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SOAPSTONE IN THE HOPEDALE AREA, LABRADOR

J. Meyer and E. Montague[1]
Mineral Deposits Section

ABSTRACT

The Hopedale area is underlain by Archean rocks, which host numerous soapstone deposits, and small amounts of carving stone are obtained from several of these deposits and used locally. There is potential to supply larger volumes of stone, in a wide variety of colours and textures, using modern quarrying techniques. The increased supply of high-quality carving stone could help the carving-stone industry grow in Hopedale, and other coastal communities.

INTRODUCTION

This is the second year of a survey to evaluate soapstone deposits on the northern Labrador coast as a source of carving stone. Archean rocks in the Okak area were prospected for soapstone deposits in 1992 (Meyer and Montague, 1993) and in 1993, the survey was carried out in Archean rocks in the Hopedale area (Figure 1). Many of the sites evaluated in 1993 were previously known to local carvers and other longtime residents of the Hopedale area. Data from previous geological mapping and archaeological studies were also very helpful in identifying areas with high potential for carving stone.

There is a growing need for carving stone in the Hopedale area. Most carving stone is currently obtained by individual carvers, who collect 'loose' pieces of stone at, or near tidewater. Carvers also saw and chisel the edges of large soapstone boulders that are found adjacent to many of the deposits. With the depletion of these easily accessible sources of soapstone, the next step is to begin very small-scale quarrying of those deposits that are capable of supplying good-quality stone.

Soapstone carving in the Northwest Territories plays a big part in the local arts and crafts industry, which in 1992 had total sales of $28 million (Kintuinamot Ilengajuk, 1993). The federal government has funded a large part of the development and marketing of this industry. While there is not yet the same degree of support for this industry in Labrador, the establishment of a resource base on which to build a carving industry is an important step in attracting such support. However, the establishment of carving studios, such as the one that currently operates in Nain, and more importantly, a marketing system, will be needed to help the carving industry grow.

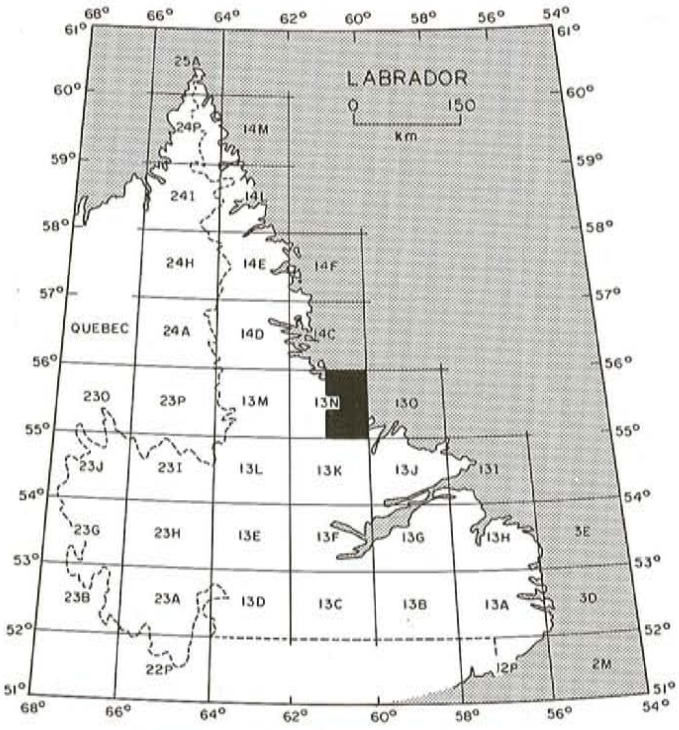

Figure 1. *Location of study area.*

TYPES OF SOAPSTONE

The Hopedale area hosts a wide variety of soapstone deposits (Figure 2). The diversity of colours and textures of soapstone in this area reflects the diversity of the original ultramafic rocks and their alteration history. The colours of the soapstone include blue-black to green-black, light to dark-grey, white, green and red. Soapstone textures range from

[1] Mineral Resource Management Branch

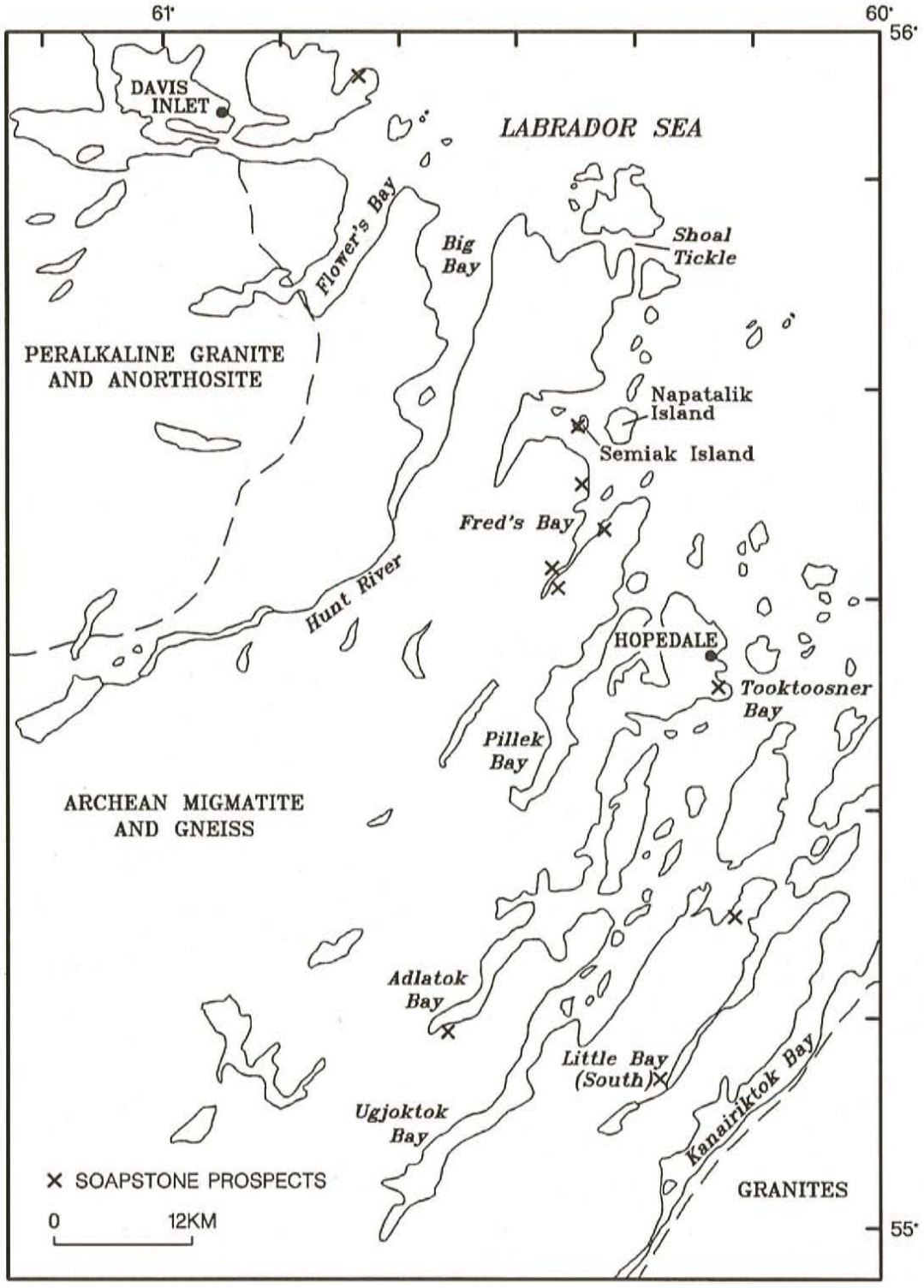

Figure 2. *Soapstone occurrences (indicated by x) in the Hopedale area that were sampled in 1993.*

fine to coarse grained, include a variety of accessory minerals, and the stone ranges from very soft to very hard. Soapstone occurs as pods within altered ultramafic lenses, and as in-situ boulders, which occur in a line, parallel to the local gneissic banding, possibly representing boudinaged ultramafic dykes. There are 5- to 100-cm-wide zones of 'soapstone' along the borders of old fracture zones, within mapped ultramafic units, and in one deposit, soapstone occurs as a distinct stratigraphic unit. The soapstone deposits are rarely consistent in colour and hardness, and they commonly contain veins and patches of coarsely crystalline amphibole minerals and other alteration products.

SOAPSTONE PROSPECTS

ADLATOK BAY

There is a 1-km-long island at the southwest end of Adlatok Bay, approximately 45 km southwest of Hopedale. Archaeologists have described a soapstone deposit on the western side of this island, which was previously quarried by 'modern methods' (Nagle, 1984). There are blocks of soapstone left on site that appear to have been sawn out from the bedrock, and there is a large amount of soapstone debris at tidewater, probably a result of blasting. The soapstone unit was traced from the island, southeast to the opposite shoreline, where sufficient quantities are present to warrent small-scale quarrying to supply stone for local carvers.

Ermanovics (1993), shows the deposit occuring near the contact of the late Middle Archean Florence Lake Group and a Late Archean migmatite unit. The soapstone unit strikes 145°, dips steeply to the southwest, and is bounded by amphibolite at both contacts. This unique deposit is approximately 5 m wide and has a distinct, and continuous, inner stratigraphy, unlike any other soapstone deposit investigated during this survey.

On the west side of the island, the soapstone outcrop at tidewater has been reduced to rubble by blasting, although some large sawed blocks sit on top of the rubble pile (Plate 1). The rubble consists mostly of blue-grey to black, very hard soapstone. The larger blocks of soapstone are up to 1 m by 30 cm by 30 cm in size, one block was nearly sawn in half with a bucksaw by a local carver. They are weathered blue-black to brown-black, and are medium grey on a freshly broken surface. The blocks have a moderate fabric, readily visible on the weathered surfaces. They are cut by occasional 1- to 3-mm-wide calcite veins, and irregular, 1-cm-wide veins of light-green amphibole, with the crystals orientated perpendicular to the vein. There are two larger blocks of soapstone hidden behind, and partially overgrown by a thick stand of alders, in a large gully along strike from the shoreline. These blocks are square-sided and cut to precise dimensions (i.e., 5 by 3 by 2 ft). The base of the gulley is near sea level, and appears to have been created by the quarrying of soapstone. The gulley continues to the southeast, approximately 30 m, where it then opens into a wide meadow with very little outcrop.

The soapstone unit could not be located on the northwest side of Adlatok Bay, but was found to outcrop along strike on the southeast side of the bay, where there is no evidence of previous quarrying. The shoreline outcrops are glacially smoothed with very low relief, and only 2.5 m of the unit's width is exposed (Plate 2). The unit consists of medium soft, grey soapstone in two bands 65 and 85 cm wide, separated by black amphibolite.

The lower 100 m of the hillside to the southeast of the shoreline outcrops, has a gentle slope and is till covered and well forested. However, the upper 400 m of the hillside has a moderate to steep slope and numerous outcrops. At the

Plate 1. *Soapstone rubble pile on west side of island at southern end of Adlatok Bay.*

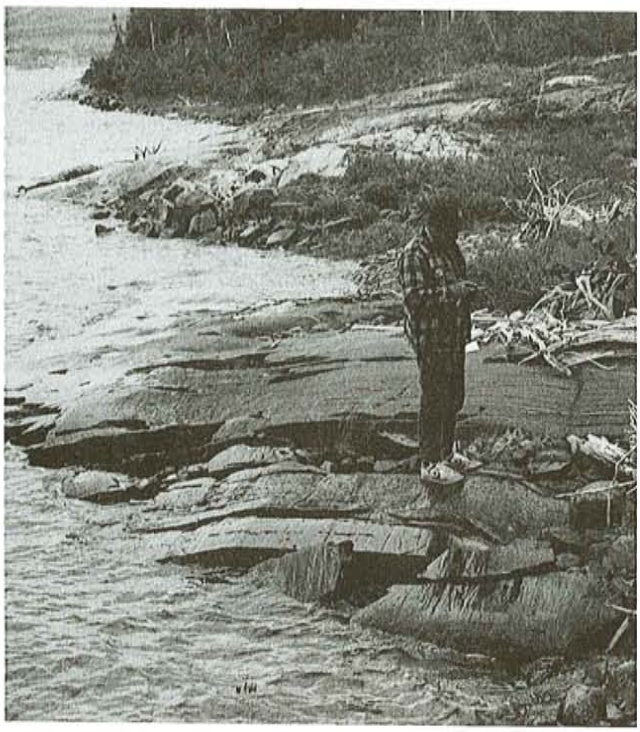

Plate 2. *Soapstone outcrop at southwest end of Adlatok Bay, 1.5 km northeast of the mouth of the Adlatok River.*

break in slope there is a 3- to 6-m-high bedrock exposure, which contains a complete cross-section of the soapstone unit. The unit is faulted and partly repeated in the middle, and there is a small gulley with an intermittent trickle of water running through the deposit. The gulley can be traced up to the top of the hill where the soapstone terminates in the nose of an antiform. There is at least one other well-exposed cross-section of the soapstone unit in the upper portion of the hill.

The soapstone unit has a true thickness of 4.6 m, of which 2.5 m is very good-quality carving stone, and another 45 cm

of which is harder, but potentially carvable stone. The good carving stone occurs as three beds, 70, 85 and 90 cm wide, and ranges from medium to dark-grey, with lesser amounts of green-grey. The soapstone is massive to flaggy bedded, and discontinuous laminations are visible on the weathered surface. The soapstone beds contain one or two, 1- to 2-cm-wide veins of light-green, medium crystalline amphibole, and coarse crystalline chlorite is present on some of the fracture planes. Despite these scattered imperfections, this stone was rated very highly by carvers. This site may be one of the best locations to begin small-scale quarrying of soapstone in the Hopedale area.

LITTLE BAY SOUTH

A series of lenses of altered ultramafic rocks, containing abundant pods of soapstone, are located on the west side of the river, which enters the south end of Little Bay 'South', (the bay between Ugjuktok Bay and Kanairiktok Bay). This deposit was pointed out to us by carvers in Hopedale, some of whom had collected soapstone there. The ultramafic lenses range from 2 to 15 m in length and up to 5 m in width. They are exposed in the intertidal zone beneath the river bank (Plate 3), on the river bank itself, and in the woods directly behind. Loose chunks of soapstone on the riverbank are used locally for carving, although this relatively easy source of carving stone is rapidly diminishing.

Plate 3. *Broken up pods of soapstone within an altered ultramafic lens at Little Bay 'South'.*

This deposit occurs within Late Archean migmatite and is located close to a northeast-trending zone of highly deformed migmatite (Ermanovics, 1993). The ductile deformation in this zone is well displayed in exposures adjacent to the deposit, which are in part derived from black Maggo migmatite and yellow-brown-weathering pegmatite.

The ultramafic lenses are enveloped by altered rinds, entirely composed of 2- to 8-cm-long, light-green amphibole crystals, which are orientated perpendicular to the rinds. The lenses are made up of 1 to 3 m pods of soapstone, which are enveloped with amphibole rinds. Veins and patches of light-green to bright apple-green amphibole crystals are present throughout some of the lenses. The migmatites around some of the larger lenses appear altered as well, and often resemble the rock called 'virginite', an ornamental stone found along the Baie Verte–Brompton Line in insular Newfoundland.

The soapstone pods include a wide range of colours, textures, and hardness; dark blue-green to dark-green, very soft soapstone, (which is always located adjacent to the amphibole bands); light to dark-green and lesser red stone, which is soft to medium hard; dark grey-black stone, which is medium hard, and a dark green-black stone, which is very hard, probably outside the range of carvers with hand tools. Fracturing within some of the soapstone pods reduces its potential as a carving stone.

There are at least 6 major ultramafic lenses, and many more smaller lenses, located in this area, which is approximately 200 by 40 m in size.

TOOKTOOSNER BAY

The Weeks amphibolite is a unit composed of supracrustal and metaigneous enclaves, which are thought to have been derived from the Hunt River Group, (Ermanovics, 1993). There is an ultramafic subunit of the Weeks amphibolite, which consists of altered peridotitic or lherzolitic rocks in mappable units, 50 to 150 m wide. This subunit occurs throughout a northeast-trending belt, roughly in the middle of the Hopedale block. While volumetrically not a significant component of the Hopedale block, this subunit contains many outcrops of serpentinite, some of which is suitable for carving.

One such area is 1 km south of the Hopedale airport, on the south side of Tooktoosner Bay. Located here is a 1-km-long outcrop of altered ultramafic rocks, which was previously investigated for chrome garnet by Brinex (Grimley, 1959). Within this outrop, there are several small deposits, up to 25 by 15 m, of light-green, weathering serpentinite (Plate 4). The deposits consist of broken-up outcrop, loose boulders up to a metre in length, and areas of sheared outcrop, which mainly consist of arrowhead-shaped pieces, 2 to 25 cm in length. The serpentinite is hard, has extremely consistent colour, and takes a greenish-black polish. Carving the stone may require some use of power tools, but its beautiful polish and easy access from Hopedale could make this an important deposit.

SEMIAK ISLAND

This island is 25 km north of Hopedale and due west of Napatalik Island. It was informally named by an archaeologist who discovered Neo-Eskimo lamp preforms on one of the many soapstone boulders located on the western side of the island (Plate 5). Adjacent to the boulder deposit, is a 1-km-long, discontinuous, serpentinized ultramafic subunit of the Weeks amphibolite.

Plate 4. *Serpentinite boulders and outcrop at Tooktoosner Bay.*

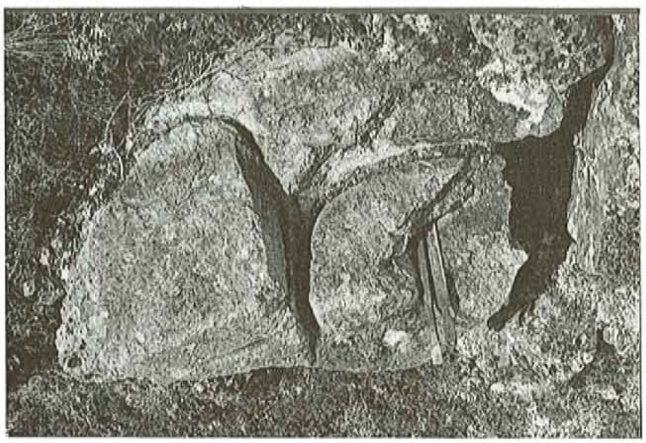

Plate 5. *Neo-Eskimo lamp preforms in soapstone boulder on Semiak Island.*

The serpentinized ultramafic rocks are for the most part, too hard to be used as carving stone. However, there are small, altered zones of soft stone that consist of massive, medium to coarse crystalline, pale-green to colourless amphibole, chlorite, and talc. The stone is greenish-white, soft and very lightweight. It is carvable, and would be considered a 'white' carving stone. The total volume of this stone is less than 10 m^3.

A series of large, grey soapstone boulders outcrop at tidewater, on the southwest side of a large cove on the western side of the island. Many of the boulders have had pieces of soapstone chiselled or sawed off by local carvers. The boulders are resistant to chemical weathering and, to a lesser extent, frost action, and appear as in-situ boulder trains (Plate 6). This deposit occurs in the Maggo gneiss unit, which

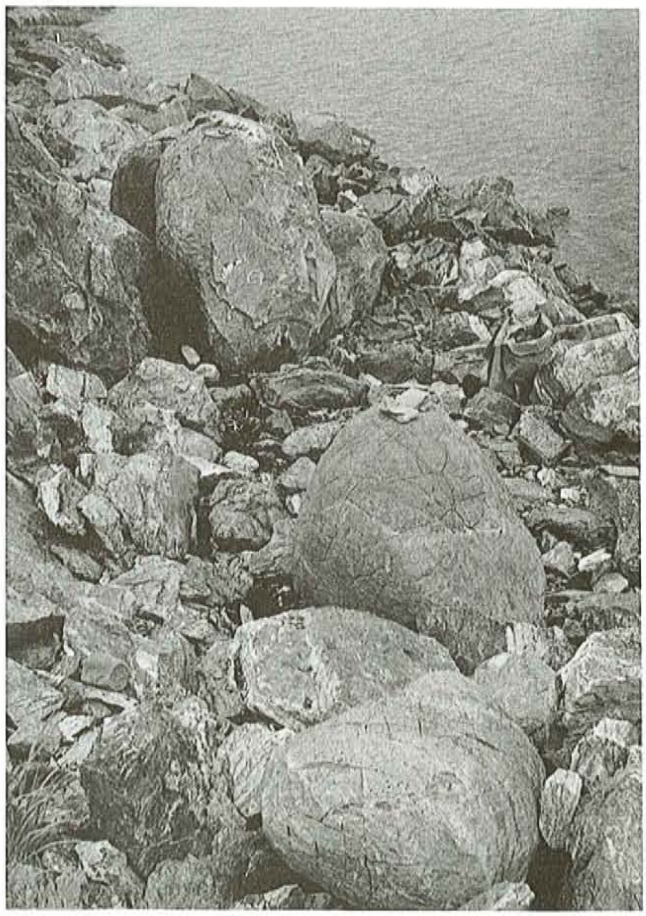

Plate 6. *Soapstone boulders on Semiak Island.*

contains some of the oldest rocks in the Hopedale block (Ermanovics, 1993). This string of boulders stretches 300 m from tidewater at the western end, eastward to where it intersects with the ultramafic outcrops. The rounded to egg-shaped boulders are 50 cm to 5 m in diameter, typically grey, but also greyish red. The stone on the outside of the larger grey boulders is very soft to medium soft, and well liked by most of the carvers. But on the inside of the boulders, which were already split into two pieces, the stone was usually very hard. The boulders, which are well exposed at tidewater, can be seen to be sitting in a zone of sheared soapstone and green chloritic fragments, with white to green quartz veins, and light-green amphibole veins/fragments. The total volume of carving stone in this deposit is probably less than 10 m^3.

FRED'S BAY

Due south of Napatalik Island, there is a 10- to 12-km-long, southwest-trending bay hosting a variety of soapstone deposits. The bay is locally known as Fred's Bay, or Kangiluasuakoluk Tagani. Halfway down the east side there is a soapstone boulder deposit, somewhat similar to the one described on Semiak Island. This deposit also occurs within the Maggo gneiss unit, and is less than 500 m west of a 1.5-km-long outcrop of altered ultramafic rock. There are approximately 15, grey, green-grey and blue-grey soapstone

boulders, some of which have been worked by local carvers. The boulders are 30 cm to 8 m in length, variable in hardness, and represent a 10 to 15 m^3 reserve of carving stone.

Near the southern end of the east side of Fred's Bay, there is a 10 by 30 m outcrop of blue-grey altered ultramafic rock, remnants of which was once a larger zone of ultramafic rock. There is a small amount of medium soft carving stone available, where the large outcrop is well fractured. Directly north of this main outcrop, there are smaller outcrops of soft to medium hard, light to dark-blue-grey soapstone. There is 10 to 20 m^3 of carving stone in this area.

Midway down the west side of the bay, a 1.0- by 1.5-m rounded boulder of medium hard soapstone was sampled at the high tide mark. It has a strong red to red-grey colour, and although not in-situ, does represent approximately 1 m^3 of unique carving stone. A smaller boulder nearby has a distinctly different, mottled brownish-grey colour, and both indicate good potential for further prospecting in this area.

There are many other serpentinized ultramfic outcrops, 1 m to 2 km in length, on both sides of Fred's Bay, and several of these have altered zones with soft stone, some of it suitable for carving stone.

SUMMARY

There is a wide variety of soapstone in the Hopedale area, with some very unique colours and textures. The reserves of stone suitable for carving are sufficient to support the 15 to 20 carvers in Hopedale for many years. New approaches are needed to more efficiently quarry the soapstone, and thus increase the reserves. The potential for the Hopedale carvers to be self-supporting is limited only by a lack of equipment, a carving studio, and a coordinated marketing effort.

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Note: Geological Survey Branch file numbers are included in square brackets.