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DIMENSION STONE IN NEWFOUNDLAND AND LABRADOR

Open File NFLD/2865

D.T.W. Evans, P.Geo and W.L. Dickson, P.Geo

St. John's, Newfoundland
March, 2004

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ABSTRACT

Simply defined, ***Dimension Stone*** *is any naturally occurring stone which can be quarried, shaped and or used as is for specified purposes. The Newfoundland and Labrador dimension stone industry has a long and varied history. Many of the familiar historic buildings, railway trestle abutments, etc. were constructed from locally quarried stone. High quality roofing slate was exported from several quarries in eastern Newfoundland and some of this slate was used locally. Stone usage decreased after the First World War as alternate building materials became available and quarrying expertise disappeared.*

In the 1980s, dimension stone resource assessment programs and demonstration projects carried out by the provincial Department of Mines and Energy renewed interest in the potential of Newfoundland and Labrador dimension stone. Less than 25 years old, the emerging Newfoundland and Labrador dimension stone industry produces a variety of granites, slates and landscaping stones. The stone products are shipped to national and international markets where they are recognized for both their uniqueness and exceptional quality. The province also has a growing local market for natural stone products. There are tremendous opportunities for the Newfoundland and Labrador dimension stone industry. The province has a largely unknown, stone resource which must be assessed and developed.

INTRODUCTION

From the early 17th century until the outbreak of the First World War, Newfoundland had an active, albeit small, dimension-stone (building-stone) industry that supplied a limited local market. By the early 19th century most of the major communities had resident stone masons. Fortifications, churches, government buildings, mercantile premises and railway-bridge abutments were constructed using stone quarried from several sites around the Island (Figure 1). Between 1865 and 1906, roofing slate was produced from several eastern Newfoundland deposits mainly for export to England. However, some slate was also used locally. By the early 20th century the local demand for stone had disappeared, local expertise died out and the use of stone was largely restricted to landscaping applications.

The modern dimension-stone industry is less than 25 years old. In 2003, the gross value of shipped dimension stone was forecast to reach almost $4.4 million (Appendix 1). Current statistics can be found on the Department of Mines and Energy website (*www.gov.nl.ca/mines&en/geosurvey/dimension/*). There are now three principle quarrying operations in the Province: 1) Ten Mile Bay/Igiak Bay in northern Labrador, 2) Finger Pond/Jumpers Brook in central Newfoundland, and 3) Britannia Cove in eastern Newfoundland (Figures 2a and 2b). There are also several companies that operate quarries on the Island of Newfoundland, providing landscaping stone for local and export markets.

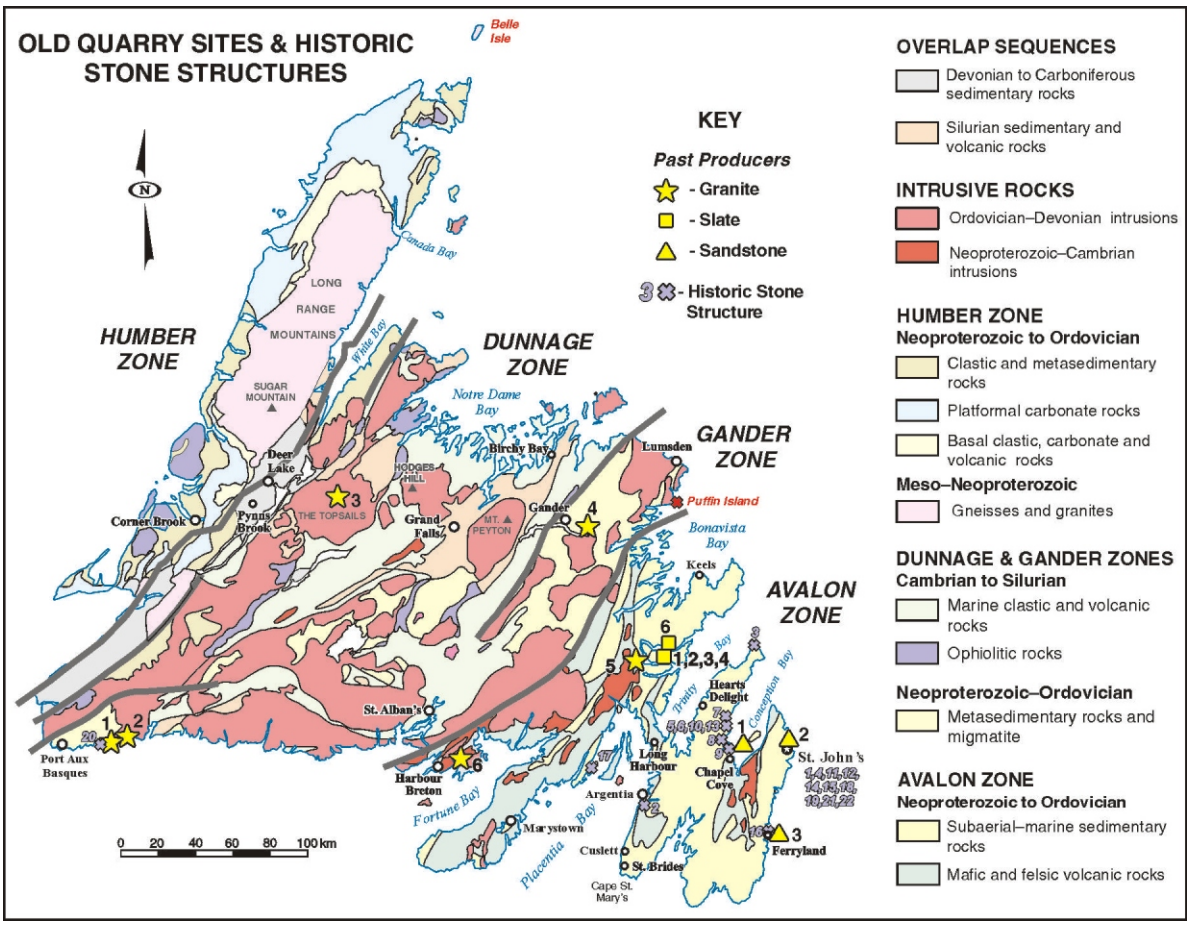


Figure 1. *Geological map of Newfoundland showing the locations of old stone quarry sites and significant historical stone structures, includes two former stone light houses on Belle Isle and Puffin Island; Key to historic stone structures: 1. Fort Townshend, St. John's; 2. Castle Hill, Placentia; 3. Grates Cove; 4. Government House, St. John's; 5. Harbour Grace Court House; 6. Ridley Hall and Ridley Offices, Harbour Grace; 7. Rorke's Stone Jug, Carbonear; 8. Donnelly House, Spaniards Bay; 9. Brigus Stone Barn, Brigus; 10. St. Paul's Anglican Church, Harbour Grace; 11. Roman Catholith Basilica of St. John the Baptist, St. John's; 12. Anglican Cathedral of St. John the Baptist, St. John's; 13. Cathedral of the Immaculate Conception, Harbour Grace; 14. St. Patrick's Church, St. John's; 15. St. Andrew's Presbyterian Church, St. John's; 16. Church of the Holy Trinity, Ferryland; 17. St. Kyran's; 18. Cabot Tower, St. John's; 19. Samuel Garrett Houses, St. John's; 20. Rose Blanche Lighthouse; 21. The St. John's Railway Station; and 22. The St. John's Court House.*

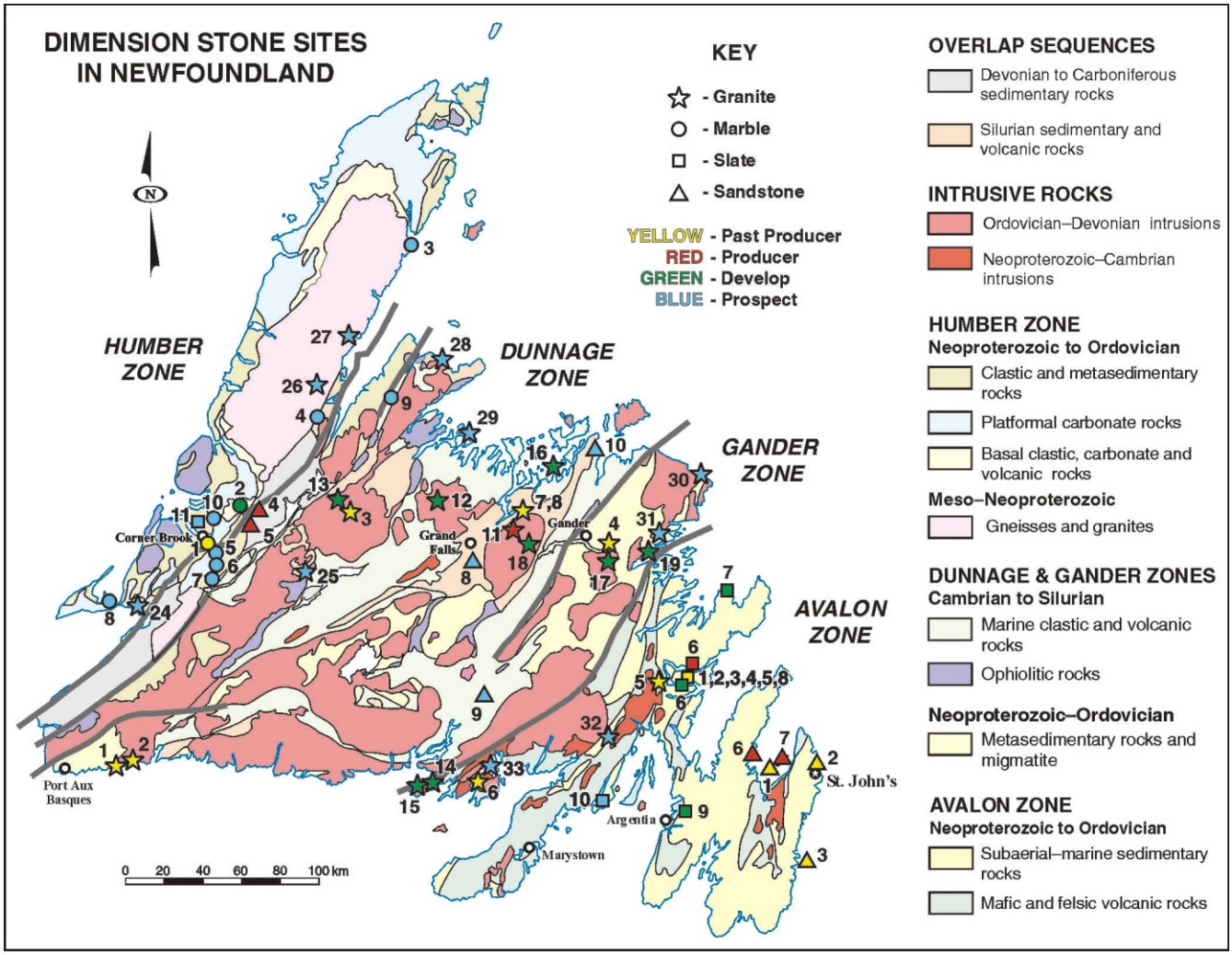


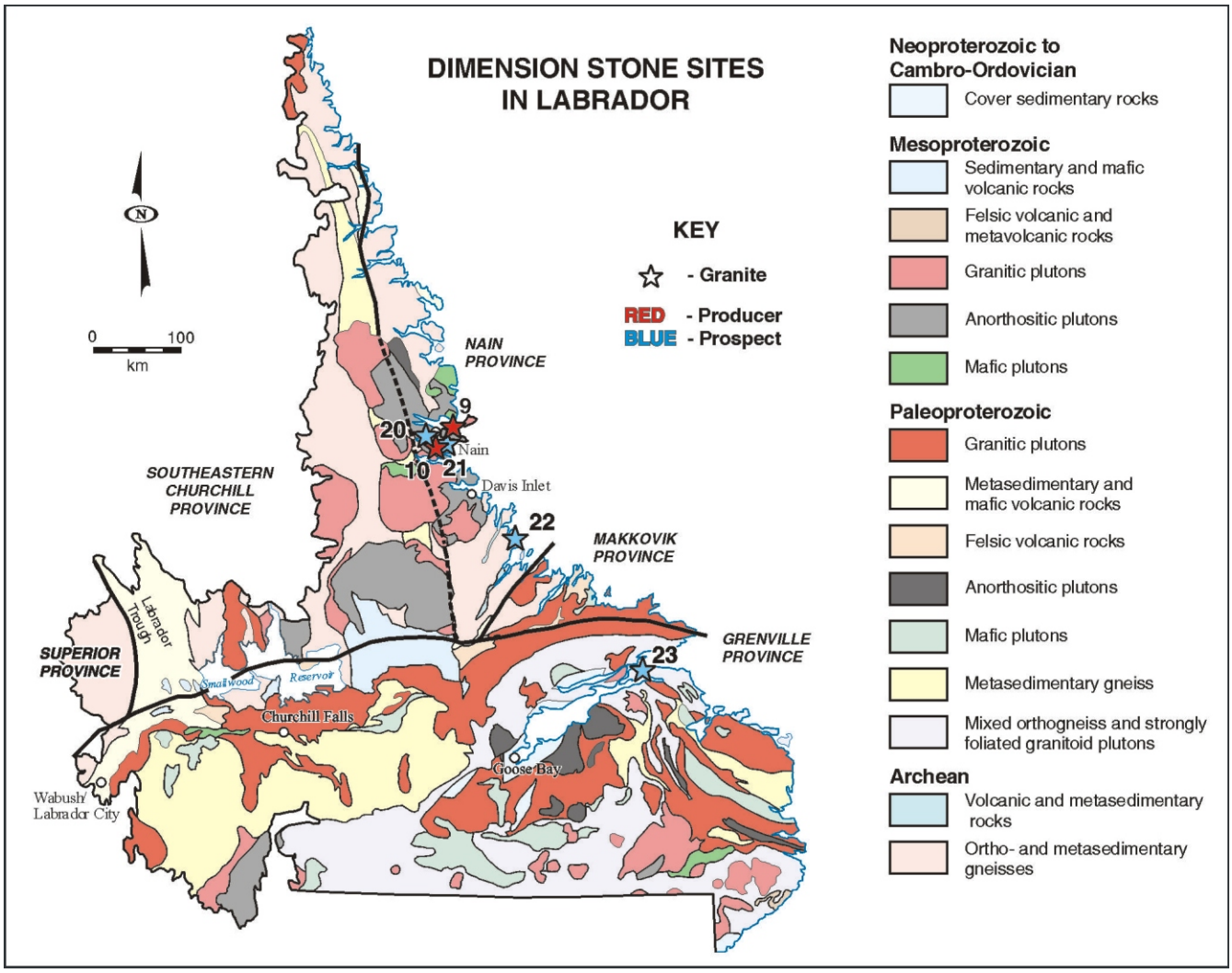
Figure 2. *(A) Geological map of Newfoundland showing the current distribution of dimension-stone quarries, developed prospects and prospects; (B) Geological map of Labrador showing active quarry sites and dimension-stone prospects.*

The Province of Newfoundland and Labrador has an abundance of stone, and with its developing expertise and untested potential, the Province is well-positioned to become a significant exporter of stone products. Continued exploration and development will see new varieties identified, which will bring unique characteristics to the marketplace. For further information the reader is referred to the “Dimension Stone” section of the Geological Survey website (*www.gov.nl.ca/mines&en/geosurvey/dimension/*).

DIMENSION-STONE POTENTIAL, NEWFOUNDLAND AND LABRADOR

The complex and varied bedrock geology of Newfoundland and Labrador (Figures 2a and 2b) represents an almost untested dimension-stone resource. It is a complex piece of Earth's history up to 3.8-billion years old composed of vestiges of ancient continents, mountain chains and long-destroyed oceans brought together by the forces of continental drift. Newfoundland offers tremendous potential for new resources of granite, marble, slate, and flagstone, while the immense landmass of Labrador offers unlimited potential for a wide variety of granitic rocks.

Extensive areas of Newfoundland are underlain by granitic rocks (Figure 2a). In eastern Newfoundland, past-exploration efforts have focused largely on an extensive area of granite lying to the north of the Burin Peninsula. In central Newfoundland, efforts have centred around the Mount Peyton, Hodges Hill and Topsails intrusive suites and these areas have further exploration potential. In western Newfoundland, Precambrian granites and gneisses of the Long Range Mountains have seen



KEY - DIMENSION STONE OCCURRENCES

☆ Granite	○ Marble	□ Slate	△ Sandstone
PAST PRODUCERS 1. Petites[i] 2. Rose Blanche[i] 3 The Quarry[i] 4.Benton[i] 5. Shoal Harbour[i] 6. Old Bay[i] 7. Quarry 4[iii] 8. Quarry 5[iii]	1. Dormston Quarry[vii]	1. Winter Quarry[x] 2. Allison Quarry[x] 3. Grieve Quarry[x] 4. Black Duck Cove[x] 5. Great Cove[x]	1. Kellys Island[xi] 2. Signal Hill/ Southside Hills[xi] 3. Stone Island[xi]
PRODUCERS 9. Ten Mile Bay[ii] 10. Igiak Bay[ii] 11. Finger Pond		6. Britannia Cove/ Nut Cove[x]	4. Fisher Hills Bluestone[xi] 5. Pynn's Brook[xi] 6. Upper Island Cove[xi] 7. Bell Island[xi]
DEVELOPED PROSPECTS 12. Hodges Hill[i] 13. Topsails/Summit[i] 14. Seal Cove[i] 15. Pass Island[i] 16. Comfort Cove/ Loon Bay[i] 17. Crown Ridge[i] 18. Christmas Lake[iii] 19. Middle Brook[i]	2. Pye's Ridge[vii]	7. Keels[x] 8. Random Island[x] 9. Long Harbour[x]	
PROSPECTS 20. John Hayes Hr[ii] 21. Tabor Island[ii] 22. Hopedale[iv] 23. Windy Hill[iv] 24. Indian Head[ii] 25. Hinds Lake[i] 26. Western White Bay[v] 27. Cat Arm[iv] 28. Dunamagon[i] 29. Brighton[iii] 30. Lumsden[i] 31. Lockers Bay[iii] 32. Sock Pond[i] 33. Pool's Cove[i]	3. Canada Bay[viii] 4. Silver Mountain[viii] 5. Twelve Mile Dam Road[viii] 6. Lady Slipper Pond[viii] 7. Pinchgut Lake[viii] 8. Port au Port[viii] 9. Flatwater Pond[ix] 10. Old Man's Pond[viii]	10. Paradise Sound[x] 11. Summerside/ Curling[x]	8. Grand Falls-Windsor[xi] 9. Twillick Brook[xi] 10. Dog Bay[xi]

Rock Types: i) Granite, ii) Anorthosite, iii) Gabbro, iv) Migmatite, v) Gneiss, vi) Conglomerate. vii) Marble, viii) Limestone, ix) Virginite, x) Slate and xi) Sandstone.

only sporadic exploration efforts. New forest-access roads continually open areas for exploration, particularly in central and western Newfoundland. In Labrador, past-exploration efforts have focused on the anorthosites south of Nain (Figure 2b). Extensive coastal areas and regions recently opened by new highway construction have to be evaluated. Gneisses and migmatites in the Hopedale area offer some potential.

Extensive units of marble and limestone are present throughout western Newfoundland. A number of areas have seen advanced exploration activity, but large areas remain to be explored and a number of marble prospects require further evaluation. Small occurrences of marble are present throughout central and eastern Newfoundland. However, these are either too deformed or too small for dimension-stone purposes. In western Labrador, the recent discovery of blue marble opens a new area for exploration.

In eastern Newfoundland, good potential exists for further development of the high-quality slate deposits along the eastern Newfoundland slate belt that includes the Brittania Cove slate quarry. Potential for expansion of landscaping-stone quarries in eastern, central and western Newfoundland is good, with steadily increasing local markets and the development of export markets for flagstone.

HISTORIC USE OF STONE

Figure 1 gives the locations of historic buildings and quarry sites discussed below. For information on the architecture and history of these, and other significant Newfoundland and Labrador buildings, the reader is referred to the *Heritage Foundation of Newfoundland and Labrador* web site (www.heritage.nf.ca). Much of the historical information used in this section was obtained from this website.

PRE-1914

Newfoundland, because of its strategic location and rich fishing grounds, played an important role in the English - French hostilities of the 17th and 18th centuries. Local dimension-stone usage traces its roots to this turbulent part of our history. Local stone, including sandstone from the St. John's area and limestone from Chapel Cove, Conception Bay, was used by the English in the construction and maintenance of fortifications, particularly in and adjacent to St. John's, and include Fort William (1618-1779), Fort Amherst (1777) and Fort Townshend (1779-1871). Placentia, located on the west side of the Avalon Peninsula, was the French capital of Newfoundland from the early 16th century until the French colony was ceded to the English in the 1713 Treaty of Utrecht. The French fortification, Fort Royal, on Castle Hill, Placentia was subsequently occupied by the English and maintained until 1811 when it fell into disrepair. The source of the stone used by the French is unknown, but it is thought to have been mainly locally derived. The site has been partially restored and is now a national historic site administered by Parks Canada.

Early settlers incorporated loose stone as they had in England and Ireland in retaining walls, cellars and foundations. Rock cleared from fields and gardens formed rock walls that defined land ownership. The well-preserved rock walls of Grates Cove on the Avalon Peninsula are representative of land-use patterns in many of the early Newfoundland settlements reflecting the early residents ties to Ireland and England and as a result have been declared a national historic site.

In the early 1800s, an increase in population, the development of a wealthy merchant middle class and the establishment of local government brought about a demand for dimension stone. Prior to 1817, the colonial governors had resided seasonally in St. John's; subsequent governors were required to occupy their positions year-round and efforts were made to have an official residence constructed. Governor Cochrane obtained permission to build a permanent stone residence, Government House (Plate 1). Plans were drawn up modeled after the Admiralty House in Plymouth, England with an estimated cost of £8,778, an exorbitant amount for that period. The original plans called for a two-story structure with a basement and a surrounding moat. In 1827 construction commenced with the arrival of 28 stone masons, 25 carpenters and 1 slater from Greenock, England. Thousands of tonnes of red sandstone were quarried from Signal Hill for use in constructing the walls. Quoins, jambs and chimney shafts were cut from English granite. After considerable modifications the building was finished in 1831 at a cost in excess of £36,000, a princely sum that brought about a Court of Enquiry into its construction. Stone also destined for the residence is thought to have made its way in to the Governor's summer home. The stately Government House is currently used by the Lieutenant Governor and the grounds are open to the general public.

Plate 1. *Government House, St. John's, Newfoundland*

In the historic Conception Bay communities of Harbour Grace, Carbonear, Spaniards Bay and Brigus stone was used in government buildings, mercantile establishments and churches. Much of the stone was quarried from nearby Kellys Island, but some stone arrived in Newfoundland as ballast on the various merchant and fishing vessels. The Harbour Grace Court House (Plate 2) was constructed in 1835 using sandstone quarried from Kellys Island. The prominent building is still used as a court house.

Many of the prominent merchants of the early 19th century had close ties with England, where stone was in common usage. Upon arrival in Newfoundland some of these merchants had stone buildings constructed. In the 1830s, local Harbour

Plate 2. *Court House, Harbour Grace, Newfoundland.*

Plate 3. *Ridley Hall, Harbour Grace.*

Plate 4. *Ridley Offices, Harbour Grace.*

Grace merchant and politician Thomas Ridley had two stone structures built. In 1834, the family residence, Ridley Hall (Plate 3) was built using local stone. In 2003 this historic structure was seriously damaged by fire. The Ridley Offices (Plate 4) were constructed circa 1838 using stone with brick trim and slate roof. The walls of this building are two feet thick with the outer and inner stone walls in-filled with rubble. The stone used in the Ridley Offices is thought to have either been quarried from Kellys Island or brought to Harbour Grace as ballast. Both of these buildings are registered heritage structures.

Kellys Island sandstone was also used in the construction of Rorke's Stone Jug, a prominent mercantile premises in Carbonear that was built in 1860 after fire had destroyed an earlier structure. The large Georgian-style three story building has a pitched slate roof. The stone walls and slate roof gave the appearance of a jug hence the name. Rorke's Stone Jug is a registered heritage building. William Donnelly built a New England-style stone house with a Welsh slate roof at Mint Cove, Spaniards Bay using stone quarried from Kellys Island.

In the first quarter of the 19th century Charles Cozens, a prominent Brigus landowner, had at least four stone structures built in that community of which only the Brigus Stone Barn remains. Built around 1825 as a residence, the three storey building was later used as a barn. The registered heritage structure has been restored and is currently used as a museum.

Several prominent churches in St. John's and Harbour Grace were also constructed using local stone. The Gothic-Revival-style St. Paul's Anglican Church in Harbour Grace, which is believed to be the oldest stone church in the province, had its cornerstone laid in 1835. The source of the stone is not given, but sandstone from Kellys Island may have been used in its construction. The church is a registered heritage building.

In the late 1830s, Bishop Fleming obtained permission to construct a new church to meet the spiritual needs of the Roman Catholic population of St. John's. In 1839, Bishop Fleming was offered sandstone that had been loosened by road construction on Signal Hill. He appealed to the congregation for assistance and three days later 6000 people moved 1,200 tons of sandstone in a single day to the site of the new church. Buff-coloured sandstone for the church construction was also quarried from Kellys Island during the summer of 1839. Stone is also reported to have been quarried at Mundy Pond, Long Pond, Logy Bay and the Southside Hills. In May 1841, the cornerstone was laid for the Roman Catholic Basilica of St. John The Baptist (Plate 5). The Roman-Basilica-style church took 14 years to complete and is one of the largest stone churches in North America, measuring 75 m long by 57 m wide with a facade 30 m wide. The church was originally faced with Gal-

way limestone; the quoins, moldings, cornices and window frames were fashioned from Dublin granite. In the 1870s, the deteriorating limestone was removed and replaced by local grey sandstone. In 1850, boulders of Holyrood Granite were shipped to St. John's for incorporation into the Presentation Convent, which was constructed adjacent to the Basilica. Both the Basilica and Presentation Convent are registered heritage buildings.

The first cornerstone of the Anglican Cathedral of St. John the Baptist (Plate 6) in St. John's was laid in August, 1843. The church was to be constructed using limestone imported from Cork, Ireland. Crates containing the limestone were destroyed during the Great Fire of 1846. New plans were drawn up by English architect Sir George Gilbert Scott and called for a Victorian or English-Gothic-style, Latin cross-shaped structure. The corner stone was re-dedicated in September, 1847. The church was almost completely destroyed during the Great Fire of 1892. Reconstruction began soon afterwards and continued until 1972. Dressed, white, fine-grained sandstone was imported from Scotland for incorporation into the church. Approximately 7,500 tons of coarser grey sandstone, quarried from the Southside Hills, was used in constructing the walls. The exterior of the cathedral, which is a registered heritage building, is undergoing renovations.

In the 1850s, Roman Catholic Bishop John Thomas Mullock ordered the building of stone churches at Harbour Grace, St. John's, Ferryland, Torbay and St. Kyran's. In 1852, construction began on the Roman Catholic Cathedral of the Immaculate Conception in Harbour Grace. Once again sandstone from Kellys Island was incorporated in the construction of the church. However, in 1889, fire completely destroyed the structure. The church was replaced with the current Gothic-style stone structure, which is a registered heritage building.

Plate 5. *Roman Catholic Basilica of St. John the Baptist, St. John's, Newfoundland.*

Plate 6. *Anglican Cathedral of St. John the Baptist, St. John's, Newfoundland.*

The cornerstone of St. Patrick's Church (Plate 7) in St. John's was lain in 1855; however, construction was not completed until 1881. Most of the grey sandstone for the church was quarried from Cudahy's quarry in the Southside Hills; quoins appear to be of grey Dublin granite. In 1859, Reverent Edward Troy began construction of the Holy Trinity Church in Torbay. The church was consecrated in 1863 and used by the congregation until it was replaced in 1919. Consecrated in 1865, the Church of the Holy Trinity (Plate 8), Ferryland was a stone building built by Thomas O'Brien of St. John's and the local parishioners. Stone for the church was quarried on nearby Stone Island (Bois Island) and transported to the site by local fishermen. Some imported granite was used for the quoins. The church is a registered heritage building.

A large stone church was also constructed in the now abandoned community of St. Kyran's, Placentia Bay. The Roman Catholic Church of the Assumption, consecrated in 1859 and now a crumbling ruin, was built out of locally quarried red granite with imported sandstone used for the quoins, windows, door frames etc. The church was reported to have measured about 79 feet long by 39 feet wide and had 20 foot high walls, which were 26 inches thick. The front of the church had three gothic arches, the central one served as the entrance way, and on each side, six gothic windows (Long, 2002). In 1923 the church was destroyed by fire.

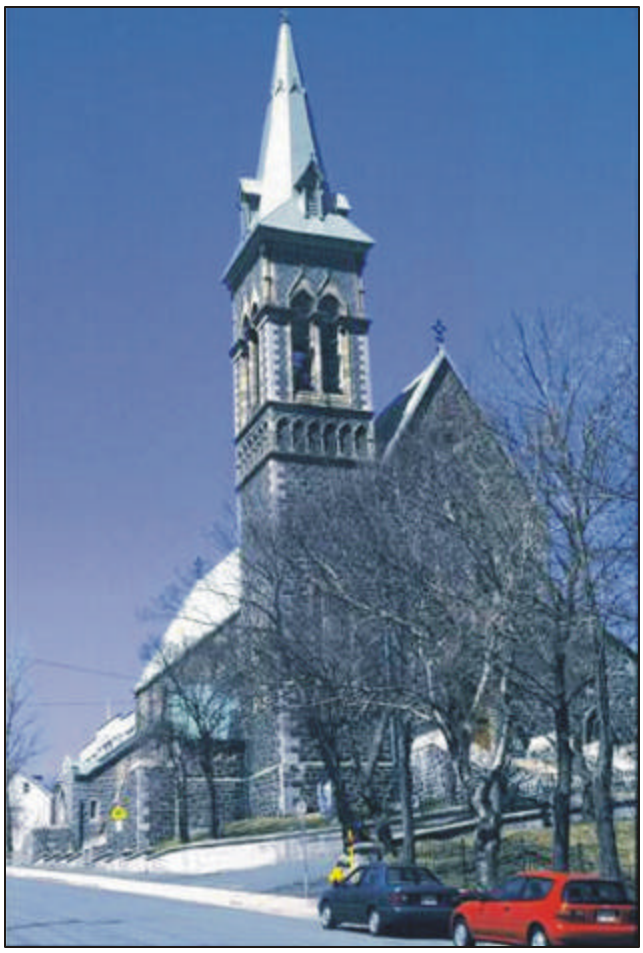


Plate 7. *St. Patrick's Roman Catholic Church, St. John's, Newfoundland.*

Plate 8. *Holy Trinity Roman Catholic Church, Ferryland, Newfoundland.*

In 1873, the modified Gothic style George Street Wesleyan Church was constructed in St. John's. The church was built of rough-hewn stone quarried from the Southside Hills and hauled to the site by sealing crews. The exterior stone walls were covered by plaster. The High Victorian Gothic-Revival-style St. Andrew's Presbyterian Church in St. John's, constructed of red Accrington brick and Scottish Giffnock sandstone, was dedicated in 1896. Newfoundland red and black slate covers the church roof.

In 1870, Great Britain recalled its Newfoundland garrisons and the local government assumed control of the former garrison buildings. A two-storey, stone barracks, which was built in 1842-1843 from local and Nova Scotian sandstone and located near Georges Pond, Signal Hill, was converted into a quarantine hospital. St. Georges Hospital, as it came to be known, was destroyed in the Great Fire of 1892. In 1897, stone salvaged from the ruined structure was used to build Cabot Tower (Plate 9), which was constructed to mark the 400th anniversary of John Cabot's discovery of Newfoundland. The tower was designed by local architect W.H. Greene and built by local stone mason Samuel Garrett at a cost of $7,000. The corner stone was laid by Archbishop Howley on June 22, 1897 and it opened three years later. The building replaced an earlier wooden structure used to signal the arrival of ships. It was at Cabot Tower that Guglielmo Marconi received the first transatlantic wireless signal in 1901. Cabot Tower is part of the Signal Hill national historic site operated by Parks Canada.

Samuel Garrett used stone left over from the construction of Cabot Tower and salvaged from the ruins of St. Georges Hospital to construct a series of four stone houses, the Samuel Garrett Houses on Temperance Street in St. John's, as wedding presents for his four daughters. The two-storey red sandstone buildings have mansard-style slate roofs and 2-ft-thick walls (Plate 10). To prevent rot and to provide insulation, an airspace separates the inner wooden wall from the outer stonewall. The Samuel Garrett Houses are registered heritage buildings.

During the latter part of the 19th century, stone lighthouses were constructed at Rose Blanche on the southwest coast, on Belle Isle near the tip of the Great Northern Peninsula, and on Puffin Island near Greenspond on the northeast coast. Both the Belle Isle and Puffin Island lighthouses have long since been demolished. The Rose Blanche lighthouse (Plate 11), which was built prior to 1873, was designed by lighthouse engineers D. and T. Stevenson of Edinburgh, Scotland. It was built using stone quarried from the underlying Rose Blanche Granite. After being decommissioned in the 1940s the lighthouse fell into disrepair and was in danger of total collapse. In 1988, the South West Coast Development Association assumed the lead role in restoring the structure. Restoration began in 1996 and was completed in 1999. Restoration included training local people in stone quarrying and stone masonry. Newfoundland slate from Britannia Cove was used for the roof. The building, which is the only remaining stone lighthouse on the eastern seaboard, is a registered heritage building and is open seasonally to the general public.

In 1889, Robert Gillespie Reid, a Scottish railway bridge builder, was contracted by the Newfoundland government to continue construction of the narrow gauge railway. The railway from St. John's to Port aux Basques was completed in 1898. To provide stone for trestle abutments, Reid operated quarries near Northern Bight, Benton and at The Quarry (Plate 12) located near the Gaff Topsails. In 1898, he was contracted to built a railway station (Plate 13) at the west end of Water Street and pave the street with granite cobble. Stone for the station and the street was obtained from The Quarry where about three dozen men laboured between 1898 and 1901 quarrying thousands of tons of granite and loading the large blocks on flatcars bound for St. John's (Plate 14) (Martin, 1983). Paving stone for Water Street was also quarried in 1898 from a small granite quarry at Petites (Plate 15) on the southwest coast of Newfoundland. Stone from the Petites quarry was also used for facing stone on the impressive St. John's Court House (Plate 16).

In 1910, a small quarry was opened at Old Bay located to the east of Harbour Breton and about 1200 tons of stone was exported to Nova Scotia before operations ceased in 1914. Stone from Old Bay was incorporated into the memorial to Sir John Guy at Cupids (Martin, 1983) (Plate 17).

The first recorded attempt at quarrying slate was in 1847 from a quarry at Great Cove, near Brigus, owned by Charles Fox Bennett (Martin, 1983). The slate was to have been quarried for local consumption; however, the Welsh slaters who worked the quarry had little success and the venture closed after two years.

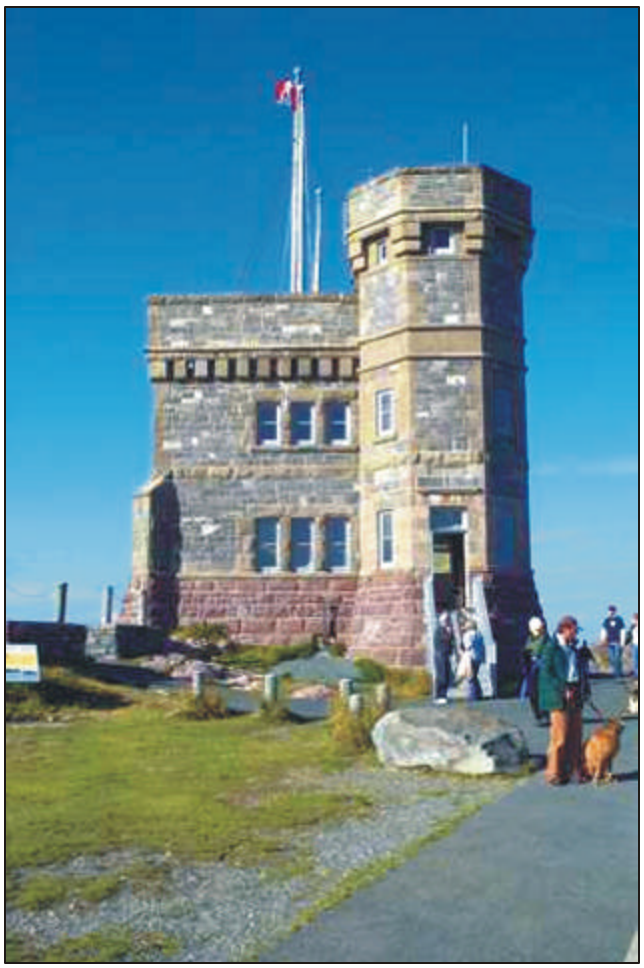


Plate 9. *Cabot Tower, St. John's, Newfoundland.*

The Random Sound area of Trinity Bay is in part underlain by units of purple, green and red slate. Exposed on the north side of Smith Sound are deposits of high-quality slate suitable for roofing material. In the 1850s, the first of the Trinity Bay slate quarries opened at Nut Cove (also known as Burn Point or Britannia Cove) on the north shore of Smith Sound (Martin, 1983). The quarry, which supplied slate both to local and export markets, was operated by the Carberry Family until 1900. Although the slate was of high quality, the Carberry quarry suffered from weak local markets. In 1860, John Currie, a Welsh slater, opened a quarry adjacent to the Nut Cove quarry. This operation was operated seasonally by the Currie family until 1899 when the operation was purchased by A.J. Harvey. Harvey subsequently formed the Newfoundland Slate Company Limited and in 1900 purchased the nearby Nut Cove quarry. The Newfoundland Slate Company renovated the operation and continued exporting slate until 1906 when through a combination of mismanagement and poor quarry practices, the operation closed. Three smaller slate quarries operated sporadically on nearby Random Island with the last quarry closing in 1910. It is reported that between 1865 and 1909, 153,702 squares of finished roofing slate were produced, the bulk of which was shipped to England (Murray and Howley, 1909).

Plate 10. *The Samuel Garrett or Temperence Street Houses, St. John's Newfoundland.*

Plate 11. *The restored Rose Blanche Lighthouse.*

Plate 12. *Cut granite blocks stockpiled at The Quarry (1898-1901), Topsails Plateau, central Newfoundland.*

Plate 13. *The Railway Station, St. John's Newfoundland.*

Plate 14. *Topsail's quarry, circa 1898, central Newfoundland.*

Plate 15. *Petits quarry, southwestern Newfoundland.*

Plate 16. *St. John's Court House, built 1897.*

Between 1901 and 1909, a number of unsuccessful attempts were made to develop slate quarries at Summerside and Birchy Bay on the west coast of Newfoundland (Martin, 1983). Mismanagement, misfortune, and low slate prices plagued both ventures and by 1909, quarrying had ceased without any slate having been shipped.

During the 19th and early 20th centuries, several unsuccessful attempts were made to quarry marble from western Newfoundland (Martin, 1983). Small shipments of marble were sent to England from the Canada Bay area in the mid 1860s, and in 1881 from the Humber River area east of Corner Brook. Between 1912 and 1915, an attempt was again made to quarry marble from the Canada Bay area. Infrastructure was put into place and local people were trained; however, the onset of First World War forced the closure of the operation.

Plate 17. *Sir John Guy Monument at Cupids, eastern Newfoundland.*

THE REVIVAL OF THE DIMENSION-STONE INDUSTRY

In 1959, as part of a regional industrial-mineral-exploration program in northern Labrador, Brinex Limited examined several labradorite occurrences in the Nain area. The Ten Mile Bay area was identified as having the best potential for dimension stone and in 1960 a number of test blocks were extracted with the assistance of National Granite Limited (Brinex, 1961). Polished slabs were prepared by National Granite Limited and the Rock of Ages Corporation in Vermont, and marketed as "Blue Granite". Physical and chemical testing of samples was completed by the Industrial Minerals Division of the Department of Energy, Mines and Resources in Ottawa. Test results were positive, but demand for the stone didn't materialize and the project was shelved (Beaven, 1966).

Beginning in 1980, the Department of Mines and Energy initiated a series of dimension-stone resource-assessment projects. These projects are briefly outlined in Appendix 2. Quarry demonstration projects were also carried out at Ten Mile Bay, Lumsden and in the Mount Peyton area. In 1988, a building-stone demonstration project saw the establishment of a small wire saw and polishing plant at Corner Brook (Agricola Mineralia, 1988). Six potential dimension-stone sites were examined and stone was obtained from five of the sites. Two of these areas have since become successful quarrying operations. The details of these projects are described further below.

Not all of the dimension-stone operations established in the province have met with success. In 1991, a joint venture was formed between Newfoundland Slate Incorporated and the Miller-McAsphalt Group from Ontario to manufacture roofing slate. A roofing slate plant was constructed at Burgoynes Cove to process slate from the nearby Nut Cove quarry. In 1995, slate production at the plant peaked at 4,700 tonnes; however, this operation closed in 1998. Also, during the early 1990s, North Atlantic Stone Incorporated, a joint venture between Classic Stone Incorporated and Kenny's Granite Works Limited, opened an integrated dimension plant in Buchans to process stone from several potential quarry sites throughout central Newfoundland including stone from the Mount Peyton area. The operation closed in 1998.

In August, 2000 Epoch Rock Incorporated initiated construction of a $20-million dollar gang saw factory at Argentia (Figure 2a). The plant had six Breton gang saws capable of handling blocks up to 35 tonnes and a single 19-head Breton polisher. Commercial and private sector sources accounted for approximately 90 percent of the funding for the operation. The Argentia site had been selected to take advantage of: 1) the former U.S. naval facility, a deep-water port close to major shipping roots; 2) duty-free access to U.S. markets under NAFTA; 3) a North American office, located within a convenient time zone and where English is the business language; and 4) a large lay-down area with a 52,000 sq. ft. (4830 m^2) warehouse, which would allow for a substantial inventory insuring prompt product delivery. In early November, 2001, the 42,000 sq. ft. (3900 m^2) facility was placed into production. The plant ceased operation in September 2003.

PROVINCIAL DIMENSION-STONE PRODUCERS

The Province of Newfoundland and Labrador currently has three dimension-stone quarrying and fabrication operations, and two operations quarrying landscaping stone for local and export markets. These operations include:

1) Torngait Ujaganniavingit Corporation, which operates anorthosite quarries at Ten Mile Bay and Igiak Bay in northern Labrador, and processing plants at Ten Mile Bay and Hopedale. A third quarry is planned for Windy Hill near Rigolet;

2) International Granite Corporation/Cabot Granite Fabricators Incorporated, which operates a black granite (gabbro) quarry and monument plant at Borney Lake/Jumper's Brook in central Newfoundland;

3) Hurley SlateWorks Limited which operates a quarry and roofing slate plant at Britannia Cove in eastern Newfoundland;

4) Carew Services Limited, which operates a stone yard in Portugal Cove and landscaping stone quarries at Upper Island Cove, Twillick Brook and Pynn's Brook; and

5) Fisher Hills Bluestone, which operates a landscaping stone quarry near Pynn's Brook, western Newfoundland.

Ten Mile Bay

Location and Access

The Ten Mile Bay quarry and fabrication plant are situated on the west side of Paul Island about 10 km southeast of Nain, northern Labrador (Figure 3). The community of Nain is serviced by a regularly scheduled air service from Goose Bay, and by passenger boats and freighters. The Ten Mile Bay quarry is a seasonal operation, accessible by boat 5 to 6 months per year.

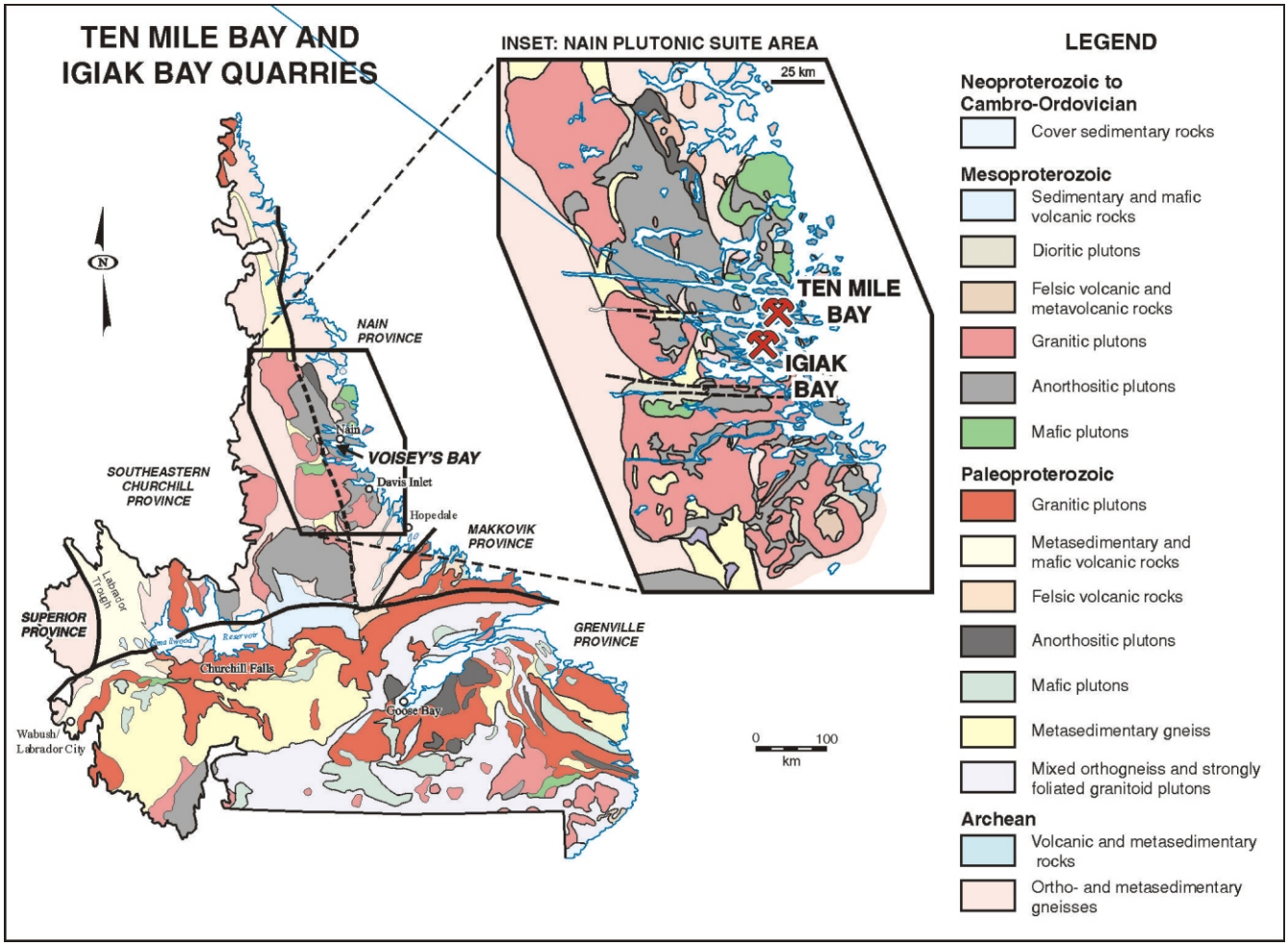


Figure 3. *Geological map showing the location of the Ten Mile Bay and Igiak Bay quarries and the distribution of the Nain Intrusive Suite (modified from Kerr, 2000).*

History of Development and Production

The 1986, the Department of Mines and Energy regional evaluation of the dimension-stone potential of the Nain anorthosite identified the Ten Mile Bay site as having the best potential for development. Test blocks were quarried, slabbed and polished and displayed at various geological and mining conferences (Meyer and Montague, 1994). The anorthosite from Ten Mile Bay is fine to medium grained, uniform light grey in colour, with between 12 to 20 percent of the labradorite crystals displaying the blue iridescence or chatoyancy (Plate 18).

In 1987, slabs of the Ten Mile Bay anorthosite displayed at a Baie Comeau trade show, Quebec, attracted the attention of a Quebec entrepreneur who in turn showed a sample to Italian dimension-stone geologist Attilio Bencaster. Bencaster visited the Ten Mile Bay site with representatives of the Labrador Inuit Development Corporation (LIDC) and the Department of Mines and Energy. A 10-tonne test block was extracted by the LIDC and the Department of Mines and Energy and shipped to

Plate 18. *Polished slab of Ten Mile Bay anorthosite showing the blue iridescence or chatoyancy which gives the stone its trade name "Blue Eyes". Coin is 2.7 cm. in diameter.*

Plate 19. *Ten Mile Bay Quarry, near Nain, Labrador (photo courtesy of the Torngat Ujaganniavingit Corporation).*

Plate 20. *Ten Mile Bay Quarry (photo courtesy of the Torngat Ujaganniavingit Corporation).*

Italy. Market response was positive and a marketing agreement was signed in 1992 between Torngait Ujaganniavingit Corporation (TUC), a subsidiary of the LIDC, and Wibestone A.G. to buy all of the quarry's production and to pay the LIDC 60 percent of the value of the anorthosite blocks, once the blocks were quarried, shaped and stockpiled (Meyer and Montague, 1994). The stone is marketed by Wibestone A.G. under the trade name "Blue Eyes" to fabricators in Europe and North American; raw block fetches a premium price per cubic metre.

During the winter and spring of 1992, the LIDC financed quarry equipment with the support of the Atlantic Canada Opportunities Agency (ACOA), Enterprise Newfoundland and Labrador, the Canadian Aboriginal Business Development Program and the Department of Mines and Energy. A small quarry was opened in the summer of 1992 under the supervision of two experienced quarrymen from Grainmax Limited of Quebec and production amounted to 16 blocks. During the winter of 1993, the local quarry crew were trained in quarry techniques.

In 1994, the operation produced more than 500 cubic metres of trimmed block. Since then, the operation has expanded considerably with in excess of 1500 cubic metres of stone exported annually (Plates 19 and 20). Large blocks are quarried using a combination of drilling, diamond wire sawing and occasionally low-grade detonating cord. Hydraulic drilling machines are used to cut out production-size blocks from 200 tonne slabs. These production-size blocks are trimmed, squared and stockpiled for shipment to Italy. Stone processing plants have also been established at Ten Mile Bay (Plate 21) and Hopedale to utilize undersize and B-grade block.

In 2001, a quarry was opened at Igiak Bay, Kikkertavok Island (Plate 22), approximately 20 km south of Nain. The quarried rock is a brownish anorthosite exhibiting large, multicoloured labradorite crystals that is marketed under the trade name Arctic Rainbow.

Local Geology

The Ten Mile Bay area is underlain by anorthosite of the Middle Proterozoic Nain Plutonic Suite (Ryan, 1991, 1995) that underlies approximately 20,000 km^2 of northern Labrador (Figure 3). The Nain Plutonic Suite straddles the collisional contact between the Archean Nain Province and the Early Proterozic Churchill Province and is one of several large anorthosite-granite massifs occurring north of the Grenville Front (Ryan, 1995). The suite is composed of anorthositic, troctolitic, dioritic and granitic plutons that intruded between 1350 Ma and 1290 Ma (Ryan and Emslie, 1994). Internally most of the suite is undeformed. However, some of the suite shows evidence of deformation related to emplacement.

The following description of the local geology of the Ten Mile Bay area is taken from Meyer and Montague (1994).

"The anorthosite being quarried at Ten Mile Bay is a very high value stone, due to its unique and extremely attractive appearance.... Blue chatoyant labradorite crystals averaging a little over 1 cm in size are set in a soft medium grey background composed of labradorite crystals which don't show blue colour because of their orientation on the cut and polished surface being viewed. When viewed from every possible angle, almost all of the labradorite crystals display chatoyancy. The resulting effect is one of "winking blue eyes" when walking past a large slab of this stone. The subangular crystals are not tightly interlocking, but nicely separated by 0.5 to 2.0 mm white margins consisting of fine grained (crushed ?) labradorite. The stone's extremely consistent appearance is enhanced by a subtle banding defined by discontinuous pyroxene-biotite foliae (up to 5%), which give gentle " movement" to the stone's appearance, and diminish the effect of any rare imperfections.

Within the quarry there is a strong rift direction (105 /20 N), which is manifested by strong joint planes running parallel to the length of the bay and dipping towards it. These persistent joint planes are gently undulating, not perfectly parallel, and may be a result of stresses induced by glacial rebound. The joints are not controlled by, but may be influenced by, the discontinuous pyroxene-biotite foliation in the anorthosite, which also strike approximately east-west, and dip gently into the hill."

"The strong north-dipping joint planes ("rift") have vertical spacing of as little as 25 cm near surface, but quickly increase to over 1.75 m, especially along the eastern side of the quarry."

Plate 21. *Ten Mile Bay Quarry (photo courtesy of the Torngat Ujaganniavingit Corporation).*

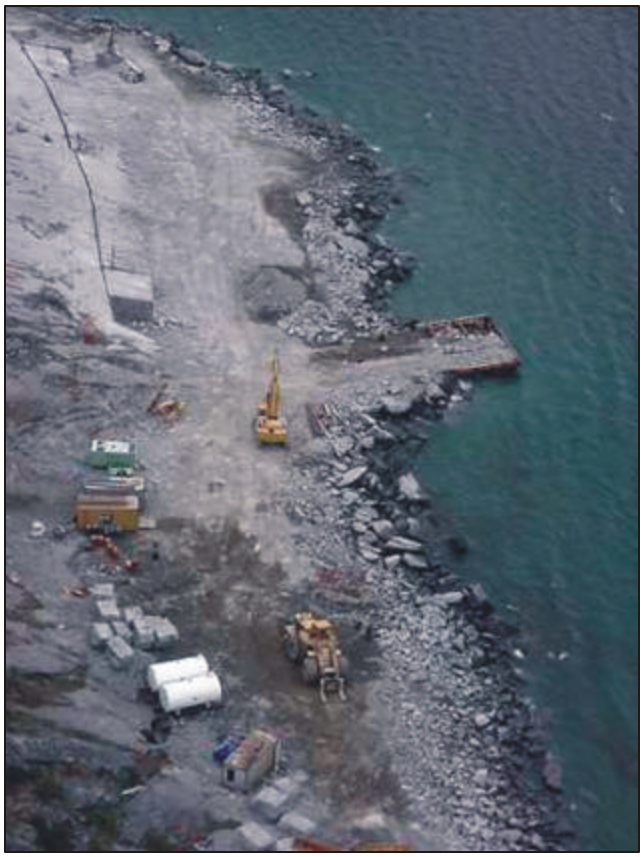


Plate 22. *Igiak Bay Quarry (photo courtesy of the Torngat Ujaganniavingit Corporation).*

Finger Pond - Jumpers Brook

Location and Access

The Borney Lake Quarry # 5 is located approximately 10 km southeast of the community of Bishop's Falls (Figures 4a and 4b). In 2002, with reserves almost exhausted in Quarry # 5, the Finger Pond quarry was opened approximately 5 km southwest of the plant. A well-maintained gravel road connects the quarry and plant with the Trans-Canada Highway immediately east of Jumper's Brook. The quarry is a seasonal operation with stone quarried and stockpiled adjacent to the plant that operates year round.

History of Production and Development

In 1982, the Department of Mines and Energy undertook an initial assessment of the Mount Peyton Intrusive Suite as a potential source of dimension stone. A trial quarry was established at Amy's Lake in 1985, but the site was not viable. Stone

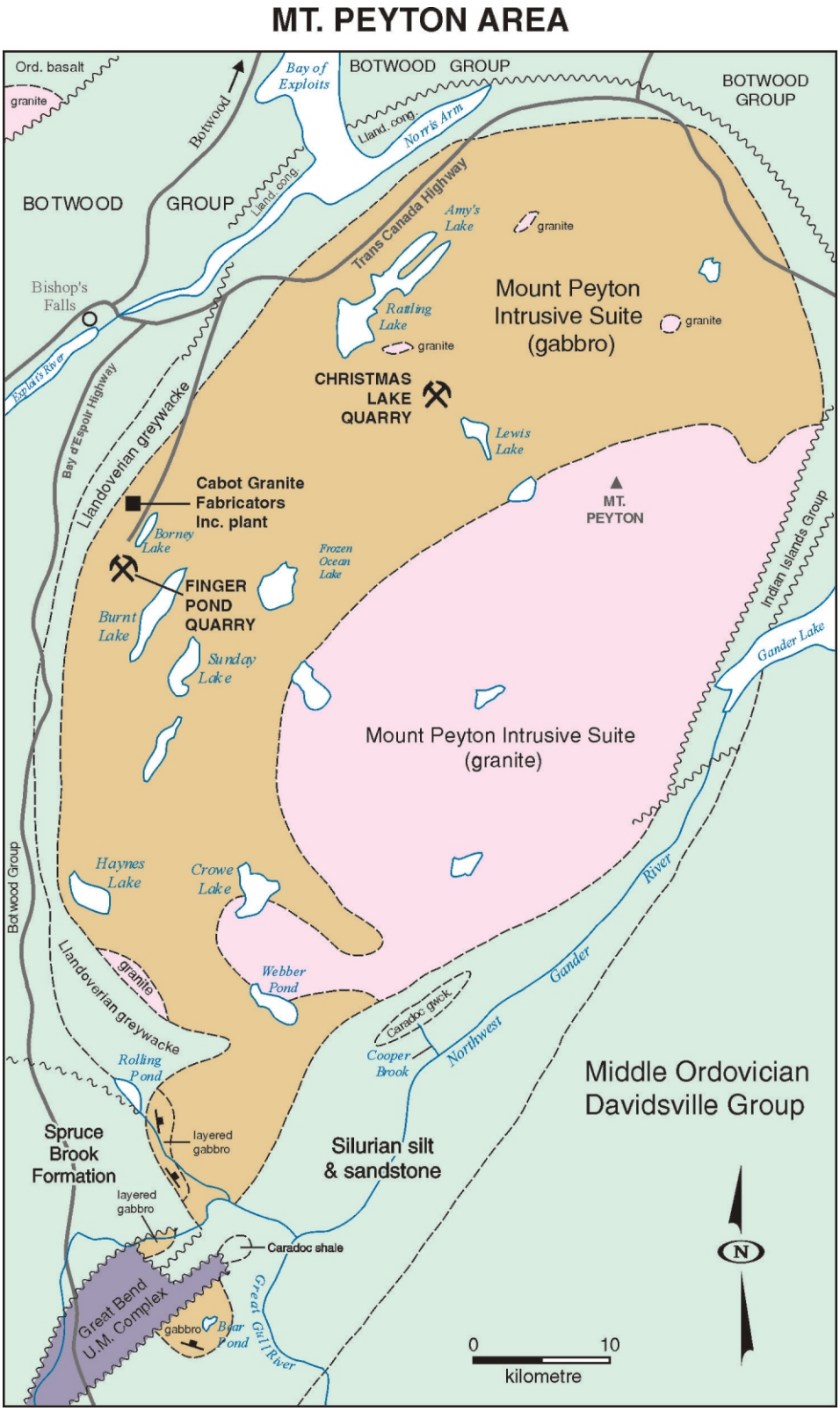
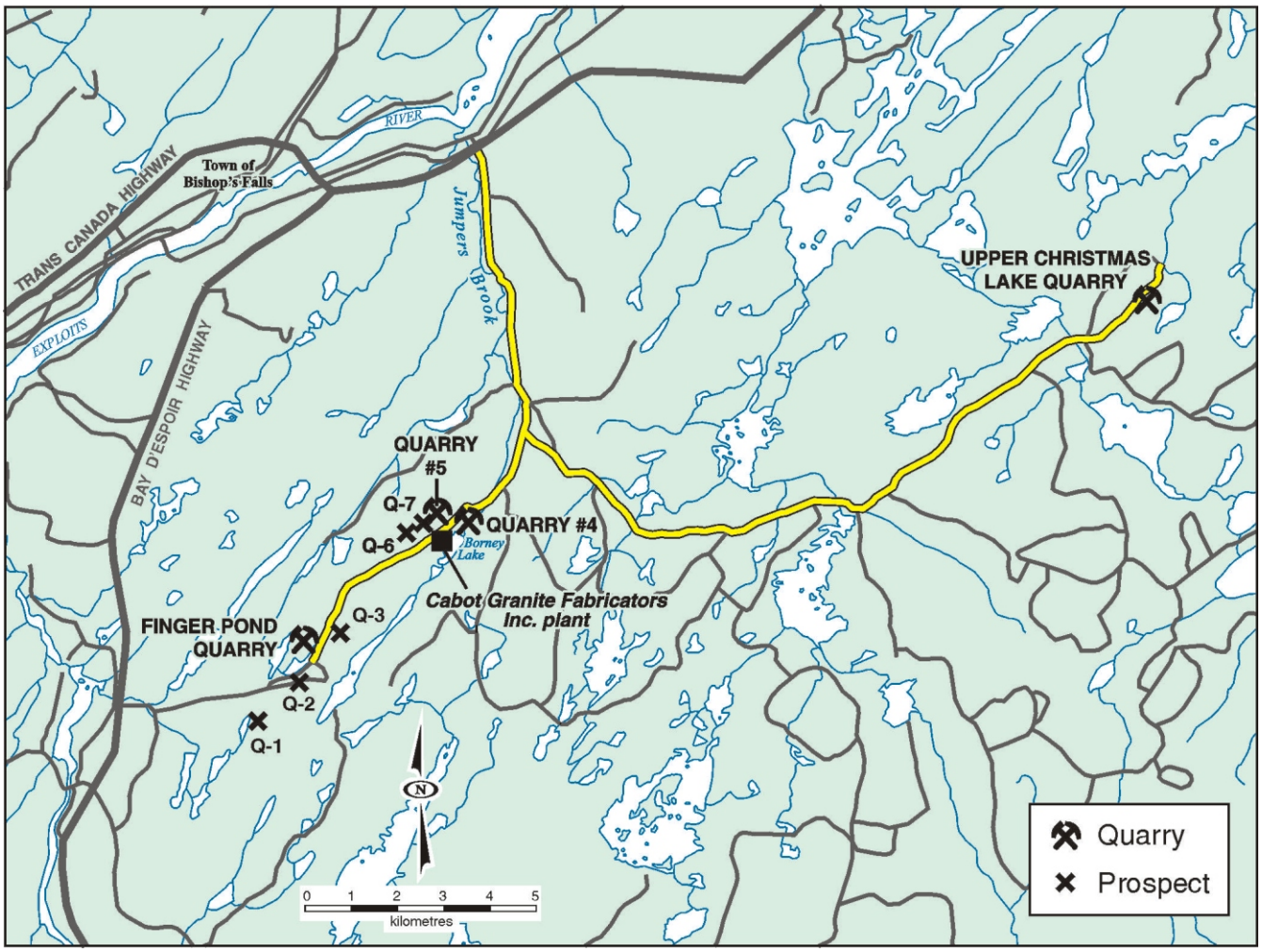


Figure 4. *(A) Geological map of the Mount Peyton area, showing the location of the International Granite Corporation quarries and the Cabot Granite Fabrication Incorporated plant (modified from Dickson, 1993); (B) Map showing the locations of quarry sites and prospects in the Borney Lake/Jumpers Brook area.*

QUARRY SITES AND PROSPECTS IN THE BORNEY LAKE/ JUMPERS BROOK AREA



from the Amy's Lake site did generate interest and in 1990 the Mount Peyton Granite Company Limited opened a trial quarry, 1 km west of the south end of Borney Lake. The greenish-black stone was very attractive, but textural problems limited its use as a monument stone.

In 1992, Mount Peyton Granite Company and Classic Stone Incorporated formed a partnership to develop quarries in the Borney Lake area and four quarry sites were opened. A total of seven potential quarry sites were identified (Figure 4b), but initial efforts focused on Quarry #4. During 1994-1995, North Atlantic Stone Incorporated was formed and an integrated dimension-stone fabrication plant was built in Buchans to process stone from Quarry # 4 (Plate 23) and other nearby sites. The black gabbro was marketed under the trade name "Ebony Black". However, by 1995, quarrying difficulties and problems with continuity of monument-grade stone in Quarry #4 required that a new source of black granite be identified. International Granite Corporation, which is part of the Gander-based Pritchett Group of Companies, completed a detailed geological mapping and diamond-drill program that led to the opening, in September, 1995, of Quarry #5 from which most of the subsequent production occurred (Plates 24 and 25). Continued exploration also resulted in the opening of the Upper Christmas Lake quarry, but textural variations forced its closure (Plate 26).

Quarry #4, and subsequently Quarry #5, initially supplied stone to North Atlantic Stone's Buchans integrated stone plant, which ceased operation in July, 1998. In January, 1998 Cabot Granite Fabricators Incorporated, a subsidiary of International Granite Corporation, opened a 20,000 square foot monument stone fabrication facility (Plate 27) adjacent to Quarry #5 near Jumpers Brook - Borney Lake. The fabrication facility operates on a two shift schedule. Sales and marketing of product from

Plate 23. *The abandoned Quarry #4, Jumpers Brook, central Newfoundland.*

Plate 24. *The abandoned Quarry #5, Jumpers Brook, central Newfoundland.*

Plate 25. *The abandoned Quarry #5, Jumpers Brook, central Newfoundland.*

Plate 26. *Variably textured gabbro, Upper Christmas Lake quarry, central Newfoundland.*

Plate 27. *Cabot Granite Fabricators Inc. 20,000 sq. ft. monument plant, Jumpers Brook, central Newfoundland.*

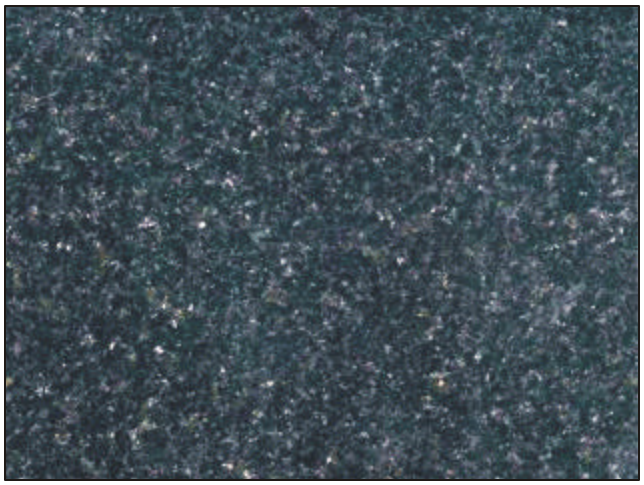


Plate 28. *Polished slab of the Mount Peyton gabbro which is marketed under the trade name "Ebony Black".*

the Jumpers Brook plant are handled by Newfoundland Quarries Incorporated. Black granite (gabbro; Plate 28) is the primary stone used in the plant. However, International Granite also provides the plant with red, pink and grey granites from sites near Seal Cove, Hodges Hill and Comfort Cove. Current production focuses on monument blanks and slabs for export, and engraved monument stone for local use, and work is under way to diversify and create other product lines. Cabot Granite Fabricators provided finished stone for the provincial museum and archive complex "The Rooms" located in St. John's.

By 2001, much of the accessible stone in Quarry #5 had been removed, necessitating the identification of a new source of black gabbro. In 2002, exploration approximately 5 km southwest of the Jumpers Brook plant identified a new resource of high-quality black gabbro near Finger Pond (Plates 29 and 30). Road access was established and a quarry developed. Diamond wire saws are used to detach large panels of black gabbro. Quarry bars (Plate 30) and plugs and feathers (Plate 31) are used to extract production-size blocks which are trucked to the Jumpers Brook plant for processing.

Local Geology

Both the Finger Pond and Quarry # 5 are located within the gabbroic phase of the extensive, Silurian Mount Peyton Intrusive Suite (Figure 4a; Dickson, 1993). The ovoid-shaped batholith underlies about 1400 km^2 of north-central Newfoundland. The dominant rock types include dark-grey, fine-grained, equigranular, pyroxene, ± hornblende ± biotite gabbro and pink, medium-grained, equigranular, biotite granite.

In the Borney Lake area, the gabbroic rocks are well exposed along a series of northeast-trending ridges and along

Plate 29. *Quarry bar setup, Finger Pond quarry, Jumpers Brook, central Newfoundland.*

Plate 30. *Block extraction, Finger Pond quarry, Jumpers Brook, central Newfoundland.*

Plate 31. *Splitting a large block into production blocks using plug and feathers, Finger Pond quarry, Jumpers Brook.*

the shoreline of Borney Lake (Tomlin, 1982a,b). Tomlin (1982a) noted that the gabbro is massive and exhibits two prominent joint directions, which trend 30° and 110°. Gabbro underlying the Borney Lake area is typically black and is composed of 50 percent plagioclase, 30 to 40 percent pyroxene, up to 15 percent hornblende, 3 to 7 percent quartz, 3 percent opaques and minor biotite. On broken surfaces, the stone is grey, but upon polishing, the stone achieves a glossy black finish. Geological fieldwork by Sherry Dunsworth has identified three main subunits of gabbro in the Borney Lake area. These are 1) massive homogeneous black gabbro (Ebony Black and Ebony Mist), 2) finely layered gabbro, and 3) variably textured gabbro. The units are related to an inclined, layered geometry that formed along the margins of a magma chamber. Orthogonal joints are 1 to 3 metres apart and formed as a result of cooling of the gabbro.

Britannia Cove/Nut Cove

Location and Access

The Hurley Slateworks Company Britannia Cove quarry and plant are located on the north side of Smiths Sound (Figure 5). A gravel road links the quarry with the nearby community of Burgoynes Cove, which is approximately 34 km by road from Clarenville.

History of Production and Development

The Britannia Cove or Nut Cove quarry was operated from the 1850s until 1900 (Martin, 1983). An adjacent quarry was opened in 1860 and seasonal production continued until 1906. Most of the slate was exported but numerous buildings, particularly in the older portions of St. John's, have Nut Cove slate roofs.

The inactive slate quarry was purchased in the mid-1980s and subsequently leased to Newfoundland Slate Inc. In 1991, a joint venture was formed between Newfoundland Slate Inc. and the Miller-McAsphalt Group from Ontario. Ardoisieres d'Angers, a major French slate producer, became interested in the development and formed an arrangement to distribute slate to European markets. The French company provided technical assistance with quarry and plant design, training and equipment. A 36,000 ft^2 modern roofing slate plant was constructed near Burgoynes Cove and quarry development work proceeded. An access road was constructed from the plant to the quarry. In 1994, Newfoundland Slate severed its ties with Ardoisieres d'Angers after a weak European market prevented Ardoisieres d'Angers from fulfilling its contract agreements. Newfoundland Slate developed its own markets and by 1995 slate production peaked at 4700 tonnes and the operation employed more than 60 people. The company produced purple and green roofing slate, which was marketed under the trade name "Trinity Slate", flooring tiles and flagstone. The operation closed in 1998.

In 2000, the locally owned Hurley Slateworks Company reactivated the quarry and built a new roofing slate production facility adjacent to the quarry (Plate 32). Slate is currently extracted using two Shell Saws capable of making horizontal and vertical cuts (Plate 33). When in production, the company employs up to 45 people and distributes finished product in 12 countries (Plate 34 and 35).

Local Geology

The Britannia Cove area is underlain by slate of the Bonavista Formation of the Lower Cambrian Adeyton Group (Figure 5). The formation comprises red, green and purple slate, shale, thin limestone beds and local quartz-pebble conglomerate at the base. The Bonavista Formation is underlain by quartzite of the Random Formation. The Bonavista Formation has a discontinuous strike length of 50 km and is host to several other potential slate deposits at Keels and Random Island and the former Allison and Winter quarries on Random Island.

The Nut Cove deposit, which sits in the hinge of a 2-km-long gently south-southeast-plunging syncline (Blackwood, 1993), has approximately 65 years of reserves. The deposit is composed of approximately 65 percent purple slate and 35 percent green slate (Blackwood, 1993). Minor red-purple, blue-green and grey slate are also present.

FLAGSTONE OPERATIONS

A number of small quarries have operated sporadically as sources of landscaping stone. Two companies currently quarrying landscaping stone are Fisher Hills Bluestone and Carew Services. In 1993, Fisher Hills Bluestone established a small

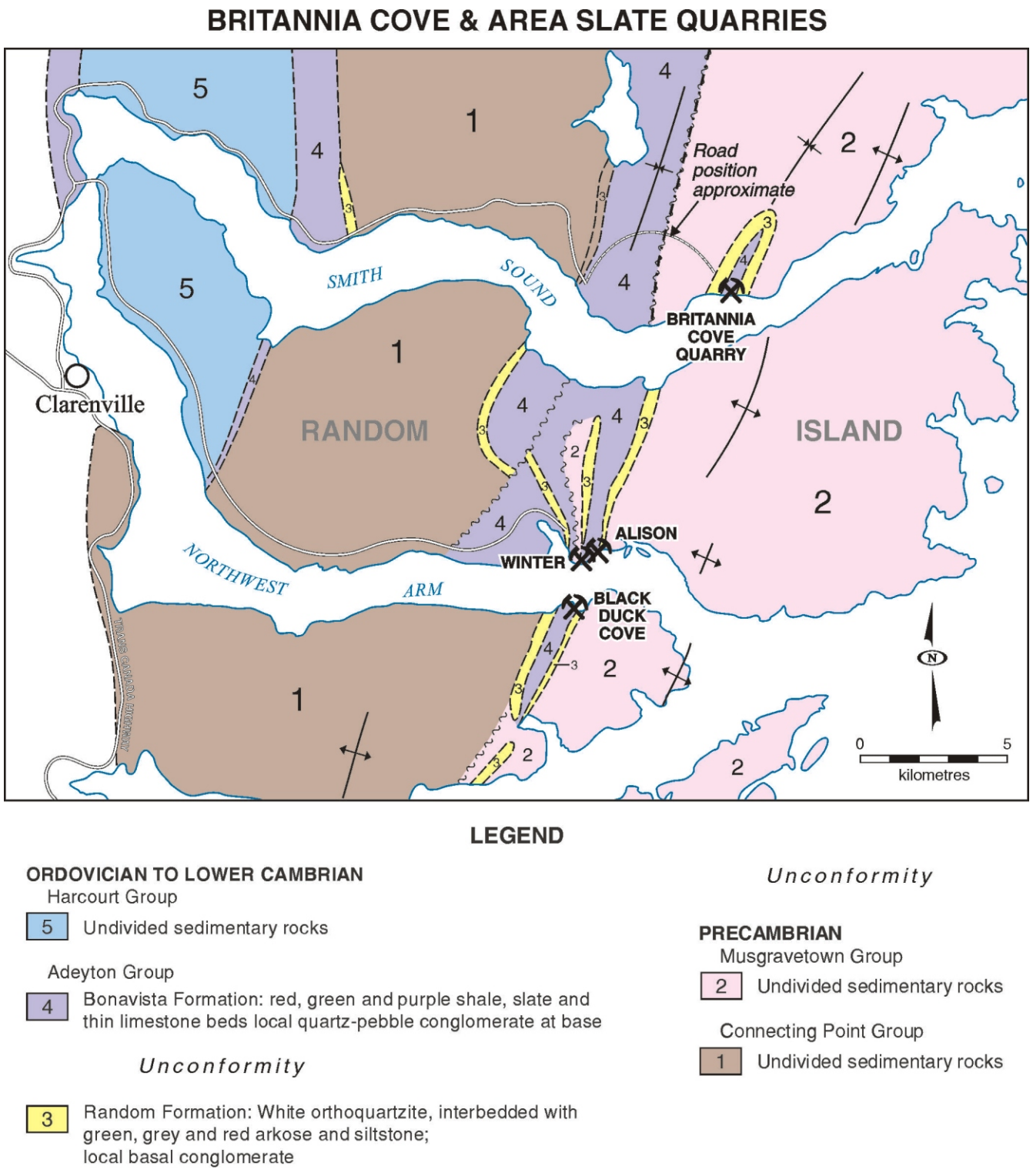


Figure 5. *Geological map of the Random Island area showing the location of the Britannia Cove quarry (modified from King, 1988).*

quarry near Pynn's Brook (Figure 6) to provide flagstone for the local market. Access was established and a small stone guillotine was purchased to break stone (Plate 36). The quarry accesses micaeous, blue-grey to green fine-grained sandstone of the Carboniferous Saltwater Cove Formation. The sandstone contains micaeous partings that produce excellent flagstone suitable for walkways, patios and retaining walls. Production from the quarry is seasonal.

Plate 32. *The Britannia Cove quarry, eastern Newfoundland. The roofing tile plant is located on the far side of the quarry.*

Plate 33. *Rotary saws used to extract slate from the Britannia Cove quarry.*

History of Production and Development

Initial dimension-stone prospecting of the area was undertaken by Mr. Bill Mercer of Badger and in 1993 test blocks were sent to Nelson Monuments for polishing. Interest in the fine-grained red granite lead to an arrangement in 1994 with Classic Stone Incorporated. In 1994, the Department of Mines and Energy completed a study of the dimension-stone potential of the Hodges Hill area between Badger and Grand Falls-Windsor (Kerr, 1995; Figure 8). The study examined 12 previously defined sites and identified 3 other potential sites. Some development work and test block removal was undertaken in 1994, including quarrying of greenish orange, coarse-grained granite from Site 3.

In 1995, the property was obtained by International Granite Corporation, which undertook geological mapping and trial quarrying at a number of sites including an attempt to quarry the red granite exposed approximately 1 km east of Cornfield Pond (Kerr, 1995). However, the granite was found to be too fractured for block extraction. In 2000, International Granite Corporation completed a geological assessment of another area of pink granite about 3 km to the east (Figure 8). The area was tested with 9 short diamond-drill holes and a production decision was made. The quarry is developed near the top of a rounded hill that rises about 250 m about the surrounding area (Plates 41 and 42). Several areas have been excavated and numerous blocks have been removed to the Jumper's Brook plant. The stone, which is named “Salmon Pink” (Plate 43), was used for architectural stone in "The Rooms" museum project in St. John’s.

Carew Services Limited operates a large stone yard in Portugal Cove supplying stone for both local, mainly the northeastern Avalon area, and export markets. A stone guillotine and various trim saws enable the company to cut and shape stone for a variety of landscaping options. The company obtains stone from its own quarries located at Pynn's Brook (Plate 37), Twillick Brook (Plate 38) and Upper Island Cove, and purchases stone from various sources. The Twillick Brook quarry is located on the west side of the Bay d'Espoir highway, south of the Twillick Brook bridge (Figure 7). The quarry exposes fine-grained dark grey to black siltstone and shale of the Salmon River Dam Formation, Baie d'Espoir Group. Flagstone obtained from the quarry is marketed in Atlantic Canada and the northeastern U.S. as Vinland Bluestone. Numerous examples of both the Pynn's Brook and Twillick Brook stone can be seen in walkways, patios, rock walls, and stairs throughout the city of St. John's (Plates 39 and 40).

PAST PRODUCERS, DORMANT QUARRIES AND DEVELOPED PROSPECTS

A number of quarries have been opened throughout the Province mainly for the extraction of test blocks. Several of these quarries have seen limited production or production upon demand and a brief discussion of the larger trial quarries is presented below. Appendix 3 gives a complete listing of the various quarry sites throughout the Province; for site locations refer to Figure 2.

Hodges Hill Quarry

Location and Access

The Hodges Hill quarry is located west of Grand Falls-Windsor, approximately 9 km north of the Trans-Canada Highway, and about 4 km east of Cornfield Pond (Figure 8). A good gravel road links the quarry site with the highway.

Plate 34. *Splitting slate with hydraulic splitters, Hurley Slateworks Company, Britannia Cove, eastern Newfoundland.*

Plate 35. *Finished roofing slate crated for shipment, Hurley Slateworks Company, Britannia Cove, eastern Newfoundland.*

Plate 36. *Landscaping stone, Fisher Hills Bluestone, Pynn's Brook, western Newfoundland.*

Plate 37. *Stacked flagstone at the Carew Services Ltd. quarry, Pynns, Brook, Western Newfoundland.*

Plate 38. *Twillick Brook bluestone quarry, Bay D'Espoir highway, southern Newfoundland.*

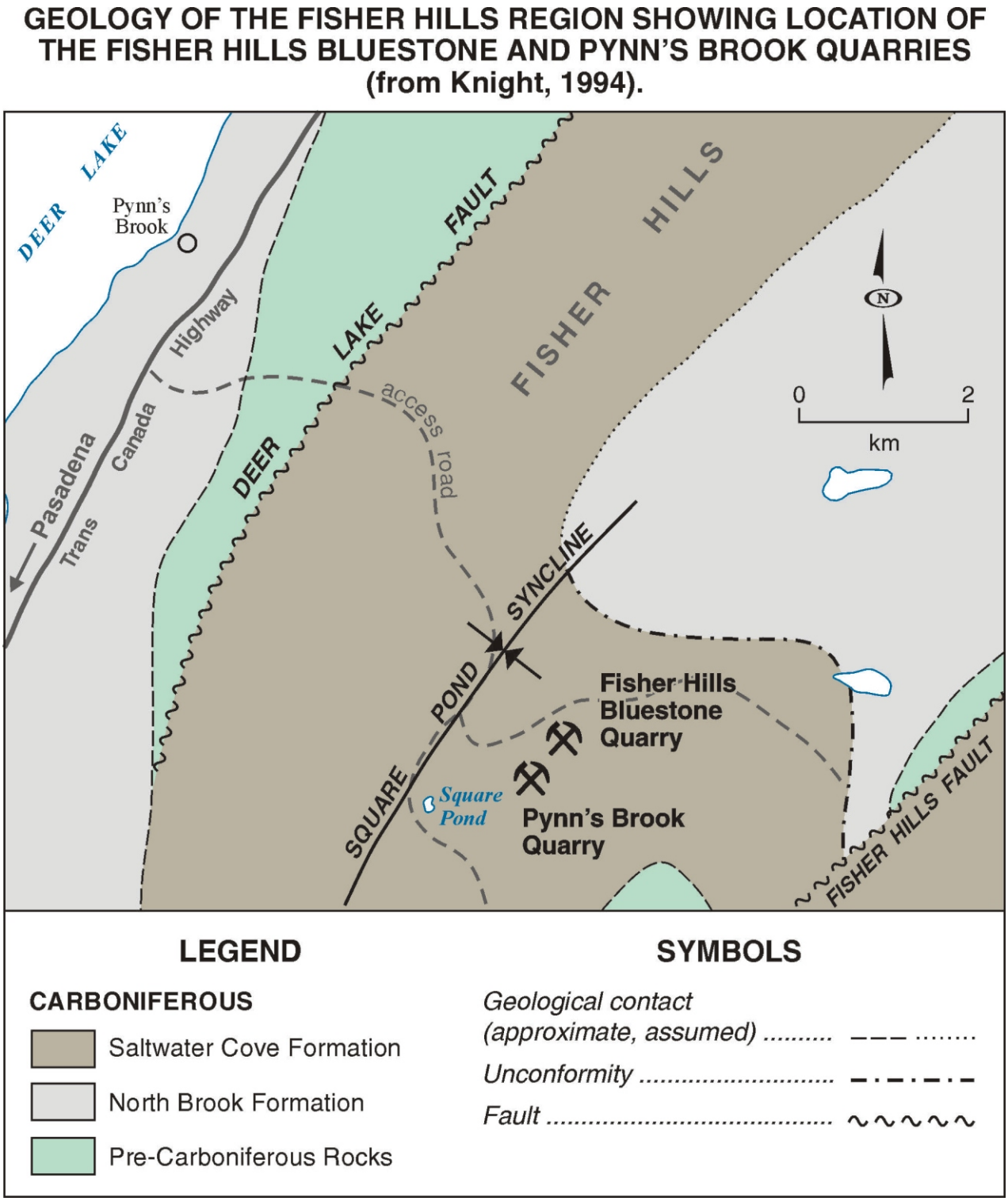


Figure 6. *Geological map of the Pynn's Brook area showing the locations of the Fisher Hills Bluestone quarry and the Pynn's Brook quarry (modified from Knight, 1994).*

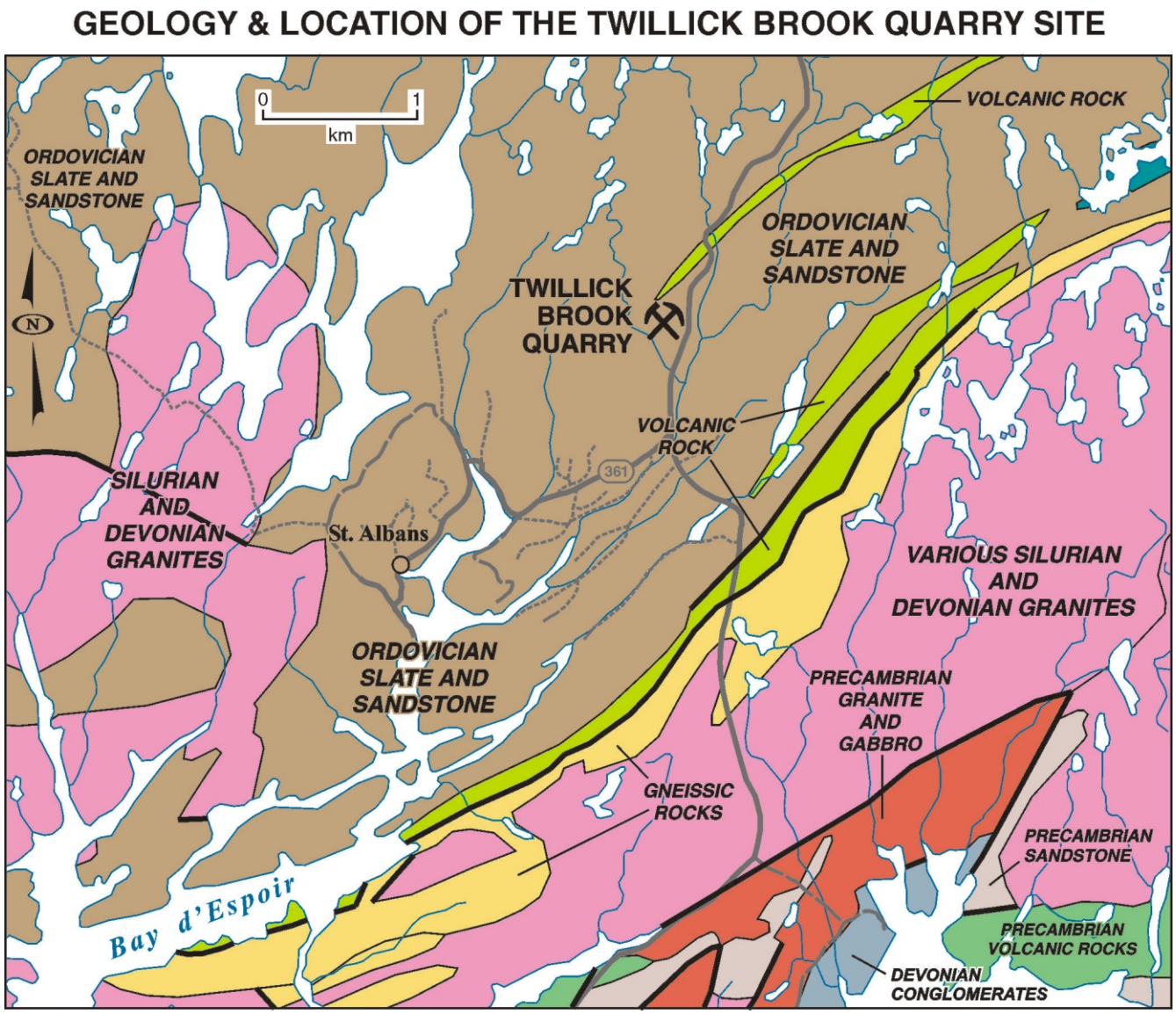


Figure 7. *Geological map of the Twillick Brook area including the Twillick Brook quarry site.*

Plate 39. *Twillick Brook and Pynn's Brook stone used in landscaping project in St. John's, Newfoundland.*

Plate 40. *Pynn's Brook stone used in landscaping project in St. John's.*

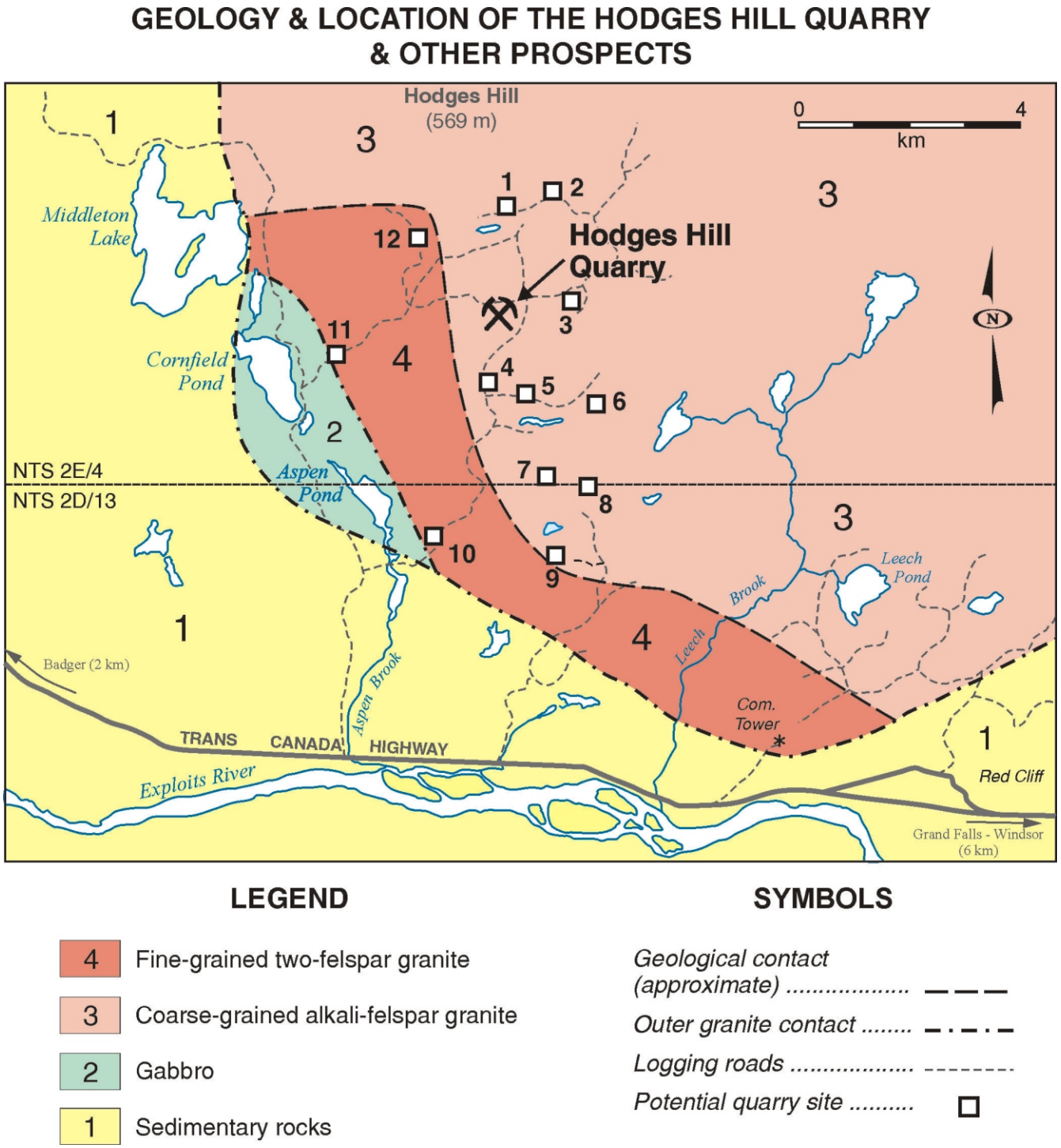


Figure 8. *Geological map of the Hodges Hill area (modified from Kerr, 1995). Also shown is the location of the Hodges Hill quarry and the prospects identified by Kerr (1995).*

Local Geology

The area north of the Trans-Canada Highway between Grand Falls-Windsor and Badger, is underlain by extensive pink granite of the Silurian Hodges Hills Intrusive Suite. The granite, which intrudes Ordovician to Silurian sedimentary rocks of the Badger Group, is in part peralkaline and resembles the Topsails Intrusive Suite (Kerr, 1995). Two distinctive granites have

Plate 41. *International Granite Corporation's Hodges Hill quarry, central Newfoundland.*

Plate 42. *Hodges Hill granite quarry face, central Newfoundland.*

Plate 43. *Hodges Hill granite marketed under the trade name "Salmon Pink".*

been identified in the area and these are a grey, buff to red, coarse-grained, alkali-feldspar granite and a marginal pink to red, fine-grained, variably porphyritic, two-feldspar granite (Figure 8).

Kerr (1995) reported that the intense orange and red colours observed in the granites were the product of post-magmatic alteration, and that the granites exhibiting these colours were typically more fractured and jointed than the green, buff or pink varieties. However, Kerr (1995) also stated that there were areas of orange and red granite exhibiting potential for quarry development and that these areas required further evaluation.

Seal Cove

Location and Access

The Seal Cove quarry is located on the Hermitage Peninsula, immediately north of Route 364 and approximately 5 km northeast of the town of Seal Cove (Figure 9). Access to the site is excellent.

History of Production and Development

The Mount Peyton Granite Company opened the initial quarry in 1990 with funding provided by the Atlantic Canada Opportunities Agency. Results were favourable and blocks up to 5 cubic metres were quarried and transported to Bay d'Espoir for shipment overseas for evaluation. The program was scuttled when the blocks couldn't be loaded for shipment. Classic Stone subsequently enlarged the quarry (Plate 44) through various government-funded training programs. The quarry is now operated by International Granite Corporation, which periodically quarries and trucks block to the Cabot Granite Inc. facility near Jumpers Brook. The stone is marketed under the trade name "Autumn Rose" (Plates 45 and 46) and is used main-

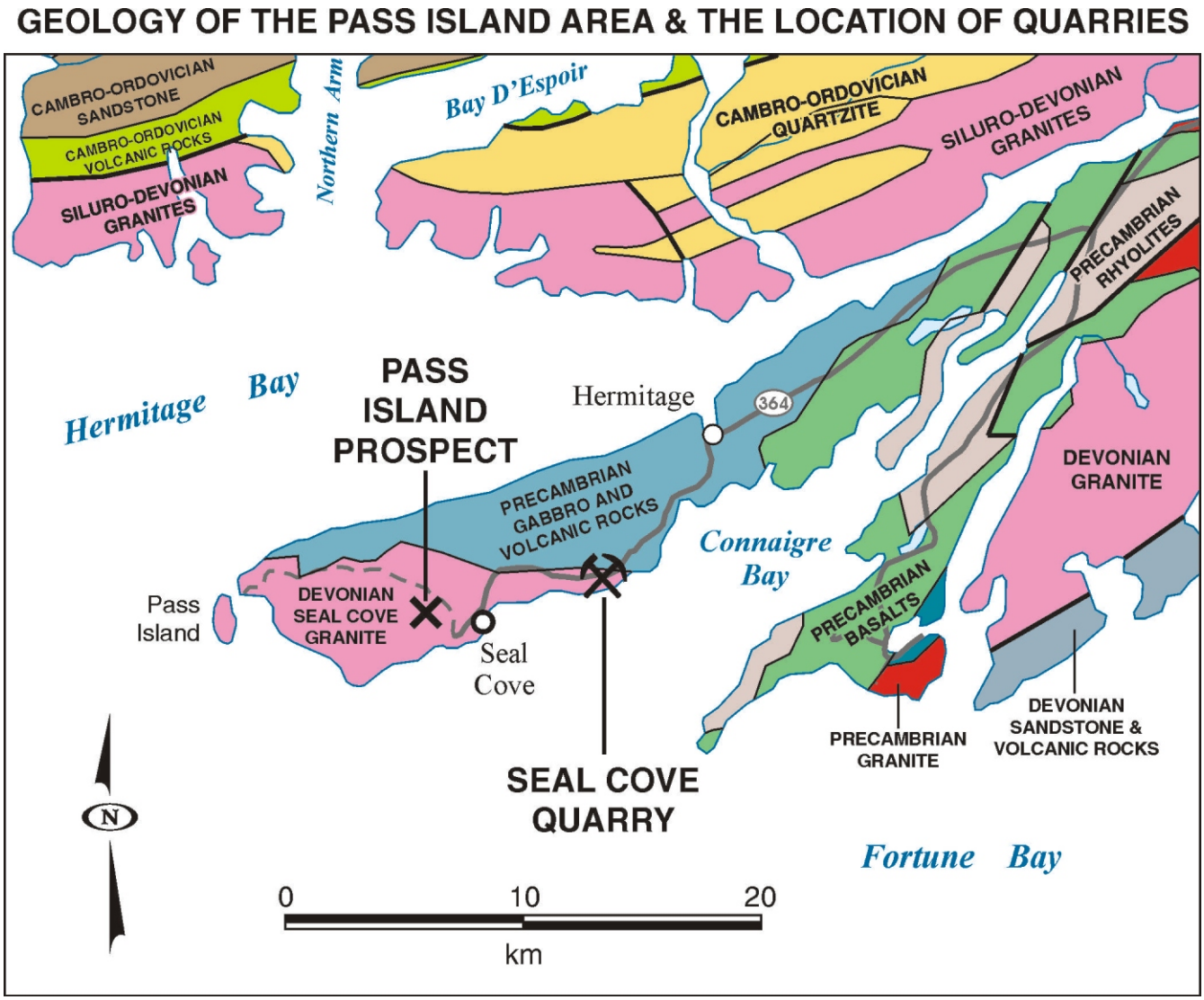


Figure 9. *Geological map showing the distribution of the Pass Island Granite and the locations of the Seal Cove and Pass Island quarries.*

Plate 44. *International Granite Corporation's Seal Cove quarry, southern Newfoundland.*

Plate 45. *Pink Pass Island Granite exposed at the Seal Cove quarry, southern Newfoundland.*

ly for funerary stone. The granite has also been used recently for floor tiles and wall panels in the Law Society Building in St. John's (Plate 47).

Local Geology

The granite exposed at the Seal Cove quarry is part of the Devonian Pass Island Granite (Seal Cove granite) that underlies the southwestern tip of the Hermitage Peninsula (Figure 9). The granite is medium to coarse grained, light pink to rose-coloured (Tomlin and Watson, 1981). Jointing patterns, colour consistency and limited overburden make the granite conducive to quarrying.

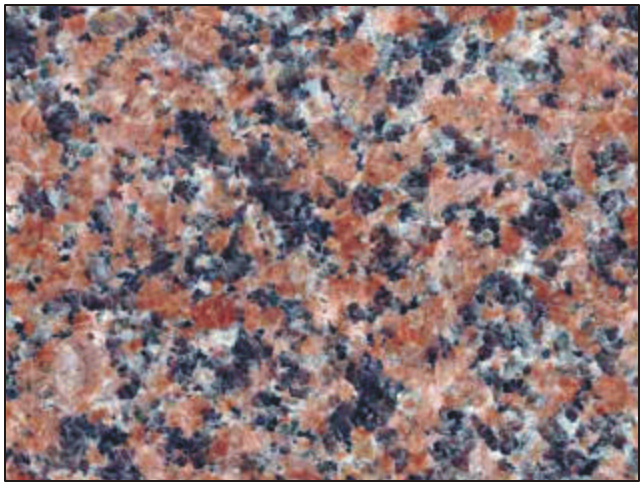


Plate 46. *Pink granite from the Seal Cove quarry, marketed under the trade name "Autumn Rose".*

The Summit (Topsails)

Location and Access

The Summit Quarry is located on the Topsails Plateau immediately west of the abandoned trans-island rail bed and approximately 5 km north of Quarry Brook (Figure 10). Access to the area is via the rail bed.

History of Production and Development

In 1992, Classic Stone Incorporated examined a number of potential quarry sites within the Topsails Igneous Complex. Test blocks shipped to Italy received a favourable response and a marketing company, Earthworks Limited, was formed. The Summit quarry (Plate 48), which is located midway between The Quarry and the Gaff Topsail, was opened in 1993 capitalizing upon various government-sponsored training programs. The granite was reported to have been very amenable to quarrying and gang-saw size blocks are possible (Plate 49). In excess of 200 cubic metres of stone was extracted and a number of blocks were processed at the former Buchans processing plant and plants in Quebec. Several large blocks of the granite remain at the quarry site. International Granite Corporation has the mineral rights to the quarry and the company has a small stockpile of the stone at the Cabot Granite Fabricators Incorporated plant at Jumpers Brook. The stone is marketed under the trade name "Glacier Green" (Plate 50) and has been used for counter top and decorative work.

Plate 47. *Seal Cove "Autumn Rose" granite, used in the Law Society office, St. John's, Newfoundland.*

Local Geology

The Summit Quarry is underlain by massive, medium-grained, peralkaline granite of the Topsails Intrusive Suite that underlies an extensive area of western, central Newfoundland (Figures 1 and 10). In the area surrounding the Summit Quarry, the granite exhibits a wide variety of colours including yellow, green, orange, pink, red and rarely mauve. Field studies carried out by Kerr (1994) revealed that colour variations exhibited by the granites were the result of both hydrothermal and surficial alteration processes. Pink, brown, orange and red variations are spatially associated with fracture systems that locally contain quartz- and hematite-filled veins. Mauve and patchy-

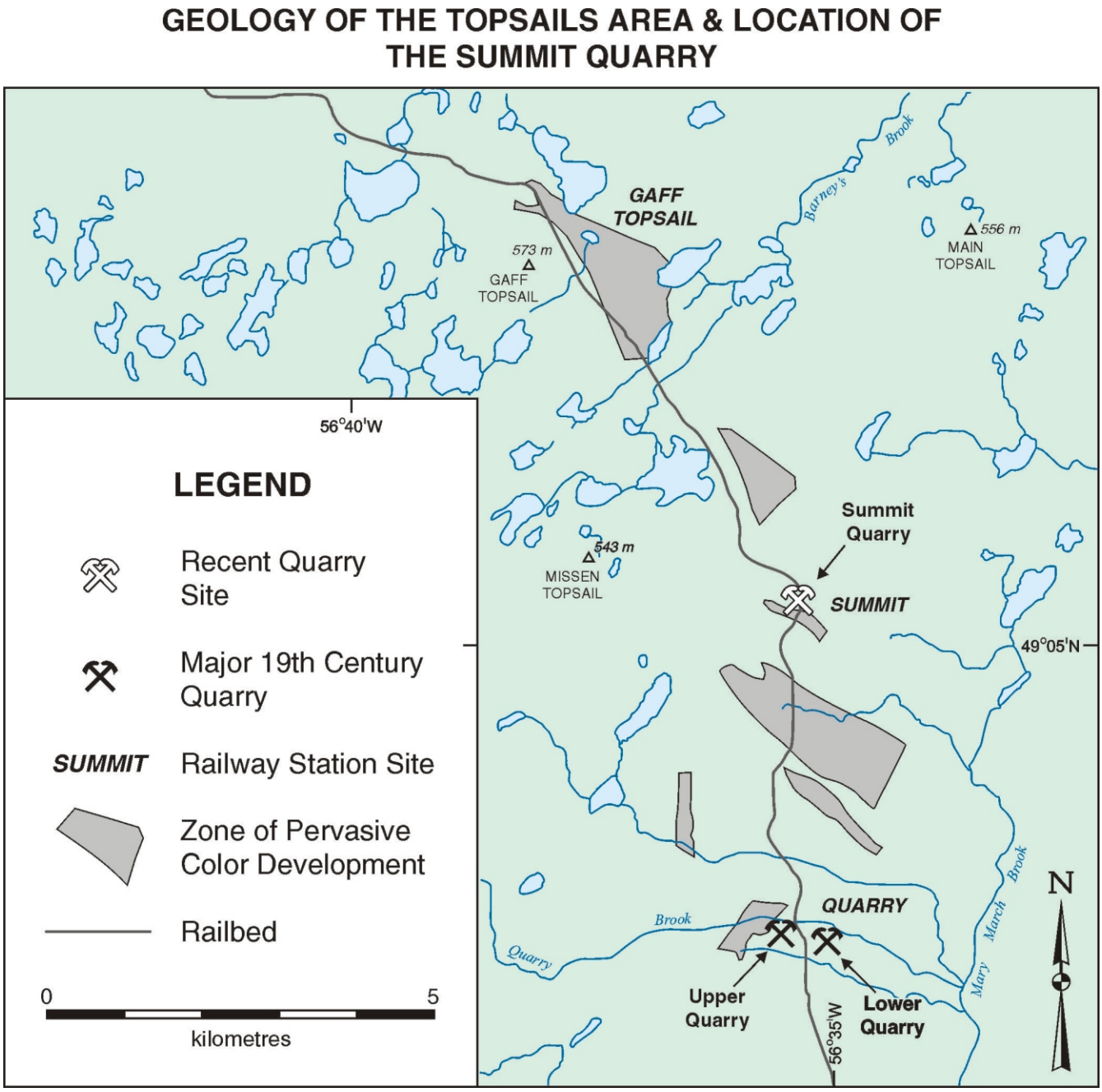


Figure 10. *Geological map of the Summit Quarry area (modified from Kerr, 1994).*

yellow and yellow green colours are attributed to oxidation due to weathering. Massive, pastel-green granite exposed in the quarry floor is interpreted to be the primary non-weathered and unaltered granite.

The granite exhibits a prominent, subhorizontal joint system with a 2 m separation, dipping 5 to 10° to the east (Kerr, 1994). Northeast - southwest- and northwest - southeast-striking, orthogonal, high-angle joints exhibit spacing in excess of 2 to 3 m and locally greater than 5 m. There are three, 2-m-high benches in the quarry and these expose the effect of surficial weathering. The uppermost bench exposes yellow granite; the middle bench yellow-green granite and the lowermost bench green granite. Small, rounded xenoliths of volcanic rock and hornfels are present locally.

Plate 48. *International Granite Corporation's Summit Quarry, central Newfoundland.*

Plate 49. *Blocks of Topsails granite, Summit Quarry, central Newfoundland.*

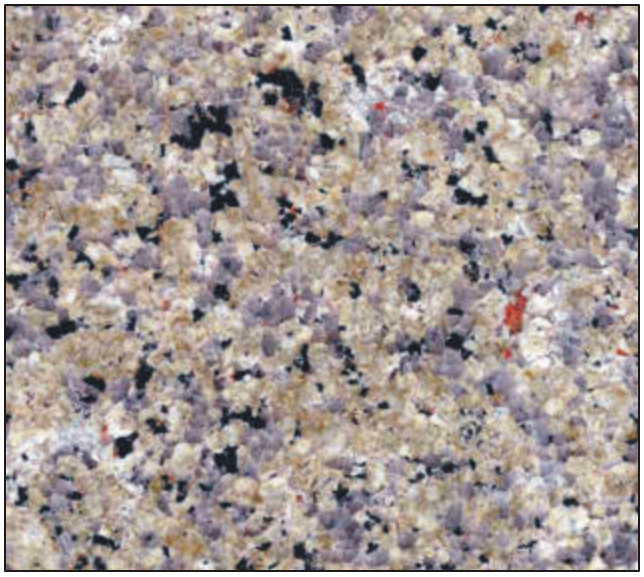


Plate 50. *Topsails granite marketed under the trade name "Glacier Green".*

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APPENDIX 1

Employment figures in person years and gross value of stone shipped, Newfoundland and Labrador dimension-stone industry (Source Dept. of Mines and Energy)

Year	Employment in Person Years (Quarrying Operations)	Gross Value of Stone Shipped
1994	79	$4,909,000
1995	86	$4,485,000
1996	96	$4,845,000
1997	90	$5,422,000
1998	58	$3,953,000
1999	41	$3,057,000
2000	43	$4,704,000
2001	73	$7,265,000
2002[e]	69	$4,838,000
2003[f]	41	$4,414,000
Note: Employment figures only include those directly employed in quarrying and do not include fabricators or support staff. ([e] estimate, [f] forecast)		

APPENDIX 2

Summary of dimension-stone assessment projects carried out by the Department of Mines and Energy

Year	Project	Reference
1980	Assessment of dimension stone sites on the island. Mount Peyton black gabbro identified as having best potential.	Watson, 1981
1982	Detailed surveys of five Mount Peyton gabbro sites. Borney Lake identified as best potential site.	Tomlin, 1982a;1982b
1985	Assessment of marble occurrences of western Newfoundland for dimension-stone and mineral filler potential.	Howse, 1986
1986	Nain anorthosite examined for dimension-stone and gemstone potential.	Meyer and Dean, 1987
1988	Davis Inlet area labradorite examined for dimension-stone and gemstone potential.	Myer and Montague, 1989
1991	Detailed assessment of Pye's Ridge marble deposit, west of Deer Lake.	Knight, 1992
1993	Dimension-stone potential of the Topsails Granite.	Kerr, 1994
1994	Study on the Silver Mountain marble deposit, Upper Humber River area.	Howse, 1994
1994	An evaluation of granite within the Hodges Hill area.	Kerr, 1995
1994	Report on the Fisher Hills bluestone, Pynn's Brook area, Deer Lake.	Knight, 1994
1995	Report on the dimension-stone potential of Hopedale and Nain migmatites.	Meyer and Montague, 1995
1997	Report on dimension-stone potential for black granite in the Upper Humber area, limestone in the Hearts Delight area, Trinity Bay and in the Cape St. Mary's peninsula around Cuslett and St. Brides.	Howse, 1997
2002	Report on potential dimension-stone sites in Newfoundland.	Dickson, 2003
2003	Report on some past, current and potential dimension-stone sites in Newfoundland.	Dickson, 2004

APPENDIX 3

Listing of past and present quarry sites throughout the province

Quarry	Location	Description	Comments	Reference
Past Producers (Granite)				
Petites	NTS 11O/10	Unit: Petites Granite Age: Devonian Name: brownish-pink porphyritic granite	In the late 1800s, 5 tidewater quarries provided stone for several St. John's buildings, including the Court House, and for cobblestone. Light to dark brownish-pink, medium- to coarse-grained potassium feldspar porphyritic granite. Warm, soft colour and texture. Variable joint spacings may limit potential for large blocks.	Dimension Stone Industry: Strategic Planning Document, 1998
Rose Blanche	NTS 11O/10	Unit: Rose Blanche Granite Age: Silurian Name: light grey granite	Quarried circa 1870s for the Rose Blanche Lighthouse. Light grey to dirty-grey, fine- to medium-grained granite. Polished slabs of a blue-grey finer grained granite exposed at Otter Bay, sampled by Classic Stone, received positive comments at US trade shows. Variable joint spacing and shearing limit potential for large blocks.	Dimension Stone Industry: Strategic Planning Document, 1998
The Quarry	NTS 12H/2	Unit: Topsails Intrusive Suite Age: Silurian Name: Nordic Green	Reid Newfoundland Company quarry 1898-1901, estimated production 5000 m^3. In 1992, Stonework Inc. had several of the existing blocks processes into tiles.	Kerr, 1994 Dimension Stone Industry: Strategic Planning Document, 1998
Quarry # 4	NTS 2D/14	Unit: Mount Peyton Intrusive Suite Age: Silurian Name: Ebony Black	1993-1995 Quarry 4 provided stone for the North Atlantic Stone Incorporated Buchans plant. The quarry was abandoned due to the lack of suitable stone.	Dimension Stone Industry: Strategic Planning Document, 1998
Quarry # 5	NTS 2D/14	Unit: Mount Peyton Intrusive Suite Age: Silurian Name: Ebony Black	Quarry # 5 was developed near Borney Lake in 1995 by International Granite Inc. From 1995 to 1998 stone from this quarry was processed at the North Atlantic Stone plant in Buchans. After the closure of the Buchans plant in 1998 the stone was processed in the nearby Cabot Granite Fabricators monument plant. The quarry ceased production in 2001.	Dimension Stone Industry: Strategic Planning Document, 1998

Benton Granite	NTS 2D/16	Unit: Gander Lake Pluton Age: Devonian Name: pink granite	First quarried at the turn of the century by the Reid Newfoundland Company for bridge abutments. Small amount of stone was used for construction in St. John's. Light pink, coarse-grained to megacrystic granite.	Dimension Stone Industry: Strategic Planning Document, 1998
Shoal Harbour	NTS 2C/4	Unit: Clarenville Granite Age: Precambrian Name: reddish-brown porphyritic granite	Quarried at the turn of the century by the Reid Newfoundland Company for bridge abutments. In 1997, Dimension Stone Inc. extracted test blocks and these were shipped to Quebec buyers.	Dimension Stone Industry: Strategic Planning Document, 1998
Old Bay	NTS 1M/12	Unit: Harbour Breton Granite Age: Devonian Name: red granite	Small quarry operated by the Colonial Granite Company Ltd. 1910-1914. Approximately 1200 tons of stone exported to Nova Scotia. The Harbour Breton Granite is described as a pink, medium- to coarse-grained alaskitic granite.	Dept. of Mines and Energy Mineral Inventory Card 001M/12Stm001 Martin, 1983
Dormant Quarries and Developed Prospects (Granite)				
Hodges Hill	NTS 2E/4	Unit: Hodges Hill Granite Age: Silurian Name: Salmon Pink	International Granite Corp. Delineation drilling 2000, road upgraded and quarry development. Block removed 2001 to 2003 for “The Rooms” project in St. John's.	Mike Regular, pers. comm., 2001
Summit Quarry	NTS 12H/2	Unit: Topsails Intrusive Suite Age: Silurian Name: Glacier Green	Classic Stone Inc. opened the quarry 1993. About 200 m^3 of yellow and yellow-green granite quarried. Massive stone with good, widely spaced joints. Quarry is adjacent to Newfoundland Trailway.	Kerr, 1994 Dimension Stone Industry: Strategic Planning Document, 1998
Seal Cove	NTS 1M/12	Unit: Seal Cove Granite Age: Devonian Name: Autumn Rose	Mount Peyton Granite Co. opened trial quarry in 1990 that was later enlarged by Classic Stone. The granite is massive with consistent grain size and potential for blocks up to 30 tonnes. Tiles and slabs fabricated from this stone were reported to be of good quality.	Dimension Stone Industry: Strategic Planning Document, 1998
Pass Island	NTS 1M/12	Unit: Pass Island Granite Age: Devonian Name: Autumn Red	Medium-grained, massive, pink to deep red granite having well-spaced jointing. In 1992, small test blocks extracted by Classic Stone and shipped to Italy. In 1993, Classic Stone opened several trial quarries. This quartz-rich stone takes a high polish.	Dimension Stone Industry: Strategic Planning Document, 1998

Comfort Cove	NTS 2E/7	Unit: Loon Bay Granite Age: Silurian Name: Atlantic Blue Mist	International Granite Corporation opened a series of trial quarries to source grey granite for monument stone. The granite is massive and many of the outcrops have widely spaced jointing, but abundant dark inclusions, fracturing and shearing make it difficult to obtain consistent quantities of stone.	Dimension Stone Industry: Strategic Planning Document, 1998
Upper Christmas Lake	NTS 2D/14	Unit: Mount Peyton Intrusive Suite Age: Silurian Name: Ebony Mist	International Granite opened a quarry to access high-quality black gabbro. The quarry is dormant due to compositional variations. Future development requires road upgrade.	Varrick Hillier, pers. comm., 2002
Middle Brook/BBK	NTS 2D/16	Unit: Middle Brook Granite Age: Devonian Name: blue quartz-bearing pink megacrystic granite	Pink megacrystic granite containing distinctive blue quartz phenocrysts. A consortium composed of Classic Stone, Dimension Stone Inc. and William Power opened the trial BBK quarry near Traverse Brook. The stone is attractive, massive and well jointed, but contains large xenoliths.	Dimension Stone Industry: Strategic Planning Document, 1998
Prospects (Granite)				
John Hayes Harbour	NTS 14/C	Unit: Nain Plutonic Suite Age: Mesoproterozoic Name: anorthosite	In 1986, the Dept. of Mines and Energy collected small test blocks from ten sites. In 1994, The Labrador Inuit Development Corporation conducted trial quarrying of the most promising site. Test blocks were shipped to Italy, but were found to contain pyroxene-labradorite pegmatitic pods that rusted. The anorthosite is massive and exhibits a well-spaced joint pattern. The stone is coarsely crystalline with labradorite crystals up to 5 cm. On polished surfaces, the rock is medium to dark brown with up to 20 percent of the labradorite crystals displaying iridescence.	Meyer and Dean, 1987 Dimension Stone Industry: Strategic Planning Document, 1998
Tabor Island	NTS 14C/5	Unit: Nain Plutonic Suite Age: Mesoproterozoic Name: labradorite	Site of the Grenfell Quarry which has been worked intermittently over the last 100 years, including an attempt by Brinex during the 1960s. Labrador Inuit Development Corporation removed test blocks from Tabor Island in 1997. The stone is coarsely crystalline. Further geological assessment is required.	Dimension Stone Industry: Strategic Planning Document, 1998

Hopedale	NTS 13N/8	Unit: Nain Province Age: Neoarchean Name: migmatite	Polished slabs of the 3.1 billion year old, finely banded, swirly textured, white, pink and black migmatite has generated interest from the group marketing the Ten Mile Bay anorthosite.	Dimension Stone Industry: Strategic Planning Document, 1998
Windy Hill	unknown	Unit: unknown Age: unknown Name: granite	Potential quarry site.	Fred Hall pers. comm. 2002
Indian Head	NTS 12B/10	Unit: Indian Head Anorthosite Age: Proterozoic Name: anorthosite	Quarried as a source of armour stone. The anorthosite varies from dark to light green and exhibits patches of mafic minerals and locally iridescent labradorite. In surface exposures, the stone is strongly jointed and displays considerable colour and grain-size variations.	Dimension Stone Industry: Strategic Planning Document, 1998
Hinds Lake	NTS 12A/15	Unit: Topsails Intrusive Suite Age: Silurian Name: red and yellow granite	Classic Stone Inc. completed a 1.5-km access road and stripping that exposed fractured medium red granite. Insufficient exploration work completed	Dimension Stone Industry: Strategic Planning Document, 1998
Western White Bay	NTS 12H/14	Unit: Long Range Inlier Age: Proterozoic Name: gneiss	In 1992, Appalachian Granite Company and Classic Stone removed frost-heaved boulders and had tiles cut by an Italian firm. In 1993, the tiles were rated as a high value stone at StonExpo. The presence of pyrite may limit its use to interior applications. Attempts to develop a quarry face failed. The stone is orange, white and black banded and is best cut parallel to the banding.	Dimension Stone Industry: Strategic Planning Document, 1998
Cat Arm	NTS 12I/2	Unit: Long Range Inlier Age: Proterozoic Name: migmatite	Tiles cut from a test block recovered from loose boulders were well received at StonExpo 1993. The rock is described as a swirly banded orange-pink (with variable amounts of green), white and black banded migmatite. The rock appears to be massive and exhibits potential for large blocks.	Dimension Stone Industry: Strategic Planning Document, 1998

Dunamagon	NTS 12H/6	Unit: Dunamagon Granite Age: Silurian Name: orange-pink granite	Slightly deformed, variably textured, medium- to coarse-grained granite. Moderately dipping sheets up to 2 m thick and vertical joint spacing up to several m. In 1993, Reuben Stone shipped samples to Italy where they received a favourable response. Trial blocks were quarried by Classic Stone and processed into monument stone.	Dimension Stone Industry: Strategic Planning Document, 1998
Brighton	NTS 2E/12	Unit: Brighton Gabbro Age: Ordovician Name: hornblende	Coarse-grained hornblendite and lesser, younger felsic intrusive rocks. The hornblendite is jet black and extremely coarse grained, with acicular crystals in excess of 10 cm. Variable calcite-quartz veining and difficulty in polishing are problematic. Potentially high end, low volume stone.	Dimension Stone Industry: Strategic Planning Document, 1998
Lumsden	NTS 2F/5	Unit: Deadmans Bay Granite Age: Devonian Name: pink, feldspar megacrystic granite	Dept. of Mines and Energy, 1987 demonstration project produced about 130 m^3 from block recovered from old highway quarry. Slabs used in the Alexander Murray Building, Memorial University. Detailed geological assessment required.	Dimension Stone Industry: Strategic Planning Document, 1998
Crown Ridge	NTS 2D/16	Unit: Gander Lake Granite Age: Devonian Name: Crown Coral	International Granite obtained a number of test blocks to the southwest of the Trans-Canada Highway. The stone is an attractive pinkish-grey, quartz and biotite-rich, feldspar megacrystic granite.	
Sock Pond/ Terrenceville	NTS 1M/16	Unit: Ackley Granite Age: Devonian Name: pink granite	The area was first examined by Rueben Stone and in 1997 Dimension Stone Inc. opened a trial quarry and extracted test blocks. The quarry is located close to the granite contact and as a result the granite contains abundant xenoliths and fine-grained granitic dykes and veins. The pink-orange megacrystic granite has large block potential (surface outcrops display widely spaced, up to 10 m orthogonal vertical jointing and 2- to 4-m-spaced horizontal jointing.	Dimension Stone Industry: Strategic Planning Document, 1998

Pools Cove	NTS 1M/11, 1M/12	Unit Pools Cove Formation Age: Devonian Name: pink conglomerate	The area was first examined by local prospector Greg Hoskins. The thick-bedded, green-grey and pink coarse-grained sandstone to boulder conglomerate is exposed in a series of barren ridges exposed to the northeast of the highway. The stone is extremely hard and non-weathered. Joint orientations result in variably sized, non-square blocks. Polished slabs of the conglomerate have attracted some attention. A large polished column is on display at the Johnson GeoCentre located in St. John's.	
Gouldings' Spillway	NTS 2E/3	Unit: Mount Peyton Intrusive Suite Age: Silurian Name: black granite (gabbro)	Examined 1992 by Rueben Stone Ltd. and the Dept. of Mines and Energy. The prospect is adjacent to the Rattling Brook reservoir and underlies a 500- by 1000-m-long hill located 1km south of the Trans-Canada Highway. A 65-m-high quarry face with 2 benches had previously been developed to supply rock for a nearby dike. The gabbro is described as massive, but contains abundant sub-horizontal white feldspar veins. The veining and the its proximity to the reservoir limited the quarries potential.	Dimension Stone Industry: Strategic Planning Document, 1998

Quarry	Location	Description	Comments	Reference
Past Producers (Slate)				
Curling	NTS 12A/13	Unit: Summerside Formation Age: Upper Hadrynian, Lower Cambrian Name: grey, green purple slate	Trial quarry opened in 1902 and operated sporadically until 1909, no production shipped. The slate is reported to not be of high quality. Proximity to major roads would limit future production.	Martin, 1983 Dimension Stone Industry: Strategic Planning Document, 1998
Summerside	NTS 12A/13	Unit: Summerside Formation Age: Upper Hadrynian, Lower Cambrian Name: grey, green purple slate	Trial quarries opened in 1905 and by 1908 work had ceased, no production shipped. The slate is reported to be of low quality and would not support a large operation. The original workings appeared to have followed a narrow band of more suitable slate.	Martin, 1983 Dimension Stone Industry: Strategic Planning Document, 1998
Great Cove	NTS 1N/11	Unit: Adeyton Group Age: Lower Cambrian Name: red and green slate	Small slate deposit operated circa 1847 by Charles Bennett. Operated sporadically for 2 years to supply slate for local market. No record of production.	Martin, 1983 MODS 001N/11/Sla001*
Winter Quarry	NTS 2C/4	Unit: Bonavista Formation Age: Lower Cambrian Name: slate	Located on the south side of Random Island near the town of Hickmans Harbour. Trial quarry operated circa 1900, supplied a limited amount of roofing slate for the St. John's market.	Martin, 1983
Grieve Quarry	NTS 2C/4	Unit: Bonavista Formation Age: Lower Cambrian Name: slate	Located at Black Duck Cove on the south side of Random Sound. Trial quarry operated circa 1900, production unknown.	Martin, 1983
Allison or Bryant Quarry	NTS 2C/4	Unit: Bonavista Formation Age: Lower Cambrian Name: slate	Located on the south side of Random Island near the town of Hickmans Harbour. Trial quarry operated circa 1860 to 1900, supplied a limited amount of roofing slate for the St. John's market. Last shipment 1910.	Martin, 1983
Black Duck Cove	NTS 2C/4	Unit: Bonavista Formation Age: Lower Cambrian Name: slate	Located on the south side of North West Arm directly across from the community of Hickmans Harbour. The quarry was operated during the late nineteenth century.	Martin, 1983

Past Producers (Sandstone)				
Signal Hill	NTS 1N/10	Unit: Signal Hill Group Age: Hadrynian Name: red sandstone	Sandstone quarried for various building projects in the St. John's area including Government House and the Roman Catholic Basilica.	Martin, 1983
Southside Hills	NTS 1N/10	Unit: Signal Hill Group Age: Hadrynian Name: red and green sandstone	Sandstone quarried from a number of sites for various building projects in the St. John's area.	Martin, 1983
Kellys Island	NTS 1N/11	Unit: Kellys Island Formation, Bell Island Group Age: Cambrian Name: buff sandstone	Sandstone quarried from a number of sites for various building projects in the St. John's and Conception Bay area.	Martin, 1983
Stone Island	NTS 1N/2	Unit: Signal Hill Group? Age: Hadrynian Name: sandstone	Sandstone quarried for construction of Roman Catholic Church, Ferryland.	
Grand Falls	NTS 2D/13	Unit: Wigwam Formation Age: Silurian Name: red sandstone	Red sandstone quarried near the site of the Abitibi Consolidated paper mill for rock walls, stairs and patios.	
Dormant Quarries and Developed Prospects (Slate)				
Keels	NTS 2C/11	Unit: Bonavista Formation Age: Lower Cambrian Name: purple, green and lesser red and grey slate	The deposit is located on a small peninsula with an elevation of 20 to 30 m above sea level. Purple and green slate with lesser red and grey slate occur within the hinge area of a syncline. The beds are reported to contain more calcareous inclusions/nodules and exhibit more rapid colour changes than the Nut Cove deposit. However, the beds are less deformed and the deposits are reported to contain substantial reserves of high-quality slate. In 1993, Power Slate Inc., through a training program, removed test blocks from which slate block was cut. Some of this material was sold to Newfoundland Slate Inc.	Dimension Stone Industry: Strategic Planning Document, 1998

Random Island	2C/4	Unit: Bonavista Formation Age: Lower Cambrian Name: purple, green and lesser red and grey slate	The Random Island slate prospect underlies a 6-km-long, north-south-trending belt, which bisects Random Island. The belt hosts the former Winter, Allison and Grieve quarries described above and the Jones quarry and Strong Tickle West and East pits. The Britannia Slate Company Ltd. carried out geological mapping and limited diamond-drill core surveys of the property. The slate lies within a large syncline, the southern 2.5 km of which has 250 to 300-m-wide vertical limbs containing high-quality, purple, green and red slate. To the north, the eastern limb of the syncline exhibits high-quality slate over widths of 100 to 200 m. Elevations at both ends of the belt exceed 125 m. The Britannia Slate Company Ltd estimated reserves at 350,000,000 tonnes.	Tuach, 1993 Dimension Stone Industry: Strategic Planning Document, 1998
Long Harbour Slate	NTS 1N/5	Unit: Bonavista Formation Age: Lower Cambrian Name: grey-green slate	The Long Harbour slate belt occurs within a 12-km-long northeast-trending syncline located to the south of the Trans-Canada Highway and about 14 km northeast of Placentia. In 1993-1994, Newfoundland Slate evaluated the property through diamond drilling and stripping. Results from the study indicated the presence of good-quality slate, but weathered slate prevented the company from obtaining test blocks.	Dimension Stone Industry: Strategic Planning Document, 1998
Paradise Sound	NTS 1M/7	Unit: Bonavista Formation Age: Lower Cambrian Name: red and green slate	The prospect is dominated by maroon red slate with lesser light green and maroon with mottled green. The slate displays a vertical to subvertical cleavage. Attempts at quarrying were undertaken circa 1900 by the Currie family.	MODS 001M/07/Sla001*

Quarry	Location	Description	Comments	Reference
Marble (Developed Prospects)				
Pye's Ridge	NTS 12H/4	Unit: Table Head and St. George groups Age: Ordovician Name: marble	Mottled blue-grey, grey and white banded, veined salmon pink, pink with white and green banding, and grey with black stylolitic marble is exposed along a 2.5 km by 5.0 km ridge located approximately 12 km west of Deer Lake. Originally staked by Mr. Len Pye the area was initially evaluated, with funding from Enterprise Newfoundland and Labrador, by Technostone S.P.A. of Carrara, Italy. Two areas of off-white marble and one area of grey marble were identified for extraction. In 1992, Tiara Marble optioned the property. Geofield in conjunction with the Quarries Group of Italy were contracted to complete a second phase of diamond drilling and to assess the potential for additional marble colours. In late 1992 and 1993, Geomapping Associates Ltd. of Vermont were contracted to review previous work and complete a more detailed feasibility study, which included overburden stripping, test block removal and drilling. Results indicated that small-scale colour changes and close spaced fractures were common. An area of dark-grey, stylolitic marble was identified as a potential quarry site and in 1993 a proposed development plan was registered with government. However, a lack of capital prevented the project from advancing halt. In 2002, Atlantic Stone carried out marble exploration and diamond drilling in the Pye's Ridge north area.	Brewer, 2002 Dimension Stone Industry: Strategic Planning Document, 1998

Dormston Quarry	NTS 12A/13	Unit: Table Head Group Age: Ordovician Name: dark grey to black marble	Form 1943 to 1965, Bowater's Newfoundland Pulp and Paper Mills Ltd. quarried about 15,000 to 20,000 tons of limestone annually for consumption in their sulphite plant. Material from the quarry was also used for road and concrete aggregate. The marble was also used as ashlar for local housing and the Western Memorial Hospital and in the reconstruction of the Corner Brook C.N.R. facilities in the 1960s. The abandoned quarry is approximately 150 m wide and the face (a bedding plane) is about 100 m high. The dark-grey to black marble, which is commonly cut by abundant thin anastomosing white calcite veinlets, takes an excellent polish. The marble is reported to be similar to the Spanish black marble *Negro Marquina*. The marble beds strike 10°, dip 60° west and are up to 2.5 m thick. Samples collected for a Dept. of Mines and Energy demonstration project were prepared by Nelson Monuments in Sussex, N.B. Past quarrying and its proximity to the City of Corner Brook and the Trans-Canada Highway may limit the potential of this site. However, further geological investigation of this unit is warranted.	DeGrace, 1974 Dimension Stone Industry: Strategic Document Planning, 1998
Marble (Prospects)				
12 Mile Dam Road	NTS 12A/13	Unit: Port au Port Group Age: Cambrian Name: marble breccia	Located about 2 km east of the Trans-Canada Highway on the Twelve Mile Dam Road, the site was originally identified by the Dept. of Mines and Energy. In 1995, the Iapetus Marble Co., with funding from the Dept. of Mines and Energy, used a diamond-wire saw to extract approximately 45 tonnes of pink marble breccia from a ridge. Some of the material was processed into 35-cm-thick slabs at the North Atlantic Stone plant in Buchans. Further exploration work, including delineation drilling is recommended.	Knight, 1995 Dimension Stone Industry: Strategic Planning Document, 1998

Lady Slipper Pond	NTS 12A/13	Unit: St. George Group Age: Ordovician Name: marble	In 1994, the Lady Slipper Pond area was mapped by the Dept. of Mines and Energy. Funding under a Federal/Provincial government dimension-stone demonstration project in 1994 provided funding to remove large boulders and blocks of subcrop from the Lady Slipper Pond site, about 4.2 km east of the Trans-Canada Highway. The material was shipped to Sussex, N.B. for cutting and to Dartmouth, N.S. for polishing and fabrication into tables. The finished tables were installed in the Marble Mountain ski lodge. A number of sites in the Lady Slipper Pond area were examined by Tim Gushue Exploration. White, pink to red-banded, stylolitic, cream, and grey marble occur at the Lady slipper Pond prospect. The unit is about 10 m thick and dips 30 to the southeast. However the marble exhibits rapid colour variation. Detailed assessment work is required to required to determine continuity of width and colour.	Knight, 1995 Dimension Stone Industry: Strategic Planning Document, 1998
Pinchgut Lake	NTS 12A/12	Unit: St. George Group Age: Ordovician Name: marble	Several marble prospects have been identified in this area, which is accessible via logging roads from the Trans-Canada Highway. Exploration in the area has been conducted by Tim Gushue Exploration and Meyer-Dunsworth Enterprises. Boulders from this area were used in the Federal/Provincial government dimension-stone demonstration project as a source of material for table tops and counter tops for the Marble Mountain ski lodge. Marble identified in the area include: 1) grey and white mottled, calcitic marble with pale orange stylolites and veining, 2) interbanded purple to mauve and white to cream dolomitic marble with quartz veining, 3) pink-banded dolomitic marble and 4) white calcitic marble. Further detailed assessment work is required to establish thicknesses and continuity of colours.	Knight, 1996 Dimension Stone Industry: Strategic Planning Document, 1998

White Bay	NTS 12H/9 12H/10	Unit: Fleur de Lys Supergroup Age: Neoproterozoic Name: marble	Several, generally small marble occurrences outcrop along the western coastline of the Baie Verte Peninsula including: marble breccia at Bear Cove; fine-grained, fractured white to blue-grey marble at Purbeck's Cove; greyish white marble at Clay Cove; fine-grained blue-white marble at The Beaches; and coarse white to pink marble at Big Chausse Brook.	Bain, 1937 Howse, 1986 Hibbard, 1983 Dimension Stone Industry: Strategic Planning Document, 1998
Sops Arm/ Jacksons Arm	NTS 12H/15	Unit: Coney Head Group Age: Cambro-Ordovician Name: marble	Belt of carbonate rocks extending about 40 km south from Great Coney Arm on the west side of White Bay. North of Jackson's Arm, the marbles are very fine crystalline blue to white, partially recrystallized calcitic and dolomitic marble. Marble colour is variable with grey with white calcite veining to blue and grey with reddish veining. Marble breccia is locally developed. Southwards, the marbles become more recrystallized and deformed. Near Main River, fine-grained, white to orangey cream and medium to dark grey, locally banded and brecciated, marble is exposed in a gravel pit. Ubiquitous orange to red veining is present. South of Main River, near Giles Brook, the marble is reported to be lighter coloured, more massive and more competent Meyers-Dunsworth Enterprises reported that samples collected from the Main River site cut and polished well. Further assessment work is required for both the Main River and Giles Brook sites.	Bain, 1937 Howse, 1986 Hibbard, 1983 Dimension Stone Industry: Strategic Planning Document, 1998

Silver Mountain	NTS 12H/11	Unit: Long Range Inlier Age: Precambrian Name: marble	The Silver Mountain prospect occurs adjacent to the Upper Humber River about 10 km west of the Sop's Arm highway. A forest access road leads directly to the site. The prospect is part of a lens-shaped unit of coarse-crystalline marble with a strike length of about 5 km and a width of approximately 400 m. Banding in the marble trends 160° and dips steeply to the east. The unit is reported to have good potential for dimension stone due to its massive character, competency, colour and polishing characteristics. The coarse grain size and locally developed graphite and arsenopyrite may present problems. A conservative estimate of reserves indicated 175,000 tonnes of white marble in an area 500 m long by 10 m wide by 10 m deep. Further detailed assessment including, mapping, drilling and test block extraction has been recommended. Some work has been completed by the Appalachian Granite Company.	Erdmer, 1984 Reusch, 1985 Howse, 1994 Meyer, 1995 Dimension Stone Industry: Strategic Planning Document, 1998
Canada Bay Area	NTS 12I/1, 12I/16	Unit: St. George Group Age: Ordovician Name: marble	Marble underlies a 40 km belt that extends from south of Canada Bay northwards to Croque. The Canada Harbour prospect, lies on the south side of Canada Bay about 6 km from the town of Englee. From 1912 to 1915, the Colonial Trading Company unsuccessfully attempted to quarry the marble for ornamental stone. The dimension-stone potential of this site was examined in the 1930s by the Geological Survey of Newfoundland and more recently by the Dept. of Mines and Energy. The marble is fine grained, diffuse cream and white in colour and exhibits wispy, light beige, pale brown and pale green-brown folded streaks. Strong cleavage and fracturing limit the potential of this site. A finely textured, dark blue marble, which when polished has a velvet-like texture, occurs at Burnt Point, Canada Bay. The marble is reported to have the potential for large blocks. However, structural complexities and discontinuity of colour, rarely exceeding thicknesses greater than 45 cm, would be a challenge to quarrying.	Howse, 1936 Howse, 1986 Dickson, 2002 Hallett, 1976 Dimension Stone Industry: Strategic Planning Document, 1998

Port au Port	NTS	Unit: Table Head Group, St. George Group Age: Ordovician Name: limestone	Very limited assessment work completed, but potential for limestone block. Slabs prepared by the Dept. of Mines and Energy compared favourably with French limestone. Further assessment work and marketing is warranted.	Dimension Stone Industry: Strategic Planning Document, 1998
Flat Water Pond	NTS 12H/16	Unit: Advocate Complex Age: Cambro-Ordovician Name: virginite/ mariposite	Virginite, a bright emerald-green rock containing ubiquitous white calcite and quartz veins, occurs as a discontinuous belt that is best exposed near Flat Water Pond, along the Baie Verte highway, approximately 45 km north of the Trans-Canada Highway. The rock, originally a serpentinite, has been altered to an assemblage of carbonate-quartz-fuchsite and trace sulphides. Material collected from this site has been used extensively by small-scale rock shops throughout the province. The virginite typically occurs as pods surrounded by talc-carbonate schist. Further assessment work is required to delineate the potential of this stone.	Hibbard, 1983 Dimension Stone Industry: Strategic Planning Document, 1998

Note: * MODS - Department of Mines and Energy Mineral Occurrence Data System. Available on-line at *http://www.gov.nl.ca/mines&en/geosurvey/mods*.