and transported by train from East Milford to Wrights Cove, Dartmouth. Crushed rock is loaded onto ships for customers in Canada and the United States. The mine also sells products within Nova Scotia for agricultural use.

### **Dean Settlement, Halifax County**

Mosher Limestone Company Limited operates a small gypsum quarry at Dean Settlement. The company did not carry out mining operations in 2018, as gypsum stockpiles provided sufficient material to meet market demands. The gypsum is crushed and ground to a fine product at the company's plant in Upper Musquodoboit. The ground gypsum is sold to agricultural markets in Nova Scotia and PEI. In 2018, 1 808 tonnes of gypsum products were sold.

## **Coal**

During 2018, coal production of 702 989 tonnes accounted for \$75.8 million (23.2%) of the total value of Nova Scotia mineral production (Fig. 10; Table 1). Production was from the surface mine in Stellarton, Pictou County, and from the Donkin underground coal mine in Cape Breton County. The Donkin Mine could eventually produce greater than 3 million tonnes per year. Coal is used locally as a fuel for electrical power generation, and is shipped to export markets through the Port of Sydney.



**Figure 10.** Coal production in Nova Scotia (tonnes and market value of shipped products).

### Stellarton, Pictou County

Pioneer Coal Limited has operated the Stellarton surface coal mine since 1996. In 2018, the operation produced 241 466 tonnes of coal from the Foord Seam, Cage Seam, Third Seam, and the Flemming/MacGregor seams. The coal seams in Stellarton are relatively thick, with the Foord Seam averaging over 12 metres in thickness. Most of the coal seams were previously mined from underground workings, and therefore coal recovery is about 50% 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.

### Donkin, Cape Breton County

The focus in 2018 at the Donkin underground mine (Fig. 11), operated by Kameron Coal Management Limited, was to continue underground mine development and establish infrastructure for full-scale



**Figure 11.** Donkin Mine, operated by Kameron Coal Management Limited.



production capacity. The mine shipped 461 523 tonnes of clean coal during the year. A room-and-pillar mining method is employed to extract the coal, which is conveyed to a raw-coal stockpile on the surface. The coal is cut by continuous mining machines and paired with battery haulers to transport coal from the active face to the feeder-breaker and conveyor belt. Plans were in place at the end of 2018 to install a flexible conveyor train to improve coal handling underground.

Mine development activities underground experienced challenging ground conditions at the end of 2018.

The Donkin Mine received approval to complete a surface haulage road to reroute coal truck traffic around a densely populated section of public road.

## Limestone

In 2018, limestone production of 517 996 tonnes from four mines accounted for \$14.5 million (4.4%) of the total value of Nova Scotia mineral production (Fig. 12; Table 1). The majority of the limestone produced (344 118 tonnes) was used as a feed stock or raw material for Portland cement production. Following that, 137 346 tonnes of limestone were used for management of combustion gas emissions at a coal-fired power station. The remainder was used for agricultural soil amendment (33 518 tonnes), in the manufacture of pulp and paper products (2 483 tonnes), and for miscellaneous uses (531 tonnes).

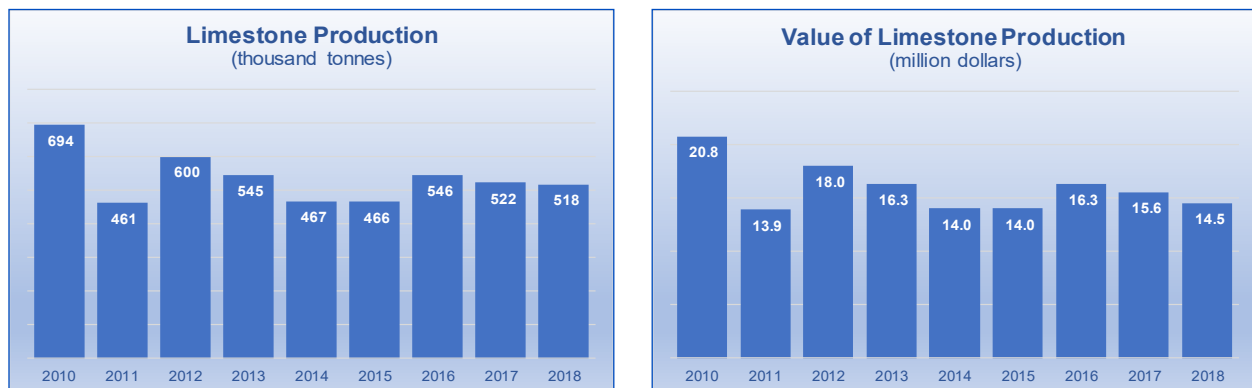
### Brookfield, Colchester County

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 2018, the Brookfield quarry produced 344 118 tonnes of crushed limestone. Mining limestone involves removing the overburden (till and cap rock), followed by drilling, blasting, and loading the rock onto trucks for haulage to a crushing plant. All of the limestone from Brookfield is used to manufacture Portland cement products.

### Glen Morrison, Cape Breton County

Production from the limestone quarry at Glen Morrison (Fig. 13), Cape Breton County, began in 1993. The quarry is owned by Nova Scotia Power Inc., and contractor Kelly Rock Ltd. operates the site. 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 into several products at an on-site crushing and screening facility.



**Figure 12.** Limestone production in Nova Scotia.



**Figure 13.** Glen Morrison Quarry.

Most of the 137 817 tonnes of limestone produced in 2018 was 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. A small volume of fine limestone was sold to other local customers.

### **Upper Musquodoboit, Halifax County**

Mosher Limestone Company Limited operates several quarries near Upper Musquodoboit. The company drilled and blasted 25 204 tonnes of limestone from its Archibald and Mosher #2 Quarry in 2018. The company sold 23 400 tonnes of limestone during the year.

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

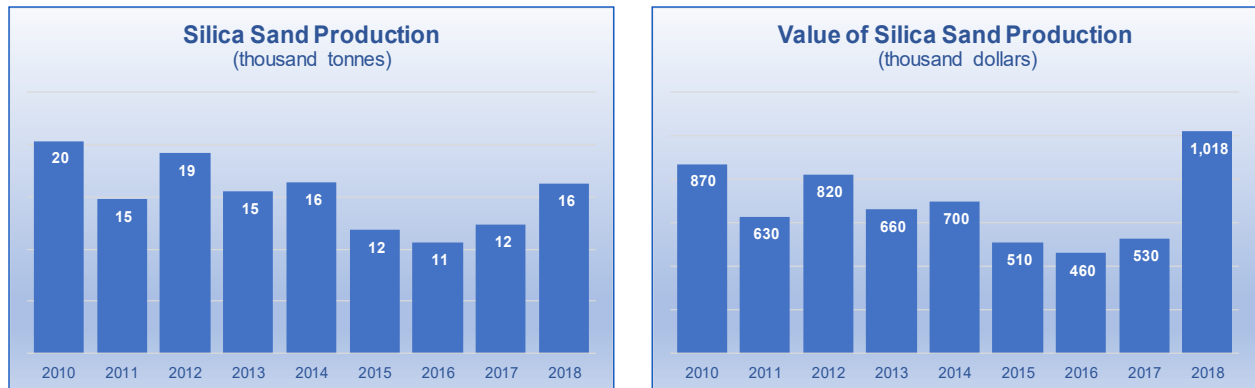
### **Southside Antigonish Harbour, Antigonish County**

Antigonish Limestone Ltd. operates a small quarry at Southside Antigonish Harbour. The company drilled, blasted and crushed 58 397 tonnes in 2018, which will provide sufficient limestone for the next three or four years. The limestone is crushed and screened into three different sizes. The company also operates a cage mill to produce a fine product for the agricultural market. The limestone products are used as agricultural soil amendments, and in the manufacture of pulp and paper products. In 2018, 12 661 tonnes of limestone products were sold, including 2 483 tonnes produced for the pulp and paper industry.

## **Silica Sand**

All of the silica sand produced in Nova Scotia comes from the Nine Mile River deposit. During 2018, silica sand production of 16 257 tonnes accounted for \$1,018,000 (0.3%) of the value of the province's mineral production (Fig. 14; Table 1).





**Figure 14.** Silica sand production in Nova Scotia (tonnes and market value of shipped products).

### Nine Mile River, Hants County

Shaw Resources, a member of the Shaw Group Ltd., produces silica sand from a deposit located on West Indian Road in Nine Mile River. Sand is excavated from the pit, stockpiled, and trucked to a wash plant. It is washed and screened into several products.

In 2018, there was no extraction from the pit and the source material for processing was taken from stockpile. There were 16 257 tonnes of product sold and shipped, mostly throughout the Atlantic provinces and Quebec.

## Reclamation Security Table for Operating Mines

In Table 2, reclamation securities for 8 of the province's 11 operating mines are listed. The data are voluntarily reported by the companies and are current as of October 2019. The reclamation securities may be held by the Department of Energy and Mines or Nova Scotia Environment, and are in the form of cash, letter of credit, or surety bond (or combinations thereof). The reclamation plan cost estimate is either contained within each mine's reclamation plan, or estimated by Energy and Mines and/or NSE.

**Table 2.** Reclamation security information for Nova Scotia mines.

Mine	Company	Status	Commodity	Reclamation Security Held	Reclamation Plan Cost Estimate and Date
Touquoy	Atlantic Mining NS Corp.	Producing	Gold	\$ 10,400,000	\$ 10,400,000 (2011)
Donkin	Kameron Coal Management Limited	Producing	Coal	\$ 7,185,000	\$ 7,185,000 (2017)
Brookfield	Lafarge Canada Inc.	Producing	Limestone	\$ 285,000	\$ 3,100,000 (2018)
Stellarton	Pioneer Coal Limited	Producing	Coal	\$ 2,500,000	\$ 2,500,000 (2008)
Glen Morrison	Nova Scotia Power Incorporated	Producing	Limestone	\$ 750,000	\$ 750,000 (2015)
Southside Antigonish Harbour	Antigonish Limestone Ltd.	Producing	Limestone	\$ 230,000	\$ 230,000 (2015)
Nappan	Compass Minerals Canada Corp.	Producing	Salt	\$ 150,000	\$ 150,000 (1998)
Upper Musquodoboit	Mosher Limestone Company Limited	Producing	Limestone	\$ 20,000	\$ 20,000 (2009)
Pugwash	K+S Windsor Salt Limited	Producing	Salt	For information contact: K+S Windsor Salt Ltd. 755 boul. St-Jean Pointe Claire, Québec Phone: 1-514-630-0900	
Milford	National Gypsum (Canada) Ltd.	Producing	Gypsum	For information contact: National Gypsum Company Head Office 2001 Rexford Road Charlotte, N.C. 28211 Phone: 1-704-365-7300 <a href="mailto:ng@nationalgypsum.com">ng@nationalgypsum.com</a>	
Nine Mile River	L.E. Shaw Limited	Producing	Silica Sand	For information contact: Corporate Secretary The Shaw Group Limited P.O. Box 60, Shubenacadie, N.S. B0N 2H0 Phone: 1-902-758-4727	

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