

# KELLY ROCK LIMITED

## Environmental Impact Assessment

### Proposed Aggregate Quarry At Kelly's Mountain

- PHASE 2 -

## EXECUTIVE SUMMARY

CEAA / ACCE  
003 EA Projects  
003 Kelly's Mountain  
4600-234 - Kelly Rock Limited -  
Environmental Impact Assessment -  
Proposed Aggregate Quarry at Kelly's  
Mountain - Phase 2 Executive Summary



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# Kelly Rock Limited

## Environmental Impact Assessment Proposed Aggregate Quarry at Kelly's Mountain

### Executive Summary

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## INTRODUCTION

This report is a summary of a much larger Environmental Impact Assessment Report on the Kelly Rock Limited project submitted to the Nova Scotia Department of the Environment in late November, 1989. While every effort has been made to provide all the important information in this summary, readers may want to refer to the original document for more detail. Copies of the full report are available at the following places:

- Edge's General Store and Nursery, Englishtown
- Bain's Grocery, Big Bras d'Or
- Administration Building, Municipality of the County of Victoria, Baddeck
- Nova Scotia Environment offices at 295 Charlotte Street, Sydney and 5151 Terminal Road, Halifax

### **The Environmental Assessment Process**

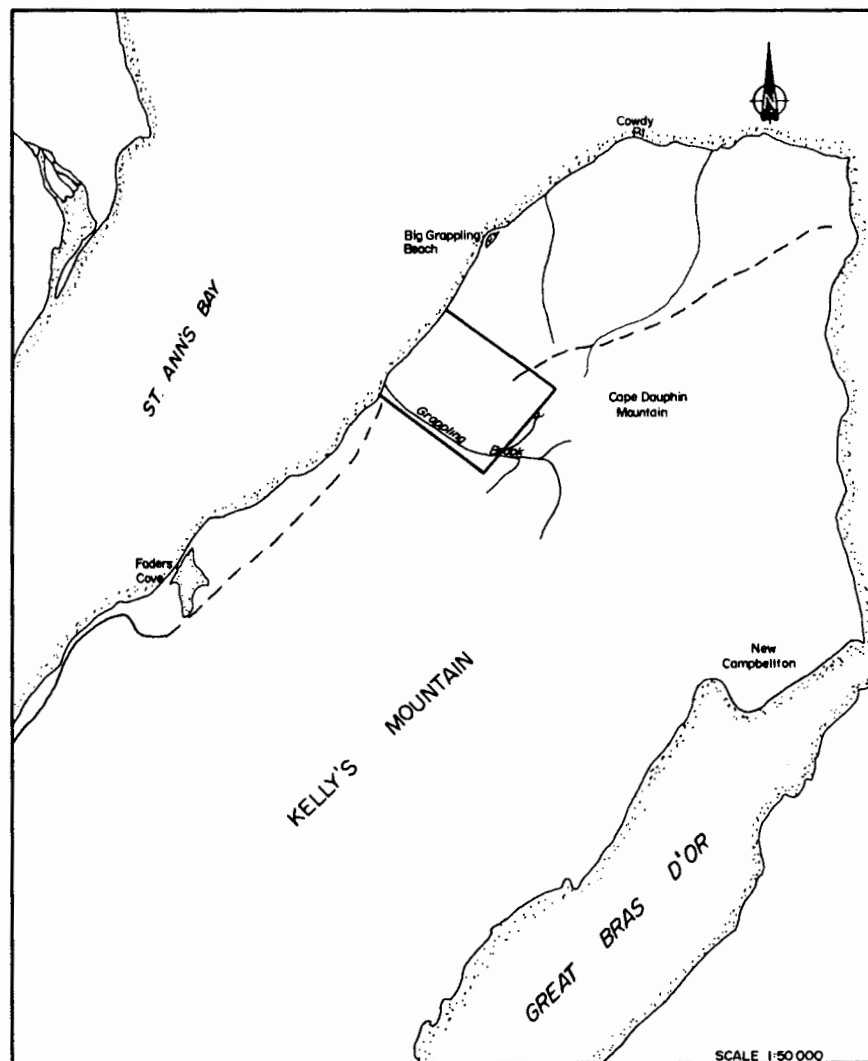
The project began before the current Environmental Impact Assessment Act became law. However, the process completed was essentially the same and Kelly Rock Ltd. requested that this project be subject to the requirements of this Act. The project is now being reviewed under this Act.

The Environmental Assessment process defined by the provincial government has a number of optional requirements including a public hearing by the Environmental Control Council. The number of steps and requirements in the process are dependent on how important the potential effects of the project are in the view of the Minister of the Department of Environment.

All project developers must submit an initial environmental evaluation that outlines the potential effects of the project based on readily available information. This part of the process resulted in the filing of what has been referred to as the *Phase 1 - Environmental Impact Assessment* for the Kelly Rock project.

After review of the initial evaluation by NS Environment and other agencies, further information required for the full Environmental Impact Assessment was defined following more discussion with federal and provincial agencies, including Fisheries & Oceans Canada. Specific field studies carried out included evaluation of water quality, lobster habitat, the bedrock granite and groundwater flow patterns on and near Kelly's Mountain. The result of this study was the *Phase 2 - Environmental Impact Assessment*, referred to in this summary simply as the Environmental Impact Assessment or EIA.

### Project Location



If approved, the Kelly Rock Ltd. project will be a granite quarry on Kelly's Mountain, Victoria County, Cape Breton. The site is located about 20 miles (30 km) west of Sydney and four miles (6 km) northeast of Englishtown. The site is about six miles (9 km) northeast of where the TransCanada Highway crosses Kelly's Mountain.

The quarry itself is to be located on the top of Kelly's Mountain with processing, storage and shipping operations located on the shoreline of St. Ann's Bay. Details of the project are provided in the next section.

### **Timing of Major Events**

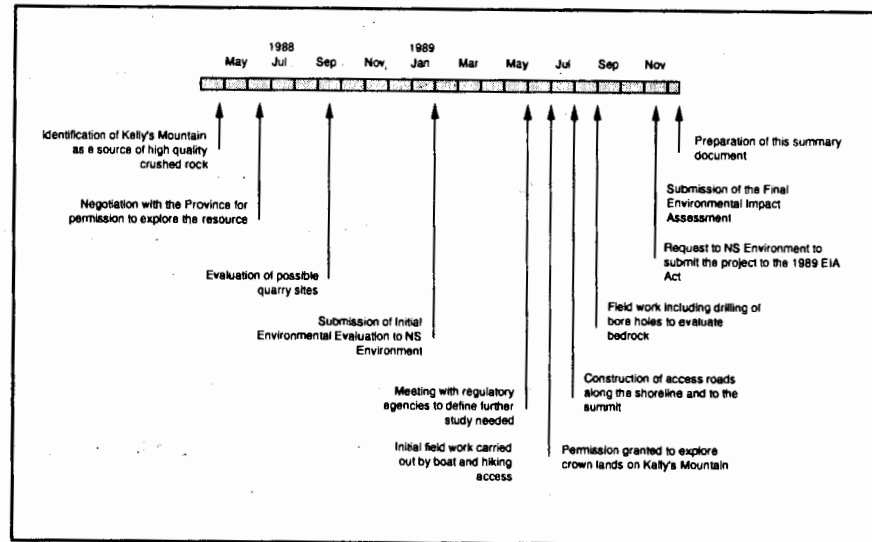
People began looking at Kelly's Mountain as a source of crushed rock in the spring of 1988. Much of Kelly's Mountain is crown land and thus initial discussions were held with the province concerning possible use of the area as a quarry. At this stage, permission to set up a quarry was not requested but the idea was considered acceptable unless major problems with the project were identified. By the fall of 1988, two possible quarry sites were identified and the initial environmental report was submitted late that year.

While a site, the *South Quarry*, on the eastern side of Kelly's Mountain near New Campbellton was initially considered, in the winter of 1988-89 attention turned to the current site, the *North Quarry*, on the western side of Kelly's Mountain. This site was preferred because of the deep water access for ships provided by St. Ann's Bay.

In the spring of 1989, more meetings were held with the regulatory agencies (including NS Environment) to define further studies needed. Initial field work was carried out on foot with access to the site by boat or hiking overland.

To properly examine the site, roads had to be built to allow the rock drilling machinery to get into the area. Permission was

granted for upgrading and building of roads, and all work was closely monitored by the regulatory agencies. Standard road building guidelines were followed.



Between August and October, a number of environmental studies including a major drilling program were completed. The final Environmental Impact Assessment report was submitted to NS Environment at the end of November.

### Public Input

Meetings were held with the general public and specific groups to both inform people about plans for the development and to identify concerns that should be addressed in the environmental assessment. The following meetings were held:

1. On September 5 and 6, 1989, open public meetings were held for residents in the St. Ann's Bay and the Great Bras d'Or Channel areas.
2. On September 11, 1989, Kelly Rock Ltd. attended a meeting with the Warden and Councillors of Victoria County.
3. Two public meetings were also held in Baddeck on October 2, 1989, and Little River on October 23, 1989.
4. As part of the marine study, a questionnaire was given to 33 Englishtown and Big Bras d'Or fishermen to identify fishing areas and concerns.

5. On September 26, 1989, a meeting was held with the Union of Nova Scotia Indians in Sydney.

Issues raised at these meetings are addressed in a question and answer format in this report.

### **Information Contained in this Report**

The seven regulatory agencies which reviewed the initial environmental evaluation agreed that the main effects of the project were likely to be:

- possible dewatering of a proposed spring development to the east;
- loss or damage to land, freshwater or marine habitats;
- annoying noise and ground vibration from operations; and
- changes in tourist views.

This summary report, therefore, emphasizes these potential effects, although the study team kept in touch with regulatory agencies to ensure that all major effects of the project were documented.

### **Study Team**

The Environmental Impact Assessment was completed under the direction of Nolan, Davis & Associates (N.S.) Limited, Sydney. The following companies were also involved with specific parts of the study:

- CEF Consultants
- Davis Archaeological Consultants
- Quarry Engineering Design Limited
- O'Halloran Campbell Consultants Limited
- Arctic Sciences Limited
- Longyear Canada Inc.

### **Organization of this Summary Report**

The information in this summary report is presented in a slightly different way from the full report but a reader of both reports

should not have any difficulty comparing information. This summary report is divided into the following sections:

- Introduction
- Project Description
- The Land
- The Sea
- The People
- Questions and Answers
- Overall Project Effects
- Index to Concerns

One difference between the summary report and the full report is that information on employment and tourism has been brought together in a single section called The People. Another difference is that the discussion of project effects has a question and answer format to make it easier to find out how specific concerns have been answered. The Index to Concerns at the end of the report provides a way to find the page that covers a particular topic more quickly.

## **WHAT IS THE KELLY ROCK PROJECT?**

Kelly Rock Limited wants to develop a coastal rock quarry on the west side of Kelly's Mountain. American markets on the East and Gulf Coasts need high quality crushed rock for making concrete and asphalt, and granite from Kelly's Mountain could meet this need. The large granite reserves and the tide water location make this area attractive for such a development.

Coastal quarries, built in sparsely populated areas and using ships instead of roads to transport crushed building rock, were first successfully developed in Norway and Scotland. This type of quarry is a way to meet increasing market demand in an environmentally acceptable manner. To make this design economic, bulk carriers of 40,000 tons and upwards are needed, and so the sites must be close to deep water.



Great care has to be taken in developing coastal quarries, since they are often constructed in areas of much natural beauty and, although remote, they can still affect the lives of the people in the area. Quarry stone is usually found in hills or mountains, which may be an environmental advantage if the project is correctly designed. By working into the centre of the hill or mountain, and taking the stone down to the dock by means of a vertical shaft, called a "Glory Hole", and a tunnel, little of the actual quarry workings need be seen from outside of the development. This Glory Hole method means that high volume quarrying is possible with a low environmental impact. No rock is carried away by road, so there are few annoying effects in the surrounding area compared to a conventional quarry.

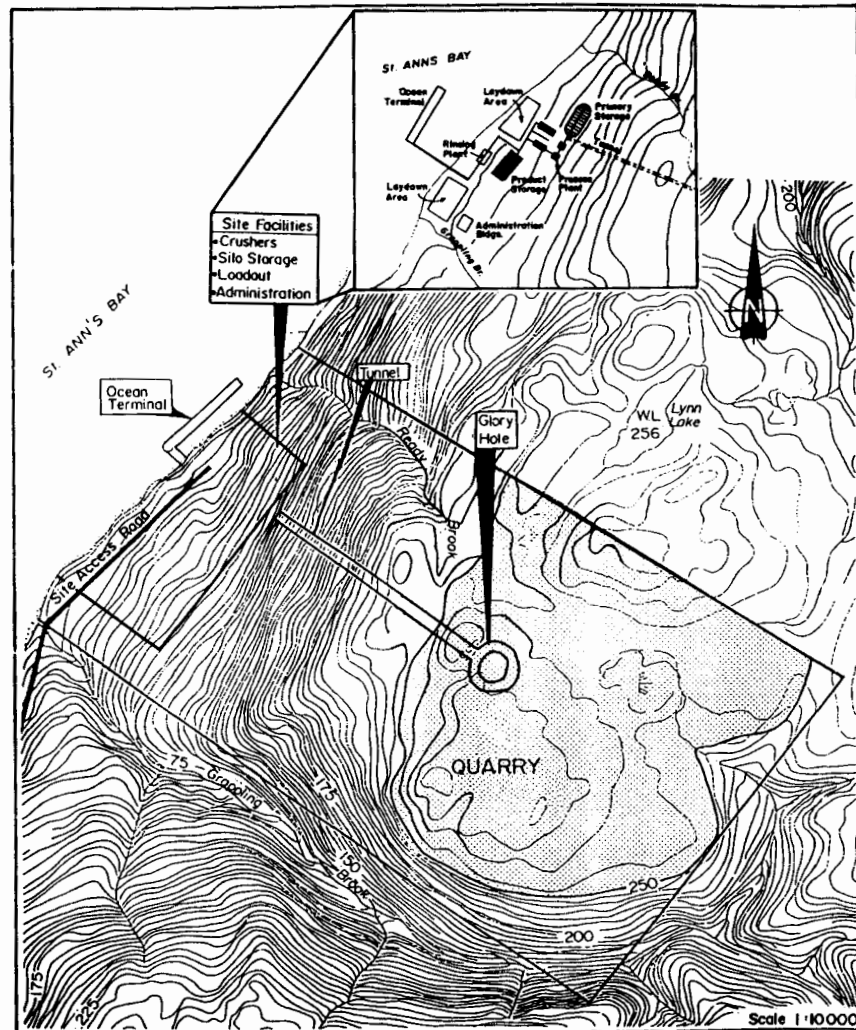
### **The Project**

Kelly Rock Limited aims to develop a quarry on the top of Kelly's Mountain, and ship the granite from the west side of the mountain on St. Ann's Bay. The area between St. Ann's Bay to the west, Grappling Brook to the south and east, and Ready Brook to the north has been studied for this EIA.

The EIA includes preliminary designs for the buildings, quarry, tunnels, and shipping facilities needed for the project. However, it must be kept in mind that in any mining development, plans need to be flexible to cope with unexpected geology or changes in the market for the crushed rock.

The three main parts to the Kelly Rock development are:

- the proposed quarry and primary crushing facilities, on the top of the mountain (highland plateau),
- processing equipment, storage and administration buildings located down near the shore, and
- shipping facilities, just off-shore.



The project will be in several stages:

1. exploration,
2. development,
3. production, and
4. closure.

Each of these stages is described separately below.

#### Explorations Before Production

To allow drilling equipment in to explore the possible quarry area, a fire road south from Cape Dauphin to the highland plateau was upgraded, as was an abandoned road north from Englishtown to the lower level. Permits for the roads were

obtained from the Nova Scotia Departments of Environment, Transportation, Lands and Forests and the Federal Department of Fisheries and Oceans. Drilling was done between August and October of 1989 to gather data to meet the needs of this EIA, assess the groundwater flow, analyze the rock, and get samples for laboratory tests. More exploratory drilling will occur in 1990, as part of development in the lower site.

Before construction can begin, the necessary permits from the NS Environment must be granted to Kelly Rock Limited. This depends on the successful completion of the Environmental Impact Assessment process. Construction on the shoreline level is planned to begin as soon as possible after permission is granted by NS Environment. Construction of the actual quarry on the top of the mountain will begin later.

#### Production

The production phase involves the following three major activities:

1. extraction from the quarry,
2. preparation of the product prior to shipping, and
3. shipping.

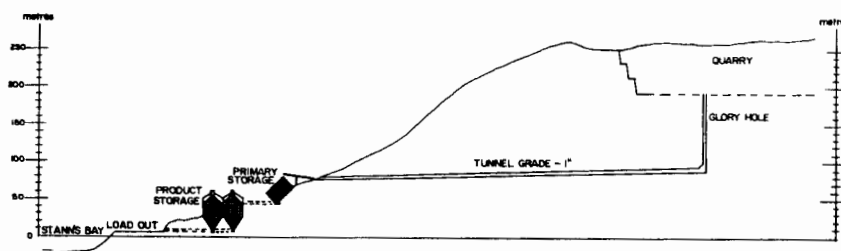
At present, the quarry is planned to be 200 feet (60 m) deep, with up to 2300 foot (700 m) long walls. Its lifetime should range between 20 to 40 years. The maximum rate of extraction is expected to be 5.4 million tonnes per year. Further tests are needed next year to more closely determine the lifetime. To begin production, an area of some 50 acres (20 h) will be stripped of topsoil and other material near the Glory Hole site. What little topsoil there is will be stored for possible future use.

A "slot" will then be quarried in an easterly direction for a drainage channel, to let surface water drain through a treatment system into Grappling Brook. Working quarry walls with a height of about 30 to 50 feet (10 to 15 m) will be progressively widened by drilling and on the north and south faces of the "slot", and will

provide rock for the crushing plant. Inside the quarry, blasted rock will be loaded into a primary crusher which will deliver the crushed material to a conveyor belt system. As the production rate increases, a larger crusher, or a second one, will be needed, as well as more conveyors.

#### Glory Hole

The conveyor system will move the crushed rock to the Glory Hole where it will be fed down a 600 feet (180 m) shaft to a tunnel. Feeders will control the movement of rock onto other conveyors located in the tunnel, which will transport the rock to the next stage of processing.



The Glory Hole and tunnel design will allow the quarry to be developed without disturbing the surrounding area. Two tunnels will be built. One tunnel will carry a conveyor, with the second for maintenance. Both tunnels will provide escape routes should there be a rockfall or other emergency. Ventilation will control carbon monoxide, nitrous oxide and carbon dioxide, as well as oxygen levels in the tunnels.

#### Storage

The tunnel conveyors will deliver the primary crushed rock to the main storage area just outside the mountain at the lower level. There the rock will be stored in a covered stockpile.

The processing plant, which is fully enclosed, contains a series of screens and crushers where the rock is crushed, sorted, and taken by conveyor to final storage bins. These bins may be constructed entirely above ground, or partially sunk into the rock.

#### Washing

The rock passes along a series of conveyors linking the storage bins and through the rock cleaning plant on its way to the ship.

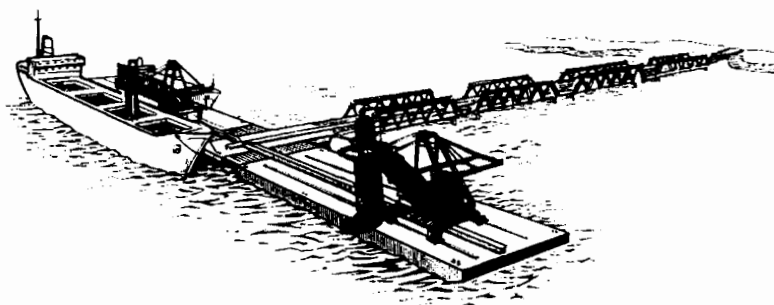
Excess dust from certain sizes of the rock must be removed, either when the stone is dry or by rinsing, before it is loaded on board the ships.

A rinsing process would spray and agitate the rock with pressurized water. The water and fine dust would pass through a screen cloth and be discharged to a cone-shaped settling area. Much of the water would be allowed to overflow the edge of the cone and pass into a number of settling ponds from which it would be withdrawn for reuse in the washing plant. This closed circuit system will allow the water to be reused and for the fine particles to be removed. This fine material will be trucked at regular intervals to the quarry level, and placed in disposal areas to be excavated around the edge of the quarry. In the future, markets may be found for the sale of this fine material.

#### Wharf

Docking and loading facilities will have to be built. A "travelling shiploader" design, which allows the shiploader to travel along the length of the wharf parallel to the ship, is recommended. Loading rates will probably be around 2,500 tonnes per hour, although this rate could be increased.

The wharf must support the shiploader and its feed conveyor, as well as be able to handle ships of up to 60,000 tonnes capacity. It will be located 500 feet (160 m) from the shoreline to accommodate the 55 foot (17 m) draft needed for such vessels.



Three designs for the harbour facilities have been prepared for review:

- OPTION 1     Rockbased wharf with or without a breakwater
- OPTION 2     Pipe pile based wharf with or without a breakwater
- OPTION 3     Floating wharf with or without a breakwater

Initially a breakwater was thought to be necessary, but this is now being reviewed. In each option, the breakwater, which would probably be of solid rock, would be located on the north side of the wharf to dampen wave action and reduce the pressure of ice build-up. If a breakwater is built, it may be possible to leave an open zone between it and the shore.

Option 3, the floating wharf concept, uses the "Flexiport System", made of large floating pontoons which are pre-fabricated and towed to the site, where they are put in place and anchored to the seabed. A bridge would be strung from the wharf to the shore.

Option 2, the pipe pile structure, is similar to the floating design, except support is provided by an open network of piles or posts.

At present, Options 2 and 3 are the most likely to be built.

#### Fuel

During the early stages of construction, power will be generated on site by means of four sound-proofed diesel generators. One will be at the main quarry, the other three in the lower plant area. Diesel fuel delivery will be by road tanker.

Fuel and oils will be stored in bulk storage tanks, placed in leak-proof diked areas large enough to hold the full capacity of the tanks in the event of rupture or spills. Waste oil from plant equipment will also be stored in tanks designed for this purpose, prior to being removed from the site by a certified waste oil contractor.

#### Noise

During construction, noise levels will be difficult to control. Mobile equipment will be working on the exposed face of Kelly's Mountain and small blasts will occur frequently during excavations. However, the noise is not expected to be loud and should last for only a short period of time.

On completion of construction, noise levels outside the site boundaries are expected to be low. Trees will be kept around the site wherever possible to provide a noise barrier. Noise reduction will be a key objective in the selection and installation of all plant equipment.

Noise from inside the quarry will be muffled by the walls of the quarry itself. The processing plant equipment will be entirely indoors, which will significantly lessen noise. Rubber mats will be fitted to the screening equipment to limit noise from this operation.

Quarry blasting operations will probably be subcontracted, and primary blasting in the quarry is expected to occur, on average, once per month. The type of blasting to be used will greatly reduce noise and ground vibrations.

During construction, explosives will be stored in approved magazines, built on site, as required by local and national regulations. During extraction, ingredients will be trucked on site for each blast and mixed prior to charging the hole.

Dust

Dust coming from equipment inside the processing plant will be controlled. Water-foam spray dust suppressants will be used on the access road, and other travelled roads on the site. Dust suppression will be used on the primary crusher in the quarry, and a dust collection system will be used on the drilling rig.

Sediment

On the lower site, surface water will be drained by ditches dug on each level of the site. A main cutoff ditch on the uphill side of the plant area will catch water running from the upper slopes, and will also be designed to trap any boulders which are dislodged and run down the hill. The ditches will discharge into Grappling, Ready or Middle Brooks after having sediment removed from the water flow. Deposited sediment will be dug out periodically and trucked to disposal storage areas within the quarry.

At the upper level, drainage waters will at first be directed into the bog to filter out sediment prior to their entering Bog Brook and eventually Grappling Brook. Later, settling basins will be built to reduce sediment before discharging the water.

**Workers**

Where possible, Kelly Rock workers will be hired from the local area. Quarry and processing plant workers, maintenance staff, office staff, and those working with the wharf and shiploading equipment will be needed. When full production is reached, about one hundred year-round staff will be required. Training programs open to local people will be provided.

People and equipment will travel north from Englishtown about 4 miles (6.2 km) to the site, using an upgraded, gravelled extension of the Englishtown road. The main administration buildings will be located at the lower level just north of Grappling Brook.

**Water**

The industrial water supply will be taken first from Grappling Brook. However, since the water system is a closed loop, the only need will be to make up any losses. This is estimated to be a maximum of 10 gallons per minute (45 Lpm), and would occur only during vessel loading operations. Vessel loading is expected to last 10 to 20 hours.

Water needs for the administration buildings will either be taken from Grappling Brook or from a well. Demands could be up to 20 gallons per minute (90 Lpm) for a short time.

**Wastes**

Sewage and waste water from the administration buildings will be treated by septic tank and field according to Nova Scotia Department of Health and Fitness requirements. Solid wastes will go to the Victoria County landfill at Baddeck.

No hazardous wastes will be used or stored on site. Handling of fuel oil, the only potentially hazardous substance, has already been described.



Colour                    The low buildings, stockpiles, and conveyors will be finished on the outside with sheeting, coloured to reduce the visual impact of the quarry plant from the shores of St. Ann's Bay.

### **Closure**

When it is time for the quarry to close, a number of steps will be taken, which will include the following:

1. allowing the quarry to flood to form a man-made lake,
2. cutting down the quarry sides to allow easy entry and exit,
3. planting vegetation on exposed surfaces,
4. removing, or selling the buildings and equipment, and
5. considering giving the public access to the highland site for recreation.

More detailed plans for closing will be developed as quarrying proceeds.

## **THE LAND**

This part of the report describes the land environment of Kelly's Mountain. Geology and climate are described first, followed by a description of stream and groundwater flows, forest cover, and wildlife.

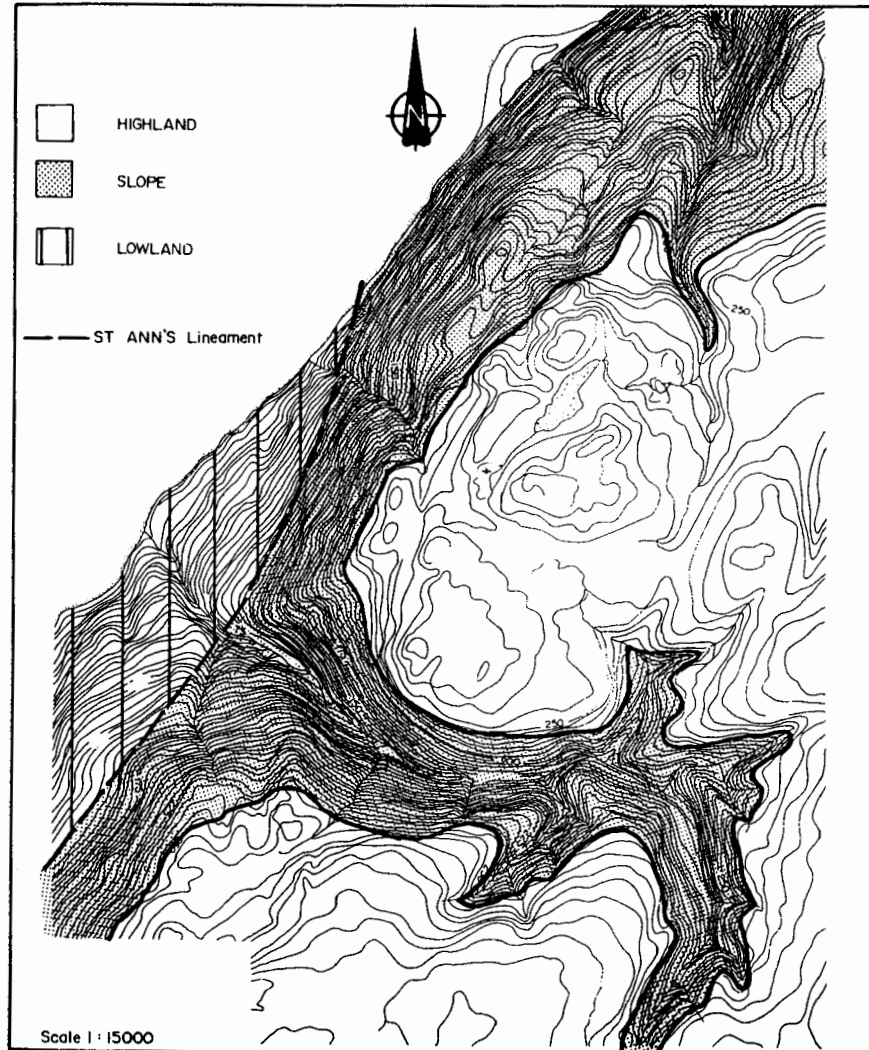
### **Geology**

The central core of Kelly's Mountain is granite, which is about 490 million years old. This granite has low levels of metals commonly found in similar rocks on Cape Breton Island.

The entire mountain was covered by glaciers during the last ice age, which ended 10,000 years ago. This ice deposited a blanket of sand, silt and boulders over the lower parts of the site near the shore and scraped the bedrock clean over the steep slopes and top of the mountain.

These geological processes created the landscape we now see. The three main features are a flat topped highland, a steep slope

leading down into the Grappling Brook valley and the shore, as well as a narrow lowland near the shore of St. Ann's Bay.



The study area and the island as a whole are located in a zone where there is a low risk of earthquakes.

The natural radiation from the granite rocks is relatively low within the proposed quarry area. It is similar to levels found over the granites on the South Mountain in the Annapolis Valley.

### **Weather**

#### **Rain and Snowfall**

The total annual rainfall at Sydney Airport is 55 inches (1,399.9 mm). It is relatively even throughout the year but peaks during

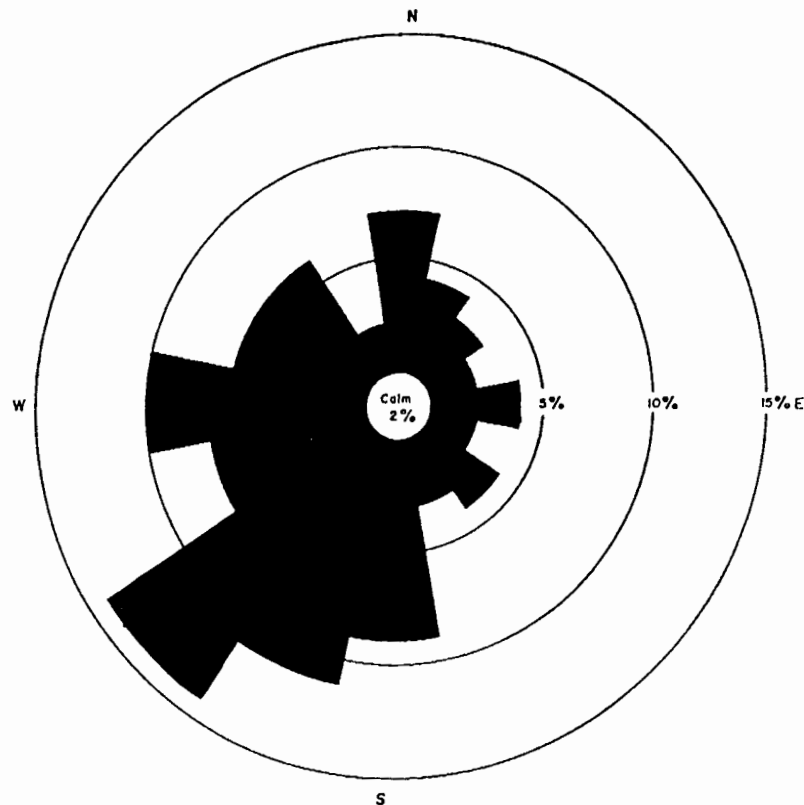
the fall. The fraction of the precipitation falling as snow can be less than 15 percent along the coast and up to greater than 30 percent over the Highlands. Rainfall in the area is acidic with an average pH of about 5.2.

Air Temperature

Maximum temperatures occur in July (average 17.7°C) and August (average 17.6°C) with temperatures below freezing from December to March. The lowest average temperature is -5.9°C in February.

Wind

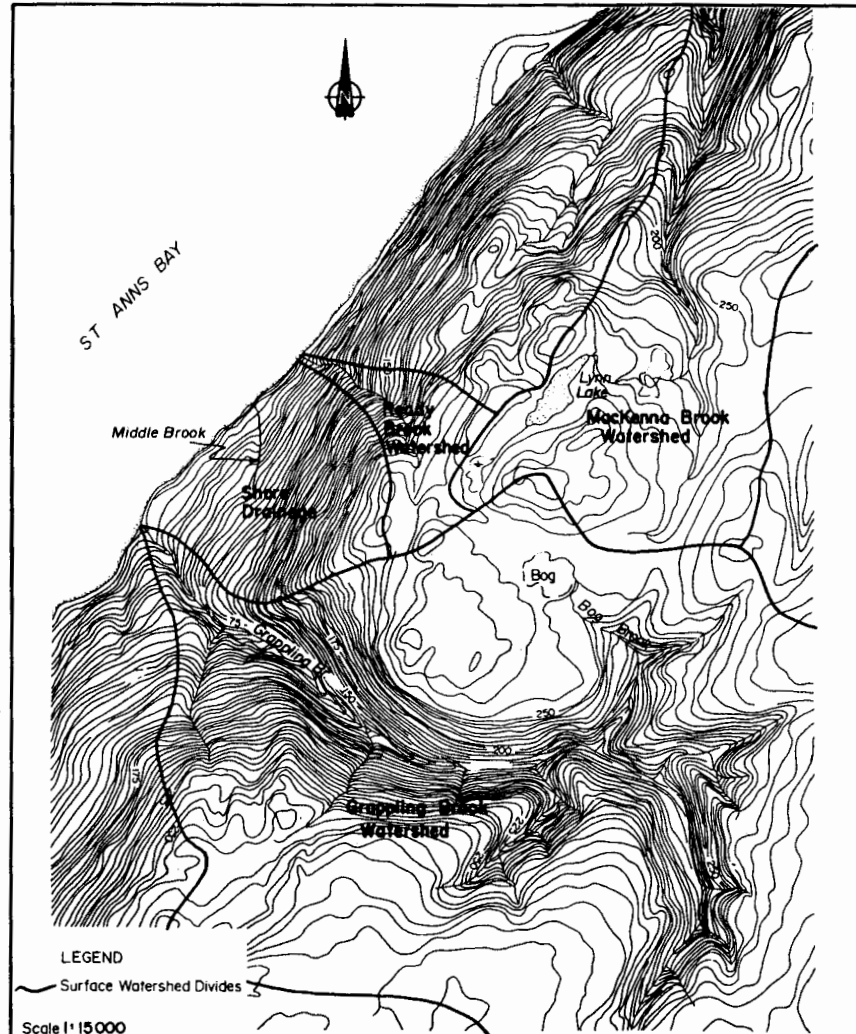
Winds are generally from the southwest toward the northeast. Some north winds blow during March, April and May.



**Surface Water**

All surface waters within the project site drain to the west into St. Ann's Bay. The proposed quarry lies mainly within the Grappling

Brook watershed, although a small upper portion of Ready Brook also drains the quarry site. Shore facilities will also drain into a very small stream called Middle Brook. There are no registered water users within any of these watersheds.



Maximum flows in these brooks would be expected to occur in November and December because of fall rains, and in April and May because of snow melt.

#### Grappling Brook

Grappling Brook has a box-shaped watershed of 1.4 square miles (3.6 km<sup>2</sup>). Grappling Brook is by far the largest brook near the site and has numerous branches. There are no lakes within

this watershed; one large bog (covering less than one percent of the area) exists in the proposed quarry.

The stream bottom over most of the brook is granite bedrock with some coarse sediment in pools. The brook has a steep slope over its entire length with numerous 30 foot (9 m) falls in the lower section.

There is always water in Grappling Brook, but very low flows were recorded in August and September of 1989. During low flows, it would take approximately 3 hours for any water from the upper quarry site to reach the mouth of the brook.

Water Quality

Grappling Brook is always clear with no colour, suspended sediment, suds or scum. The water is very soft with a neutral to slightly acid pH (6.2 to 7.1). Nutrients and organic carbon are detectable but at low concentrations. Small amounts of aluminum, barium, iron, manganese and mercury occur naturally.

Ready Brook

Ready Brook has a tear-drop shaped watershed of 0.08 square miles (0.2 km<sup>2</sup>). This brook is a single main channel without branches.

The stream bed of this brook is composed mostly of cobble and boulders. This brook is extremely steep although it flattens in its headwaters. There is a 16 foot (5 m) falls at the mouth of this brook.

Ready Brook is a seasonal stream, which is dry during most of the summer and early fall months.

Water Quality

The water of Ready Brook is similar to Grappling Brook. The water is very soft with a neutral to slightly alkaline pH (6.7 to 7.8). Small amounts of barium were always present in samples; aluminum and iron were sometimes present in small amounts.

### Mackenna Brook

The only lake within the project area is in the headwaters of the Mackenna Brook watershed. This lake covers approximately 6 acres (2.5 hectares). Although it lies outside the proposed quarry, it could be at least partially dewatered by quarry operations. This lake is extremely shallow with maximum depths of only 3 feet (1 m).

### Water Quality

The water in the small lake is very soft with an acidic pH near 5.0.

### **Groundwater**

The water quality of the groundwater is generally similar to that of the surface water except that the groundwater is more acidic and low concentrations of some radionuclides were found in a few samples. All waters are soft and acidic (pH 5.8 to 6.0).

The study area receives a large volume of precipitation with relatively low losses. Groundwater is built up over nine months from winter to early spring and in late fall.

During summer, May to September, plants use more water than supplied by rainfall.. The result is a lowering of groundwater and stream flows. The low soil moisture in June, July and August is quickly restored in September.

### Radionuclides

The two uranium samples collected showed a range in values of 0.003 to 0.032 mg/L; both are lower than levels suggested to be of concern in existing guidelines. In terms of radionuclides, only <sup>210</sup>Pb is slightly above NS Environment guidelines of 0.3 Bq/L, three out of four times. The highest value recorded was 0.45 Bq/L.

### Groundwater Users

The nearest groundwater user is a company named Aqua Gold. They have applied for a water rights permit to extract water from a series of natural springs discharging out of the eastern side of

Kelly's Mountain. They are located 1.6 miles (2.5 km) due east of the eastern edge of the proposed quarry. Aqua Gold has not as yet made use of this spring.

The nearest domestic well is located at the north end of Englishtown, 2.8 miles (4.5 km) to the southwest.

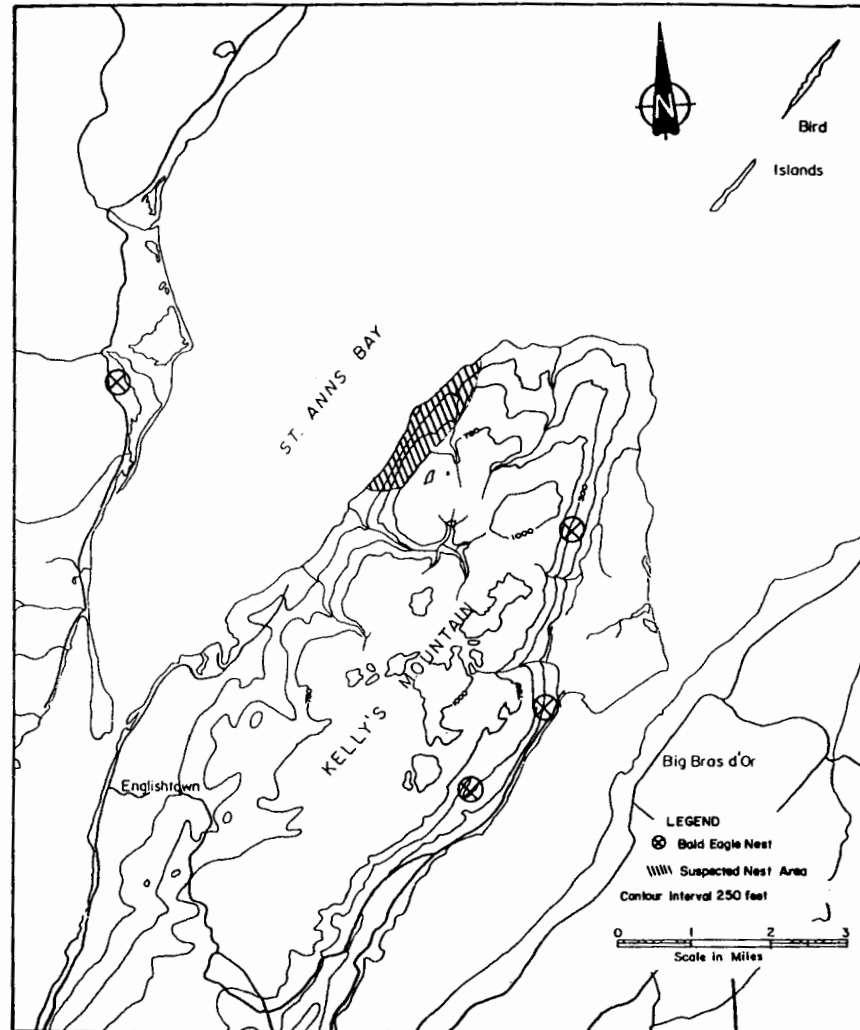
### **The Forest**

Kelly's Mountain is covered by mixed-wood forest. The softwoods are balsam fir and black spruce. These were hit hard by the spruce budworm in the late 1970's and because of this, almost all the sizable trees are dead. The hardwoods are made up mostly of red maple and white birch. Only 8 percent of the forest land within the project area would be worth harvesting.

### **Birds**

Wetlands in the area consist of one small shallow lake and bogs. These areas do not make good habitat for waterfowl.

There are several bald eagle nests on Kelly's Mountain and young bald eagles are frequently seen near the mouth of Grappling Brook. However, a helicopter search for nests did not find any nests within or near the project area in the late summer of 1989. The closest known nest is on the other side of the mountain.



## Animals

### Deer and Moose

Deer and moose are likely common on Kelly's Mountain. However, the project area is not unusually good habitat and no important wintering areas (deer yards) are known to be nearby.

### Rare or Endangered Species

A rare slug, found in old, mixed forests under rotting wood and vegetation, has been found near the site. This slug is found in other parts of mainland Nova Scotia and elsewhere in North America. The slug was found along the Trans Canada Highway near Kelly's Mountain at an elevation of 820 feet (250 m). The



slug may be present within the project area but the known location is about 6 miles (9 km) to the south.

The Gaspé Shrew, commonly found in loose rock and shale or talus, was first recorded in Nova Scotia in 1971 on Kelly's Mountain, approximately 3 miles (5 km) southwest of the project area. This animal was later found in a number of spots within the Cape Breton Highlands National Park in 1974.

### **Fish**

Grappling Brook has two falls approximately 30 feet (10 m) high block near its mouth, which stop fish from swimming upstream. Most of the brook, including the upper reaches near the quarry, is fast-flowing, narrow and steeply sloped. These factors may increase flows enough to wash gravel from the streambed, thus eliminating spawning areas. This, along with the falls, may explain why no fish were found in the brook during field surveys.

Other streams draining the project area, including Ready Brook, are similar to Grappling Brook. Because of high flows and falls, fish probably do not live in the upper parts of any of these streams.

Smelt probably spawn in the mouth of Grappling Brook and other brooks during the spring. Sea trout may also be caught in the mouths of these streams, but it is unlikely that they actually come from them.

## **THE SEA**

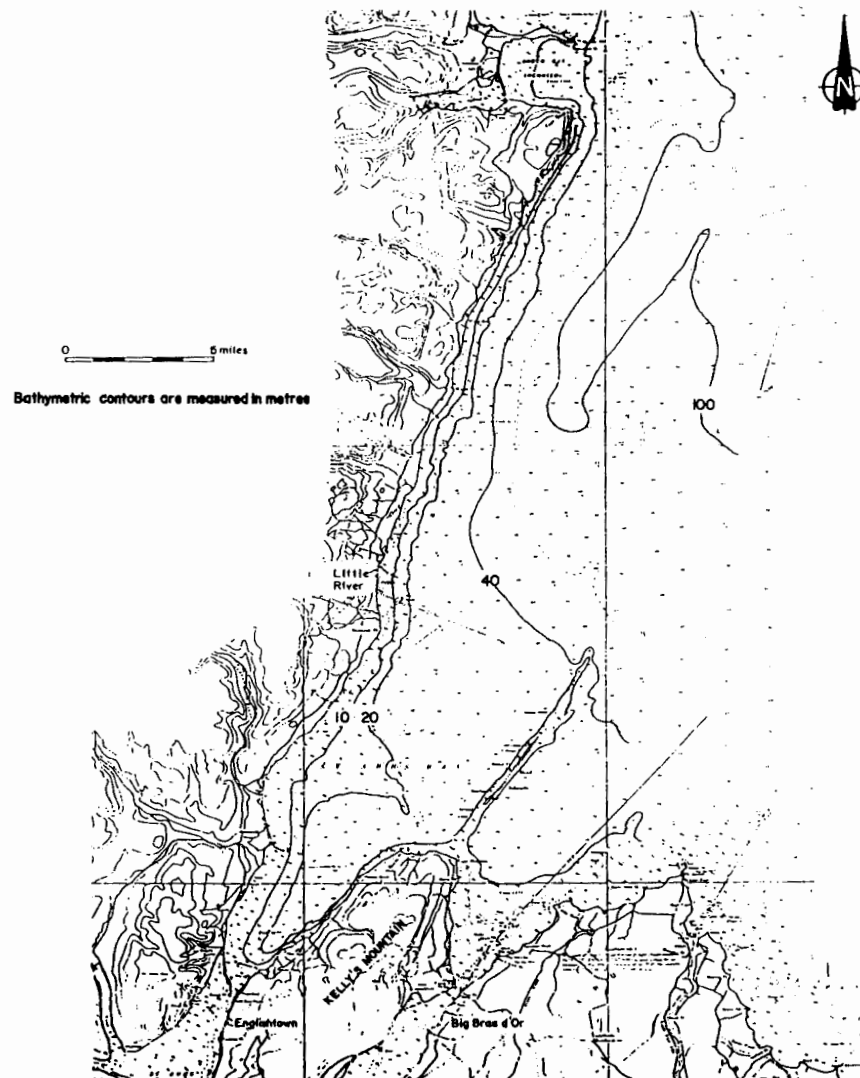
This section describes the physical features of St. Ann's Bay, the distribution of fish and shellfish within the bay, and sea birds. More information on fishing activity is provided in the next section.

### **St. Ann's Bay**

St. Ann's Bay is a relatively deep inlet, with typical depths of 65 feet (20 m). The deepest water occurs in the southeastern half of

the bay, with a deep trough (depths greater than 80 ft) extending to within a few miles of the quarry site.

At the project site, a narrow rocky ledge about 650 feet (200 m) wide drops quickly to the flat bottom of the bay. The shoreline south of Big Grappling Beach is relatively exposed to wave and ice action but is probably sheltered from the worst storms.



### Currents

Direct observations of currents are not available in St. Ann's Bay away from the harbour entrance. However, the factors that control currents can indicate general conditions likely to be present.

**Regional Currents** There is a general southward flow of water off the east coast of Cape Breton Island. Surface velocities are generally between 0.3 to 0.6 knots (0.15 to 0.30 m/s) in summer. This current would result in southwest flow of water along the northwest coast and an opposing northeast flow along the southeast coast.

**Harbour Currents** St. Ann's Harbour is large in comparison to the freshwater entering the harbour from the North River. In addition, the freshwater and saltwater in the harbour are well mixed by the time they leave the harbour because of the strong currents at the entrance. Therefore, estuarine or harbour currents are not likely to be important near the project site.

**Wind Currents** Winds are expected to be the major source of surface currents in St. Ann's Bay. The most frequent winds, blowing from the southwest, cross a relatively small distance of open water (10 to 20 miles). This would result in low surface currents of about 0.17 knots (0.09 m/s) to 0.78 knots (0.40 m/s). Winds from the northeast, while less common, would result in stronger currents because these winds are not blocked by land. These surface currents would have speeds of about 0.29 knots (0.15 m/s) to 1.3 knots (0.67 m/s).

**Tidal Currents** Currents driven by the tidal variations will be even over depth, and may represent the largest overall flows. Available information suggests that tidal currents would be in the range of 0.1 knots (0.05 m/s) to 0.3 knots (0.15 m/s).

Southwesterly currents will tend to be somewhat stronger past the southeastern coastline, including the development site. This results from the tendency of ocean currents to turn to the right in the Northern Hemisphere due to Coriolis force.

Ice

Ice in St. Ann's Bay is made up of locally-formed solid ice and thicker drift ice originating in the Gulf of St. Lawrence. Drift ice is forced into the bay by wind and currents, so its movement is

highly variable. The landfast local ice cover forms in late December or January while the drift ice first appears in the Cabot Strait between mid-January and mid-February. Some ice is usually in the bay until the end of April.

### Waves

Large waves occur in exposed portions of Cabot Strait. But even at the most exposed outer portion of the St. Ann's Bay, near Cowdy Point, the largest waves are expected to be only about 12 feet (3.8 m) high.

### **Fish and Shellfish**

#### The shoreline

Deeper water parts of the bay are covered with silt, but near the shore, the bottom changes to sand and then broken rock. Off the project site, bedrock is between 20 and 30 feet (6 to 10 m) from the surface. A shallow rocky ledge extends about 350 feet (100 and 120 m) from shore in the area of the proposed wharf.

#### Seaweeds

Nearest shore, waves prevent seaweeds from growing. However, there is a thick kelp bed at depths of between 6 and 25 feet (2 and 8 m). Kelp is less common at depths over 25 feet (8 m) and the slope of the bottom increases. The bottom changes quickly from a rocky slope to a sandy and then silty bottom.

#### Shellfish

Lobster are abundant in all areas where depths are between 6 feet and 50 feet (2 to 15 m). Kelp and loose rock provide good shelter for the . In sandy areas, the lobster dig burrows for shelter.

Between late July and early October, lobster densities ranged from one every 45 square feet ( $4 \text{ m}^2$ ) to one every 160 square feet ( $15 \text{ m}^2$ ). Large numbers of both market-sized and small lobster were present in late July even though the commercial fishing season had ended only two weeks previously.

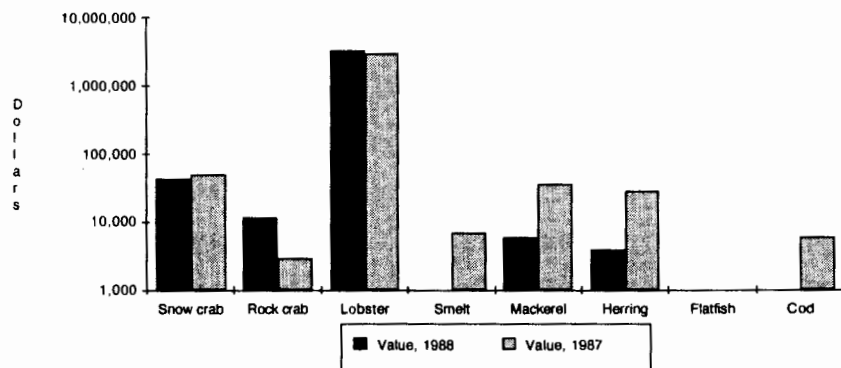
Even though care was taken to observe scallops during diving in the area in July and October, only very few were seen (eight scallops were found during six dives along the shore of the project site).

Small hermit crabs, approximately one-half inch (1 cm) in diameter, are common in sandy areas. While reportedly common in deeper water parts of the bay, few rock crab were seen within 1000 feet (300 m) of shore.

The Bay

Lobster, rock crab, smelt, mackerel, herring, flatfish, and cod are the major fish and shellfish in St. Ann's bay. Lobster and snow crab are the most valuable species for fishermen in the area, but snow crab is fished further north near Ingonish, outside the bay.

Value of Landings for St. Ann's Bay and Big Bras d'Or, 1987-88



Lobster

Lobster is by far the most important commercial species in St. Ann's Bay. In 1988, lobster landings totalled 515 tonnes with a value of \$3.42 million in the fishery district that includes St. Ann's Bay and Great Bras d'Or Channel.

Lobster catches in St. Ann's Bay have increased over the last decade as they have in other parts of Nova Scotia. Catches are now approximately double those of 1978. The increase in lobster landings probably reflects an increase in the overall numbers of lobster in coastal waters of Nova Scotia. This increase may have

peaked and, if environmental conditions change, lobster catches could drop as quickly as they have increased.

Information on the behaviour of lobster or patterns of larvae in the surface waters is not available. We do know, however, that the young of lobster are carried by surface currents and their distributions would thus be widespread and variable within the bay.

When the very small lobster first seek the bottom, they generally survive best in gravel. The project area does not appear to have a bottom suitable for these very young lobster. The shoreline area around the project site does, however, provide excellent habitat for older lobster (those with a carapace over 1.6 inches in length).

Rock crab            Rock crab are common over most of the deeper water parts of St. Ann's Bay. Near the project site, rock crab were only seen in water deeper than 50 feet (15 m).

Salmon and trout    Salmon and trout spawn in freshwater but may spend a part of their adult life in salt water. Atlantic salmon from the North River, as well as other Maritime rivers, pass through the bay in the summer. Sea trout are also present in the Bay during the summer.

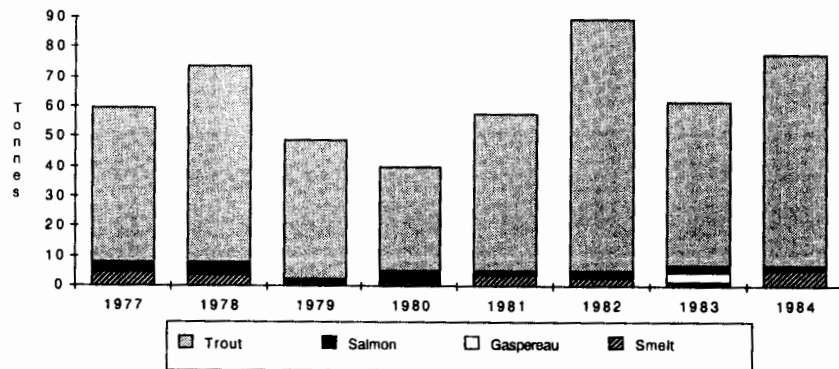
Salmon were commercially fished until trap nets were banned in 1983. Records of commercial catch and capture of tagged salmon show that salmon caught in the bay come from a variety of Maritime rivers including the Margaree and Miramichi Rivers.

Salmon are most abundant in St. Ann's Bay in June and July with large numbers occasionally present in May and only a few present in August.

Discussion with a fisherman who operated traps near the project site indicated that most salmon were caught while moving out of the bay. This would suggest that salmon move into the Bay in deeper water or along the Little River shore and leave the Bay

along the eastern shore. The fisherman also reported catching fish that had been tagged in Newfoundland.

Commercial Catch of Anadromous Fish,  
1977-84



Other Fish

A number of other species, including cod and mackerel are caught in the St. Ann's Bay area, but are not generally fished near Kelly's Mountain. Herring and mackerel are migratory species that enter St. Ann's Bay and St. Ann's Harbour during the spring to fall period. These fish are most often fished in the harbour. Groundfish, primarily cod, are most often fished near the Bird Islands. Gaspereau or alewife, smelt and capelin are also present in the Bay during the summer. Smelt probably spawn in the mouth of Grappling Brook in the early spring.

Sea Birds

Many sea birds nest and feed in and around the Bird Islands, two miles (3 km) north of the northern tip of Kelly's Mountain. These islands are a protected bird sanctuary.

The most important or numerous sea birds present around the Bird Islands are:

- the great cormorant,
- the double crested cormorant,
- the puffin,
- the razorbill auk,
- the black-legged kittiwake,

- the guillemot, and
- herring and great black-backed gulls.

Other species of birds are also present.

## THE PEOPLE

### Archaeology

On September 9 and 10, 1989, archaeologists checked the areas between MacDonald's Brook and north of Grappling Brook to identify any signs of old settlement. On October 9, 1989, archaeologists visited three caves in the vicinity of the north end of Kelly's Mountain to investigate their spiritual significance to Micmac heritage. In addition, a three person team from the Nova Scotia Museum also undertook a separate investigation of these caves in early October.

Literature research was also done to identify Micmac mythology related to the caves and Kelly's Mountain in general.

### Findings Near the Quarry Operation

Road construction for access to the lowland project area has not affected any heritage resources. However, there are a number of historic features between Oyster Cove and the new shoreline access road. These include two rock cairns of unknown function and a stone boundary wall which extends for approximately 250 feet (80 m). Small fragments of white refined earthenware with a transfer print too small to identify were found near a small stream. This type of ceramic ware dates to post 1850.

Although no foundations were found in this area, a local resident reported that a farm and a school house existed here in the early part of this century. The first occupants of the farm are reported as being MacLeods, with later occupation by a MacKenzie family. The school was apparently a wooden structure without a foundation.



No prehistoric cultural resources were found within the study area. The only heritage resources found date to between 1850 to 1935. These remains will not be affected by the project.

#### The Micmac Site

A cave of cultural significance to Micmacs is more than 2 miles (3 km) northeast of the quarry. At the request of the Micmac representatives, the exact location will not be identified in this report. Two additional caves were discovered but were small and were not of any cultural importance.

The cave was explored by a study team and three Micmacs from Eskasoni. The first three chambers were inspected for petroglyphs. Modern graffiti was found on the cave walls; the earliest dated to 1924. Unfortunately, many of the carvings are on top of each other, making it difficult to tell if any of the glyphs are aboriginal. The limestone is soft and has a coating of fungus. No glyphs were found that were remotely like those glyphs found at other sites in Nova Scotia.

Four areas were also examined on the floor of the second chamber for evidence for aboriginal use. Fish bones and two fragments of bird bone were found. It is suspected that the bones are a result of periodic flooding of the cave. However, based on the existence of the cave and the myths about it, the cave does have importance to the Micmacs.

#### Micmac Myths

Micmac myths are tied to this cave. A summary of these myths is provided below.

In the old days, Micmacs thought of their land as a mighty giant with one foot at "landend" at Yarmouth, the other at Gaspé, and his head on the island of Cape Breton. This was the land they knew as Megumaageo.

At Cape North, the great deity Kteini'syam made Gluskap out of earth and then breathed on him. Gluskap was considered a great personage, maybe a god, something big, the inventor of material culture, transformer of the landscape and reducer of animals to comfortable size.

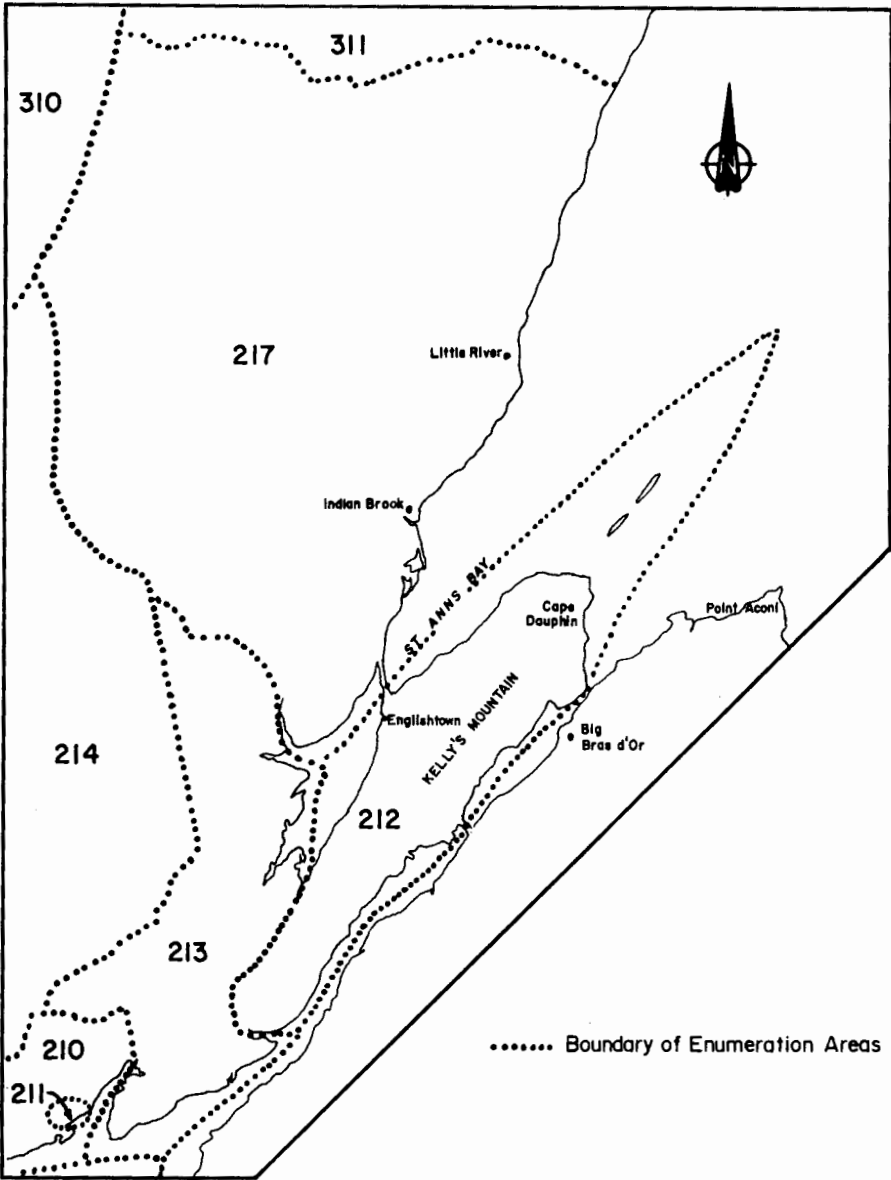
He lives in a mountain cave in Cape Breton near Cape Dauphin where there is always a roaring sound; the entrance gets smaller and smaller as one approaches, until it is only a tiny hole. The Micmacs feel that the cave on the edge of Kelly's Mountain is this cave.

### **Current Population, Employment and Recreation**

Information on population and work force characteristics are available from the 1986 Census. This information is available at the county level and within specific Enumeration Areas (EA's). The Enumeration Areas that most closely fit the area affected by the project extend from the communities of New Campbellton on the east, to Wreck Cove in the north, and Baddeck Bay in the south. These EA's exclude the community of Baddeck which has a major influence on the population characteristics of Victoria County.

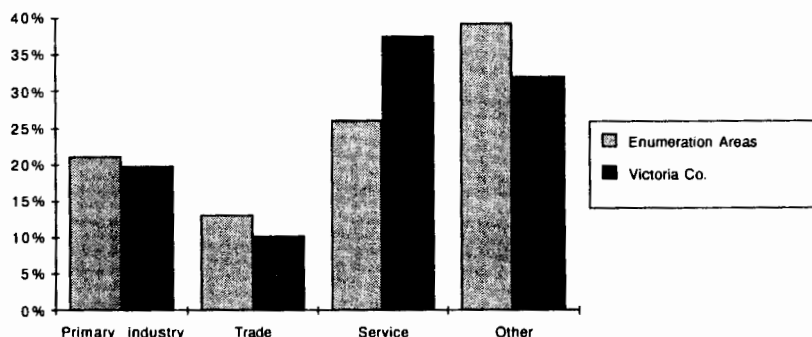
In 1986, the population of Victoria County was 8,704, an increase of 3.2 percent since 1981. The largest community in Victoria County is Baddeck with a population of 995 in 1986, which accounts for 11.4 percent of the county's population. The average family income for the residents of the county was \$28,354, similar to average family incomes in Cape Breton, but 14 percent less than the provincial average.

In 1986, the total labour force near the project was approximately 700 out of a total labour force of 4,125 in the county. Unemployment rates near the project ranged from 22.2 percent to 8.8 percent in 1986.



Approximately 20 percent of the work force is employed in primary industry, mostly forestry and fishing. The trade and service industries, major parts of the tourist industry, account for 39 percent of work. Employment in trade and service industries is lower near the project because of the concentration of trade, service and tourist businesses in Baddeck and other communities like Ingonish.

Percentage of Work Force in Major Industries,  
1986



### Fishing

The major fishing communities near the project include Baddeck, Big Bras d'Or, Englishtown and Little River. There were 84 fishermen holding one or more specific licenses in fishing from these communities in 1988. Fishermen fishing in St. Ann's Bay can be grouped into the home ports of Englishtown, Little River and Big Bras d'Or. Fishermen from Baddeck do not fish in St. Ann's Bay

While most fishermen hold lobster licenses, licenses for snow crab are most commonly held by Little River and Big Bras d'Or fishermen, and licenses for scallop are most commonly held by Big Bras d'Or fishermen. Between 1983 and 1988, the number of lobster licenses increased by 7 and the number of scallop licenses decreased by 3. Few other changes occurred.

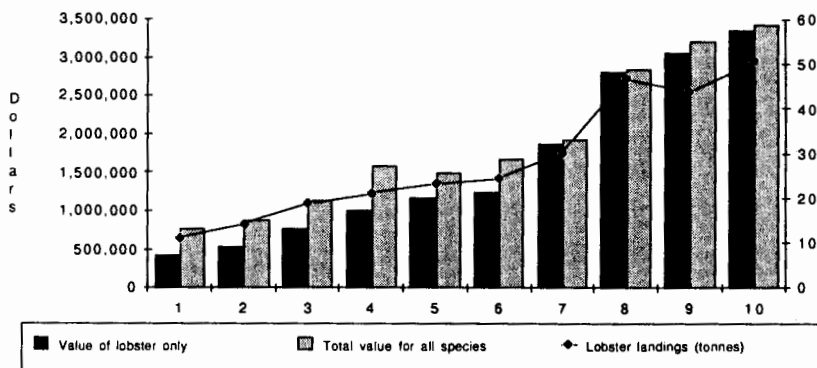
The lobster season extends from May 15th to July 15th. The lobster fishery is by far the most intense period of fishing activity. Bait fishing for the lobster fishery generally begins around mid-April, although some fishermen begin fishing herring through the ice in March. Winter fishing for smelt also occurs within St. Ann's harbour, mostly in the North River estuary. Following the lobster season, fishing activity is sporadic, and largely depends on the abundance of particular species and the price obtainable.

Lobster

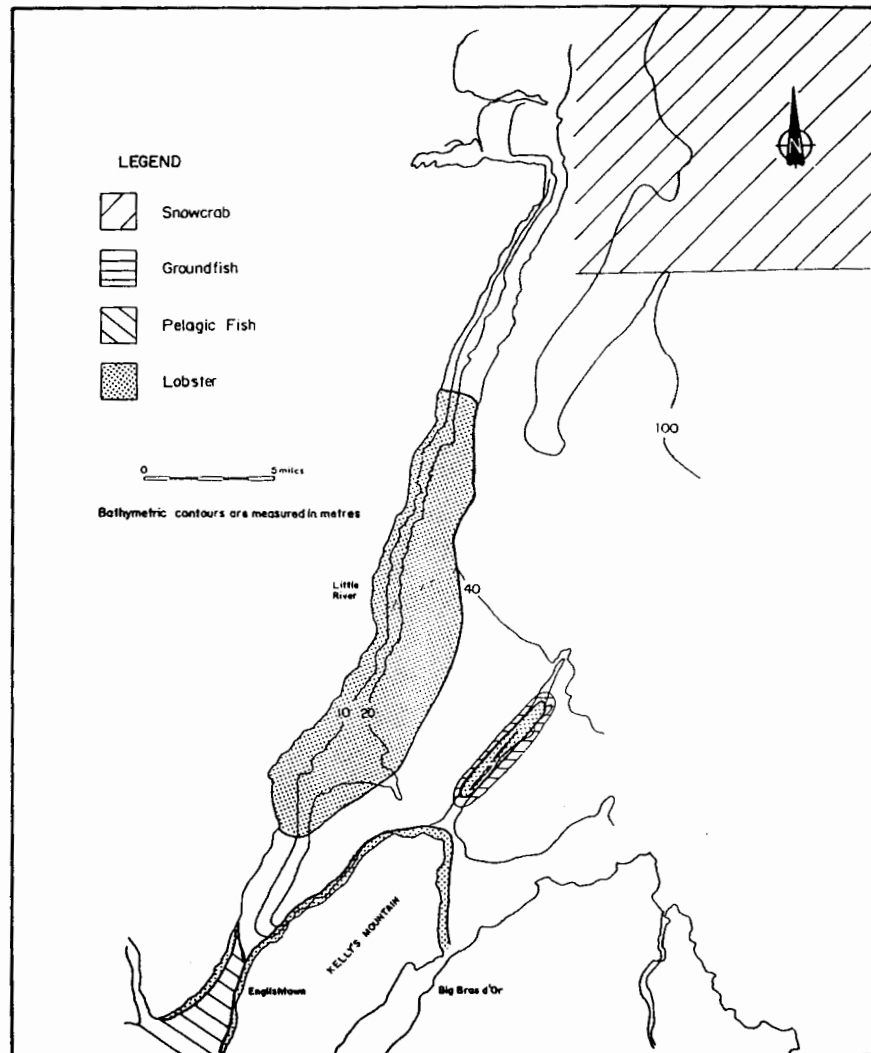
While the price of lobster has increased over the last decade, fishermen's investments have also increased because of larger boats and larger crews. Operating costs have increased as much as threefold because of rising fuel and bait prices, as well as increased vessel operation hours. Even with increasing costs, however, net incomes for fishermen in northern Cape Breton have nonetheless tripled since 1978.

Landings and value of lobster in the general area of St. Ann's Bay have not only increased steadily, but lobster has increased as a proportion of total fishery value. In 1988, lobster accounted for 86.4 percent of the landed weight and 98.1 percent of the landed value within the fishery.

Landings and Value for St. Ann's Bay and Big Bras d'Or, 1979-88



Lobster fishing areas are self-regulated. Englishtown fishermen do not fish on the Little River side of St. Ann's Bay, and Little River fishermen do not fish on the Kelly's Mountain side of the Bay. Both Englishtown and Big Bras d'Or fishermen fish along Kelly's Mountain, but few Big Bras d'Or fishermen fish near the project site. While Little River fishermen do not fish along the western edge of Kelly's Mountain or around the Bird Islands, they do fish up to two nautical miles from shore.



**Scallop**

Scallop landings in St. Ann's Bay are low and variable. Anyone with an inshore scallop license can fish scallops within St. Ann's Bay, and fishermen from Point Aconi and Alder Point are reported to occasionally fish in the bay. There are a total of 52 licensed scallop fishermen in the area between Wreck Cove and Glace Bay.

A scallop fishermen from Englishtown said that the major scallop bed near the project site was located near Cowdy Point (Mary's Rocks). While most Englishtown and Big Bras d'Or scallop fishermen indicated that they fished scallops near the project site,

diving surveys did not find any commercial quantities of scallops in the area.

**Snow crab** Snow crabs are fished by Little River and Big Bras d'Or fishermen. The snow crab fishery occurs north of St. Ann's Bay, not near Kelly's Mountain.

**Rock crab** Recently a market has opened for rock crabs although the price is low. To date, they have only been fished as part of the lobster fishery, but fishermen in the area are interested in increasing the fishing season available for rock crab. If a specific rock crab fishery is allowed, fishing activity in the deeper portions of the bay may increase to some extent.

**Other Fisheries** Herring, mackerel and cod are the most important finfish caught in St. Ann's Bay and Harbour. Herring and mackerel are caught in inshore areas like St. Ann's Harbour but cod is generally caught in the Bird Islands area.

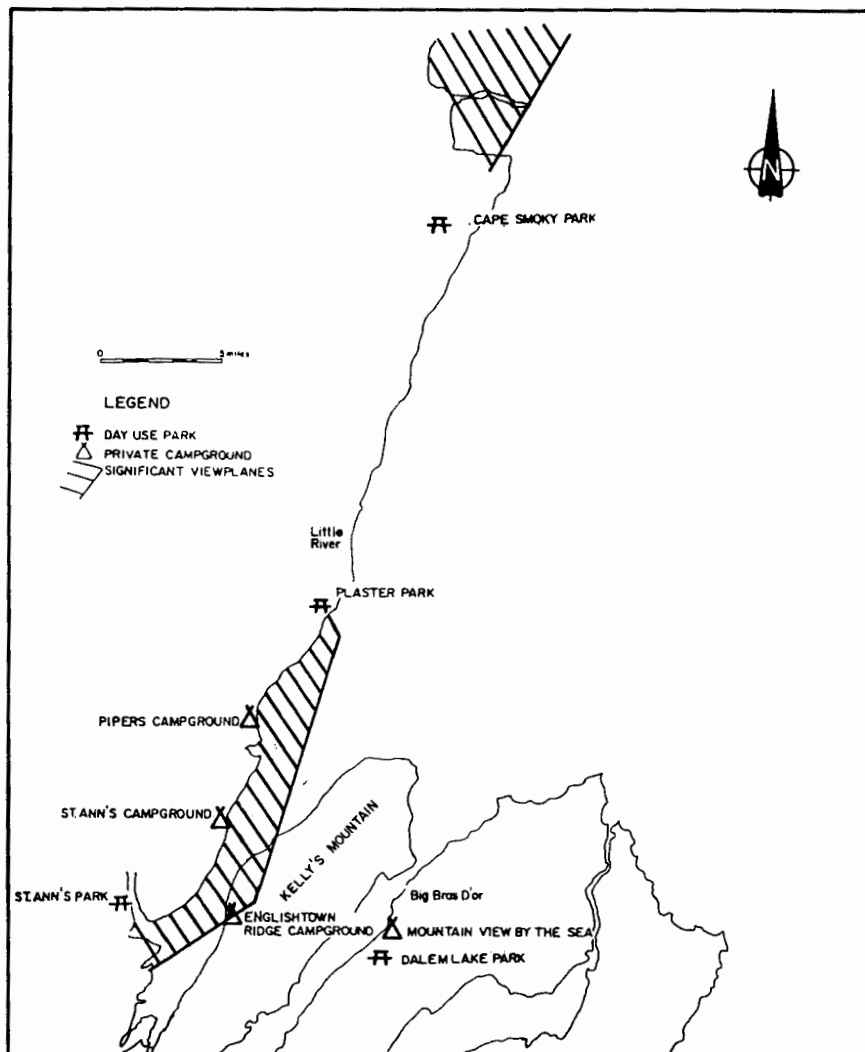
Herring and mackerel are both fished as bait for lobster, although mackerel are not often common before or during the lobster season. Most fishermen fish mackerel for sale if they are abundant following the end of the lobster season but few fish herring for sale to commercial buyers.

Other species caught include smelt, alewife, eel, oyster, and soft-shell clams. Squid are also important if they appear inshore in large numbers. A number of fishermen hold swordfish and tuna licenses but neither fish has been common in the area recently.

**Aquaculture** A number of aquaculture operations are present in St. Ann's Harbour, and one finfish operation overwinters salmon and trout in Oyster (Fader's) Pond just north of Englishtown in St. Ann's Bay. There are only three active leased aquaculture sites within St. Ann's Harbour. Two of these raise mussels and one raises salmon and trout.

### Tourism

There are four provincial picnic parks and four private campgrounds near St. Ann's Bay. Peak vehicle counts for these picnic parks in 1989 ranged from 58 to 150 vehicles per day. A maximum of 488 people used any one of these parks in a day. The Gaelic College, located in St. Ann's, is also a major tourist facility in the area. Approximately 42,000 visitors pass through the College during the summer season.



The three private campgrounds bordering St. Ann's Bay are Piper's, St. Ann's and Englishtown Ridge Campgrounds. Piper's operates 44 serviced and 10 unserviced sites; St. Ann's has 45



serviced and 5 unserviced sites; and Englishtown Ridge has 67 serviced and 5 unserviced sites. Many of the sites at these campgrounds are occupied by semi-permanent summer residents who return to the campground every year. In addition to these campgrounds, the Mountain View by the Sea campground, located on the Great Bras d'Or side of Kelly's Mountain, offers boat tours to the Bird Islands during the summer.

The proposed quarry site is not visible from the Gaelic College but is visible from two private campgrounds and one day-use park.

#### Views

View planes in Nova Scotia have been classed as excellent, moderate or fair views. View planes are generally associated with roadside look-offs along major travel routes. There are two excellent view planes in the St. Ann's Bay area. One is defined from the look-off on Cape Smokey in a northerly direction towards Ingonish. The other is of St. Ann's Harbour and Bay from the look-off on the TransCanada Highway near the top of Kelly's Mountain.

Portions of the Cabot Trail bordering St. Ann's Harbour are also of major scenic importance, and a view of St. Ann's Harbour from the lower portion of the Trans Canada Highway was ranked as fair.

The project site is not within any of these view planes.

#### Recreational Fishing

Recreational fishing for salmon and trout is important in the St. Ann's Bay area. The North River, flowing into St. Ann's Harbour, is the most important recreational fishing area. The North River is a major early run salmon river with heavy fishing beginning in July. At its peak, over 400 salmon (including grilse) were caught in the river in one year. Available information suggests that people may spend over 10,000 days a year in total sport fishing on the North River.

In addition to fishing for salmon and trout, people fish for mackerel and pollock with rod and reel along the outer bar of the harbour in the summer. The Barrachois River and Indian Brook are two other rivers that provide sport fishing for trout and salmon. Both of these rivers flow directly into St. Ann's Bay.

#### Traffic

There are several sections of road in the Kelly Rock project area that may be affected by the project. Available information from 1987 suggests that the average daily traffic on the Englishtown Road is 730 vehicles per day with a peak of over 1250 vehicles. About 190,000 vehicles cross St. Ann's Bay on the Englishtown ferry in a year.

Information from 1988 suggested that the Cabot Trail along St. Ann's Bay carried an average of 890 vehicles per day.

### **QUESTIONS ABOUT THE PROJECT**

This section describes the effects of the project in a question and answer format. Questions and answers are grouped by the following topics:

- commercial fishing,
- shipping,
- wildlife and sport fish,
- local culture,
- views and tourism,
- pollution,
- streams and wells, and
- noise and vibration.

To help you find specific questions, the topic dealt with on each page is identified at the bottom of the page. The overall impacts, including a summary of the positive effects of the project are described in the next section.

### Commercial Fishing

***Will the building of a wharf and breakwater damage lobster grounds?***

Building a breakwater of coarse rock will actually provide more good lobster habitat in the area, and use of the artificial area by lobster will increase over time. For example, only two years after a rock reef was built in the Northumberland Strait in 1965, the lobster population of the reef was up to around 75 percent of the numbers in nearby natural lobster areas. If a breakwater was built, near natural levels of production should be reached within a few years.

The wharf will be built in 50 to 60 feet (15 to 20 m) of water, which is deeper than where lobsters are fished now. Although the breakwater (if constructed) would be built on existing lobster ground, the new habitat it provides would make up for this loss.

Fishermen will be allowed to continue to set traps within the wharf area and thus should not be affected by the project.

***Will silt and sediment from the project affect lobsters?***

Lobster prefer stony bottoms. If rocky lobster bottom is smothered by fine sediment, it can take years for lobsters to come back. Sediment build-up could destroy lobster habitat and reduce the number of lobster.

If a floating or pile wharf were constructed without a breakwater, there would be no risk of sediment build-up or changes in current patterns. But if a solid wharf or wharf and breakwater were constructed, some sediment would probably build up and destroy lobster bottom. However, as the breakwater itself would provide a good rocky environment, this loss will probably be offset by this new habitat.

How much sediment builds up depends on how much natural sediment is moving with the currents, and how much leaves the project. Because of the granite cliff coastline and lack of sand beaches, there is little natural sediment available along the western Kelly Mountain shoreline. Little is expected to be produced by the project, because:

- topsoil will be stripped from the quarry site before excavation begins,
- there are only small quantities of fine material at either the lower site or the upper quarry,
- the crushed granite will be too large to be suspended,
- quarry run-off will pass through settling basins, and all dust will be controlled; lower site crushers are all indoors,
- crushed rock waiting to be shipped will be stored under cover so there is no chance of rain washing dust away, and
- ship loading facilities will be enclosed.

As a result, little build-up of sediment should take place as a result of the project, and loss in lobster habitat is not expected.

***Will blasting affect the lobsters?***

Blasting is expected to occur about once a month; at the beginning of construction, blasting will be more frequent. Blasting within the quarry could result in pressure waves that would be felt by lobsters near the quarry site.

Studies done on the effects of pressure on lobster show that lobster are not affected by pressure changes. Migrations of lobster are more likely triggered by large changes in water motion caused by major storms. During blasting and construction of the Canso Causeway, lobster catches stayed high in the area. So, although it is possible that lobster could sense and react to pressure waves from blasting, such an effect is unlikely.

***Could oil  
pollution harm  
the lobster  
fishery?***

Lobster carry fertilized eggs until they hatch. After hatching, the lobster larvae float freely near the surface of the water for about two months and then move to the bottom where they remain. All near-surface larval marine life is extremely sensitive to pollution, particularly floating pollutants like oil. The lobster larvae, however, are dispersed throughout St. Ann's Bay by wind and water currents. So, if there was a small spill at the project or a ship released a small amount of oil, only a few larvae would come into contact with it.

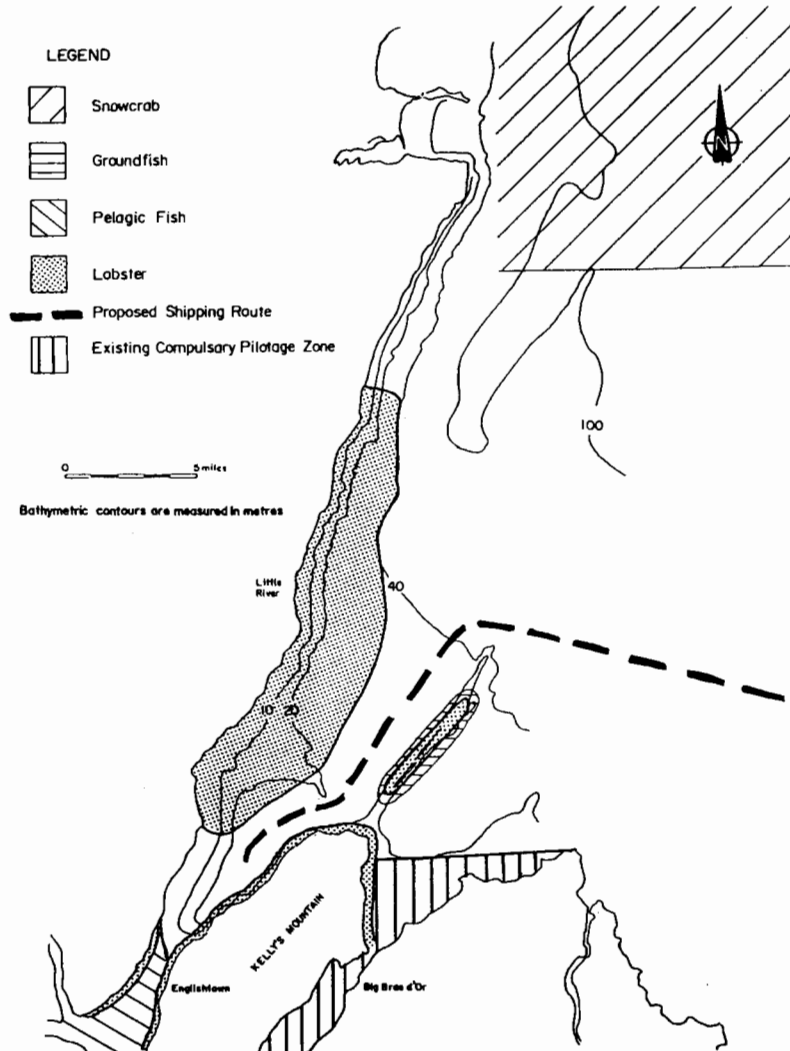
Adult lobsters may change their behaviour, particularly the rate at which they feed, when exposed to small amounts of crude oil (9 parts per million). However, there is little chance of oil concentrations exceeding this level at the bottom of the bay.

Fuel oil for the generators will be delivered by truck so accidental oil spills from ships servicing the quarry would be limited to the vessels' own fuel and lubricants.

***Will ships  
interfere with  
lobster gear?***

During the May 15 to July 15 lobster season, dense clusters of traps are found in some parts of the bay. If a ship passes through these areas, gear could be damaged and in bad weather local fishing boats could have trouble seeing the ship, since most of them do not have radar. Damage to gear and boats is of obvious concern to local fishermen.

A narrow band of densely concentrated lobster traps follows the shoreline of the west side of Kelly's Mountain. Another extends eastward from the Little River side of St. Ann's Bay for about 3 miles. This leaves an open channel for ships on the eastern side of St. Ann's Bay. If ships used this route, fishing gear would not be damaged.



Fishing vessels setting gear or steaming to or from fishing grounds do not have the right-of-way over large ships. However, regular use of a known shipping route should minimize the danger to fishing boats. Fishermen would know the routing and use caution passing through this area.

Since a ship could be liable for damage to gear if the location of traps and other gear is known, ships will avoid those areas. One solution to this problem is to require ships to carry pilots who would ensure that the vessel's captain knows local conditions.

***Will ships interfere with scallop draggers?***

Sometimes vessels from the local areas, as well as Point Aconi and Alder Point, drag for scallops in various parts of the bay. Vessels towing mobile gear, like scallop drags, have the right-of-way over a large ship, and the large ships will have good navigation systems on board. Local pilots can further reduce any navigation risk.

***Will a new rock crab fishery be affected?***

Fishermen in Cape Breton and the Eastern Shore have been pressing Fisheries and Oceans Canada to allow a "directed" rock crab fishery; at the moment rock crab can only be caught through the lobster fishery. In 1990, Fisheries and Oceans may issue up to twenty rock crab licenses, with about 200 traps allowed for each license, for the entire region.

If a rock crab fishery starts in St. Ann's Bay, it is probable that at most 400 traps would be allowed in the bay. They would likely be distributed throughout the deeper portions of the bay over a spring to fall fishing season. While a rock crab fishery would mean that fixed gear would be in place in the currently open waters of the bay, the small number of traps suggests that fishermen should be able to avoid setting traps in the known shipping route.

***Will the snow crab fishery be affected?***

Local fishermen work in a major snow crab fishery, but its location north of St. Ann's Bay near Ingonish, means that it is outside the area affected by shipping or other aspects of the project.

***What impacts could there be on fishing for other species?***

Other fishing activities are not likely to be affected by the project. The wharf could occupy an area where fishing for scallops occurs once in a while, but this is not a good area for fishing scallops.

### **Shipping**

***How many ships will enter the bay?***

One or two per week.

**Will the ships be required to carry pilots?** Kelly Rock Ltd. will request that all ships servicing the project carry local pilots.

**Will diesel fuel be brought in by ship?** No.

**Will pumping of bilges be allowed?** The main concern about bilge water is that some oil is often in the bilge, which then contaminates the surrounding water when it is pumped out. Current regulations require that ships must be underway before any bilge water can be released. To further reduce such pollution, the Canadian Shipping Act in 1990 will require ships to have separators that remove most of the oil from the water before it is pumped.

New regulations will also require that the amount of oil in the water pumped out cannot exceed 15 parts per million anywhere within the 12 mile Canadian territorial limit.

**What about ships discharging ballast water? Could this be harmful?** Ships travel all over the world, often empty until they reach the ports where they pick up their cargo. These ships pump water into their ballast tanks so that they will not ride too high out of the water for safe passage. The ballast water is then pumped out as the ship approaches port. With this water, however, comes various organisms and sediments. Sometimes organisms in the ballast water can establish themselves and cause problems.

The survival of an organism carried from some other place depends on several factors: its ability to endure and adapt to change; its ability to successfully compete with native species; the number of possible predators; the availability of food; and the right temperature and salinity. It must also live through the voyage in the ship in sufficient numbers to reproduce once released.



The range of different organisms that can survive being transported in ballast tanks is wide; anything from microscopic organisms up to fish have been found. Upon release, if the conditions are right, a species can spread rapidly.

Most of the ships hired to export rock from Kelly's Mountain are expected to be coming from the eastern seaboard of the U.S., and these ships could dump their ballast water into St. Ann's Bay under existing government regulations. Not many organisms that could be brought from any of these U.S. ports would cause problems in Nova Scotian waters, but there are a few potentially harmful ones.

To minimize any risk to existing fisheries or aquaculture from the release of organisms carried in ballast water, Kelly Rock will require that all vessels serving the project exchange ballast water with open-ocean water while on the way to Nova Scotia. Random samples of ballast water will be analyzed to determine whether or not this has been done. Pilots will also be asked to report any pumping of ballast while they are on board.

#### **Wildlife and Sport Fish**

***What effects will there be on deer and other common wildlife?***

Deer, moose and other animals and birds use the area, as they do almost all other parts of Nova Scotia. For common forest animals or birds to be significantly disturbed, unique areas, like deer yards (wintering grounds), would need to be affected by the project. However, the local forest is unlikely to provide good yarding areas. While wildlife and forest birds may be affected by the project to some degree, the effects are minor since the rest of the Mountain provides more than enough suitable habitat.

**What effects will there be on bald eagles?** Bald eagles are a special case. Plentiful in many parts of Nova Scotia, including Kelly's Mountain, they are rare and considered endangered in the United States. Eagles tend to return to the same nesting site year after year and disturbance of a nest can seriously affect their reproduction.

A pair of eagles has been seen along the shoreline near Grappling Brook, however, Nova Scotia Department of Lands and Forests' staff were unable to find a nest near either the lower or upper levels. In any case, it seems that the likelihood of disrupting an eagles' nest is low, as they continue to return and breed at a nest next to the active dolomite mine on the southeast side of Kelly's Mountain.

**What about the cougars, if they exist?** Many residents of the Englishtown and St. Ann's Bay area have reported seeing a cougar on Kelly's Mountain. Wildlife biologists from the Nova Scotia Department of Lands and Forests think it is unlikely that a cougar is there. However, if a single cat, or even a breeding pair is present, the fact that cougars have very large home ranges means the project would probably not affect them.

**Are there endangered species in the area that would be at risk?** Two rare species, the Gaspé shrew and a species of slug, may be present within the project area. While these species are rare in North America, they are found in a number of areas in Nova Scotia.

The same shrew is known to live in the Cape Breton Highlands National Park. It tends to live in loose rock slopes at the base of steep cliffs, common on Kelly's Mountain, and which lie in the area between the quarry and the shoreline facility. This part of the slope will not be developed in the quarry project.

The slug is found in locations throughout Nova Scotia, primarily in mature forests. The slug was found near the TransCanada Highway and not near the project area. Mature forest is rare within the project area, and this slug is not likely present within the quarry area in significant numbers.

***What effects  
will there be on  
the Bird  
Islands?***

The Bird Islands are an important feeding and breeding area for many sea birds. The birds are concentrated in a small area and would be affected by any oil or other fuels that reached the islands. Of the birds most common around the Bird Islands, diving birds, the cormorants, puffins and auks are highly sensitive, particularly to oil on the surface of the water.

Fuel oil for the generators will be delivered by truck, so large quantities of oil at sea are not involved.

There are no major navigation hazards that endanger vessels passing through St. Ann's Bay. Additional shipping in the St. Ann's Bay area would slightly increase the possibility of pollution of the Bird Islands, but the nearby Cabot Strait is already a major shipping route.

Although the risk of marine accidents leading to pollution of the Bird Islands would increase slightly as a result of the project, the change from current conditions is not considered significant.

***Will the project  
interfere with  
North River  
salmon?***

Many people sport fish in the North River for Atlantic salmon and sea-run brook trout. St. Ann's Bay is an important migration route for these North River fish as well as salmon from other Maritime rivers. Available information suggests that these fish enter the bay on the western side and leave the bay on the Kelly's Mountain side.

Since fish tend to enter on the western side of the bay, a wharf or breakwater on the eastern side of the bay would not stop fish from coming into the bay. The presence of a wharf or breakwater is, therefore, unlikely to affect the movement of North River salmon into St. Ann's Bay or Harbour.

### **Local Culture**

***What job opportunities will there be for local people?***

The project will create 100 jobs in an area where the existing work force is approximately 700, and will therefore have a major impact on employment. Given the small existing work force, it is likely that workers will commute from considerable distances.

Where possible, quarry workers will be hired from the local area. Besides those in the quarry and processing plant, maintenance staff, office staff, and those working with the wharf and ship loading equipment will be needed. A training program will be set up to enable the local work force to operate the quarry.

***Will locals likely go to work for the quarry and leave traditional jobs?***

Some people are worried that the project may draw people away from fishing and other traditional jobs in the area. It is unlikely lobster fishermen would choose to leave the fishery while their earnings remain high. Some people with lower paying jobs, however, may find working for Kelly Rock Ltd. attractive.

***Will the project harm the Micmac heritage site?***

The Micmac site at the north end of Kelly's Mountain is an important part of Micmac culture in the area. The concern regarding the site is that blasting in the quarry could cause collapse of the roof or walls of the caves through ground vibrations.

The maximum distance significant vibrations could travel from blasting at the site is less than one mile (1.2 km). Since the caves in question are more than 2 miles (3 km) from the northern perimeter of the quarry, they will not be affected by blasting. Monitoring equipment will be set up in the cave to measure vibration levels, if any, during the initial trial blasts. If any impact is noticeable, blasting design will be changed to eliminate any problem.

### **Views and Tourism**

***Can the project be seen from local highways? From across the bay?*** While the project is located in a relatively isolated area, the buildings on the lower level and the wharf and ships will be visible from Piper's and St. Ann's Campgrounds, as well as a provincial picnic park near Indian Brook on the Cabot Trail. They will be barely visible from a major vantage point at Cape Smokey, 14 miles (23 km) away.

As many trees as possible will be kept during construction to screen the project from the bay. All buildings will be low and coloured to blend with the surroundings. Once the upper level quarry is below ground level, it should not be visible from the bay. Very little of the project, apart from the wharf and loading ships, should be visible from anywhere around the bay.

***What about light at night?*** The project site would be most visible at night when lights are needed. Since operations on the lower level are within buildings, large amounts of light are not required. The wharf and loading areas are expected to be the main sources of light visible from the bay. Care will be taken to direct light away from the bay as much as possible.

***Will traffic increase?***

Most quarry personnel will use the gravelled road north from Englishtown to get to the site after having either crossed the ferry or travelled north from the Trans Canada Highway. Approximately 50 people are expected to be at work at any time. If all individuals had vehicles and all travelled on the road to Englishtown, this would result in an average increase of 13 percent over current traffic. This increase in traffic is not likely to cause problems.

***Will tourism be affected?***

The project is located in an area of major importance to tourism, largely because of the beauty of the surroundings. For a large number of people, this means businesses and jobs.

Since the site has been designed to blend into the surroundings as much as possible, the project is expected to have little effect on the appearance of the bay or tourism in general.

**Pollution**

***Will heavy metals, especially copper, be able to get into the bay?***

The groundwater within the quarry area was checked for 20 different heavy metals and none were found to be high. However, as a further check of the effects of acid rain on open quarry walls, samples of the granite were crushed and then treated with different acid solutions. These tests indicated that some metals, especially copper, could be dissolved from the quarry granite under worst case conditions.. It is not likely that these metals would remain dissolved in the water for long but small amounts could reach the sea.

Copper is highly toxic to most freshwater fish, but marine organisms are generally less sensitive. The concentration of copper in seawater is around 0.003 mg/L. Lobster need some copper for an important protein that carries oxygen in the blood, but it is toxic to adult lobster if it reaches 0.056 mg/L. Lobster larvae are more sensitive to copper than adults and their levels of toxicity are probably close to that of freshwater fish, that is around 0.02 mg/L).

The chance of copper being released from the quarry is low because the crushed rock will not be exposed to rain. Any release of copper from the site will be in low concentrations and only for short periods, and therefore should not affect Lobster or other life in the bay. To ensure that a problem does not occur, surface waters will be monitored for metals.

***Will there be  
air pollution  
from dust?***

Dust from the crushers will be contained inside buildings and captured by dust extraction and suppression methods. Dust suppressants will be used on the access road, and other travelled roads on the site. Water-foam spray dust suppression will be used on the primary crusher in the quarry, and a dust collection system will be used on the drilling rig.

***Could harmful  
or unknown  
minerals be  
uncovered?***

Radionuclides are present in the groundwaters of the site at fairly low concentrations. The National Research Council has shown that all of these radionuclides are found in nature in small quantities, especially in the marine environment. The groundwater samples collected on site have fairly low values of the two main radionuclides, <sup>238</sup>uranium and <sup>232</sup>thorium. These values are natural concentrations which have been occurring in the fresh water and marine environments of the study area for millions of years.

Due to the low concentration levels, the low amount of groundwater flowing into the quarry, the high precipitation rate (which would dilute the radionuclides), and the control of sediment erosion, it is not likely that the radionuclides carried off site will differ from natural levels.

In a small number of the samples,  $^{210}\text{Pb}$  was slightly higher than drinking water standards and therefore  $^{210}\text{Pb}$  will be monitored to make sure acceptable limits are maintained.

***Are there any plans for storage of toxic wastes?***

No. The most hazardous material to be stored on the site is fuel oil needed to supply power. Explosives will be stored at the site during construction, but explosives will be trucked to the site for regular quarrying after that.

#### **Streams and Wells**

***What effects will there be on wells and the Aqua Gold Springs?***

The quarry will mine below the water table; groundwater will tend to flow in and pumping will be needed. As a result, water levels will be lowered for some distance outward from the pit.

However, the Aqua Gold springs on the east side of the mountain will not be affected because of their distance from the site, the fact that they are on the other side of a major groundwater divide formed by Grappling Brook, and geologic formations at the site.

All currently used wells in the area are far enough away that they will not be affected by the project.

***Will local streams be affected?***

Grappling, Ready, and Middle Brooks will all receive drainage from different places within the project. The runoff will be treated in one form or other to remove sediment before it enters the brooks. Since Grappling Brook may supply some nutrients to the lobster habitat along the shoreline and is the main stream used for quarry drainage, it will be protected by NS Environment regulations controlling water discharges.



At first, the water for the project will probably be taken from Grappling Brook. However, since the water system is a closed loop, only small amounts of water will be needed later to make-up for any losses. Water needs for the administration buildings will either be taken from Grappling Brook or from a well. These water withdrawals will not remove a noticeable amount of water from the brook.

### **Noise and Vibration**

***How much noise will there be?***

The homes nearest the site are 2.1 miles (3.4 km) to the southwest, and 2.7 miles (4.4 km) to both the west across St. Ann's Bay, and east to New Campbellton. Englishtown is 3.4 miles (5.5 km) away at the ferry.

Noise levels measured at similar projects have indicated levels similar to background levels on Kelly's Mountain when it is relatively windy. It is considered unlikely that noise from the project will be audible at any homes near the site. Even though crushers on the lower level will be inside buildings, some sound may be audible across the bay on quiet evenings because of the unusual way sound can travel across water.

Noise levels will increase during blasting. However, even noise from blasting should only be heard on a quiet evening from any homes.

***Will there be vibrations from blasting?***

Blasting at the quarry will cause ground vibrations. If the blasts were large enough, nearby structures could be damaged. The closest structures that could be damaged are homes, springs, the Micmac site and Kelly Rock Ltd.'s own facilities.

Since the closest structures of value are the Kelly Rock facilities themselves, especially the Glory Hole and tunnel, blasting will be controlled to ensure no damage to any structures occurs.

## **OVERALL IMPACTS**

Any project has both positive and negative effects. Whenever a possible negative effect of Kelly Rock Ltd. project was identified, measures to minimize the effect were adopted by the company. In all cases, measures adopted reduce negative effects to what we feel are acceptable levels. In addition, monitoring programs have been adopted to ensure that negative effects are kept within these acceptable levels. Nonetheless, the project will still change the environment of St. Ann's Bay and Kelly's Mountain.

This section summarizes the positive effects of the project and the negative effects that remain after measures to minimize them have been put in place.

### **Positive Impacts**

The positive impacts of the proposed quarry operation are:

1. In an area where the unemployment rate ranges from 8.8 to 22.2 percent, the creation of 100 full-time jobs will be a positive impact. This will allow the flexibility for families to remain in the area and enjoy the quality of life the Island has to offer.
2. The site will provide a significant additional tax base to Victoria County.
3. Given the U.S. markets, the facility will increase the foreign exchange earning to both provincial and federal governments.
4. The company has a policy to buy locally, resulting in benefits for local industries.
5. If a breakwater is constructed, it will provide additional shelter for fishing boats caught in storms.
6. If tug boats are used to dock the vessels, it will result in an increase in the marine search and rescue capabilities in the

area. A marine radio will also be manned at the site and this could help fishermen and pleasure crafts in cases of emergency.

7. The water tanker and heavy equipment at the site will increase the level of local fire protection for nearby communities.
8. The staffed first aid station at the site can provide some emergency medical treatment within the local area.
9. The improved road north of the Englishtown ferry and the restricted access road to the top of the mountain will improve access to remote areas in case of a forest fire and also open up new private properties north of Clawson's Gate.

### **Remaining Impacts**

#### Shipping

Increased shipping in the bay will require some adjustment from the fishermen in navigation practices and placing of fixed gear outside of the proposed shipping route.

The possibility of an oil spill from a marine accident at the entrance to or within St. Ann's Bay is low, but any increase in shipping would increase the chance of a spill occurring. While clean-up measures exist, the effect of a spill would vary depending on the location, size and timing of the spill.

#### Fishing Areas

The traditional fishing areas for a few lobster fishermen from Englishtown will be affected by the construction of a wharf or breakwater. The area available for fishing will not be significantly reduced but some traps will need to be set in different spots. While steps can be taken to keep fishermen informed of plans for the project, they will need to work out fishing areas amongst themselves.

Quarry Abandonment

After the lifetime of the project has been reached, the quarry hole will remain. Since quarrying will occur below the water table and given the high precipitation rate, the quarry will fill with water to near ground surface after it is abandoned. The quarry will then become a new lake.

Quality of Life

The positive impacts of the quarry must also be considered. Long-term jobs will be created and local services will be used. These jobs, along with an increase in the county tax base, will provide benefits to the local communities and should improve the overall quality of life in the area.

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