

CHAPTER 9. INVERNESS COUNTY

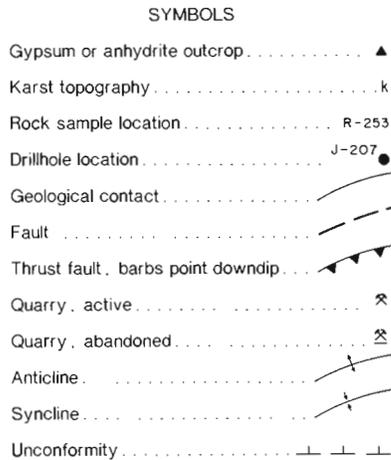
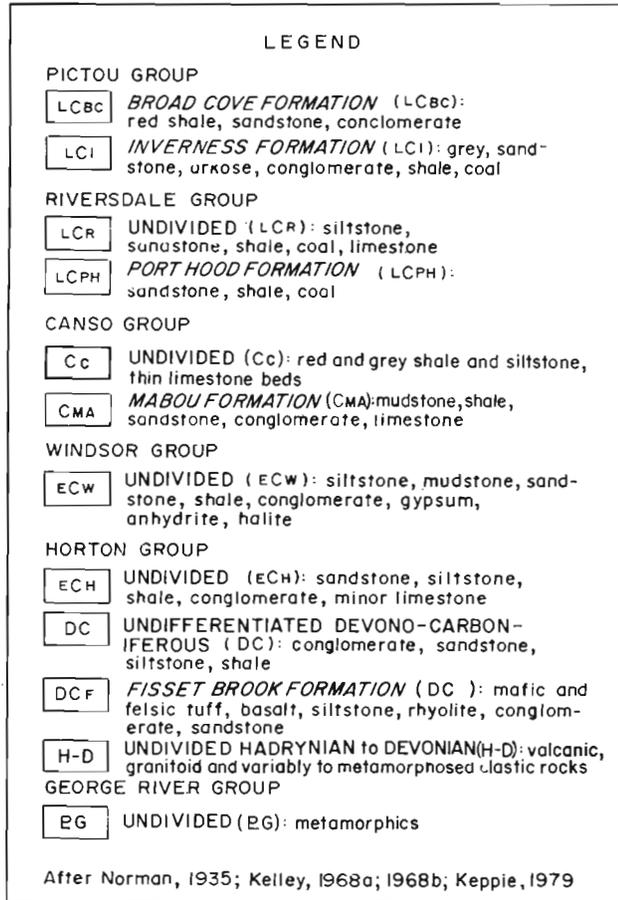


Figure 9-1. Geological legend for Inverness County gypsum and anhydrite occurrence maps.

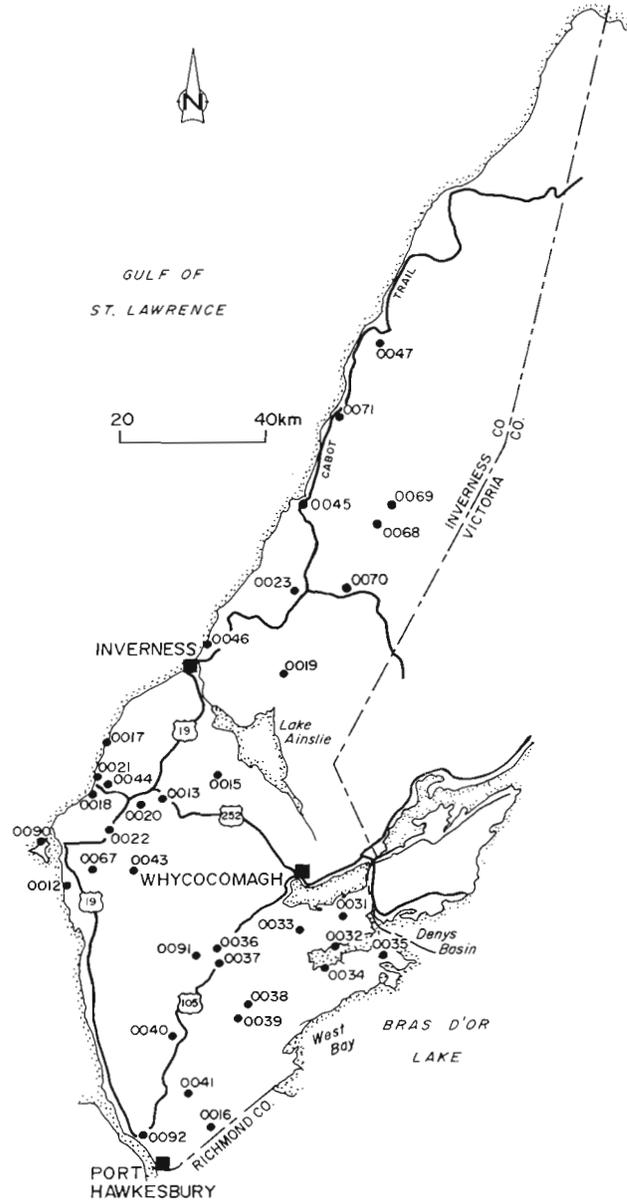


Figure 9-2. Location map for Inverness County gypsum and anhydrite occurrences by reference number.

ALBA (0031)
NTS 11F/14D
UTM 652000 E 5087000 N

The Alba area is in the central portion of an extensive Carboniferous basin which runs from Port Hawkesbury in the southwest to Baddeck in the northeast (Fig. 9-3). Little detailed geological mapping or compilation has been undertaken to date in this basin which is dominated by rocks of the Windsor and Canso Groups (Kelley, 1968a; Weeks, 1955). Generally the basin is

flanked by Devono-Carboniferous intrusive rocks in the North Mountain to the southeast and Hadrynian metamorphic and intrusive rocks to the northwest in the Creignish Hills.

Geological mapping in the Alba area by Rio Tinto Canada Exploration Ltd. (Blakeney, 1974) indicated it to be, for the most part, underlain by carbonates and evaporites of the Windsor Group. Major Cycles 1 and 2 (A and B Subzones) were found south of the Canadian National Railroad and the Upper Windsor was found to the north of the Railroad. The northern portion of the area is underlain by clastic sedimentary rocks of the Mabou Formation.

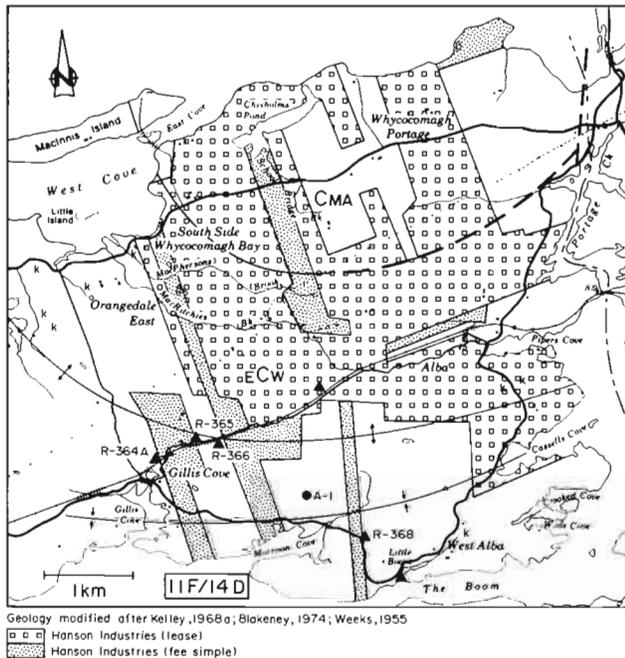


Figure 9-3. Location and geology of the Alba occurrence area. See Figures 9-1 and 9-2 for legend and location.

The strata in this area mainly dip to the north and northeast under the Mabou Formation clastics. Blakeney (1974) interpreted a series of broad anticlinal and synclinal folds trending roughly east-west through the area. Some small scale faulting was seen, but no major fault structures were encountered.

During 1957 and 1958 Allied Chemicals drilled 193 diamond-drill holes (5507 m) in this area. This drilling defined seven gypsiferous areas containing approximately 33.6 t of gypsum. These areas straddle the main line of the Canadian National Railway and show good economic potential. No drill logs are presently available for these holes.

In addition to these seven areas, numerous gypsum outcrops and sinkholes are known to exist in the Alba area. Also one diamond-drill hole, A-1, drilled by Rio Tinto Canada Exploration Ltd. in 1974 to the immediate south and east of the Allied areas, encountered 47.8 m of gypsum (at the top of the basal anhydrite of Major Cycle 1) under 18.3 m of overburden (Blakeney, 1974). The same geological situation will probably occur along strike both to the east and to the west.

Information available on this area is limited, however that which is available indicates good reserves of high quality gypsum with thin overburden. Open-pit mining could be possible in the area with good transportation access either by rail, road or ship. Most of the gypsum rights are currently controlled by Hanson Industries.

BIG BROOK (0039)
 NTS 11F/14A
 UTM 638400 E 5072700 N

Big Brook has been the site of Georgia-Pacific Corporation's open-pit gypsum operation since 1962 (Fig. 9-4). The quarry is being phased out as the company moves much of its production to a new quarry at Sugar Camp (0041), Inverness County. Over the past 25 years the company has produced a total of 15.4 Mt of gypsum (by the end of 1986). The average production has been 614 000 t per annum, with the maximum of 891 691 t produced in 1985 (Nova Scotia Department of Mines and Energy, Annual Reports, 1963-1988).

The Big Brook deposit lies near the southeastern margin of an extensive Carboniferous basin which runs from Port Hawkesbury in the southwest to Baddeck in the northeast. The basin is dominated by rocks of the Windsor and Canso Groups which are flanked by Devono-Carboniferous intrusives to the southeast (North Mountain) and Hadrynian metamorphics and intrusives in the Creignish Hills to the northwest (Kelley, 1968a; McCulloch, 1974b).

Although the quarry area has been extensively drilled, only a little information from a few of these holes is presently available. The available information shows the quarry area to be underlain by thick evaporites with interbedded clays and minor carbonates (Province of Nova Scotia, 1957c).

Overburden thickness is variable 6.1-24.5 m, typical of heavily karstified gypsum bodies, however gypsum, clay and limestone horizons also appear variable (Province of Nova Scotia, 1957c). Units are rarely

correlative between drillholes <150 m apart. Bohner (personal communication) suggests that, in this portion of this Carboniferous basin and probably in others, e.g. MacIntyre Lake (0016), (Giles, 1981b) large scale dissolution of the salt horizons in the Windsor has lead to collapse and disruption of all strata within and above the salt zones.

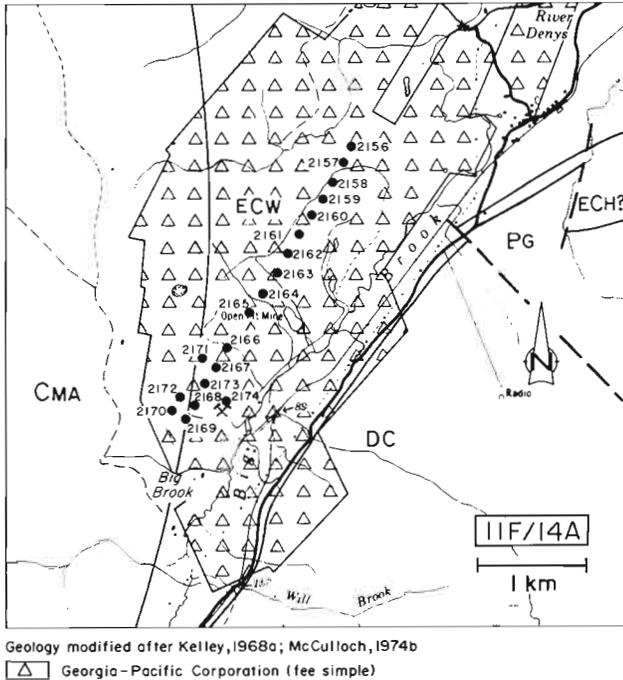


Figure 9-4. Location and geology of the Big Brook occurrence area. See Figures 9-1 and 9-2 for legend and location.

All of the Big Brook area is underlain by thick anhydrite (Graham, personal communication) which probably belongs to the basal anhydrite of Cycle 1 (A Subzone) of the Windsor Group. The disturbed section observed at Big Brook probably belongs to the top of this Cycle and may contain some portion of the overlying Cycle 2 (B Subzone).

Georgia-Pacific Corporation is currently reducing its operations at Big Brook. Most of the land in and around the quarry site is held in fee simple by the company and it is its intent to retain possession of it at this time. Substantial volumes of high purity anhydrite are presently exposed in the quarry and could be readily exploited.

BROAD COVE (0046)
 NTS 11K/06B
 UTM 633100 E 5124350 N

The Broad Cove occurrence is located 5 km northeast of the Town of Inverness, Inverness County, on the shore

of the Northumberland Strait (Fig. 9-5). A steeply dipping section of interbedded gypsum, clastic and carbonate units can be found along the coast in this area. In addition two drillholes were completed in this area in 1907 by the Department (Province of Nova Scotia, 1908). Minor karst topography can be found inland from the outcrop area.

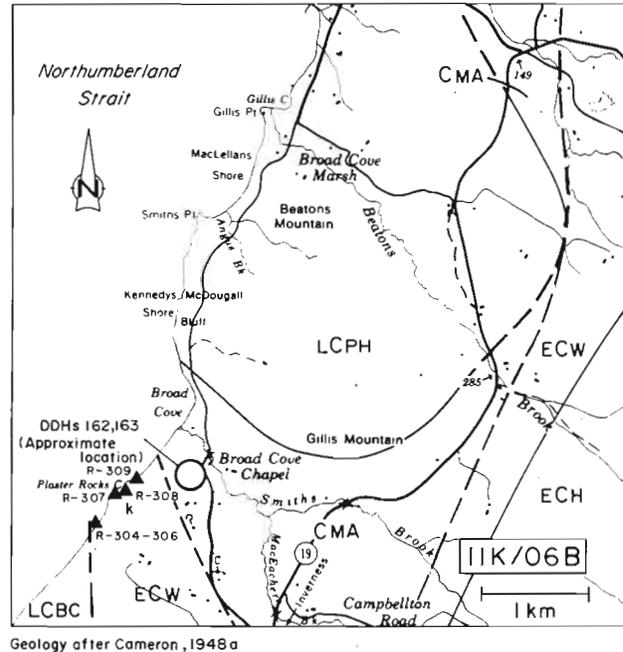


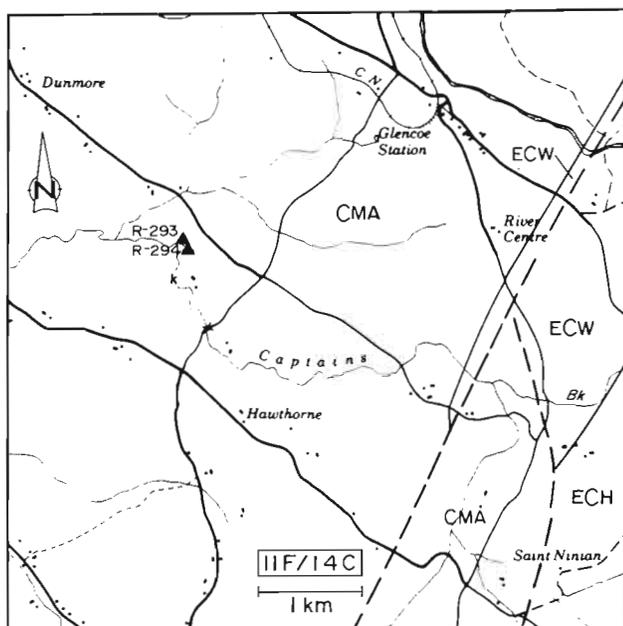
Figure 9-5. Location and geology of the Broad Cove occurrence area. See Figures 9-1 and 9-2 for legend and location.

Geological mapping by Cameron (1948a) indicated that this area is underlain by the undivided Windsor Group. These rocks are in fault contact with clastics of the Canso Group Mabou Formation to the east and in fault contact with clastics of the Pictou Group Broad Cove Formation to the west. Giles (personal communication) believes that the shoreline section represents the uppermost Windsor Group (E Subzone) and base of the Canso Group Watering Brook Formation equivalent (Giles and Bohner, 1982).

Although the exact collar locations of the holes drilled in 1907 are not known, the thickness of the gypsum encountered in hole 163 (24.2 m) is due to the fact that the local bedding, as seen at the shore, is steeply dipping. The gypsum seen at Broad Cove is very interesting geologically but its interbedded, steeply dipping setting plus the limited extent of Windsor Group outcrop at Broad Cove, make this occurrence one of little economic interest.

CAPTAINS BROOK (0067)
 NTS 11F/14C
 UTM 617900 E 5092800 N

The Captains Brook area is located approximately 45 km north of Port Hastings and 2 km southwest of Glencoe Station, Inverness County (Fig. 9-6). It consists of two small outcrops along the Brook with minor areas of lightly karsted topography adjacent to them.



Geology after Kelley, 1968a

Figure 9-6. Location and geology of the Captains Brook occurrence area. See Figures 9-1 and 9-2 for legend and location.

Geological mapping in the area by Kelley (1968a) placed these units in the Mabou Formation of the Canso Group. Although not noted by Kelley (1968a) as such these sulphates are most likely lateral equivalents of the lower most Watering Brook Formation of the Canso Group as described by Giles and Bohner (1982) in the Shubenacadie Basin. No drillhole information is available in the immediate area which might substantiate this conclusion.

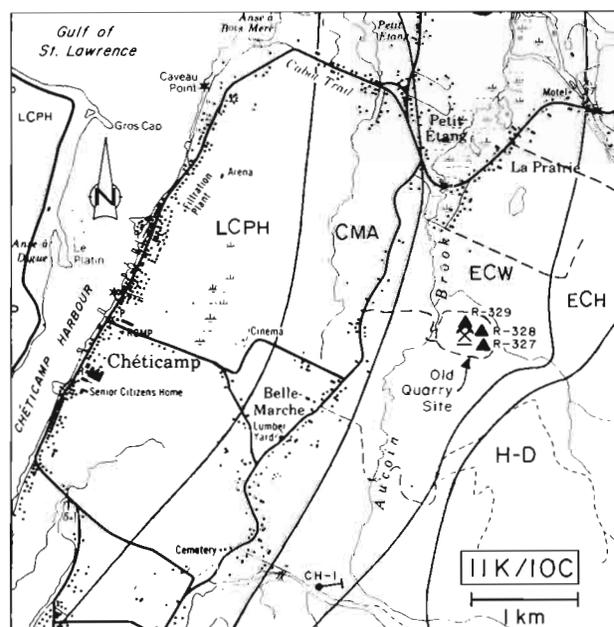
This area is of no economic interest.

CHÉTICAMP (0047)
 NTS 11K/10C
 UTM 655500 E 5165500 N

The Chéticamp deposit is located 3.5 km east of the Village of Chéticamp, Inverness County (Fig. 9-7). Gypsum was produced intermittently at quarries in the Chéticamp area between 1900 and 1940. A calcining

plant was also operated at Chéticamp for part of this period with finished plaster products sent to Upper Canada.

Ownership of gypsum leases changed five times during the active life of operations at Chéticamp. The Great Northern Mining and Railway Company held the properties from 1906-1915 at which point they ceased production. The leases were acquired in 1923 by the International Gypsum Company then gained the following year by the P. M. O'Neil Gypsum Company. In 1925 operations halted again only to restart in 1927 under the name of Atlantic Gypsum Products. The National Gypsum Company took over in 1936 and carried on until the quarries were finally closed in 1940 (King, 1985).



Geology after Cameron, 1948b; MacLaren, 1956a

Figure 9-7. Location and geology of the Chéticamp occurrence area. See Figures 9-1 and 9-2 for legend and location.

Although records for the early history of production are poor, a total of 1 324 943 t of gypsum were produced at Chéticamp over the 19 years between 1912 and 1940. Average annual production was 69 736 t, however this varies from a low of 371 t in 1923 to a high of 203 307 t in 1930. According to King (1985) gypsum leases at Chéticamp were renewable after only five years and it is unlikely that any gypsum companies presently hold leases in the area.

The Chéticamp deposit (also known as Belle Marche) lies on the eastern side of a northerly trending Carboniferous syncline that dips westward under the

waters of the Gulf of St. Lawrence. These Carboniferous rocks are bound on the east by Horton Group clastics and Hadrynian granitoid rocks.

Gypsum at Chéticamp was from the Windsor Group which is underlain to the east by clastics of the Horton Group and overlain to the west by clastics of the Canso Group (MacLaren, 1956a). Due to the steeply dipping strata in this area (50-70°W) the Windsor only subcrops along a strip 500-1500 m wide.

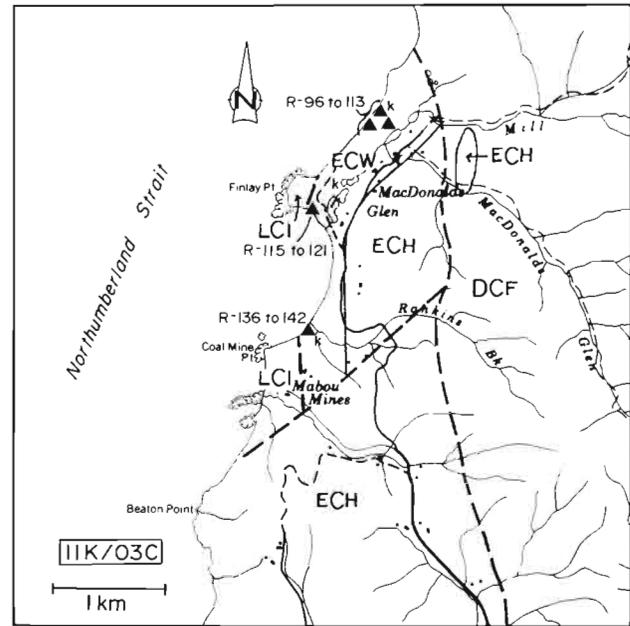
Getty Mines Ltd. carried out extensive geological mapping in the area in 1974 as part of its base metals exploration program (Comeau, 1974c). They also drilled one inclined diamond-drill hole south of the old quarry area (CH-1) to a depth of 328.57 m. No detailed stratigraphic interpretation has been attempted in the area, however the units present are believed to belong to Cycle 2 (B Subzone) of the Windsor Group.

The drillhole encountered only 2.74 m of overburden then went through 54.86 m of interbedded shales and sandstones before encountering the gypsiferous section. A total of 130.36 m out of 262.89 m cored in the lower part of CH-1 was gypsum. Brecciated shales make up most of the interbedded material which included some minor carbonates. The hole was stopped in basal anhydrite before it reached the underlying Horton rocks.

Steeply dipping strata with significant proportions of interbedded materials would make mining of gypsum at Chéticamp a costly proposition. Further investigation of the area may turn up thicker units of hydrated basal anhydrite with greater development potential. The area currently has little potential for commercial development.

FINLAY POINT (0017)
NTS 11K/03C
UTM 619400 E 5110800 N

The Finlay Point occurrence area is located 9 km north-northwest of Mabou, Inverness County (Fig. 9-8). Extensive outcrops of nodular gypsum can be seen along the shore from Finlay Point north for 1000 m and a second area 1100 m south just north of Coal Mine Point. The gypsum appears to belong to the Lower Windsor and is in fault contact with younger clastics to the west. Regional mapping by Norman (1935) indicated that the Windsor units are underlain by older, Horton Group clastics to the south and east and in fault contact with the Devonian-Carboniferous Fisset Brook Formation to the northeast.



Geology after Norman, 1935; Keppie, 1979

Figure 9-8. Location and geology of the Finlay Point occurrence area. See Figures 9-1 and 9-2 for legend and location.

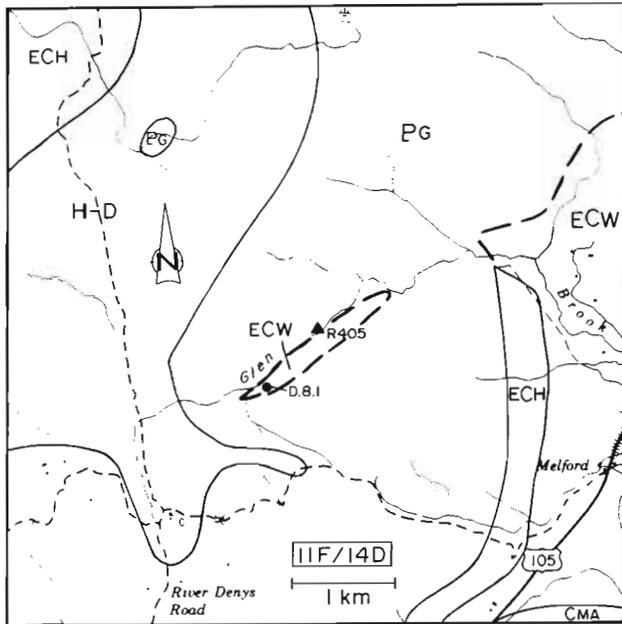
A topographic high, which is karsted, extends east-northeast away from the exposures on the shore north of Finlay Point for >600 m and may be underlain entirely by gypsum. An independent engineering study, undertaken in 1962 (Domtar Gypsum, confidential company report) used seismic information on the area gathered by the Nova Scotia Research Foundation. The study suggested that 36.1 Mt of gypsum might be present at Finlay Point. Only one-third of this material or approximately 12 Mt was above sea level.

This area warrants some additional work in the form of diamond drilling. One major drawback seen would be the shallow water found along this shore which would allow only small vessels to be used for transport.

GLEN BROOK (0091)
NTS 11F/14D
UTM 632100 E 5082200 N

The Glen Brook (previously known as Diogenes Brook) occurrence area is located 30 km north-northeast of the Town of Port Hawkesbury, Inverness County (Fig. 9-9). It is accessible by bush road up the valley of Glen Brook from the Trans-Canada Highway 105 at Melford.

Kelley (1968a) described the geology of the immediate area as a fault-bound block of Windsor Group surrounded by Precambrian George River Group



Geology modified after Kelley, 1968a

Figure 9-9. Location and geology of the Glen Brook occurrence area. See Figures 9-1 and 9-2 for legend and location.

metamorphic rocks. The occurrence consists of one or more rounded, fine- to medium-grained gypsum outcrops. No stratigraphic interpretation has ever been undertaken to determine what portion of the Windsor Group is present at Glen Brook. Work carried out by Dickie (1987) included one drillhole D.B. 1 which drilled through 119.5 m of Cretaceous material which is believed to have infilled the previously eroded Windsor Group sedimentary rocks. The hole was only drilled to 121 m and encountered 1.5 m of weathered breccia with sedimentary rock fragments thought to be Windsor Group.

Although the area is of geological interest and a possible silica sand source (MacDonald, 1988) it is of no economic interest for gypsum or anhydrite.

GLENDYER STATION (0013)

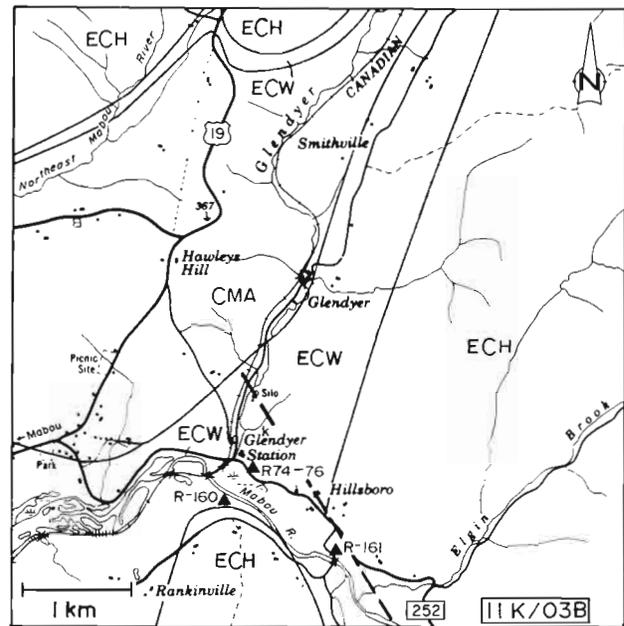
NTS 11K/03B

UTM 627200 E 5103500 N

The Glendyer Station occurrence is located 3 km east of Mabou, Inverness County (Fig. 9-10). Outcrops of gypsum of varying purity can be found both north and south of the Mabou River in this area. These exposures, as well as an area of karst topography which extends north of Route 252 (discontinuous over 1200 m), comprise all of the information available in the area.

Geological mapping by Norman (1935) indicated the immediate area to be underlain by a north-northeastward striking section of undivided Windsor Group rocks. These are underlain to the east by Horton Group clastics and overlain to the west by clastics of the Mabou Formation of the Canso Group. The apparent thickness and purity of the gypsum seen at this locale would indicate that these units belong to the lower part of the Windsor Group, either Cycle 1 (A Subzone) or Cycle 2 (B Subzone).

Although of geological interest this occurrence's remote location and apparent lack of lateral extent make it of little economic interest.



Geology after Norman, 1935

Figure 9-10. Location and geology of the Glendyer Station occurrence area. See Figures 9-1 and 9-2 for legend and location.

GRAND ÉTANG (0071)

NTS 11K/11A

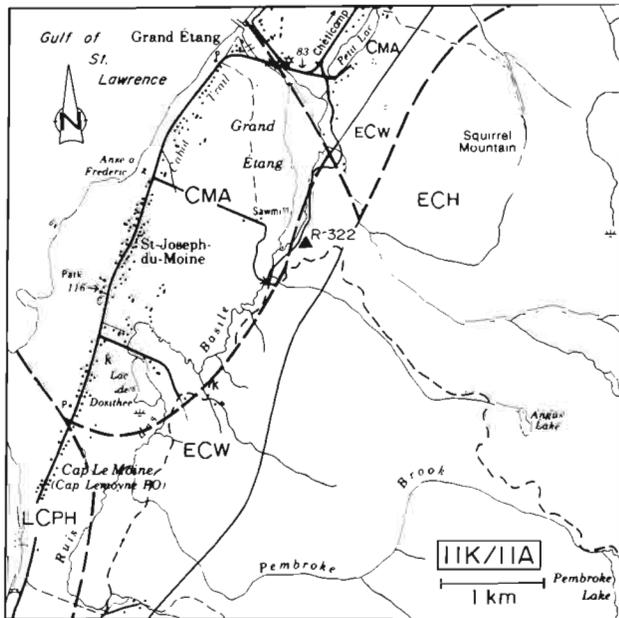
UTM 650400 E 5154800 N

Grand Étang is located 10 km south of Chéticamp, Inverness County (Fig. 9-11). The occurrence consists of a small block of light grey, fine grained gypsum found at the southeastern corner of the pond, Grand Étang.

The area was mapped by Cameron (1948b) as part of the Chéticamp map area. He interpreted the geology as a set of offset fault blocks of thin Windsor Group sedimentary rocks between underlying Horton Group

clastics to the east and overlying Canso Group clastics to the west. The sulphate units probably belong to either the Cycle 1 or 2 (A or B Subzone) of the Windsor Group, however no detailed stratigraphic interpretation of the area has been attempted to date.

Although the occurrence is situated along strike from the previously mined gypsiferous areas at Chéticamp, it is of more geological than economic interest. Available gypsum would be limited due to the limited extent of area underlain by Windsor Group units here which hinder its development potential.



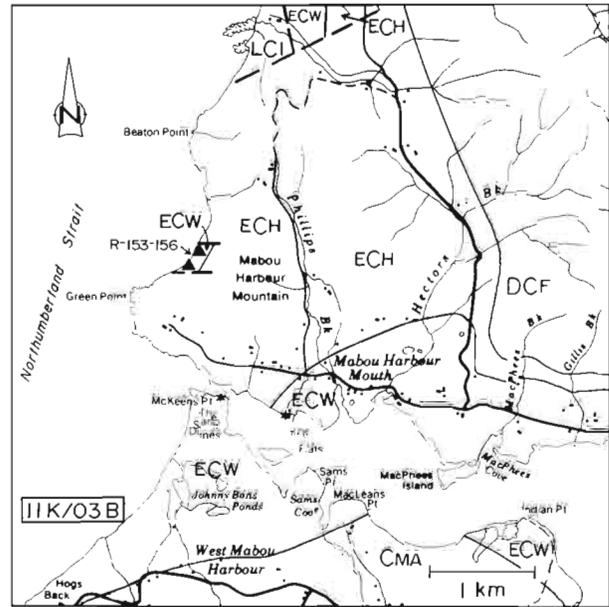
Geology modified after Cameron (1948b)

Figure 9-11. Location and geology of the Grand Étang occurrence area. See Figures 9-1 and 9-2 for legend and location.

GREEN POINT (0021)
 NTS 11K/03B
 UTM 617700 E 5106000 N

The Green Point occurrence is located along the shore between Green Point and Beaton Point 7 km northwest of the Village of Mabou, Inverness County (Fig. 9-12). Norman (1935) mapped this area as a fault-bound block of Lower Windsor Group surrounded by Horton Group clastics.

Consisting of three small contorted gypsum outcrops which are slowly disintegrating into the Northumberland Strait, this occurrence is of more scenic interest than economic.

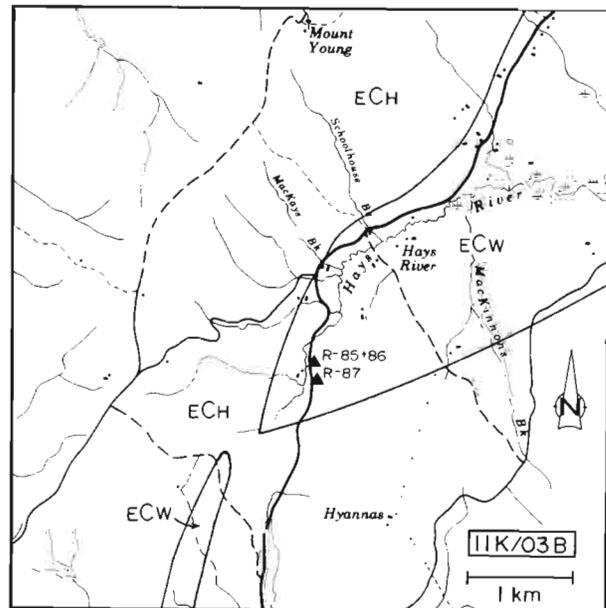


Geology after Norman, 1935

Figure 9-12. Location and geology of the Green Point occurrence area. See Figures 9-1 and 9-2 for legend and location.

HAYS RIVER (0015)
 NTS 11K/03B
 UTM 634000 E 5105900 N

The Hays River occurrence is located 15 km northeast of Mabou, Inverness County (Fig. 9-13). Several expo-



Geology after Norman, 1935

Figure 9-13. Location and geology of the Hays River occurrence area. See Figures 9-1 and 9-2 for legend and location.

tures of gypsum of varying purity can be found in this area. Norman (1935) mapped this area as being underlain by Lower Windsor Group rocks, lying in a north-easterly plunging syncline which is underlain by clastics of the Horton Group.

Limited outcrop area and the remote location of this occurrence make it of geological interest only.

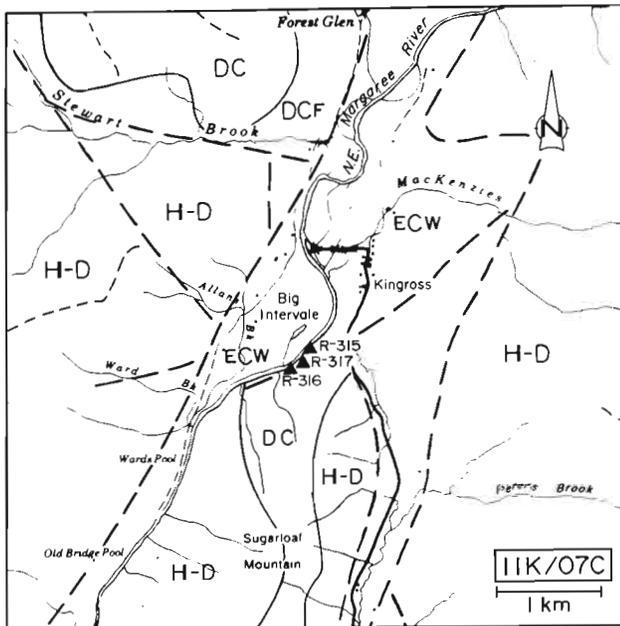
KINGROSS (0069)

NTS 11K/07C

UTM 659200 E 5144700 N

Kingross is located 10 km north of the Village of Margaree Valley, Inverness County (Fig. 9-14). The occurrence consists of several exposures of light grey, hard, fine- to medium-grained gypsum interbedded with light brown limestone, redbeds and black, brecciated limestone. Kelley (1960) mapped these units as undivided Windsor Group in fault contact with older igneous and metamorphic rocks to the south. Recent work by Barr et al. (1987) has updated the mapping of these older rocks. The outcrops are found along the eastern bank of the Northeast Margaree River approximately 1.0-1.2 km downstream below the highway bridge connecting Kingross and Big Intervale.

These outcrops are of geological interest, but have little or no economic value due to their remote location and apparent lack of extent.



Geology modified after Kelley, 1960; Barr et al., 1987

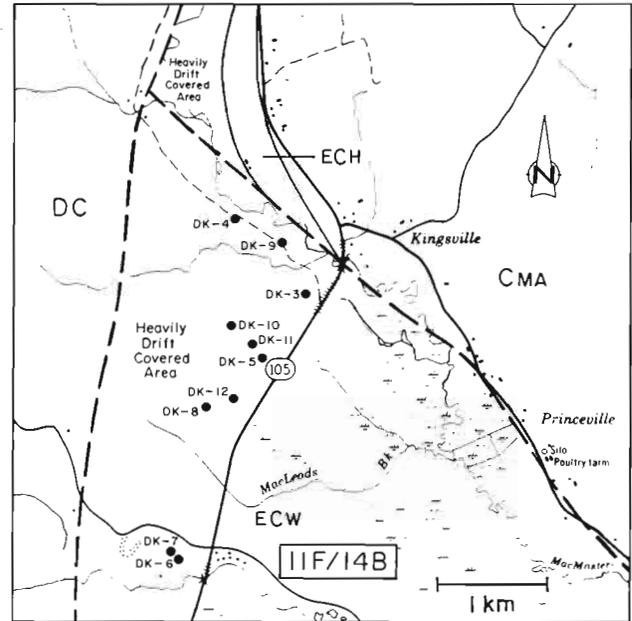
Figure 9-14. Location and geology of the Kingross occurrence area. See Figures 9-1 and 9-2 for legend and location.

KINGSVILLE (0040)

NTS 11F/14B

UTM 629500 E 5070000 N

The Kingsville occurrence area is located 15 km north-east of Port Hawkesbury, Inverness County (Fig. 9-15). No outcrops or karst topography were found in this area, however between 1968 (René and Rowbottom, 1968) and 1970 (René, 1970) Domtar Chemicals Limited drilled 10 holes (DK-3 to DK-12) in this area as part of a salt exploration program.



Geology after Kelley, 1968a; Keppie, 1979

Figure 9-15. Location and geology of the Kingsville occurrence area. See Figures 9-1 and 9-2 for legend and location.

Regional geological mapping by Kelley (1968a) showed this area as drift covered with no geological interpretation. Keppie (1979) indicated that the area is underlain by undivided Windsor Group rocks which are in fault contact with Devono-Carboniferous basement to the west and in fault contact with clastics of the Canso Group to the northeast. Domtar's drilling established that a large salt deposit underlies this area at depth (Boehner, 1986). Typical of all the deformed saline Windsor Group strata in the area, salt has been removed by groundwater dissolution to a depth of 200-300 m.

Seven of Domtar's drillholes were triconed for the top +100 m making it difficult to determine the near surface geology. Holes DK-10, -11 and -12 all encountered in excess of 30 m of overburden. These same three holes encountered good gypsum intervals some of which Domtar analyzed (C. René, personal communica-

tion). The best interval was in DK-10 where 15.5 m of gypsum grading 87.7% was found from 48.8-64.3 m.

Gypsum found at Kingsville is covered by thick overburden. The presence of an underlying salt mass suggests that these upper units belong to the Upper Windsor, Cycles 3-5 (C-E Subzones) and are thus unlikely to contain significant amounts of gypsum or anhydrite. Further work for gypsum or anhydrite at Kingsville cannot be justified.

LITTLE JUDIQUE HARBOUR (0012)

NTS 11F/13D

UTM 613900 E 5091300 N

Little Judique Harbour is located 6.5 km south of Port Hood, Inverness County (Fig. 9-16). The occurrence consists of a number of outcrops of gypsum exposed at MacNeil Point on the northern side of the Harbour and Seonaid's Point on the southern side.

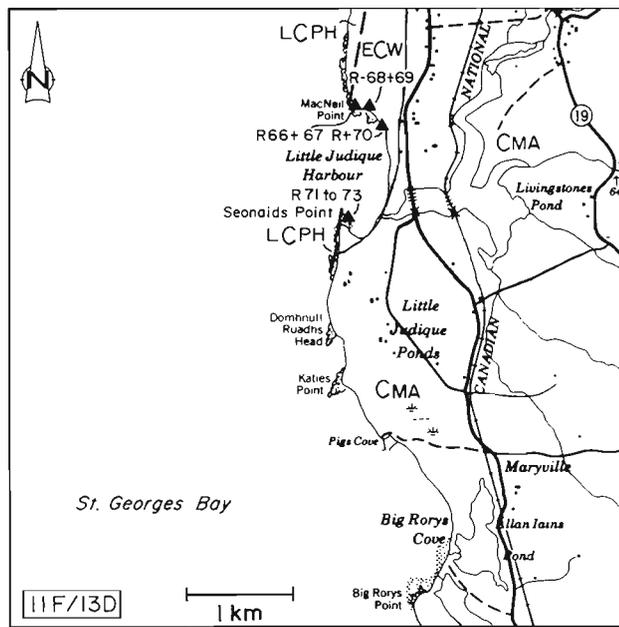


Figure 9-16. Location and geology of the Little Judique Harbour occurrence area. See Figures 9-1 and 9-2 for legend and location.

Regional mapping by Norman (1935) indicated that the gypsum units belonged to the Upper Windsor Group. These were overlain to the east by clastics of the Mabou Formation of the Canso Group and in fault contact with clastics of the Port Hood Formation of the younger Riversdale Group to the west. Later work on the section at MacNeil Point (Ragged Point) by Stacy (1953) identified a carbonate interbed as the E₁ limestone. Bohner and Giles (personal communication)

place the calcium sulphate horizons in the Watering Brook Formation of the Canso Group.

This occurrence is of geological interest only.

MABOU HARBOUR MOUTH (0044)

NTS 11K/03B

UTM 619000 E 5105000 N

The Mabou Harbour Mouth area is located 5 km west of Mabou, Inverness County (Fig. 9-17). Gypsum was produced from a small quarry intermittently from 1891-1940. Last operated by the Nova Scotia Coal and Gypsum Company, a subsidiary of Gypsum, Lime and Alabastine Canada Limited, the property now belongs to Domtar Gypsum (Domtar Gypsum, confidential company report).

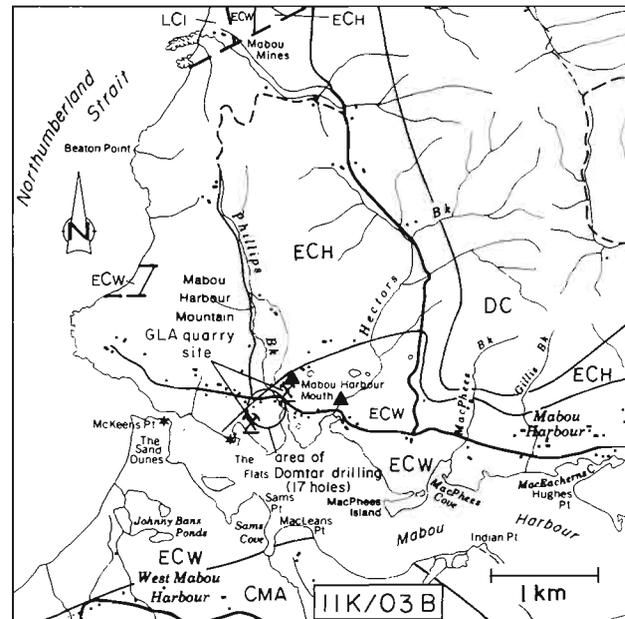


Figure 9-17. Location and geology of the Mabou Harbour Mouth occurrence area. See Figures 9-1 and 9-2 for legend and location.

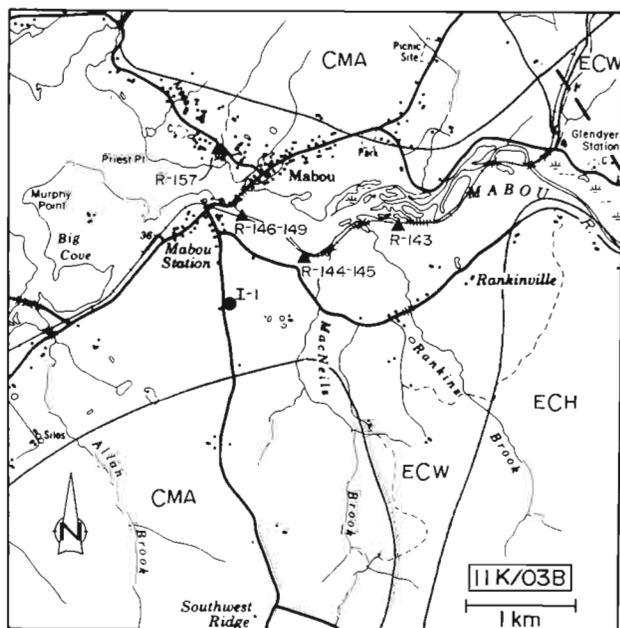
In 1960 Domtar drilled 17 drillholes on two adjoining areas of its property to evaluate the potential for future development of this deposit (Domtar Gypsum, confidential company report). One drillhole located just north of the old quarry intersected 19.8 m of gypsum, however it was the only hole which penetrated >9.1 m of gypsum. The area was determined to be on the northern side of a syncline which runs roughly northeast-southwest and plunges to the southwest (Norman, 1935). Clastic sedimentary rocks of the underlying Horton Group outcrop just to the north and northwest of the sulphate bearing areas.

Domtar determined that hydration was locally controlled by the porosity of adjoining beds, in this case the underlying Horton Group and infilled solution trench which often occurs at the Horton-Windsor contact. Also they believed that groundwater runoff patterns dictated depth of hydration of the anhydrite (Domtar Gypsum, confidential company report). A total of only 1.86 Mt of gypsum reserves was estimated for the quarry area and immediate vicinity. Reserves below sea level were not calculated because the amount of gypsum available would not warrant the extra cost of pumping water.

Domtar still holds gypsum leases (not shown on map) over much of the area around the quarry. The volume of gypsum available, however, would probably prohibit any future development.

MABOU STATION (0020)
NTS 11K/03B
UTM 624400 E 5102600 N

The Mabou Station occurrence area is located immediately south of the Mabou River, near Mabou Station, Inverness County (Fig. 9-18). Numerous small gypsum outcrops can be found along the River bank in this area. These consist of light brown to white, nodular gypsum with minor intermixed dark brown carbonate. Some limestone interbeds can be seen along the River. One drillhole was completed in this area by Imperial Oil Ltd.



Geology after Norman, 1935

Figure 9-18. Location and geology of the Mabou Station occurrence area. See Figures 9-1 and 9-2 for legend and location.

in 1959 as part of an oil exploration program (Cote, 1958). A total depth of 155 m was attained, the lower 52 m of which consisted of interbedded gypsum and anhydrite with abundant caves.

Regional geological mapping by Norman (1935) indicated that this area is underlain by undivided Windsor Group units. These are underlain by Horton Group clastics to the east and overlain by younger clastics of the Canso Group Mabou Formation to the south and west. No detailed stratigraphic interpretation of the Windsor Group has ever been undertaken in this area.

Although numerous outcrops of gypsum are found along the River in this area, no amount of karst topography can be seen which might indicate more extensive subcropping of gypsum. This occurrence is primarily of geological interest.

MACINTYRE LAKE (0016)
NTS 11F/11C
UTM 634000 E 5058000 N

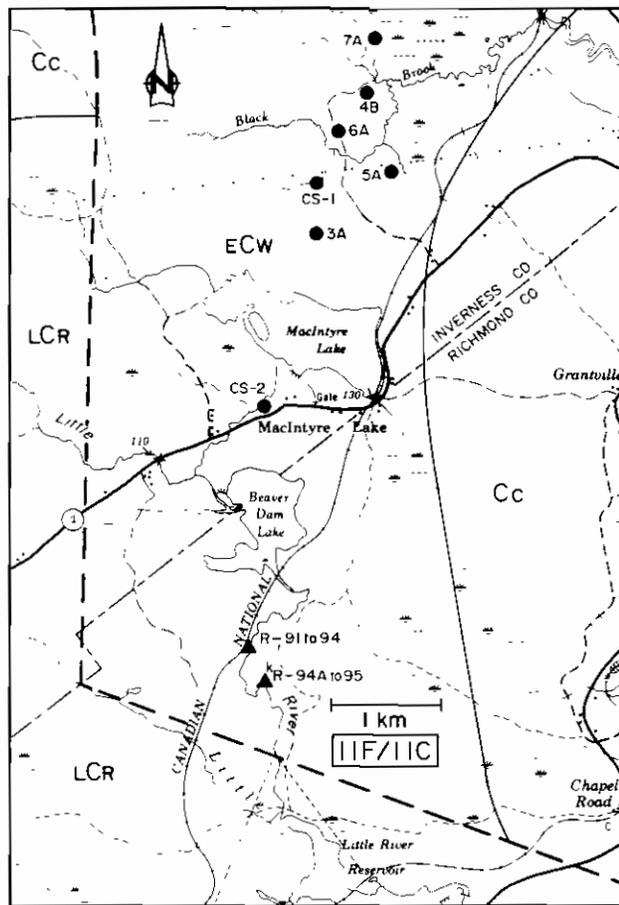
The MacIntyre Lake occurrence is located 6 km northeast of Port Hawkesbury, Inverness County (Fig. 9-19). The area straddles the county line between Inverness and Richmond Counties. A number of small outcrops of white to light grey gypsum with varying amounts of intermixed carbonate can be found along the Little River south of Beaver Dam Lake. An area of karst topography can also be seen 1 km south of Beaver Dam Lake. A total of seven drillholes were completed in the northern portion of the area between 1972 and 1978 by Northern Canadian Oil and Murphy Oil Co. Ltd. (Hale, 1972; 1974) and Home Oil Co. Ltd. (Home Oil Co. Ltd., 1978) investigating oil storage caverns in salt bodies.

Geological mapping in this area by Ferguson and Weeks (1950) indicated that much of this area is underlain by undivided Windsor Group rocks trending northerly and dipping to the east under clastic units of the Canso Group. Clastics of the Riversdale Group are in fault contact with the Windsor to the west and south.

The seven drillholes completed in this area by Northern Canadian Oil and Murphy Oil (CS-1 and CS-2) and Home Oil (3A, 4B, 5A, 6A and 7A) were the subject of a study by Giles (1981b). He found that the area is underlain by interbedded halite, sulphate evaporites, carbonates and clastics of both the 'Upper' and 'Lower' Windsor Group. Complex stratigraphy of the area reflects low angle faulting and folding of the original horizons. The presence of interbeds of anhydrite and carbonates in all of the salt horizons observed

in this area suggests that the drilling never reached the thicker salts usually found in the Cycle 1 (A Subzone).

The abundance of salt interbeds, as well as the structural complexity of this area, both detract from the MacIntyre Lake area's economic potential. The fact that much of the area lies within the boundary of the water supply area for Port Hawkesbury would also hinder additional investigation of the areas of karst topography south of Beaver Dam Lake. The area's proximity to deep water shipping at Port Hawkesbury makes it worthy of additional investigation in the vicinity of those outcrops and karst areas found in the southern portion of this area.



Geology after Ferguson and Weeks, 1950

Figure 9-19. Location and geology of the MacIntyre Lake occurrence area. See Figures 9-1 and 9-2 for legend and location.

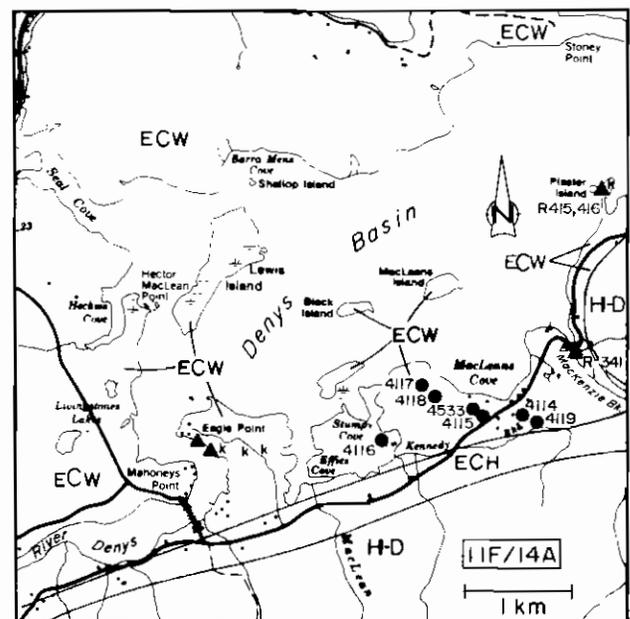
MACLEANS COVE (0034)
 NTS 11F/14A
 UTM 650650 E 5080400 N

The MacLeans Cove occurrence area is located 10 km east-northeast of River Denys, Inverness County (Fig.

9-20). A series of six short drillholes were completed by the Department of Mines in 1965 (Nova Scotia Department of Mines, 1965b) as part of a limestone investigation. Another hole (4533) was drilled by the Department in 1968 (Province of Nova Scotia, 1969a). Several exposures can be found in this area; large grey, gypsum outcrops can be seen at Eagle Point and Plaster Island. A small outcrop can be found beside a secondary road where it crosses MacKenzie Brook. Karst topography is evident in the area of Eagle Point and Plaster Island.

Regional geological mapping by Kelley (1968a), showed this area as being underlain by units of the Windsor Group which are underlain by Horton Group clastics to the south. Nova Scotia Department of Mines drillholes (1965b) were believed to have encountered a Cycle 2 (B Subzone) carbonate. The thickness of adjacent gypsum and anhydrite units suggests that the carbonate is near the base of the Cycle 2 (B Subzone) and the local geology is either moderately folded or faulted.

Although interesting exposures and karst are present in the MacLeans Cove area, the potential resource is narrow and constrained by the basement to the south and the waters of Denys Basin to the north. This would preclude any possible development.



Geology after Kelley, 1968a; Keppie, 1979

Figure 9-20. Location and geology of the MacLeans Cove occurrence area. See Figures 9-1 and 9-2 for legend and location.

MALAGAWATCH (0035)
NTS 11F/15C
UTM 656000 E 5081000 N

The Malagawatch occurrence area is located 15 km east-northeast of River Denys, Inverness County (Fig. 9-21). Although some light karst topography is evident within this area most of the information available comes from drilling carried out by Chevron Standard Limited between 1978 and 1981 (Dekker, 1982).

CIM-1, CIM-2) which encountered significant potash horizons (Dekker, 1982). Finally in 1980-81 Chevron completed eight deep diamond-drill holes (CM-3 to CM-10) searching for potash (Dekker, 1982).

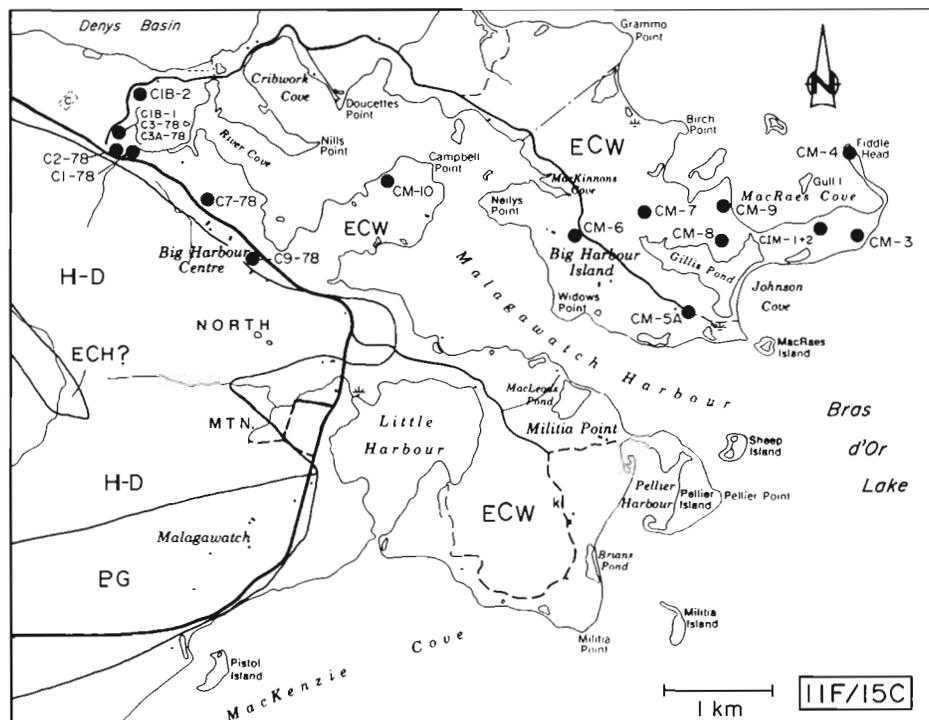
All of these holes intersected evaporites, carbonates and clastic sedimentary rocks of the Windsor Group, and Dekker (1982) stated that all major cycles of the Windsor had been encountered. Holes drilled further out into the Carboniferous basin encountered thick sections of saline evaporites. The strata representing Cycles 2-5 (B-E Subzones) display complex folding and faulting with overturned sections and stratigraphic repetitions. Holes located nearest the basin margin penetrated Cycle 1 (A Subzone) evaporites and went into Devonian-Carboniferous basement intrusives which outcrop in the highlands to the west of the area. The best gypsum intersection encountered was in hole C7-78 where 18.7 m (61.25 ft) of gypsum in the basal anhydrite of Cycle 1 (A Subzone) underlies 6.7 m (22.0 ft) of overburden. Most of the sulphates in this area, except where seen at surface, are anhydrite of which there are vast resources.

Unfortunately the most prospective areas for deep hydration, along the basal Windsor contact, are confined between the basement to the west and the waters of the

basin to the east. It is unlikely that any substantial development could take place in this area due to this limitation.

MARGAREE CENTRE (0070)
NTS 11K/06A
UTM 652300 E 5133000 N

The Margaree Centre occurrence is located 2 km southwest of the Village of Margaree Centre, Inverness County (Fig. 9-22). The occurrence consists of a highly visible discontinuous cliff of gypsum approximately 300 m in length which lies on the northwestern wall of the Northeast Margaree River valley. These exposures are accompanied by heavy to moderate karst topography and smaller outcrops to the northwest.



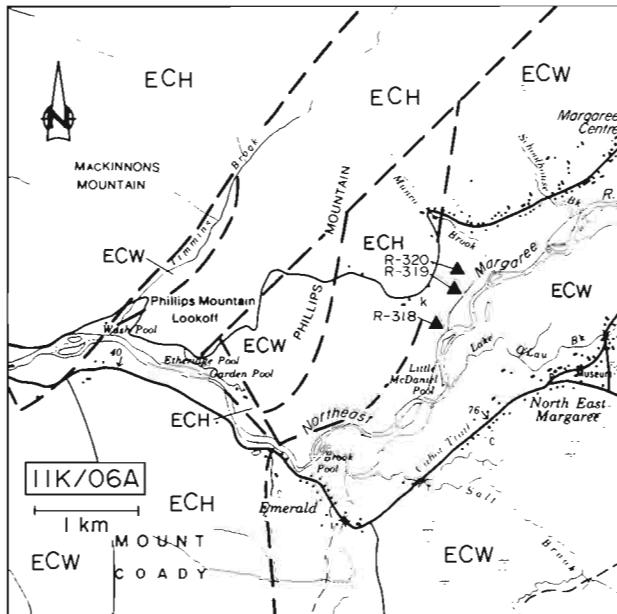
Geology after Weeks, 1955; Kelley 1968a; Keppie, 1979

Figure 9-21. Location and geology of the Malagawatch occurrence area. See Figures 9-1 and 9-2 for legend and location.

Regional geological mapping by Weeks (1955) and Kelley (1968a) indicated that this area is underlain by undivided Windsor Group rocks. These are underlain to the southwest and west by granitic basement rocks. The Windsor Basin deepens to the northeast and east under the waters of the Bras d'Or Lake.

A total of 18 drillholes have been completed in the Malagawatch area. Fourteen of these were diamond-drill holes and the rest were petroleum exploration wells which produced only chip samples (Boehner, 1986). In 1978 Chevron Standard drilled six diamond-drill holes (C1-78 to C3-78, C3A-78, C7-78, C9-78) while exploring for base metals and encountered light crude oil (Dekker, 1982). In 1979 Chevron, in conjunction with Irving Oil Company Limited, drilled four oil wells (CIB-1, CIB-2,

Mapped by Cameron (1948a) as undivided Windsor Group; this occurrence probably represents units of the basal sulphate of the Cycle 1 (A Subzone). A distinct solution trench, common along the Horton-Windsor contact can be found approximately 100 m northwest of the cliffs. This feature runs 010-020° and is indicative of the local strike of this contact. The trench is locally >20 m deep.



Geology after Cameron, 1948a

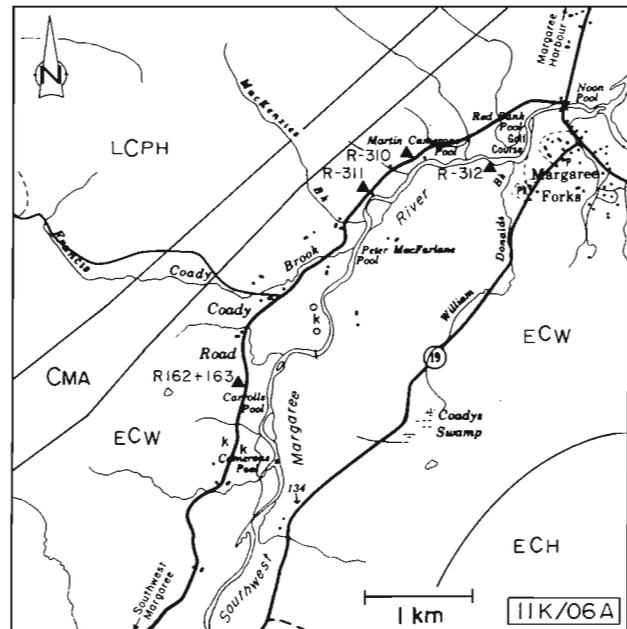
Figure 9-22. Location and geology of the Margaree Centre occurrence area. See Figures 9-1 and 9-2 for legend and location.

Although no drillhole information is available in the area, surface indications suggest that there could be in excess of 1 Mt of gypsum in the immediate area. This would not be sufficient to warrant large scale development, however it might be useful at some future time as a local source of agricultural gypsum.

MARGAREE FORKS (0023)
NTS 11K/06A
UTM 643400 E 5130400 N

The Margaree Forks area is located 11 km south of Margaree Harbour along the Southwest Margaree River (Fig. 9-23). Cameron (1948a) noted a number of gypsum outcrops and sinkholes in an area from Margaree Forks to South West Margaree which he mapped as undivided Windsor Group. These are underlain by Horton Group clastics to the southwest, south and east and are overlain by clastics of the Mabou Formation to the northwest.

Karst topography is generally light and not extensive and gypsum outcroppings are usually small. Additional investigation might identify more extensive gypsiferous areas, however the distance of the area from shipping facilities makes it economically unattractive.



Geology after Cameron, 1948a

Figure 9-23. Location and geology of the Margaree Forks occurrence area. See Figures 9-1 and 9-2 for legend and location.

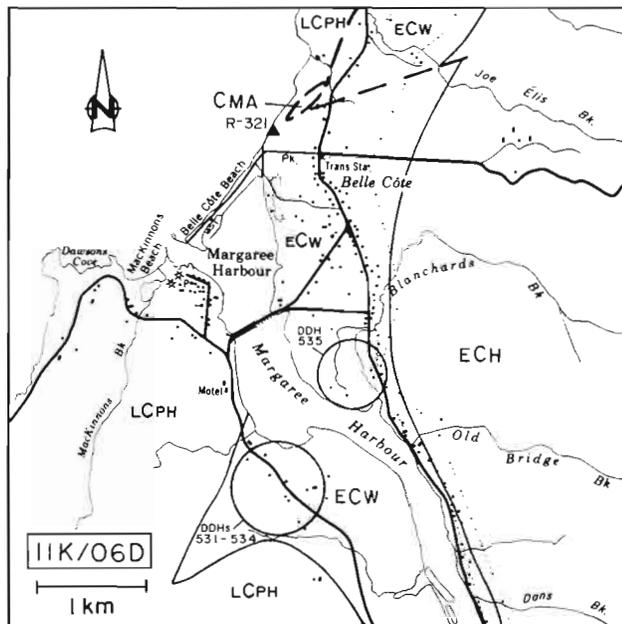
MARGAREE HARBOUR (0045)
NTS 11K/06D
UTM 646000 E 5142500 N

The Margaree Harbour occurrence area is located 22 km south-southeast of Chéticamp, Inverness County, along the Cabot Trail (Fig. 9-24). One exposure of white gypsum overlain by black limestone can be found along the shore at Belle Côte in this area. Other information comes from five drillholes completed by Eastern Gulf Oil Company in 1927 (Province of Nova Scotia, 1928a).

Regional geological mapping by Cameron (1948a) indicated that this area is underlain by a northerly trending sequence of undivided Windsor Group. These units are underlain to the east by clastics of the Horton Group and overlain to the west by clastics of the Canso Group Mabou Formation.

All five drillholes were located in the Valley of the Margaree River and all encountered thick overburden,

generally >30 m. Detailed logs or core from these drillholes are not available. No exact locations are known for any of these drillholes, consequently stratigraphic interpretation is impossible. Substantial gypsum thicknesses with mud and carbonate interbeds were described in the log of hole 532 (Province of Nova Scotia, 1928a), however additional information is lacking which would allow further detailed assessment of this area. In addition, the location of this area, in the Valley of the Margaree River, would preclude any possible development. Therefore the Margaree Harbour occurrence is of geological interest only.



Geology after Cameron, 1948a; Keppie, 1979

Figure 9-24. Location and geology of the Margaree Harbour occurrence area. See Figures 9-1 and 9-2 for legend and location.

MELFORD (0037)
NTS 11F/14B
UTM 635000 E 5080000 N

The Melford occurrence area is located 29 km northeast of Port Hawkesbury, Inverness County (Fig. 9-25), just south of the Upper River Denys occurrence area (0036). Available information on the area comes from logs of government drills which completed a series of six holes for Mr. G. Logan in 1956 (Province of Nova Scotia, 1957d) and several small rounded outcrops of medium grained gypsum containing minor interstitial and interbedded carbonates and siltstones located on the southern side of a bush road which cuts through the area.

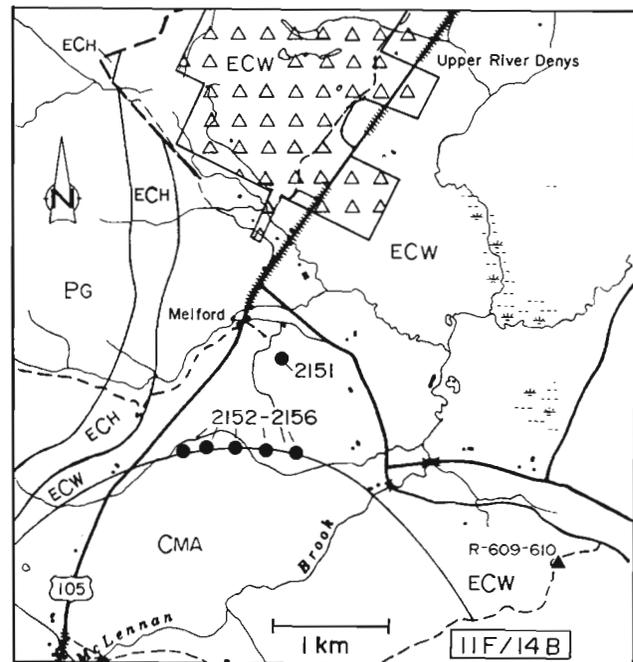
Kelley (1968a) mapped this area as being underlain by undivided Windsor Group sedimentary rocks in a

basin which deepens to the southeast. These units are underlain by clastics of the Canso Group to the south.

Five of Logan's holes were drilled along the Windsor-Canso contact and the sixth was completed 800 m to the north. All drillholes encountered gypsum, anhydrite, carbonates and clays of the Windsor Group. The high portions of gypsum described in drillers logs would indicate that they belong to the top of Cycle 1 (A Subzone) or base of Cycle 2 (B Subzone). Correlation between these holes, located only 200 m apart, is apparently impossible because the drillholes are shallow depth and there appears to be structural deformation or dissolution of parts of the section.

Overburden thickness is generally <12.2 m. Gypsum is often interbedded with clay and limestones and contains varying amounts of these materials interstitially. The best section of gypsum encountered was in hole 2151 in which 44.3 m of 51.2 m were described as white gypsum with grey limestone and red clay interbeds (Province of Nova Scotia, 1957d). This was overlain by only 10.4 m of overburden.

This area has been the subject of additional drilling carried out by Georgia-Pacific Corporation over the years (J. Graham, personal communication). This area warrants further work because it is located near the Trans-Canada Highway and within 30 km of Port Hawkesbury.



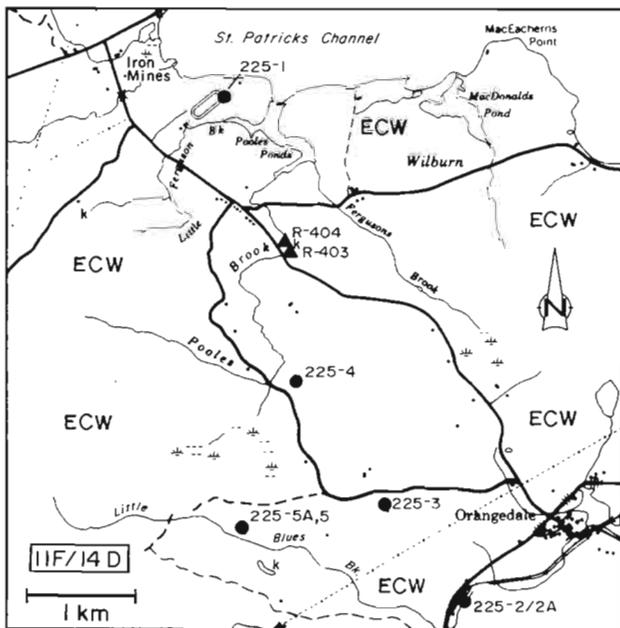
Geology after Kelley, 1968a

△ Georgia-Pacific Corporation (fee simple)

Figure 9-25. Location and geology of the Melford occurrence area. See Figures 9-1 and 9-2 for legend and location.

ORANGEDALE (0033)
 NTS 11F/14D
 UTM 645000 E 5085000 N

The Orangedale occurrence area is located 8 km south of Whycocomagh, Inverness County (Fig. 9-26). Although several small areas of light karst topography and a few small outcrops of gypsum can be found in the area, most of the information available is from drillhole data. This drilling was carried out by Bestwall Gypsum (Georgia-Pacific Corporation, unpublished company reports) in the late 1950s and by Noranda Exploration Company Ltd. between 1978 (Leahey, 1979) and 1981 (Cooper, 1980; 1982) as part of a regional potash exploration program.



Geology after Kelley, 1968a

Figure 9-26. Location and geology of the Orangedale occurrence area. See Figures 9-1 and 9-2 for legend and location.

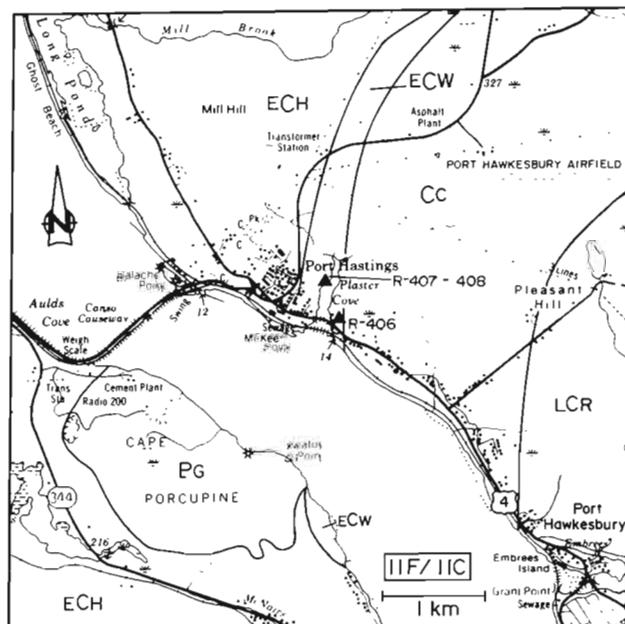
Regional geological mapping by Kelley (1968a) indicated that this area is underlain by undivided Windsor Group rocks. Bestwall's shallow drillholes encountered interbedded gypsum, carbonates and clastics apparently from Cycle 2 (B Subzone) or above. Cooper (1982) indicated that this area is structurally complex. Some of Noranda's drillholes encountered upright sections while others drilled through sections that were completely overturned. The greatest depth drilled was in hole 225-5A which was stopped at 1078.1 m in what was believed to be Cycle 2 (B Subzone) (Cooper, 1982).

All holes drilled by Noranda contained varying amounts of gypsum and anhydrite, however the most interesting intersection occurred in 225-5A. Although chip samples were the only lithological record from the upper section of the drillhole they indicate a total of 79.2 m of gypsum overlain by 21.3 m of interbedded gypsum, mudstone and limestone. This in turn was covered by 3 m of overburden. Substantial amounts of anhydrite occurred at depth in all of Noranda's drill-holes.

The structurally disturbed nature of this portion of the Windsor Group rocks found in the Orangedale area does allow much deeper hydration of anhydrite, however it also makes it much more difficult to find substantial volumes of minable gypsum. This area would require a substantial drilling program to delineate reserves of gypsum. The first area to drill would be in the vicinity of 225-5A.

PORT HASTINGS (0092)
 NTS 11F/11C
 UTM 624800 E 5055900 N

The occurrence at Port Hastings is located along the shore of Plaster Cove and is visible from Route 4 between Port Hastings and Port Hawkesbury, Inverness County (Fig. 9-27).



Geology after Ferguson and Weeks, 1950

Figure 9-27. Location and geology of the Port Hastings occurrence area. See Figures 9-1 and 9-2 for legend and location.

The regional geology, as mapped by Ferguson and Weeks (1950), indicated the area is underlain by Windsor Group rocks which are underlain by Horton Group clastics to the west and overlain by Canso Group clastics to the east. Although stratigraphic interpretation has not yet been undertaken the local geology is believed to be somewhat structurally complex with Macumber Formation at the base of the Windsor Group in close proximity to Cycle 2 and Canso Group strata near Plaster Cove. The entire Windsor Group is represented by a section only 200-300 m in width.

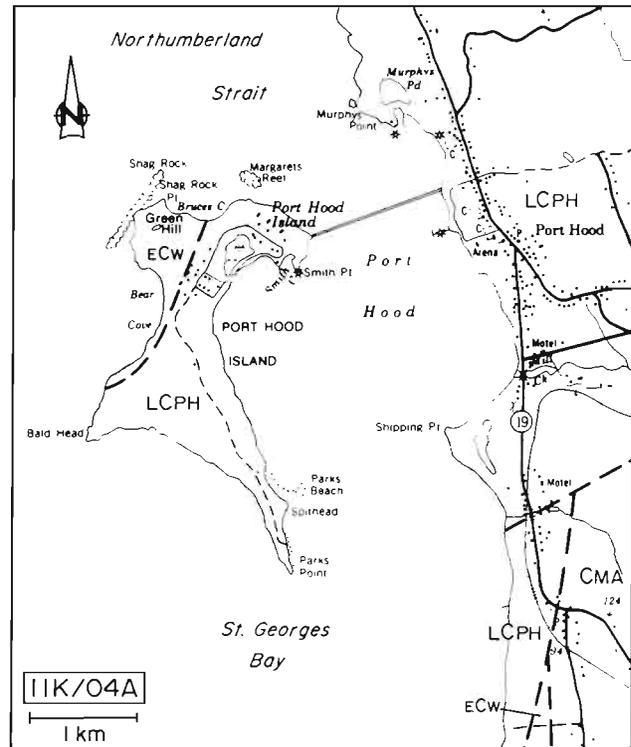
The occurrence consists of several outcrops along Plaster Cove, the more prominent of which consist mainly of coarse, crystalline anhydrite which is in part hydrated to high purity medium- to coarse-grained gypsum.

Although substantial volumes of high purity anhydrite may be present at this locale the proximity to Port Hastings would probably prevent any development. A greater understanding of the geology of the area may lead to the discovery of exploitable resources at some point along strike.

PORT HOOD ISLAND (0090)
NTS 11K/04A
UTM 610500 E 5096400 N

The Port Hood Island occurrence is located on the northwestern portion of Port Hood Island, Inverness County (Fig. 9-28) (not visited by author, therefore not marked on map). A well exposed Upper Windsor Group section containing gypsum interbeds, found along the western shore of the Island, south of Shag Rock Point, has been the subject of detailed examination by numerous authors over the years. Regional geological mapping by Norman (1935) indicated that the occurrence area is underlain by units of the Upper and Lower Windsor Group. These are in fault contact with younger clastics of the Riversdale Group, Port Hood Formation to the east.

Probably the most detailed description of the section was given by Stacy (1953). Giles (1982a) correlated this section, which Norman (1935) and Stacy (1953) believed to contain both Upper and Lower Windsor Group, with the Upper Windsor Group as seen elsewhere in the Province. Bedding is vertical in the section along the shore and therefore most of the unit thicknesses reported by Stacy (1953) are near true. Although several gypsum horizons can be seen, the only one of significance is found at the apparent base of the section (southeastern end) where over 100 m of white to dirty



Geology after Norman, 1935; Keppie, 1979

Figure 9-28. Location and geology of the Port Hood Island occurrence area. See Figures 9-1 and 9-2 for legend and location.

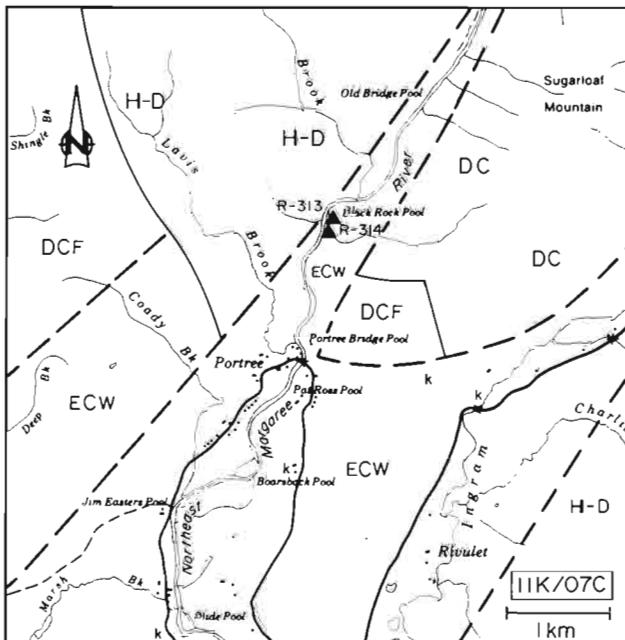
white gypsum with variable intermixed clay can be found. Giles (1982a) believed this section to be fault bound and has not tried to determine its stratigraphic position.

Although the thick gypsum horizon found on Port Hood Island is geologically interesting, it is not of economic interest. The limited areal extent and proximity to homes on the Island would prevent possible development even if sufficient resources could be outlined in the area.

PORTREE (0068)
NTS 11K/07C
UTM 656700 E 5141700 N

The Portree area is located 6 km north of the Village of Margaree Valley, Inverness County (Fig. 9-29). The occurrence consists of two small, light grey, saccharoidal gypsum outcrops found along the eastern bank of the Northeast Margaree River 1.2 and 1.5 km upstream above the bridge at Portree. Kelley (1960) mapped these as undivided Windsor Group strata in fault contact to the east and west with older igneous and metamorphic units. The sulphates are associated with redbed clastic and light brown carbonate interbeds.

Some small areas of apparent karst topography can also be seen to the south and east of Portree, however no outcroppings of gypsum were found in these areas. There is no economic interest in these occurrences which are too small and remote to be of possible commercial value.



Geology after Kelley, 1960; Barr et al, 1987

Figure 9-29. Location and geology of the Portree occurrence area. See Figures 9-1 and 9-2 for legend and location.

RIVER CENTRE (0043)
NTS 11F/14C
UTM 622500 E 5093500 N

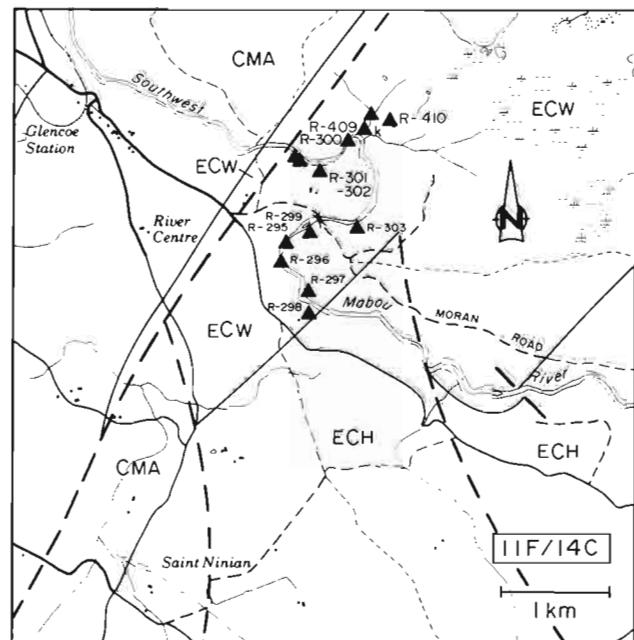
The River Centre occurrence area is located 13 km east of Port Hood, Inverness County (Fig. 9-30). Numerous exposures of gypsum and accompanying areas of karst topography can be found in this vicinity.

Mapped by Kelley (1968a), the area is underlain by units of the undivided Windsor Group which strike northeastward and dip to the west. These are underlain by Horton Group clastics to the south and east and are overlain by clastics of the Canso Group to the west and north. Kelley (1968a) indicated that the Windsor-Horton contact is offset by faulting in this area.

Numerous large exposures of light grey to white gypsum containing variable amounts of intermixed carbonate material can be found in this area. Outcrops of carbonates and clastics found in close proximity to the gypsum exposures suggest that some of this area belongs in Cycle 2 (B Subzone). Faults are present in the expo-

surements indicating that the geology of the area may be quite complex structurally.

The area of greatest interest lies 1300 m downstream along the Southwest Mabou River north of the iron bridge where the Moran Road crosses the River. At this point, two small brooks enter the River from the north and east and karsted terrane extends north of the River for several hundred metres. Although this area is located 45 km north of possible shipping facilities at Port Hawkesbury, additional work should be carried out. Diamond-drilling will be required to determine the extent of hydration in the subsurface as well as the nature of the interbedded material in the sulphates. Analyses of samples indicate high purity gypsum is present (Appendix 3).



Geology modified after Kelley, 1968a

Figure 9-30. Location and geology of the River Centre occurrence area. See Figures 9-1 and 9-2 for legend and location.

RIVER DENYS (0038)
NTS 11F/14A
UTM 642000 E 5076500 N

The River Denys occurrence area is located 29 km northeast of Port Hawkesbury, Inverness County (Fig. 9-31). Geologically, it is an extension of Georgia-Pacific Corporation's Big Brook deposit (0039) which lies immediately to the southwest of this area. Although one small outcrop and some light karst topography can be found in the River Denys area, most of the information available comes from drillhole data.

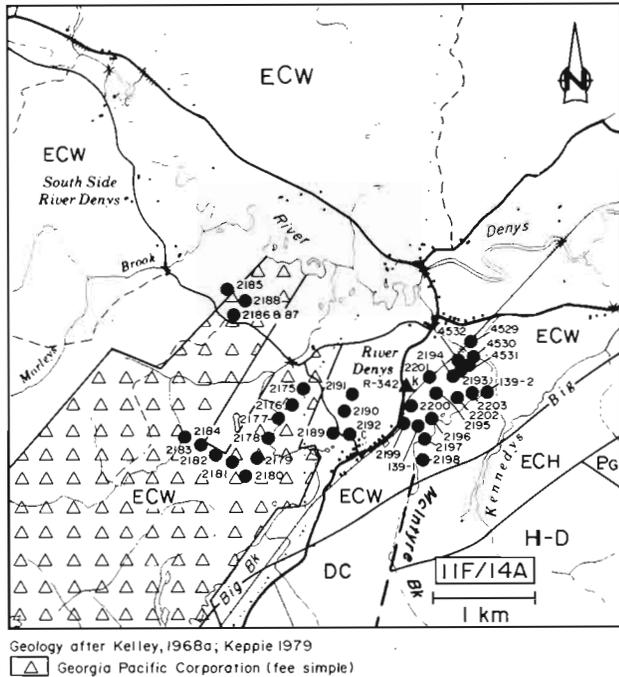


Figure 9-31. Location and geology of the River Denys occurrence area. See Figures 9-1 and 9-2 for legend and location.

Regional mapping by Kelley (1968a) indicated that this area is underlain by undivided Windsor Group sedimentary rocks which thicken towards the northwest. These are underlain by Horton Group clastics to the south and southeast.

A total of 34 diamond-drill holes are known to have been completed in the River Denys area. The Nova Scotia Department of Mines drilled 28 holes in 1956 for Mr. G. Logan who was looking for gypsum (NSDM 2175-2203) (Province of Nova Scotia, 1957e). Unfortunately most of these were shallow and a total of 12 were stopped in overburden. An additional four holes (4529-4532) were drilled in 1968 by the Nova Scotia Department of Mines in search of dolomite (Province of Nova Scotia, 1969b) and two (139-1 and 139-2) were drilled in 1974 by St. Joseph Explorations Ltd. in search of base metals (McCulloch, 1974b). One of the latter was stopped in overburden at 93.3 m.

Most of these holes were drilled between Big Brook and McIntyre Brook, with many of the holes located close to the Brooks. Almost all of the drillholes in

this area encountered thick overburden which possibly is associated with paleokarstification. Because most of the holes are shallow, little stratigraphic correlation can be carried out. The evaporites, with interbedded and interstitial limestone and clastics which were encountered, probably could be placed in Lower Cycle 2 or Cycle 1 (B or A Subzone) of the Windsor Group.

The best shallow gypsum encountered was in hole 2201 which contained 24.4 m of 'white gypsum' with some red clay overlain by 5.5 m of overburden. This area is practically surrounded by areas of heavy overburden in excess of 15 m. Hole 139-2 drilled through a thickness of 34.4 m of gypsum, but this was overlain by 59.4 m of overburden (McCulloch, 1974b).

Much of this area is owned in fee simple by Georgia-Pacific Corporation whose open-pit mine at Big Brook lies immediately to the southwest.

SOUTHWEST MABOU (0022)
 NTS 11K/03B
 UTM 619400 E 5098400 N

The Southwest Mabou occurrence area is located 7 km southwest of Mabou, Inverness County (Fig. 9-32). Two small outcrops of coarse grained, white gypsum can be found on the western side of the Southwest Mabou River valley. In addition nine drillholes have been put down in this area between 1926 and 1960 (Boehner, 1986). Eastern Gulf Oil drilled five of these, four in

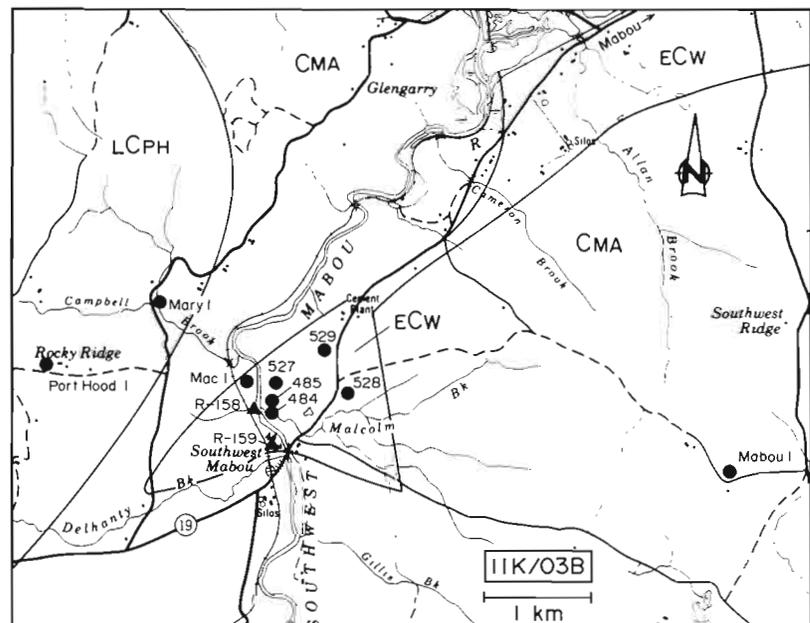


Figure 9-32. Location and geology of the Southwest Mabou occurrence area. See Figures 9-1 and 9-2 for legend and location.

1926 (Province of Nova Scotia, 1927b) and one in 1927 (Province of Nova Scotia, 1928b). Lion Oil Refining Co. drilled two holes in 1944 (MacNeil, 1945). Imperial Oil Ltd. drilled one hole in 1959 and a second in 1960 (Cote and Hill, 1960). All of these holes were drilled to search for oil in the area.

First mapped by Norman (1935), Windsor Group rocks exposed in the Southwest Mabou area have been interpreted using the deep drillhole results available. A number of authors mentioned in Bohner (1986) have described the geological structure of the area to be an anticlinal diapir with thrust or reverse angle faults. Bohner and Giles (1982) interpreted the disturbed intercalated gypsum, limestone, siltstone section which overlies the salt zones to be Cycle 2 (B Subzone) Addington Formation.

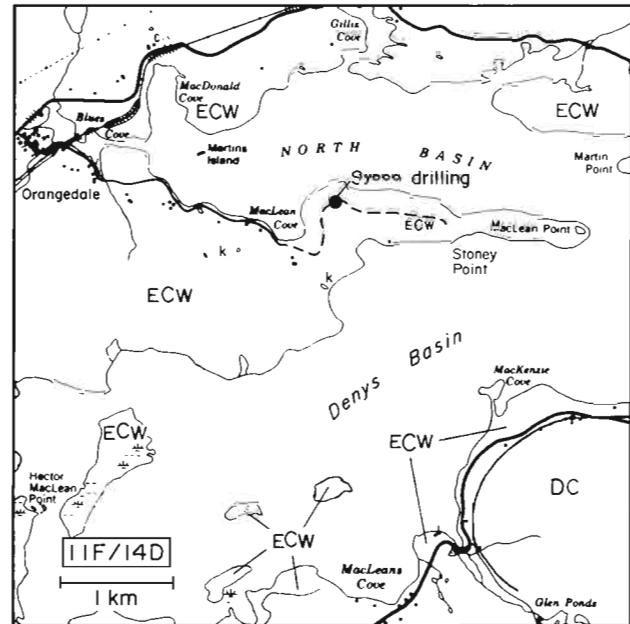
Closely spaced drillholes completed by Eastern Gulf Oil in 1926 and 1927 (484, 485, 527, 528 and 529) intersected significant gypsum horizons at shallow depths. However, correlation between these holes, some of which are < 100 m apart, is virtually impossible due to the structurally disturbed nature of the area. This area holds little immediate economic potential for development of gypsum or anhydrite due to the complex nature of the geology of the area.

STONEY POINT (0032)
NTS 11F/14D
UTM 650600 E 5084200 N

Located 4 km east of Orangedale, Inverness County, the Stoney Point occurrence is evidenced by minor karst topography and drillhole data (Fig. 9-33). Regional geological mapping by Kelley (1968a) indicated this area as underlain by undivided Windsor Group rocks.

Drilling results from the 28 limestone exploration diamond-drill holes completed in 1970 (Murray, 1970) by the Nova Scotia Department of Mines for Sysco showed significant amounts of gypsum in this area. A total of 19 holes bottomed in gypsum and one in anhydrite. The sulphates appear to underlie a thick body (perhaps bed) of dolomite. The thickest evaporite section drilled consisted of 45.6 m of interbedded gypsum and siltstone (17.5% siltstone) overlain by 9.8 m of overburden. The units appear to be Cycle 2 (B Subzone) Windsor Group and their lateral extent is presently unknown.

This locale is geographically restricted, located on a narrow peninsula. However, karst topography just to the west probably indicates a good area for a potential gypsum deposit.



Geology after Kelley, 1968a

Figure 9-33. Location and geology of the Stoney Point occurrence area. See Figures 9-1 and 9-2 for legend and location.

SUGAR CAMP (0041)
NTS 11F/11C
UTM 631000 E 5063000 N

Located 10 km northeast of Port Hawkesbury, Inverness County, Sugar Camp is the site of Georgia-Pacific Corporation's new open-pit gypsum operation (Fig. 9-34). Over the next two or three years this deposit will replace the company's Big Brook deposit as its main source of gypsum. When the quarry goes into full scale operation it will produce approximately 1.0 Mt per annum.

The Sugar Camp deposit lies near the northwestern margin of an extensive Carboniferous basin (Ferguson and Weeks, 1950) which runs from Port Hawkesbury in the southwest to Baddeck in the northeast. This basin is dominated by rocks of the Windsor and Canso Groups which are flanked by Devono-Carboniferous intrusives to the southeast in North Mountain and Hadrynian metamorphics and intrusives to the northwest in the Creignish Hills.

Georgia-Pacific has carried out an extensive diamond drilling program over the area of its deposit, however little of this information is available at present. Information is available for five drillholes (1-5) completed for G. Logan (Cormier, 1960; Hodge, 1960) and another five drillholes (S-1, S-2, S-3, S-7 and S-8) drilled

for Rio Tinto Canadian Exploration Ltd. in 1974 (Rio Tinto Canadian Exploration Ltd., 1974).

The Sugar Camp mine is located in the basal anhydrite of Cycle 1 (A Subzone) of the Windsor Group. The deposit lies in a northerly trending syncline which plunges to the north. The underlying Horton Group clastic rocks outcrop to the west and again to the east of the area. The Horton uplift or anticline to the east is in turn underlain by pink Devono-Carboniferous granite which is exposed on Georgia-Pacific's property. Drill-hole information indicates that the basin deepens to the east where significant thicknesses of gypsum and anhydrite can be found.

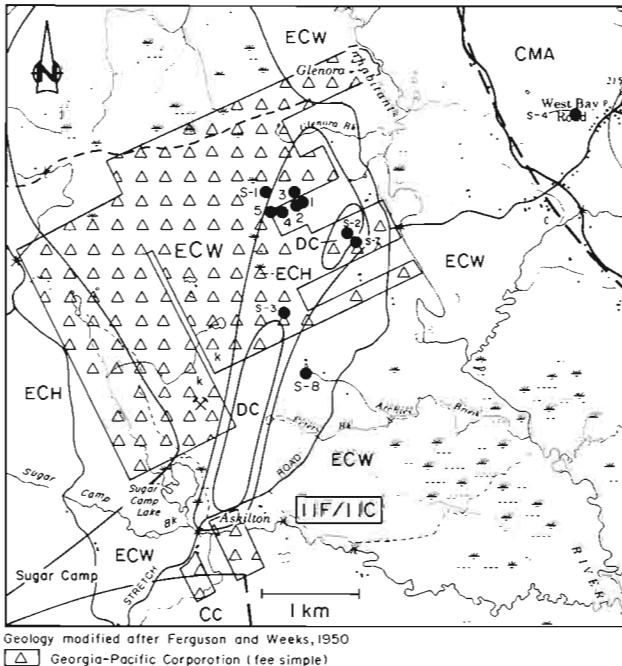


Figure 9-34. Location and geology of the Sugar Camp occurrence area. See Figures 9-1 and 9-2 for legend and location.

Overburden thickness, as in most gypsiferous areas, is quite variable. Generally it is <15 m thick over much of the deposit, but increases to >30 m along the Windsor-Horton contact where solution trenches are commonly found. Typical of Cycle 1 (A Subzone) deposits studied to date, the depth of hydration is somewhat irregular. Gypsum thickness varies from a few metres up to +20 m with deeper hydration found closer to the Horton-Windsor contact (Graham, personal communication).

Gypsum invariably grades to anhydrite with depth over the entire area. Hydration extends to greater depths along the basal anhydrite/Macumber contact where gypsum extends down dip along the contact. The

Cycle 1 sulphate member is in turn overlain by interbedded sulphates, carbonates and clastics to the north as the section thickens. This overlying unit is probably Cycle 2 (B Subzone) of the Windsor Group.

Estimates, using available data, indicate Georgia-Pacific's Sugar Camp deposit may contain in excess of 50 Mt of gypsum which reportedly grades +90% (Graham, personal communication). Road construction for direct access to Route 4 into Port Hawkesbury is in progress. Upon completion this will mean a truck haul of 11 km to company shipping facilities at Point Tupper.

Additional potential for gypsum occurs in this area outside of the Sugar Camp deposit. One drillhole completed by Rio Tinto to the east of the basement high (S-8), encountered 16 m of overburden over 15.5 m of gypsum (Rio Tinto Canadian Exploration Ltd., 1974). This was underlain by a thick anhydrite unit, however numerous gypsum horizons were encountered before the hole bottomed in limestone, then mud and sand at 312.4 m. This eastern area, not presently owned by Georgia-Pacific Corporation, warrants additional drilling.

UPPER MARGAREE (0019)
 NTS 11K/03D
 UTM 643200 E 5118700 N

The Upper Margaree area is located 12.5 km east of the Town of Inverness, Inverness County (Fig. 9-35). Geological mapping by Norman (1935) placed the

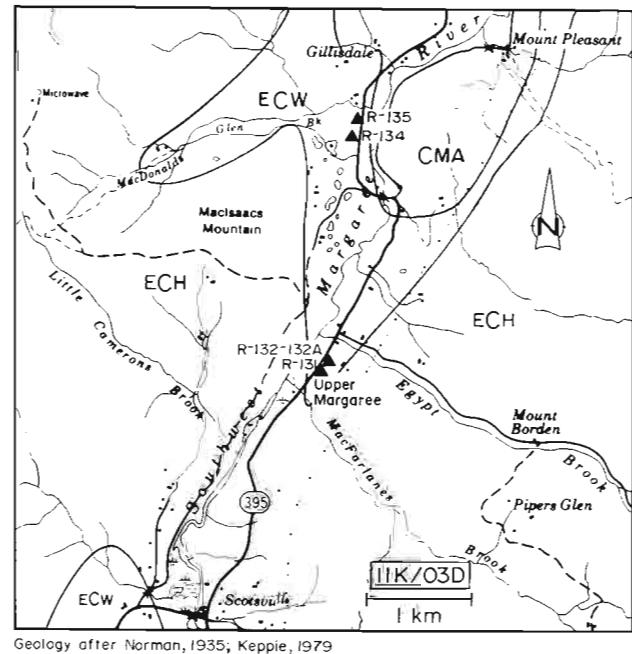


Figure 9-35. Location and geology of the Upper Margaree occurrence area. See Figures 9-1 and 9-2 for legend and location.

several small rounded gypsum outcrops found here in the Lower Windsor Group. The area was mapped as a syncline which plunges to the north with underlying Horton Group clastics to the west and east and overlying Mabou Formation clastics to the north.

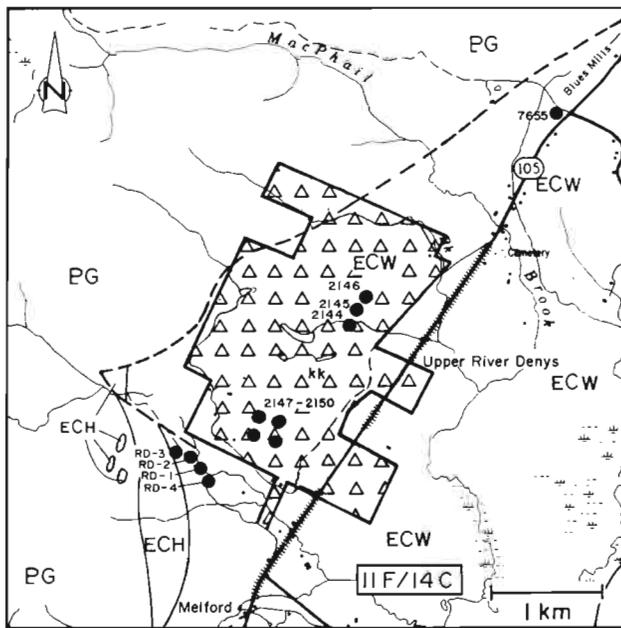
Karst topography is minimal in this area and the gypsiferous area appears not to be extensive. It is doubtful that this area would be of any economic interest.

UPPER RIVER DENYS (0036)

NTS 11F/14C

UTM 635000 E 5082600 N

The Upper River Denys occurrence area is located 31 km north-northeast of Port Hawkesbury, Inverness County (Fig. 9-36). Although karst topography is evident in this area, much of the information available on Upper River Denys comes from drillhole data.



Geology after Kelley, 1968a

△ Georgia Pacific Corp. (fee simple)

Figure 9-36. Location and geology of the Upper River Denys occurrence area. See Figures 9-1 and 9-2 for legend and location.

Regional geological mapping by Kelley (1968a) showed this area to be underlain by undivided Windsor Group rocks. These are underlain by Horton Group clastics to the west and in fault contact with metamorphics of the George River Group to the north.

A total of 12 diamond-drill holes have been completed in this area. Seven holes were completed in 1956 by government drills (2144-2150) for Mr. G. Logan who was drilling for gypsum (Province of Nova Scotia, 1957f) for Bestwall Gypsum. Texasgulf Inc. drilled four holes along the Horton-Windsor contact in this area in 1977 (RD-1 to RD-4) in search of base metals (Mann, 1977), and in 1983 the Department of Mines and Energy drilled hole 7655 near Blues Mills to test the potential of Cretaceous deposits (Nova Scotia Department of Mines and Energy, 1984) in this area.

Texasgulf's drilling along the basal Windsor contact encountered solution infill material, the basal carbonate and Horton Group clastics, but no significant gypsum or anhydrite. Logan's drilling, located further out into the basin, encountered what appears to be deeply karsted top of Cycle 1 (A Subzone) and possibly base of Cycle 2 (B Subzone). Typical of gypsum exploration holes, these were not drilled to a stratigraphic horizon, but rather were stopped in anhydrite or when overburden was deemed to be too thick. As a result it is impossible to correlate between drillholes due to a lack of information. The best gypsum section encountered was in hole 2148 where +51 m of gypsum with minor mud seams was overlain by only 6.7 m of overburden. Hole 7655, located approximately 3 km to the northeast of 2148, encountered 93 m of clay before being stopped in a mixture of gypsum and clay at 130 m.

Gypsum in this area appears to be thick and a good grade with only minor interbeds of limestone and clay. Minor interbeds of anhydrite were also encountered. The area lies adjacent to the Trans-Canada Highway 105 and is approximately 32 km from Port Hawkesbury. Georgia-Pacific Corporation owns most of the land in this area.

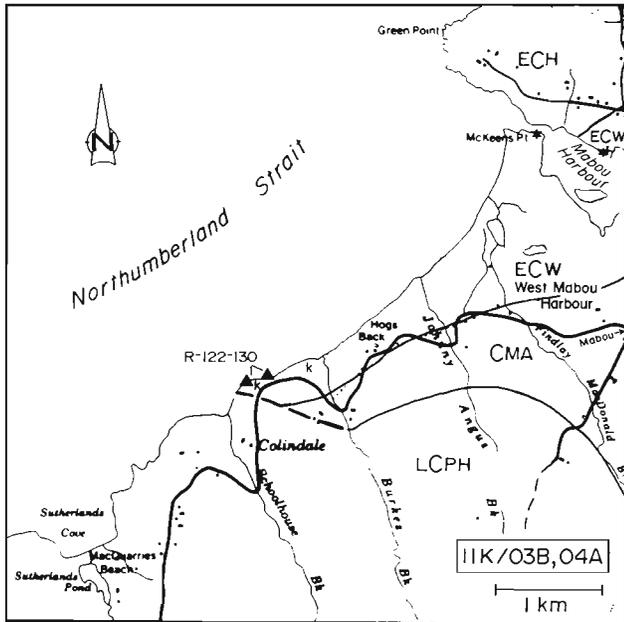
WEST MABOU HARBOUR (0018)

NTS 11K/03B, 11K/04A

UTM 616400 E 5102850 N

The West Mabou Harbour occurrence is located 8 km west of the Village of Mabou, Inverness County, along the shore south of the mouth of Mabou Harbour (Fig. 9-37). Norman (1935) mapped this faulted sequence of interbedded gypsum, anhydrite, siltstone and limestone as Upper Windsor Group. It is underlain by Lower Windsor Group to the northwest and overlain by clastic sedimentary rocks of the Mabou Formation to the southeast.

Some minor karst topography can be seen inland, however these steeply dipping units do not produce extensive karst. This area is of no economic interest.



Geology after Norman, 1935

Figure 9-37. Location and geology of the West Mabou Harbour occurrence area. See Figures 9-1 and 9-2 for legend and location.