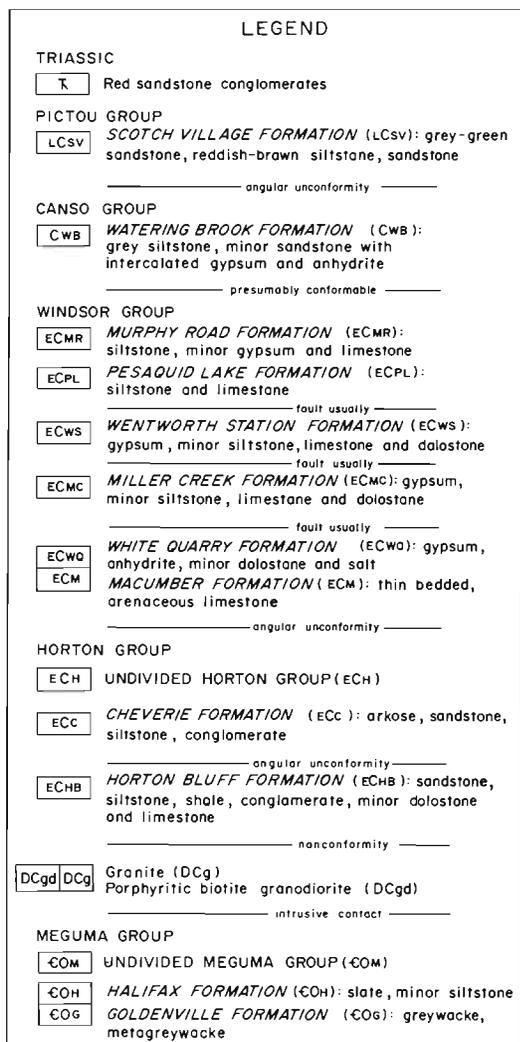


CHAPTER 8. HANTS COUNTY

-Windsor Basin-



After Moore and Ferguson, 1986

SYMBOLS

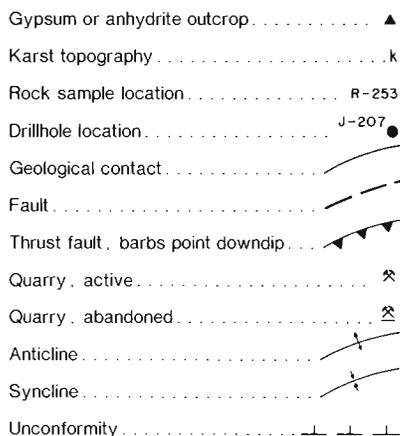
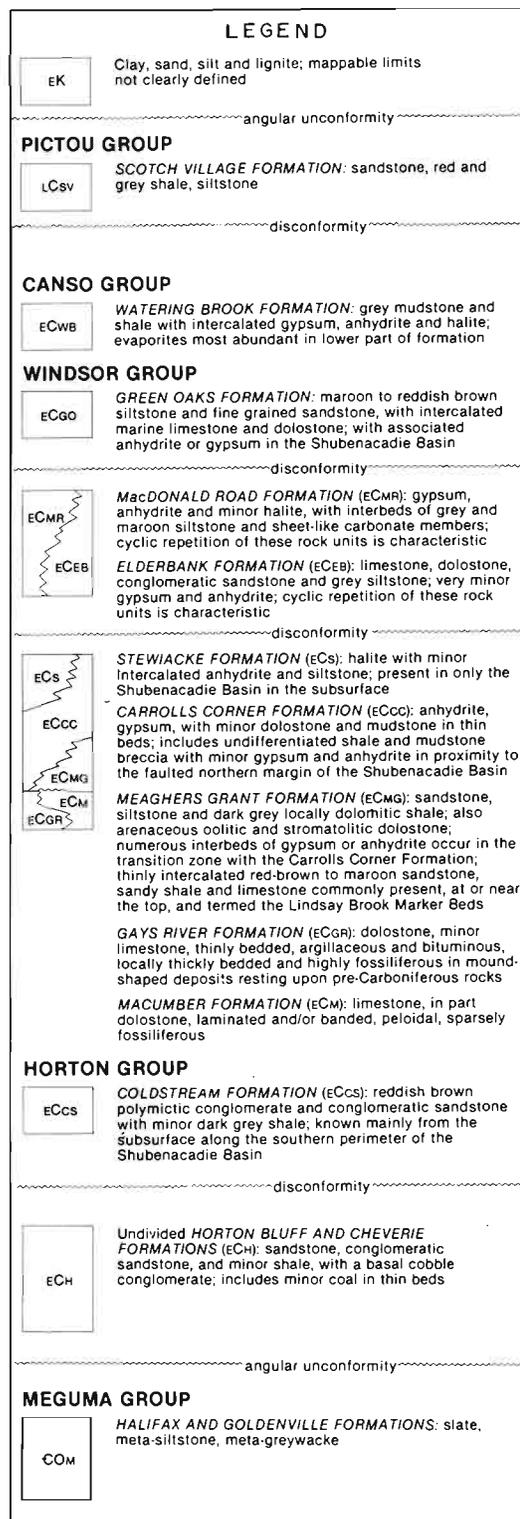


Figure 8-1. Geological legend for Windsor Basin, Hants County, gypsum and anhydrite occurrence maps.

-Shubenacadie Basin-



After Giles and Boehner, 1982

Figure 8-2. Geological legend for Shubenacadie Basin, Hants County, gypsum and anhydrite occurrence maps.

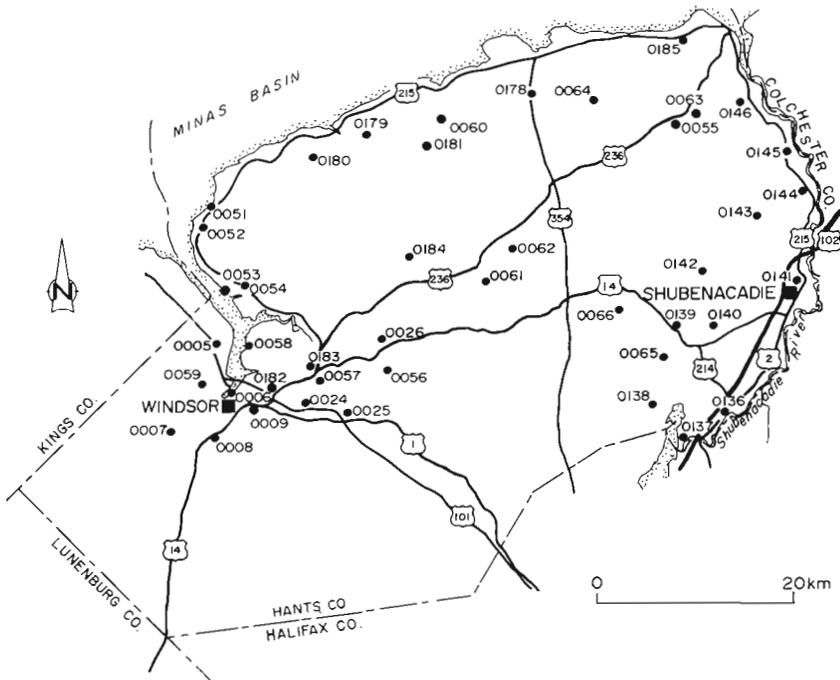


Figure 8-3. Location map for Hants County gypsum and anhydrite occurrences by reference number.

ADMIRAL ROCK (0144)
 NTS 11E/03C
 UTM 468000 E 5003000 N

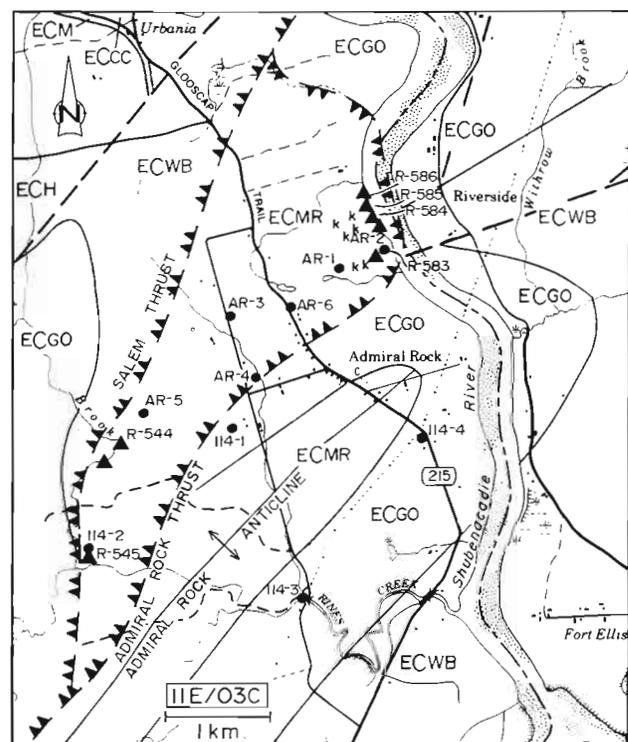
The Admiral Rock occurrence area is located 10 km north of the Village of Shubenacadie, Hants County (Fig. 8-4). Extensive karst topography and outcrops of gypsum can be found along the western side of the Shubenacadie River in this area. Other information is available from a number of diamond-drill holes completed by Great Horn Mining (International Mine Services Ltd., 1973) and St. Joseph Explorations Ltd. (McCulloch, 1974a) during the mid 1970s.

Much of this area is underlain by interbedded carbonates, sulphates and clastics of the MacDonald Road and Green Oaks Formations of the Windsor Group (Giles and Bohner, 1982). The most interesting area is a block of MacDonald Road Formation which overrides similar horizons from MacDonald Road and Green Oaks Formations to the south and east along the Admiral Rock Thrust and is in turn overlain to the west and northwest by the much younger Canso Group Watering Brook Formation along the Salem Thrust (Giles and Bohner, 1982).

Great Horn Mining drilled a series of six holes in this area in 1973 (AR-1 to AR-6) as part of a regional base metal exploration program (International Mine Services Ltd., 1973). Drilling was performed using a reverse circulation tricone rig and therefore all litholog-

ical descriptions were made using only chip or sludge samples. Abundant karst topography near some of these holes, as well as extensive gypsum outcropping along the Shubenacadie River nearby, help to support the drill log information. Three of these holes were completed between Route 215 and the River (AR-1, AR-2 and AR-6). Hole AR-1 went to a depth of 119.5 m passing through 30.5 m of overburden then 73.2 m of variable, impure gypsum with minor clay and limestone interbeds before encountering a thicker 6.1 m/limestone and clay horizon. After drilling through this interbed, the hole continued on in gypsum until it was stopped. Hole AR-2 was stopped at 31.1 m after passing through a section similar to that seen in the top of AR-1. The horizons encountered in hole AR-6 approximately 600 m to the southwest are much the same.

Along the western bank of the Shubenacadie River in this area, there is a partially concealed exposure of



Geology after Giles and Bohner, 1982

Figure 8-4. Location and geology of the Admiral Rock occurrence area. See Figures 8-2 and 8-3 for legend and location.

gypsum 450 m in length (only 95 m of which is concealed). The gypsum varies from fine grained, white to light grey with minor intermixed silt and carbonate to medium to dark grey selenitic with minor intermixed silt and carbonate. Although some minor subhorizontal laminae can be observed, they are also contorted and no attitudes are noted. Minor zones of what appear to be mudstone breccias having limestone and gypsum clasts can be observed in the middle portion of the section.

Drilling carried out by St. Joseph Explorations Ltd. in 1974 included one hole (114-2) near the southwestern end of the same thrust block as the AR series holes. In addition, three other holes (114-1, 114-3 and 114-4) were drilled around the Admiral Rock Anticline in the southern portion of the occurrence area (McCulloch, 1974a). Hole 114-2 appears to have been collared and completed in the MacDonald Road Formation and may be faulted in part. The other three holes all collared in the Green Oaks Formation and drilled through the MacDonald Road Formation into the underlying Stewiacke or Carrolls Corner Formations. Although all four holes encountered substantial sulphate horizons most of these were either deeply buried beneath overburden and other interbedded materials or were predominately anhydrite.

The Admiral Rock occurrence is considered to have good potential for development. Unfortunately, the AR series drillholes are unsuitable for detailed stratigraphic interpretation, therefore much additional work needs to be done in order to determine the geology and quality of the units in this area. Local karst topography, outcrop exposure and drillhole indications are favourable indicators and the potential exists for a deposit in excess of 10 Mt of gypsum in the area east of Route 215. The area is located approximately 60 km north of Halifax and 30 km east and south of Walton and may hold potential as a small sized producer.

AVONDALE (0058)

NTS 21H/01A

UTM 411000 E 4986400 N

The Avondale occurrence area is located 4.5 km north of Windsor, Hants County (Fig. 8-5). Two areas of gypsum outcrop can be found along the eastern bank of the Avon River and Moore and Ferguson (1986) indicated the presence of several abandoned gypsum quarries in this vicinity.

According to regional geological mapping by Moore and Ferguson (1986), the area is underlain by faulted blocks of Windsor Group rocks of the Miller Creek, Wentworth Station, Pesaquid Lake and Murphy Road

Formations as well as a small block of Canso Group, Watering Brook Formation.

One gypsum exposure can be found just south of Wallace Point where a 4 m thick bed of white to pink, fine grained to selenitic gypsum is interbedded between clastic redbeds. The unit grades from laminated at the apparent base to nodular mosaic at the apparent top. A possible karst solution feature can be seen in the form of a small lake inland along strike (130° Az from the outcrop).

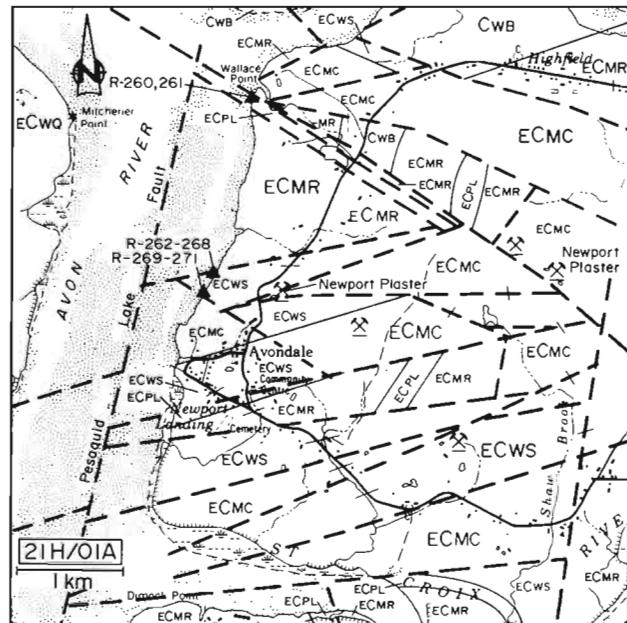


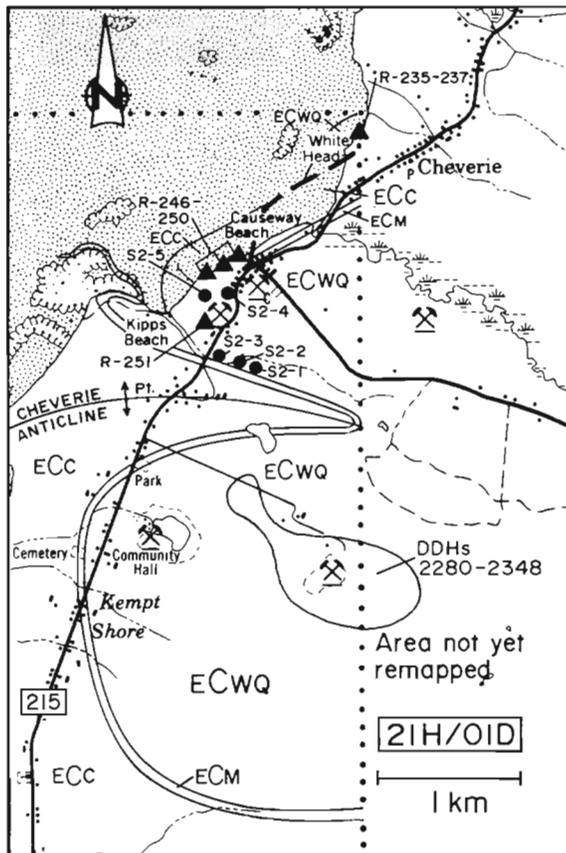
Figure 8-5. Location and geology of the Avondale occurrence area. See Figures 8-1 and 8-3 for legend and location.

A second exposure can be found 1700 m to the south of Wallace Point where a discontinuous sequence of moderate to steeply dipping, interbedded gypsum, siltstone and limestone extends over 280 m along the eastern bank of the River. Moore and Ferguson (1986) identified these units as belonging to the Wentworth Station Formation. Gypsum interbeds comprise approximately one-third of the section. The thickest sulphate exposure was a 20 m thick bed of fine grained, massive to nodular, white gypsum located at the northern end of the section.

Development potential of the Avondale area is considered to be poor even though a large part of the area is underlain by units of the sulphate-rich Miller Creek and Wentworth Station Formations because much of the immediate vicinity is used for agriculture. Gypsum rights over most of the area may be held by the Fundy Gypsum Company Ltd.

CHEVERIE (0051)
 NTS 21H/01D
 UTM 407400 E 5000800 N

The Cheverie occurrence area is located in and around the Village of Cheverie, Hants County, which is approximately 30 km north of the Town of Windsor (Fig. 8-6). Geological mapping by Ferguson (1983) determined that this area, which lies north of the Cheverie Point Anticline, is underlain by sulphates of the White Quarry Formation. These units are in conformable and fault contact with underlying carbonates of the Macumber Formation and clastics of the Cheverie Formation (Ferguson, 1983).



Geology modified after Ferguson, 1983

Figure 8-6. Location and geology of the Cheverie occurrence area. See Figures 8-1 and 8-3 for legend and location.

Gypsum and anhydrite can be found in outcrop along the shore at White Head and Causeway Beach as well as in the old quarries beside Route 215 within the Village. Hydration of the basal anhydrite appears, as elsewhere, to be from the surface downward and enhanced along the basal contact. Several drillholes in the area passed through this hydration zone into the underlying Macumber Formation (Quarch et al., 1979).

The thickest gypsum encountered was in Saarberg Interplan's hole S2-5 where 23.1 m of gypsum is underlain by 7.6 m of overburden (Quarch et al., 1979).

Although two past producing gypsum quarries are known in the area, production records are unclear and exact figures for production cannot be determined.

Two roads presently pass over the best gypsum sections in this area. Further away from the basal contact with the Macumber Formation, anhydrite becomes more common. Little opportunity exists for quarry development in the Cheverie area due to cultural development and the thin hydration (i.e. low potential volume of the basal anhydrite).

ELMSDALE (0136)
 NTS 11D/13D
 UTM 459500 E 4979000 N

The Elmsdale occurrence is located in and around the Village of Elmsdale, Hants County (Fig. 8-7). It lies southwest along strike from the Dutch Settlement area (0135), Halifax County, however the thick hydrated section seen at Dutch Settlement and East Milford (0134), Halifax County, is not present in this area.

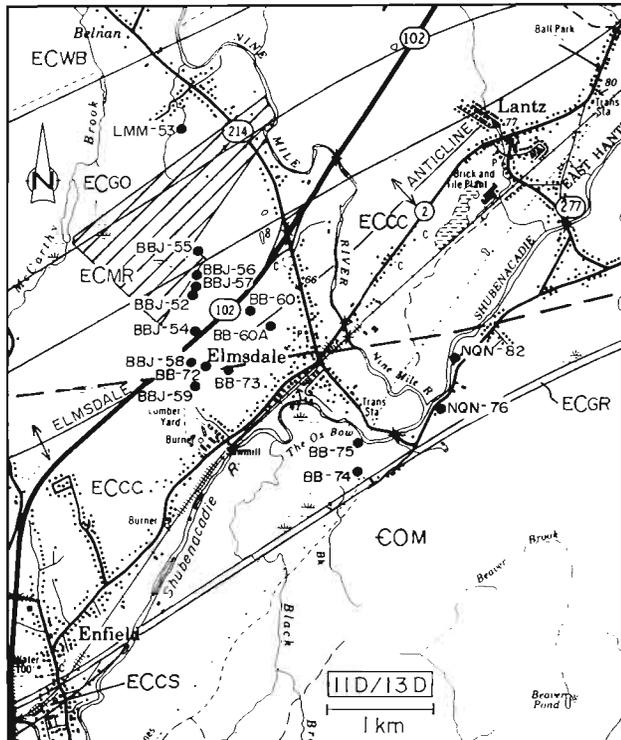
Regional geological mapping by Giles and Boehner (1982) indicated that the area is underlain by the sulphate dominated Carrolls Corner Formation along the southeastern margin of the Shubenacadie Basin. These units overlie the basal carbonate Gays River Formation and the Meguma Group metamorphic rocks to the southeast. A basement high is found in the area of Highway 102 and the Basin then deepens to the northwest where the Carrolls Corner Formation is overlain by interbedded sulphates, carbonates and clastics of the MacDonald Road Formation which is overlain by the Green Oaks Formation.

A total of 15 drillholes were put down in this area in 1974 by Amax Exploration Inc. as part of a regional base metal exploration program (Amax Exploration Inc., 1974g). All of these holes encountered varying thicknesses of gypsum and anhydrite. The thick hydrated section, seen at the base of the MacDonald Road Formation and top of the Carrolls Corner Formation at Dutch Settlement, is apparently not present in the Elmsdale area. This could be due to a lack of drilling immediately northwest of the Elmsdale Anticline where that portion of the section should occur.

The best gypsum intersected in the area is found along the Windsor-Meguma contact at the Basin margin. Both BB-74 and NQN-76 encountered thick white gypsum horizons (Amax Exploration Inc., 1974e). At

27.4 m, NQN-76's gypsum section was the thickest. It is overlain by 12.2 m of overburden. There appears to be the typical thick hydration of the basal anhydrite along the contact which is seen throughout the Province.

Development potential does not appear to be good in the Elmsdale area. Along the Basin margin some deeper hydration is observed, but does not appear to extend very far into the Basin. The Elmsdale area is also a rapidly developing community and this fact could preclude any mineral development.



Geology after Giles and Boehner, 1982
 [Hatched Box] National Gypsum (lease)

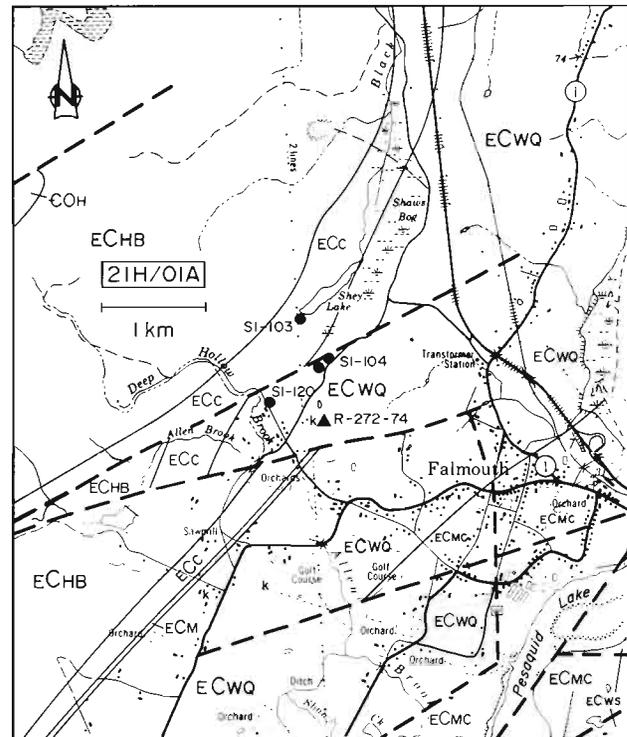
Figure 8-7. Location and geology of the Elmsdale occurrence area. See Figures 8-2 and 8-3 for legend and location.

FALMOUTH (0059)

NTS 21H/01A

UTM 406300 E 4983700 N

The Falmouth occurrence area is located 3 km northwest of Windsor, Hants County (Fig. 8-8). It is geographically and geologically contiguous with the Mount Denson occurrence (0005) to the north and the Upper Falmouth occurrence (0007) to the south. Numerous areas of karst topography and some exposures of gypsum may be found within the area. Subsurface information was obtained from drillhole data provided by Interuranium Canada Ltd. (Saarberg Interplan Canada Ltd.) which is still held confidential under the uranium closure.



Geology after Ferguson, 1983; Moore and Ferguson, 1986

Figure 8-8. Location and geology of the Falmouth occurrence area. See Figures 8-1 and 8-3 for legend and location.

Geology mapping by Moore and Ferguson (1986) indicated that most of the area is underlain by the thick calcium sulphate unit of the Windsor Group White Quarry Formation which strikes north-northeastward through the area and dips to the east. This Formation is underlain to the west by the basal Windsor Group Macumber Formation carbonate and clastics of the Horton Group. Shey Lake appears to overlie a dissolution feature along the Windsor-Horton contact in this area. Most of the drillholes in this area encountered thick overburden (+30 m) along this contact as well. Hydration of the basal sulphate decreases basinward away from the contact. As in the Mount Denson area (0005), a number of faults appear to offset the contact.

Most of the Falmouth area is actively used for agriculture, and residential developments are gradually spreading. These factors would hinder possible quarry development and render the Falmouth occurrence of geological interest only.

GLEN BROOK (0061)

NTS 11E/04B

UTM 435700 E 4992900 N

The Glen Brook occurrence is located 1.8 km southwest of Clarkesville, Hants County, between Glen Brook on

the west and McInnis Brook on the east (Fig. 8-9). Stevenson (1959) provided the most recent mapping in the area and included this area in his undivided Windsor Group. This section probably belongs to the White Quarry Formation.

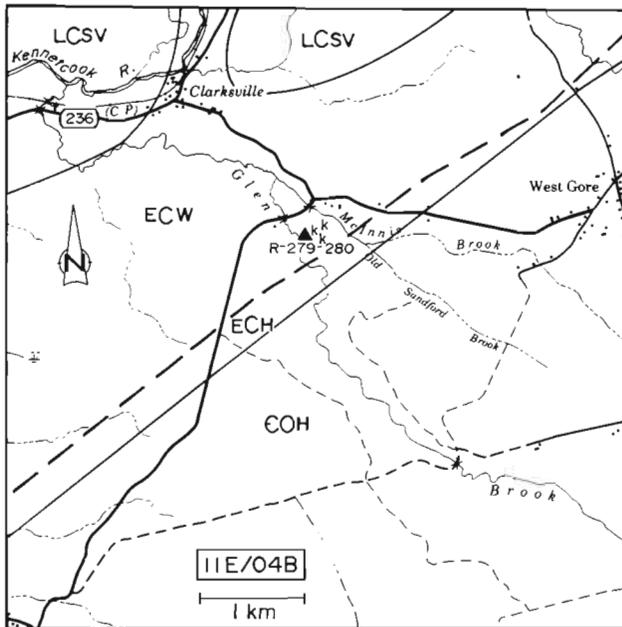


Figure 8-9. Location and geology of the Glen Brook occurrence area. See Figures 8-1 and 8-3 for legend and location.

The occurrence consists of a large cliff, 20-30 m high, which extends for 100 m in a northeasterly direction. Moderate to heavy karst topography extends southeastward from the face towards the Windsor-Horton contact. Gypsum here is white, fine grained and massive, however hydration is shallow at the cliff with light blue, fine grained anhydrite visible at the top. This could be due to the rapid erosion of hydrated material adjacent to the Brook valley. Deeper hydration is evident in the heavily karsted area behind the cliff.

Little hydrated material (gypsum) remains in the immediate area between the Brooks at this occurrence. Development potential is limited by this factor as well as the distance to any possible shipping terminus.

GYPSUM MINES (0024)
NTS 21A/16D
UTM 416700 E 4979700 N

The Gypsum Mines area is located 6 km southeast of the Town of Windsor, Hants County, just east of Three Mile Plains and west of St. Croix (Fig. 8-10). The sulphate dominated White Quarry Formation underlies

virtually all of the area and is underlain by Horton Group clastics to the south and overlain by the Miller Creek, Wentworth Station and Pesaquid Lake Formations to the north (Moore and Ferguson, 1986).

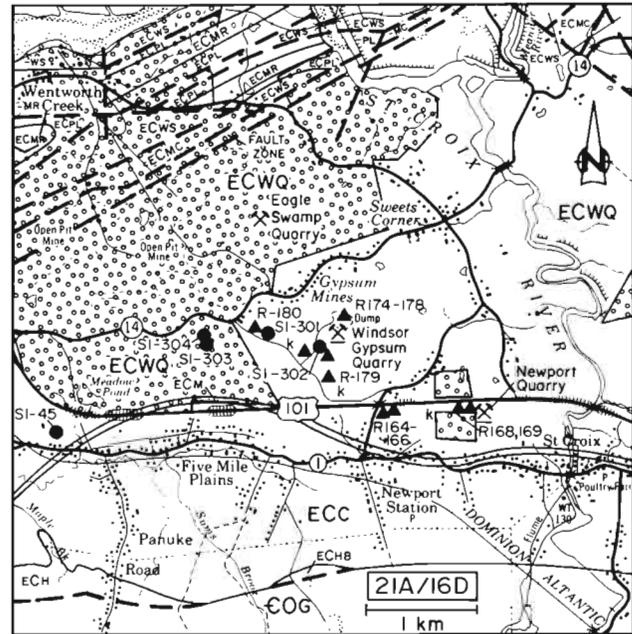


Figure 8-10. Location and geology of the Gypsum Mines occurrence area. See Figures 8-1 and 8-3 for legend and location.

Within this area three quarries were operated in the early part of this Century (Jennison, 1911). The Newport Gypsum Quarry is located near Newport Station, the Windsor Gypsum Quarry lies south of the Village of Gypsum Mines and the Eagle Swamp Quarry is located on property still held by the Fundy Gypsum Company.

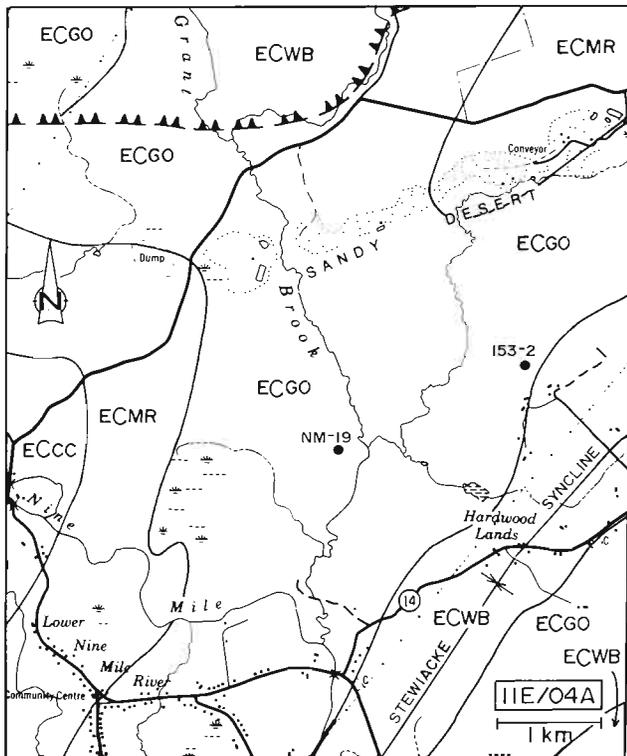
Numerous outcrops and sinkholes are found throughout the area. Hydration is generally restricted to the surface of the basal anhydrite with gypsum thicknesses <10 m. Although additional quarry potential in the Gypsum Mines area is poor, some of the material found in the Old Windsor Gypsum Quarry is very fine grained, dense gypsum which may be attractive to stone carvers.

HARDWOOD LANDS (0140)
NTS 11E/04A
UTM 459000 E 4988000 N

The Hardwood Lands occurrence area is located 6 km west of the Village of Milford Station, Hants County (Fig. 8-11). It is a subsurface occurrence intersected by

two drillholes located nearly 2000 m apart and is of geological interest only.

This area is located near the northeasterly trending axis of the Shubenacadie Basin along the northwestern side of the Stewiacke Syncline (Giles and Boehner, 1982). Much of the area is underlain by interbedded carbonates, clastics and sulphates of the Green Oaks Formation which is overlain to the southeast by similar units of the Watering Brook Formation (Canso Group) and underlain to the northeast by the Cycle 2 (B Subzone) MacDonald Road Formation.



Geology after Giles and Boehner, 1982

Figure 8-11. Location and geology of the Hardwood Lands occurrence area. See Figures 8-2 and 8-3 for legend and location.

Imperial drilled one hole in the area in 1973 (NM-19) exploring for base metals (Johnston, 1973c), and St. Joseph Explorations Ltd. drilled a second hole (153-2) nearby in 1975 (St. Joseph Explorations Ltd., 1975). Both holes penetrated through the Green Oaks Formation into the MacDonald Road Formation and hole 153-2 bottomed in the salt/anhydrite sequence of the Cycle 1 (A Subzone) Stewiacke Formation.

Some gypsum was noted near the top of hole NM-19, however most of the thicker sulphate units seen in both holes are at depth and predominately anhydrite. These holes show units which can be correlated over

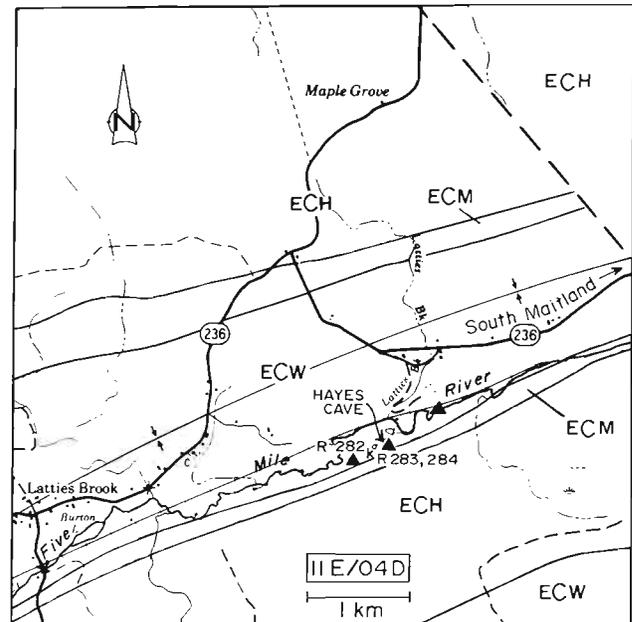
some distance and therefore may be traced updip to the northwest where they should subcrop. The base of the MacDonald Road Formation does not appear to be greatly disturbed in this area, as it is at East Milford (0134), Halifax County, where hydration occurs to +70 m depths. Nonetheless thick sulphate beds do occur in these sections which may be significant as they approach surface towards the margin of the Shubenacadie Basin.

HAYES CAVE (0063)

NTS 11E/04D

UTM 458600 E 5009900 N

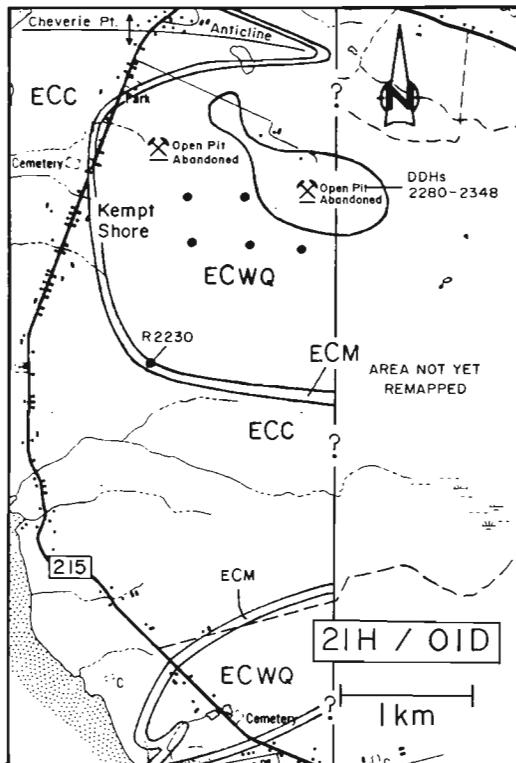
The Hayes Cave occurrence is located 9 km south-southwest of Maitland, Hants County (Fig. 8-12). Mapped by Stevenson (1959) as undivided Windsor Group, the sulphates seen here are believed to belong to the A Subzone White Quarry Formation or Carrolls Corner Formation of the Windsor Group. They are underlain to the southeast by the basal Macumber Formation and clastics of the Horton Group (Stevenson, 1959).



Geology modified after Weeks, 1946a; Stevenson, 1959

Figure 8-12. Location and geology of the Hayes Cave occurrence area. See Figures 8-1 and 8-3 for legend and location.

Three areas of anhydrite/gypsum cliffs and moderate to heavy karst topography extend for 2.2 km along the Five Mile River in this area. Cliffs often exceed 20 m in height and consist mainly of light blue, fine grained anhydrite which has been hydrated along its upper surface, along fractures and along minor petroliferous



Geology modified after Ferguson, 1983

Figure 8-14. Location and geology of the Kempt Shore occurrence area. See Figures 8-1 and 8-3 for legend and location.

During 1956 a government core drill was employed by B. A. Parsons Limited to complete a total of 69 holes over a portion of this area. Although the exact drillhole locations are not known, the rough drill logs show overburden thicknesses from 2.7- >18.3 m and gypsum thickness between 1.8 and 39.0 m (Province of Nova Scotia, 1957a). Minor limestone and mudstone horizons are common within the gypsum sections and most of the holes bottomed in anhydrite.

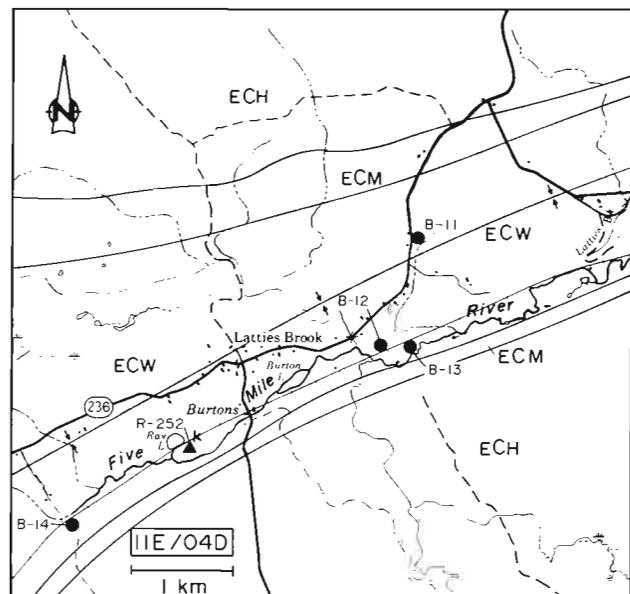
This area deserves additional evaluation to determine what reserves of gypsum or anhydrite might be available. It is possible that a small quarry could be operated in the area to supply the spot market.

LATTIES BROOK (0055)
 NTS 11E/04D
 UTM 454600 E 5008300 N

The Latties Brook occurrence area is located 11 km southwest of the Village of Maitland, Hants County (Fig. 8-15). Information available on this area consists of four diamond-drill holes completed by Imperial Oil Ltd. in 1974, numerous sinkholes and a single exposure of

gypsum found south of the Dominion Atlantic Railway right-of-way below Ray Lake (MacLeod, 1974).

This area straddles the boundary between Weeks' (1946a) Londonderry map and Stevenson's (1959) Kennetcook map area. Their mapping indicates that the area is underlain by units of the Lower Windsor Group in a narrow syncline which trends northeast-southwest along the valley of the Five Mile River. These include the basal carbonate Macumber Formation which is underlain by the Horton Group clastics. Local mapping by Imperial in the early 1970s indicated a more complex geological setting with a number of synclines and anticlines in the Windsor Group strata in the area (MacLeod, 1974).



Geology modified after Weeks, 1946a; Stevenson, 1959

Figure 8-15. Location and geology of the Latties Brook occurrence area. See Figures 8-1 and 8-3 for legend and location.

The gypsum outcrop found at Latties Brook consists of a small (2 x 3 m) block of fine grained, dense, medium to light grey gypsum containing only minor intermixed carbonate material. It is found south of an area of moderate karst topography that extends 100-200 m north-south by 300-400 m east-west, parallel to the regional geological trend. Imperial's hole B-11 was collared near the middle of the syncline and encountered clastics before passing through +10 m of gypsum and anhydrite then into the basal carbonates (MacLeod, 1974). Three other holes were collared along the southern Windsor-Horton contact by Imperial Oil Ltd. Two were abandoned in thick overburden which probably represents a section of dissolved gypsum/anhydrite (B12,

B-12A). Hole B-13 encountered a thin layer of gypsum covered by thick overburden before passing into the basal carbonate and the underlying Horton. B-14 was collared in the basal carbonate.

Although gypsum/anhydrite underlie much of the Latties Brook area, there is little potential for economic development because much of the calcium sulphate which was once present has been removed by dissolution. The area is also distant from any possible shipping points.

LOWER BURLINGTON (0054)

NTS 21H/01A

UTM 410500 E 4993000 N

The Lower Burlington area lies immediately southeast of the Summerville area (0053) (Fig. 8-16). Crosby (1962) indicated that the area was underlain by undivided Windsor Group sedimentary rocks which are underlain to the north by Horton Group clastics and overlain to the south by the Scotch Village Formation.

Ten diamond-drill holes were completed in the area in 1964 by the Magnet Cove Barium Corporation (Magnet Cove Barium Corp. Ltd., 1964). The exact

locations are uncertain. Five of the holes encountered gypsum, three near surface. No karst topography indicative of evaporites is evident in the Lower Burlington area. It is possible that the strata encountered in the drillholes is steeply dipping. Further investigation by drilling in the area is required.

MACPHEES CORNER (0142)

NTS 11E/04A

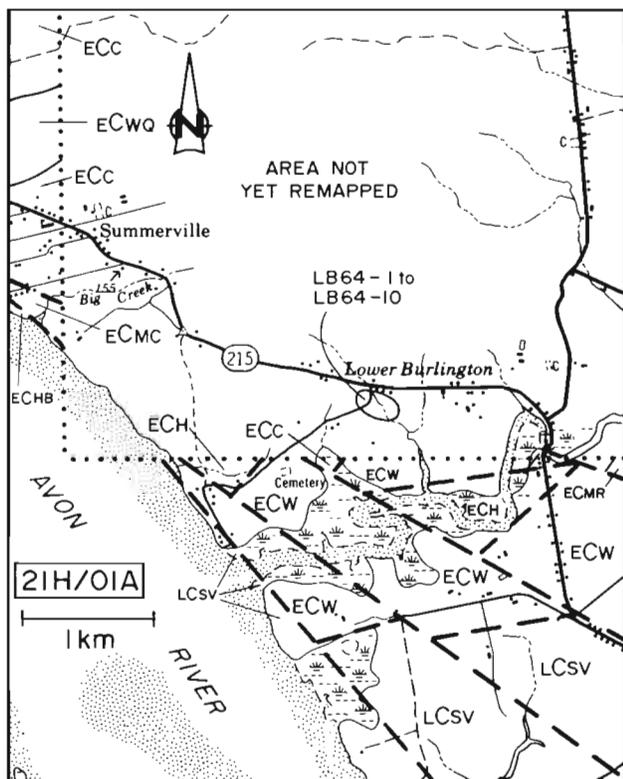
UTM 457000 E 4995000 N

The MacPhees Corner occurrence area is located 10 km west-northwest of the Village of Shubenacadie, Hants County (Fig. 8-17). Some karst topography can be seen in this area, however since no surface occurrences have been located geological information is taken from several drillholes which intersected gypsum and anhydrite.

This occurrence is located in a highly deformed portion of the Shubenacadie Basin where the section encountered by some drillholes is entirely overturned in large scale nappe like folds. Giles and Bohner (1982) referred to this structure as the MacPhee Synformal Anticline which strikes northeastward. The area is underlain by interbedded clastics, carbonates and calcium sulphate units of the MacDonald Road and Green Oaks Formations of the Windsor Group and the Watering Brook Formation of the Canso Group. The fault-bound block overthrusts units of the Green Oaks and MacDonald Road Formations to the south and east along the Salem Thrust and is in high angle fault contact with Horton Group clastics to the north and west along the Roulston Corner Fault.

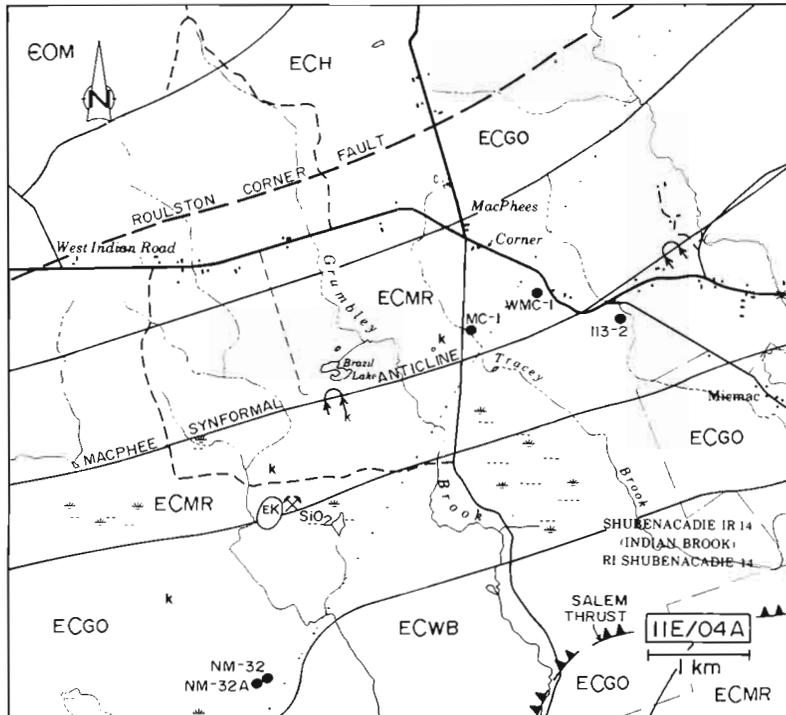
Sedco Exploration drilled hole WMC-1 in 1967 to a depth of 609 m, however most of the hole was not cored and only a brief description of the hole is available (Nova Scotia Department of Mines, 1967b). In 1973, Jorex drilled two holes (NM-32 and NM-32a) in the southern portion of this area, just north of the Salem Thrust (Johnston, 1973c). In 1974, Imperial Oil Ltd. drilled hole MC-1 (Boehner, personal communication) and St. Joseph Explorations Ltd. drilled hole 113-2 (McCulloch, 1974a).

Holes NM-32 and -32a passed through the Salem Thrust, into units at the base of the MacDonald Road Formation and through the Carrolls Corner Formation into the underlying Meguma Group metamorphic rocks. Within the overturned section, MC-1 was collared in the MacDonald Road Formation and stopped near the top of the Green Oaks Formation (Giles and Bohner, 1979). Hole 113-2 appears to have collared in the MacDonald Road Formation and stopped in the lower



Geology after Ferguson, 1983; Moore and Ferguson, 1986; Crosby, 1962

Figure 8-16. Location and geology of the Lower Burlington occurrence area. See Figures 8-1 and 8-3 for legend and location.



Geology after Giles and Boehner, 1982

Figure 8-17. Location and geology of the MacPhees Corner occurrence area. See Figures 8-2 and 8-3 for legend and location.

part of the Green Oaks Formation. Several areas of surface karst can be identified in this area. L. E. Shaw's West Indian Road Cretaceous silica sand deposit reportedly occupies a large solution feature (Fowler, personal communication).

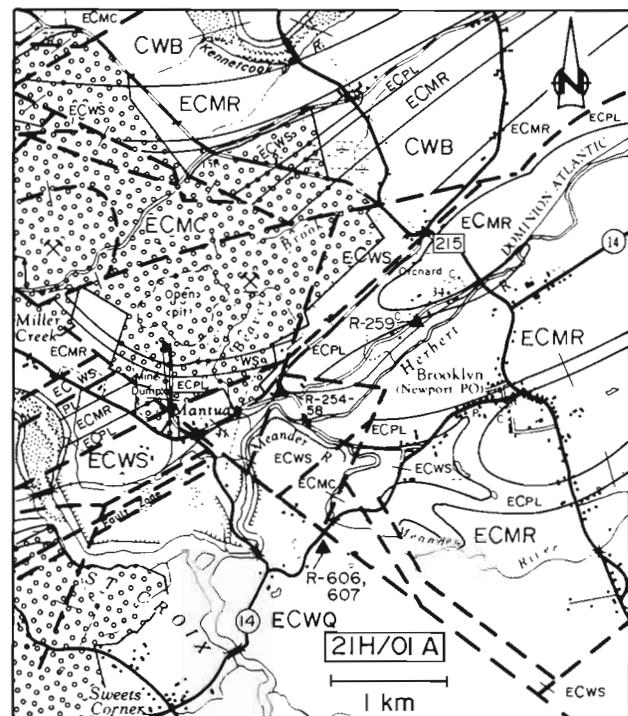
Those areas which are underlain by either the upper portion of the Carrolls Corner Formation or the base of the MacDonald Road Formation hold good potential for being deeply hydrated. Hole 113-2, for example, intersected 70.1 m of variably impure gypsum, but is overlain by 88.4 m of overburden and apparent solution fill material. This highly disturbed area may also be deeply hydrated elsewhere along strike. In general, the MacPhees Corner area holds good potential for large gypsum deposits, however much additional work needs to be done beginning with the area around hole 113-2.

MANTUA (0057)
NTS 21H/01A
UTM 418400 E 4983700 N

The Mantua area is located just west of the Village of Brooklyn, Hants County, and southeast of Fundy Gypsum's Miller Creek Quarry (Fig. 8-18). Numerous outcroppings of Windsor Group strata can be found along the abandoned Dominion Atlantic Railway right-of-way as well as along the Herbert River which runs

through the middle of the area. Recent mapping by Moore and Ferguson (1986) indicated that a fault-bound block of Wentworth Station Formation underlies much of the immediate area. These rocks are in contact with the overlying Pesaquid Lake and Murphy Road Formations to the east, White Quarry, Miller Creek and Wentworth Station Formations to the south and west, as well as Murphy Road and Wentworth Station Formations to the north.

Samples taken during this survey, from gypsum outcrops in the area, produced high purity gypsum assays (Appendix 3). However much of the gypsum has probably been removed by the action of the Herbert River. Little possibility exists for the development of the remaining gypsum in the Mantua area because Route 14 passes through the northern portion of the area where potential resources of gypsum could still exist. In addition, the interbedded nature of the Wentworth Station Formation is not conducive to economic extraction of the gypsum units found in it. As a result the



Geology after Moore and Ferguson, 1986
□ Fundy Gypsum (fee simple)

Figure 8-18. Location and geology of the Mantua occurrence area. See Figures 8-1 and 8-3 for legend and location.

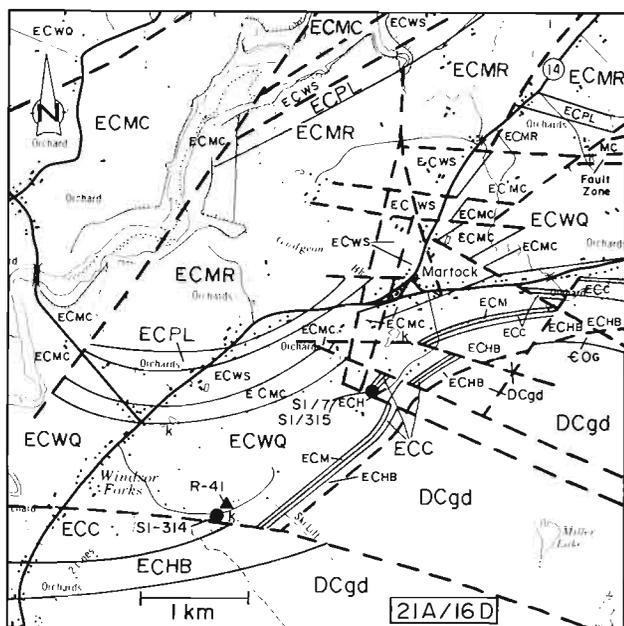
Mantua occurrence is primarily of geological interest at this time.

MARTOCK (0008)

NTS 21A/16D

UTM 407050 E 4976150 N

The Martock occurrence area is located 4 km southwest of the Town of Windsor, Hants County (Fig. 8-19). This occurrence area extends from Windsor Forks in the southwest to Three Mile Plains in the east. Rocks of the White Quarry Formation dominate the area and are overlain by interbedded sulphates, siltstones and carbonates of the Miller Creek, Wentworth Station and Pesaquid Lake Formations to the north and west. They are underlain by clastic sedimentary rocks of the Horton Group and in one small area by Devonian-Carboniferous granodiorite to the south and east.



Geology after Moore and Ferguson, 1986

Figure 8-19. Location and geology of the Martock occurrence area. See Figures 8-1 and 8-3 for legend and location.

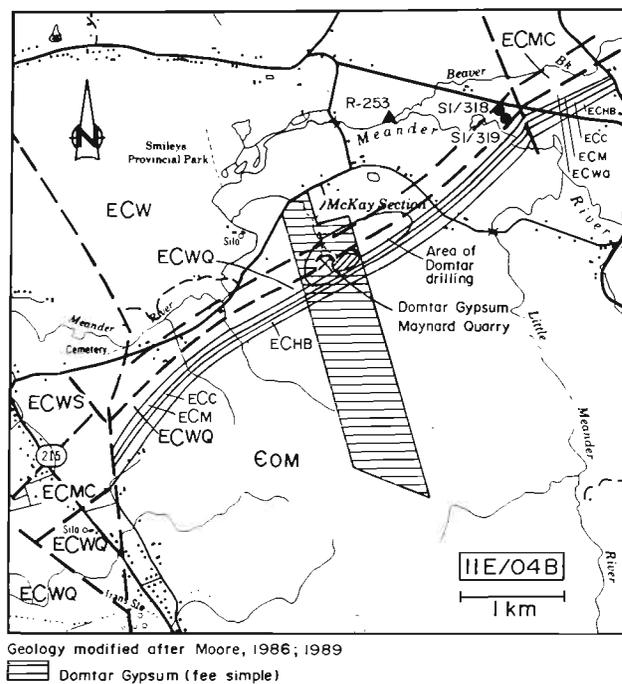
Only minor outcroppings of gypsum and anhydrite and limited karst can be seen in this area. Limited drillhole information in this area does not contribute much information on hydration of the anhydrite here. Extensive faulting interpreted by Moore and Ferguson (1986) would suggest the potential for extensive gypsum, however the presence of a small stream valley along the White Quarry/Cheverie contact in the area may have removed much of the gypsiferous section. This stream as well as cultural conditions would prohibit any mining development in the Martock area, subsequently it is of geological interest only.

MCKAY SECTION (0056)

NTS 11E/04B

UTM 424800 E 4984700 N

High purity, white gypsum has been produced from quarries in the McKay Section (McKay Settlement, historical name) area 15 km east of the Town of Windsor, Hants County, for over 45 years (Fig. 8-20). The Windsor Plaster Company opened a calcining plant in Windsor in 1891 and that plant has remained in operation ever since. Gypsum, Lime and Alabastine Ltd. took over the company in 1956 and were in turn bought out by Domtar Construction Materials Ltd. in 1962 (King, 1985).



Geology modified after Moore, 1986; 1989

Domtar Gypsum (fee simple)

Figure 8-20. Location and geology of the McKay Section occurrence area. See Figures 8-1 and 8-3 for legend and location.

Prior to 1943 gypsum for the Windsor plant was taken from quarries other than those at McKay Section. In 1943 the Veinot Quarry, located 400 m northeast of the present site, was opened. Shortly afterwards the Maynard Quarry, which is still in production today, was developed and began to produce in 1946. Some evidence exists to indicate that small scale production may have occurred at the Baxter Quarry located 500 m southwest of the Maynard.

Accurate production figures are not available for the years 1942-1947, however between 1948 and the present a total of 400 305 t of gypsum have been extracted from this area (Nova Scotia Department of Mines and Energy,

Department of Mines and Energy are combined tonnages from both the Miller Creek and Wentworth Creek sites (0182). Production from the original Miller Creek Quarry continued until about 1978 when minable reserves were exhausted. At that time a second quarry, the Bailey Quarry, adjacent to the first was opened. The Bailey continues to produce while the old Miller Creek Quarry is now used to dispose of impurities screened off in the crushing process. A conservative estimate of Miller Creek's production to date would be about 25 Mt. All of the gypsum produced here is taken by train 21 km west to the Company's loadout facilities at Hantsport. Company vessels as well as chartered ships then carry the gypsum to wallboard plants along the Eastern Seaboard of the United States from Boston, Massachusetts, to Houston, Texas.

Recent detailed geological mapping by Moore and Ferguson (1986) indicated that much of the Miller Creek area is underlain by highly complex, structurally deformed units of the Miller Creek Formation. Lewis and Holleman (1983) stated the following, "Frequently one or more stratigraphic members will be intersected three or four times in a vertical, 100 m drillhole. . . ." Interbedded calcium sulphates, carbonates and clastics of the Miller Creek Formation present a complex and consequently somewhat more expensive mining situation where stripping and grade control must be carefully monitored. These units are in fault contact with interbedded carbonates, clastics and calcium sulphates of the Wentworth Station, Pesaquid Lake and Murphy Road Formations which surround the Quarry area. To the northwest, 2 km away, similar fault-bound blocks of the Miller Creek Formation were the location of smaller quarries in the late 1800s and early 1900s (Moore and Ferguson, 1986).

As with the Wentworth Creek Quarry area (0182), little detailed drillhole information is publicly available on the Miller Creek area. The only exploration drilling undertaken in this vicinity was a single hole (SR1-1) put down by Scurry-Rainbow Oil Ltd. in 1966 as part of its regional sulphur exploration program (Kawase, 1967). Unfortunately the rotary drill did not core the section and only produced chip samples to determine the lithology. Considering the geological complexity of this area, the lithological log of SR1-1 is of little use in stratigraphic interpretation.

Hydration depths of the calcium sulphate horizons at Miller Creek are typical of those occurring in the Cycle 2 (B Subzone) elsewhere in the Province. As a result of enhanced permeability of these sections due to

the presence of porous interbeds and deformation related to folding, fracturing and fault zones, hydration often extends to depths in excess of 50 m below surface. The gypsum at Miller Creek is of lower purity than that at Wentworth, having up to 25% interstitial carbonate and clastic material in the calcium sulphate beds in addition to the carbonate and clastic interbeds themselves. Selective mining and beneficiation by screening after crushing results in a product suitable for the manufacture of gypsum wallboard.

Reserve calculations for Miller Creek are not available and without drillhole and analytical information it is impossible to attempt such a calculation. Fundy Gypsum probably has sufficient gypsum at Miller Creek to sustain its operations for the short term future. Other areas in the vicinity to the northeast, underlain by similar units of the Miller Creek Formation are not owned by the company nor are the gypsum rights held (King, 1985). Recent exploration by Fundy Gypsum at Dutch Settlement (0135), Halifax County, suggests that it is considering establishing a site there with additional reserves of gypsum. At the time of writing a decision regarding the Dutch Settlement property is on hold as a result of corporate financial problems.

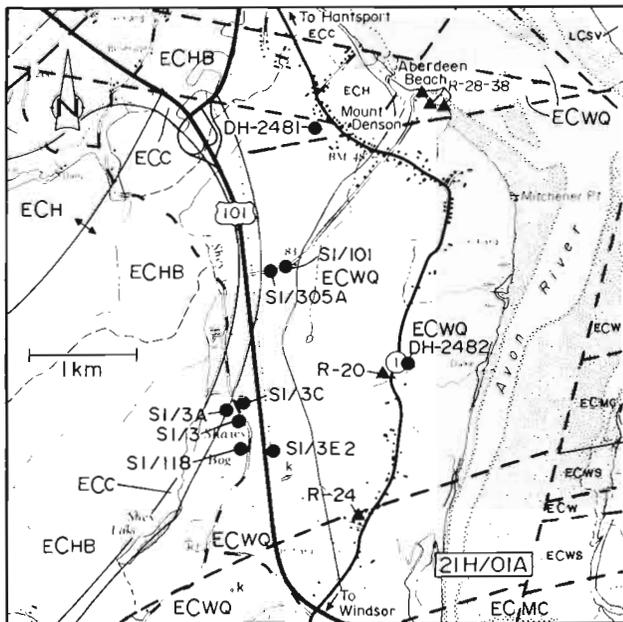
MOUNT DENSON (0005)
NTS 21H/01A
UTM 408460 E 4986540 N

Located between Windsor and Hantsport in Hants County, this occurrence area has to be divided arbitrarily due to the fact that the entire Hantsport-Windsor area is underlain by Windsor Group rocks and numerous drillholes have been completed here (Fig. 8-22). This occurrence discussion will include an area bounded on the north by an east-west fault which cuts through Mount Denson (Ferguson, 1983; Moore and Ferguson, 1986) south to the top of Shey Lake (Falmouth, 0059).

The area is generally underlain by the sulphates and minor carbonates of the White Quarry Formation of the Windsor Group which in turn are underlain by interbedded clastics of the Cheverie and Horton Bluff Formations of the Horton Group to the west. A series of faults appears to offset this sequence at regular intervals through the area. The White Quarry Formation attains thickness in excess of 200 m in the area (DH-2482) and is dominated by anhydrite (Province of Nova Scotia, 1958). Hydration appears to be surficial for the most part with some gypsum thickening in the vicinity of faults and along the White Quarry-Cheverie

contact where it has not been eroded away. Karst is generally poorly developed in this area. This is due to the fact that overburden ranges from 10-50 m in thickness.

A section of the White Quarry Formation can be observed in the northern part of the Mount Denson area, at Aberdeen Beach 2 km southeast of the Town of Hantsport, Hants County. Large exposures of high purity, light blue anhydrite overlain by white, fine grained gypsum up to 10 m in height extend 400 m along the western bank of the Avon River at this locale.



Geology modified after Ferguson, 1983, Moore and Ferguson, 1986

Figure 8-22. Location and geology of the Mount Denson occurrence area. See Figures 8-1 and 8-3 for legend and location.

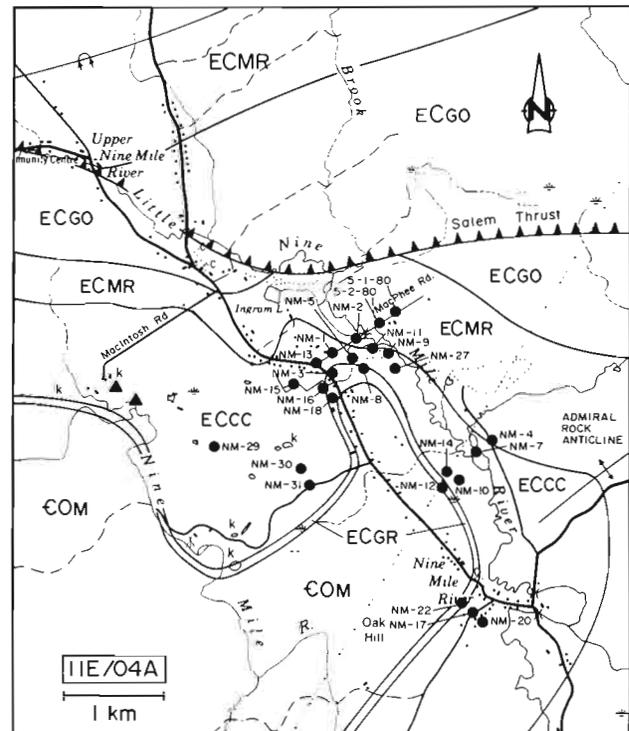
Although of economic interest due to the potential volumes of gypsum and anhydrite available, this area is traversed by Highway 101, the Dominion Atlantic Railway, Route 1 and a secondary roadway all of which would inhibit development.

NINE MILE RIVER (0139)
NTS 11E/04A
UTM 453000 E 4989500 N

The Nine Mile River occurrence area is located 12 km northwest of the Village of Elmsdale, Hants County (Fig. 8-23). It includes several areas of karst topography, minor gypsum outcrops as well as 19 drillholes which encountered gypsum and anhydrite. Drilling was carried out in 1973 as part of a base metal exploration joint venture between Jorex and Imperial Oil Ltd.

(Johnston, 1973c) and again in 1980 when L. E. Shaw drilled two shallow holes in search of sand deposits (Smith, 1981).

Geological mapping by Giles and Boehner (1982) indicated that much of this area is underlain by the Carrolls Corner Formation along the western margin of the Shubenacadie Basin. A Meguma Group high extends out into the Basin in this area (Admiral Rock Anticline) and an associated carbonate buildup Gays River Formation along this feature was the focus of the Jorex/Imperial drilling. Little outcrop information is available away from the Basin margin, however Giles and Boehner (1982) indicated a typical section of inter-bedded carbonates, sulphates and clastics of the MacDonald Road and Green Oaks Formations overlying the Carrolls Corner Formation to the north and east. Slightly to the north of this area they indicated that units of the Green Oaks Formation have overridden part of the area along the Salem Thrust Fault.



Geology after Giles and Boehner, 1982

Figure 8-23. Location and geology of the Nine Mile River occurrence area. See Figures 8-2 and 8-3 for legend and location.

Several areas of light to moderate karst topography, having small isolated sinkholes, occur in the Nine Mile River area. Well developed karst is found at the western end of MacIntosh Road where several fine grained, white gypsum heads are exposed. Drillhole information indicates that hydration along the Carrolls Corner-Gays

River Formations contact is typical with gypsum thicknesses up to 23 m overlain by similar thicknesses of overburden. Further away from the basin margin hole NM-4 may have collared near the base of Cycle 2 (B Subzone) MacDonald Road Formation (Giles and Boehner, 1979). It, along with several other holes along strike to the north-northwest, encountered thick overburden in the valley of the Nine Mile River before encountering gypsum bedrock. Two holes drilled east of the River in the immediate vicinity were completed by L. E. Shaw along MacPhee Road (Smith, 1981). Both passed through shallow overburden 10.7 m and 4.6 m, before entering gypsum. Hole 5-1-80 drilled through 6.1 m of gypsum before being stopped and hole 5-2-80 drilled 13.7 m of gypsum before stopping in gypsum.

The Nine Mile River occurrence area shows typical hydration at the base of the Windsor with potential for small high purity gypsum deposits along the contact. It also has good indications for the East Milford (0134), Halifax County, intermixed to interbedded type of deposit at the contact between the Carrolls Corner and MacDonald Road Formations. Attractive areas occur east of Nine Mile River in the MacPhee Road area. This particular area has been developed for its granular aggregate and industrial sand resources which might facilitate gypsum development in the area. Further drilling is warranted in this highly prospective area which is approximately 48 km from shipping at Halifax.

NOEL LAKE (0178)

NTS 11E/05A

UTM 443550 E 5012700 N

The Noel Lake occurrence is located 10 km north of the Village of Kennetcook, Hants County (Fig. 8-24). This area was the site of gypsum production carried out by the Noel Plaster Co. between 1906 and 1914. Several areas of karst topography, an area of gypsum outcrop as well as extensive overburden drilling in the area help to delineate those areas underlain by gypsum and anhydrite.

Nova Scotia Department of Mines, Annual Reports from the early 1900s indicated that the Noel Plaster Co. produced gypsum for export between 1906 and 1914. Jennison (1911) reported that two quarries were worked, one west of Noel Lake and a second east of the Lake. Little evidence of either site can be seen on the ground at present, although the exposures found to the east of the Lake are probably related to one of these sites. According to King (1985), all the gypsum produced at Noel was sold to J. B. King and Co. of New York with shipments made via barge out of a pier at Noel.

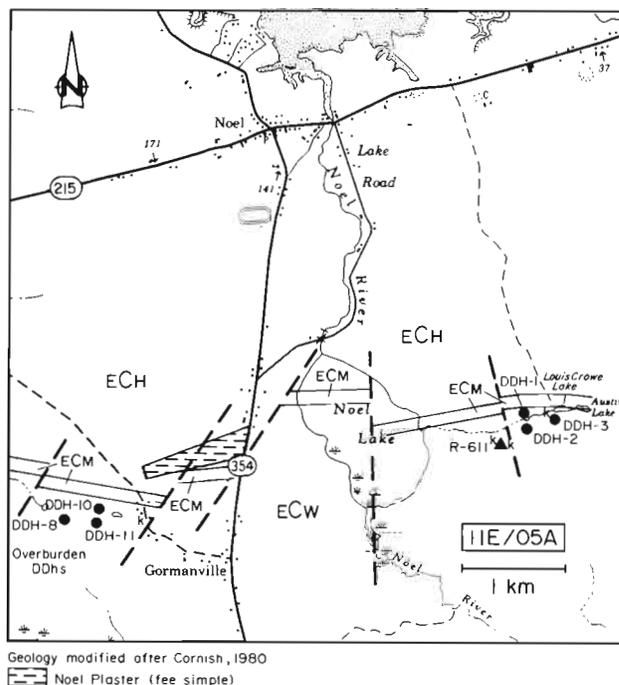


Figure 8-24. Location and geology of the Noel Lake occurrence area. See Figures 8-1 and 8-3 for legend and location.

Detailed geological mapping in this area was carried out by Shell Canada Resources Ltd. and Billiton Canada Ltd. including an extensive overburden drilling program (Cornish, 1980; Hart and Cornish, 1981; and MacGillivray, 1983). This modified the previous regional mapping of Weeks (1946b) and Stevenson (1959). Much of the Noel Lake area is underlain by a narrow, easterly trending band of Lower Windsor Group strata which dips southward. These units are offset by northerly faults and are underlain to the north by clastics of the Horton Group. They are overlain by interbedded clastics, carbonates and sulphates of the Upper Windsor Group to the south (Cornish, 1980).

The only exposures found in the Noel Lake area occur east of Noel Lake, 500 m southwest of Louis Crowe Lake where a number of heads can be found in an area of moderate to heavy karst (250 x 100 m elongate 110°). The gypsum is fine- to medium-grained, light grey and massive. Shell's (1980) holes were able to determine the nature of bedrock, however they did not extend >1-2 m into bedrock and therefore are of little use for stratigraphy on more than a gross scale (Hart and Cornish, 1981). In 1983, Billiton Canada Ltd. drilled a series of eight diamond-drill holes in the same area which substantiated the geological contacts determined by Shell (MacGillivray, 1983). Although the descriptions of the gypsum and anhydrite intervals are

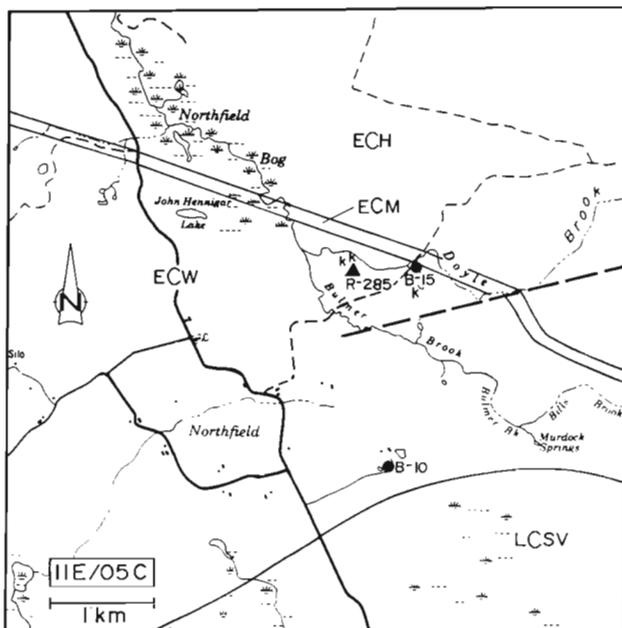
unclear, the thicker gypsum sections were intersected west of Noel Lake in holes 8, 10 and 11. Hole 8, inclined 74°, intersected 65.51 m of gypsum with minor interbeds and lenses of silty limestone overlain by 15.86 m of overburden. True thickness is estimated to be 64.9 m.

Typical of the geology along the northern flank of the Windsor Basin, the Noel Lake occurrence consists of a narrow band of gypsum/anhydrite horizons which dip steeply into the Basin. Consequently, the gypsiferous area here is of limited extent and has limited development potential. The nearest possible point of shipment would be at Walton 30 km to the west where barite from the Walton Mine was once shipped out on vessels up to 6400 t.

NORTHFIELD (0064)
NTS 11E/05A
UTM 448500 E 5011700 N

The Northfield occurrence is located 9.5 km north-northeast of the Village of Kennetcook, Hants County (Fig. 8-25). A number of small, rounded outcrops, two drillholes and several small areas of karst topography comprise all of the information available on this occurrence.

Local geology mapping by Shell Canada Resources Ltd. (Cornish, 1980) modified regional mapping by



Geology modified after Cornish, 1980; MacLeod, 1974

Figure 8-25. Location and geology of the Northfield occurrence area. See Figures 8-1 and 8-3 for legend and location.

Weeks (1946a) and Stevenson (1959). Much of the vicinity is underlain by units of the Lower Windsor Group which strike northwest-southeast through the area and dip to the southwest. These are underlain to the north and northeast by Horton Group clastics and overlain to the south by clastics of the Scotch Village Formation of the Pictou Group.

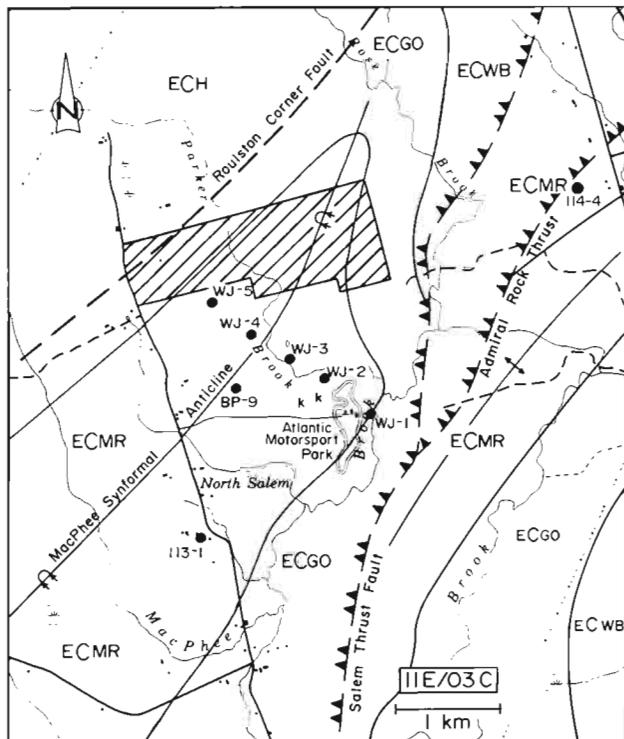
Several small (1.5 x 2 m) outcrops of fine grained, white gypsum can be found in an area of moderate karst topography located just south of Doyle Brook (Etter Brook, local name). Other areas of karst can also be seen along strike both to the southeast and northwest. Two diamond-drill holes were completed in the Northfield area by Imperial Oil Ltd. in 1974 as part of a regional base metals exploration program (MacLeod, 1974). Hole B-15, collared near the Windsor-Horton contact appears to have encountered an infilled dissolution zone above the basal Windsor carbonate. Located 1900 m into the Carboniferous basin to the south, hole B-10 encountered a section of gypsum, carbonates and thick clastics which ended in a salt bearing anhydrite unit. Stratigraphic interpretation of this hole has not yet been attempted, however this hole probably intersected a disturbed section of the bottom of the Upper Windsor Group.

Although of high purity, the gypsum seen at Northfield appears to be of very limited extent. Little economic potential exists for large scale development of this area, however a rapidly growing agricultural industry in the area could use limited volumes of material locally.

NORTH SALEM (0143)
NTS 11E/03C
UTM 464250 E 4999300 N

The North Salem occurrence area is located 8.5 km northwest of the Village of Shubenacadie, Hants County (Fig. 8-26). Small areas of karst topography can be found just northwest of the Atlantic Motorsport Park, however outcrops of gypsum or anhydrite were not located in the area. Geological information on this area comes from seven base metal exploration holes drilled by three companies between 1973 and 1975.

This area is located near the northern end of the overturned MacPhee Synformal Anticline (Giles, 1977). Giles (1977) correlated drillhole information from Denison Mines Ltd.'s five holes (WJ series) drilled in 1975 (Chan, 1975) to help determine the overturned nature of the interbedded carbonates, sulphates and clastics of the MacDonald Road and Green Oaks



Geology after Giles and Boehner, 1982
 National Gypsum (lease)

Figure 8-26. Location and geology of the North Salem occurrence area. See Figures 8-2 and 8-3 for legend and location.

Formations in this structurally disturbed area. Much of the immediate area is an overturned section consisting of the MacDonald Road Formation which is underlain by the Upper Windsor Group Green Oaks Formation which is underlain by the Watering Brook Formation of the Canso Group. Similar to the MacPhees Corner area, this entire block overrides similar units to the south and east along the Salem Thrust Fault and is also in fault contact to the northwest with older Horton Group clastics across the Roulston Corner Fault.

Imperial Oil Ltd. drilled hole BP-9 in 1973 as part of a regional exploration program (Boehner, personal communication). This hole encountered an overturned section of sulphate, carbonate and clastic horizons which probably represents the base of the MacDonald Road Formation and possibly the top of the Carrolls Corner Formation. The hole stopped at 239.9 m still in the MacDonald Road Formation. Although covered by 51.8 m of overburden and other sedimentary rocks, 56.5 m of variably impure gypsum were intersected (51.82-103.33 m). Although this may be structurally thickened, the gypsum horizon would be of economic interest up dip should it come near surface.

Hole 113-1 was drilled by St. Joseph Explorations Ltd. in 1974 as part of a regional base metal exploration program (McCulloch, 1974a). It intersected an overturned sequence and collared near the base of the MacDonald Road Formation and stopped in the upper part of the Green Oaks Formation. After passing through 17.8 m of overburden, it intersected 15.4 m of impure gypsum containing variable amounts of calcareous material.

Although only a few drillholes have been put down in the North Salem area, interesting intersections of deeply hydrated MacDonald Road Formation have been encountered. Further drilling in the vicinity of BP-9 and 113-1 could readily determine if these hydrated sections are laterally extensive. Large areas of as yet undeveloped land are located along strike to the north-northeast of these holes which might allow for mineral development. The area is approximately 60 km from possible shipping sites in the Halifax Harbour area. These factors make the North Salem area a candidate for further investigation.

PEMBROKE (0180)

NTS 21H/01D

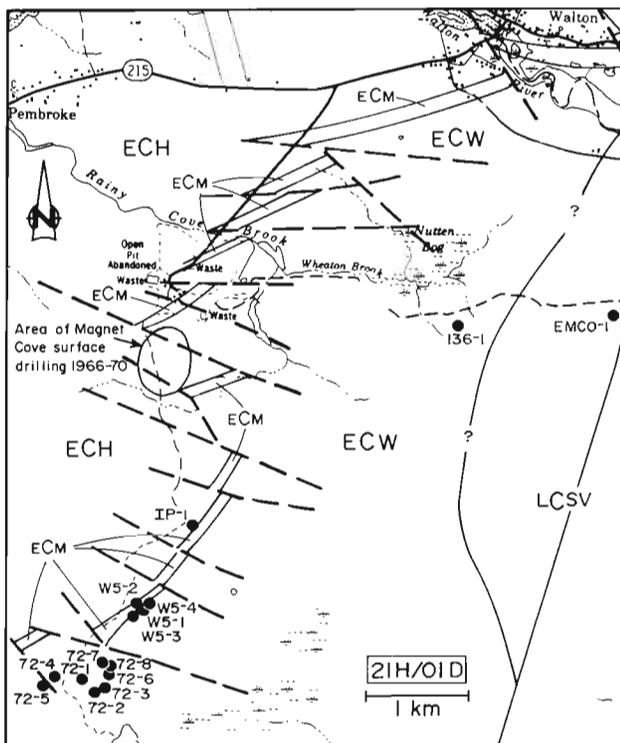
UTM 418500 E 5006000 N

The Pembroke occurrence area is located 3 km southwest of the Village of Walton, Hants County (Fig. 8-27). The Horton-Windsor contact extends both to the northeast and south of the abandoned Walton Barite Mine which lies in the midst of this occurrence area. Virtually all available data were obtained from exploration drillholes completed by numerous companies in the area.

Although no gypsum or anhydrite has been mined along this margin of the Windsor Basin, the area is best known as the location of the Walton barite-lead-zinc-copper-silver deposit as well as several manganese mines. Numerous episodes of mineral exploration drilling have been carried out in search of similar deposits in this area. Regional geological mapping by Boyle (1972) indicated a complex geological setting with highly faulted, steeply dipping to overturned structure along the Horton-Windsor contact through this entire section of the Basin. This fact is reflected in the subsurface information from the Walton Mine (Boyle, 1972) as well as from the available drill logs. In general, much of this area is underlain by undivided Windsor Group strata of interbedded clastics, carbonates, calcium sulphate and salt. These are overlain to the east and southeast by clastics of the Pictou Group Scotch Village Formation

and are underlain to the northwest and west by clastics of the Horton Group. At the base of the Windsor, the Macumber Formation has been recognized and mapped, however deep dissolution (+300 m) of the basal calcium sulphates along this contact with infilling by clastic materials makes it even more difficult to map the disrupted geology of the Lower Windsor Group.

Although thick sections of gypsum and anhydrite have been noted in drillholes in this area, virtually all are overlain by +30 m of clastic infill material. This would prevent any possible gypsum and anhydrite development in this area, therefore the calcium sulphates in the Pembroke area are of geological interest only.



Geology modified after Boyle, 1972

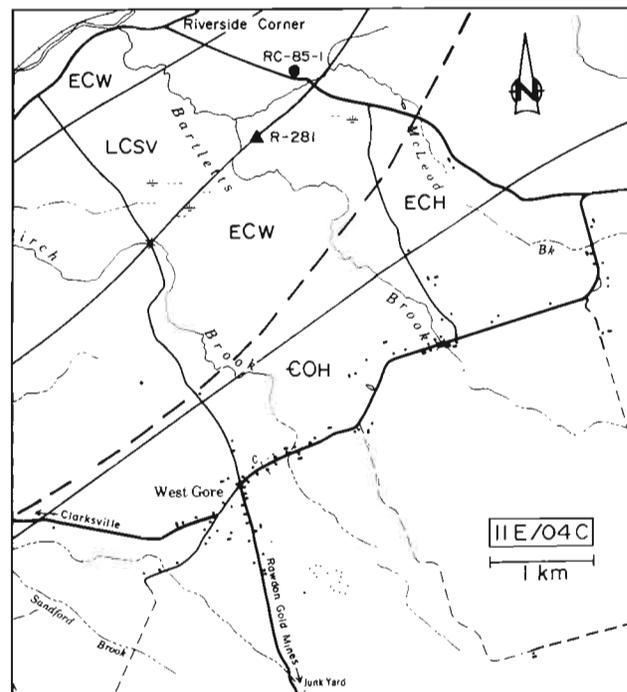
Figure 8-27. Location and geology of the Pembroke occurrence area. See Figures 8-1 and 8-3 for legend and location.

RIVERSIDE CORNER (0062)
NTS 11E/04C
UTM 438800 E 4996700 N

The Riverside Corner occurrence is located 4.5 km southeast of Clarksville, Hants County (Fig. 8-28). Mapping by Stevenson (1959) showed the area underlain by undivided Windsor Group and overlain to the northwest by clastics of the Scotch Village Formation (Canso

Group) and underlain to the southeast by clastics of the Horton Group.

Although some fine grained, white gypsum debris can be seen along a woods road on the eastern side of Bartlett's Brook, there is little surface evidence of gypsum in the area. In 1985 the Nova Scotia Department of Mines and Energy drilled hole RC-85-1 approximately 1 km northeast of the surface occurrence (Carter and Bohner, 1986). This hole encountered a complex geological section with the Canso Group Watering Brook Formation apparently faulted on top of the Scotch Village Formation of the Pictou Group. Beneath the Scotch Village a complex sequence of B and C Subzone Windsor clastics, carbonates and evaporites was encountered to a final depth of 1057.6 m. This section is described in greater detail in Nova Scotia Department of Mines and Energy, Open File Report 86-040 (Carter and Bohner, 1986).



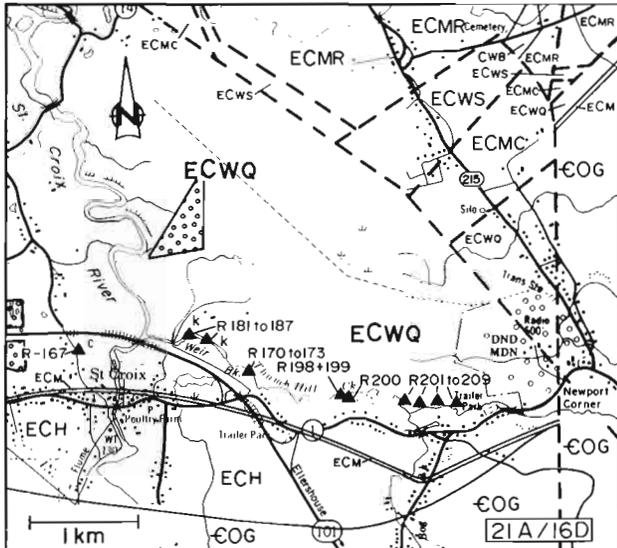
Geology after Stevenson, 1959

Figure 8-28. Location and geology of the Riverside Corner occurrence area. See Figures 8-1 and 8-3 for legend and location.

The surface sample of gypsum could possibly be either from the B or C Subzones (probably Wentworth Station or Pesaquid Lake Formations) or even the Watering Brook Formation of the Canso Group. There is little potential for economically interesting gypsum or anhydrite in the Riverside Corner area.

ST. CROIX (0025)
 NTS 21A/16D
 UTM 419800 E 4979300 N

Located 8 km southeast of the Town of Windsor, the St. Croix area extends from the St. Croix River on the west to Newport Corner on the east (Fig. 8-29). Most of the area is underlain by the sulphate dominated White Quarry Formation which is underlain by the Horton Group to the south (Moore and Ferguson, 1986).



Geology after Moore and Ferguson, 1986; Moore, 1989
 * Fundy Gypsum (fee simple)

Figure 8-29. Location and geology of the St. Croix occurrence area. See Figures 8-1 and 8-3 for legend and location.

Nova Scotia Department of Mines, Annual Reports from the early 1900s mentioned a quarry in the Ellershouse area, however no production records have been found to substantiate these reports. A small portion of this area is held by the Fundy Gypsum Company. Domtar Gypsum holds rights to another small section (Domtar Gypsum, confidential company report).

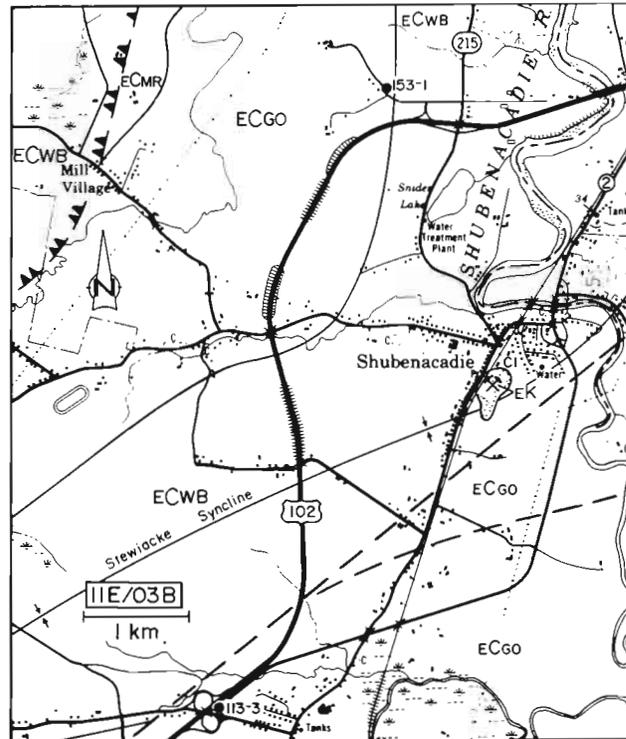
Numerous surface exposures can be found in this area especially along Weir Brook and the St. Croix River. Anhydrite dominates these outcrops with gypsum occurring along fractures and as a thin rind on the top of the anhydrite. Drilling by Domtar Gypsum in the area has substantiated this style of hydration in the middle of the area (Domtar Gypsum, confidential company report).

This area is remote enough to permit possible quarry development, however there appears to be insufficient hydration to allow substantial gypsum

reserves. Should anhydrite become a more sought after commodity then the St. Croix area will become attractive.

SHUBENACADIE (0141)
 NTS 11E/03B
 UTM 466000 E 4993000 N

The Shubenacadie occurrence area is located in the vicinity of the Village of Shubenacadie, Hants County (Fig. 8-30). Information on this area consists of two deep drillholes 6 km apart, both of which intersected gypsum and anhydrite horizons.



Geology after Giles and Boehner, 1982

Figure 8-30. Location and geology of the Shubenacadie occurrence area. See Figures 8-2 and 8-3 for legend and location.

Geological mapping by Giles and Boehner (1982) placed this area along the western side of the north-easterly trending axis of the Shubenacadie Basin. Much of the area is underlain by interbedded clastics with minor sulphates of the Canso Group Watering Brook Formation which overlies the Upper Windsor clastics, carbonates and sulphates of the Green Oaks Formation.

St. Joseph Explorations Ltd. drilled hole 113-3 for base metal in 1974 and 153-1 in 1975, in search of potash (St. Joseph Explorations Ltd., 1975). Both holes penetrated through the Green Oaks and MacDonald

Road Formations (Giles and Boehner, 1979); 113-3 stopped near the top of salt and 153-1 penetrated through the Stewiacke Formation before stopping in the basal anhydrite of the Carrolls Corner Formation at 681.8 m.

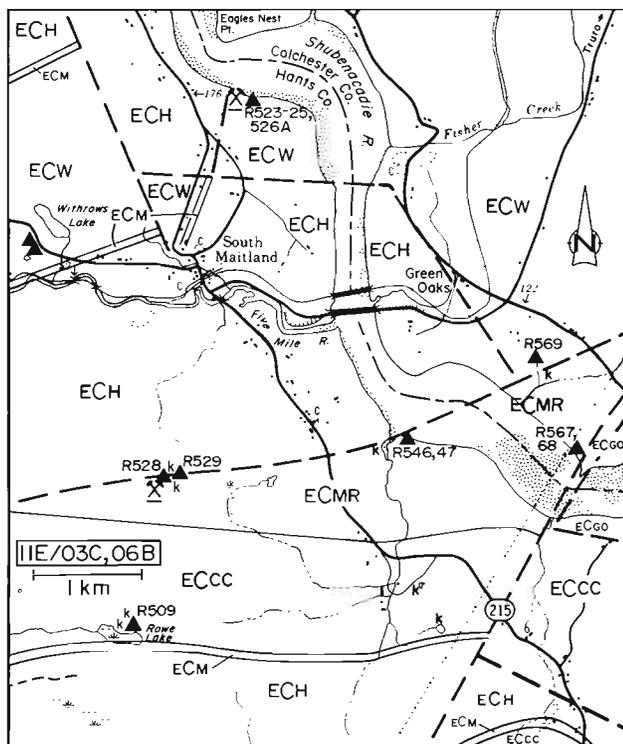
Information from these holes is of geological interest only. Continuity of sulphate horizons well into the Shubenacadie Basin as well as their relationship with the carbonate and halite units found in the deeper portions of the Basin can be observed. These observations may be useful towards basin margins where hydration of the anhydrite units of the MacDonald Road and Carrolls Corner Formations may become of economic interest (i.e. East Milford (0134), Halifax County, and related deposits).

SOUTH MAITLAND (0146)

NTS 11E/03C, 11E/06B

UTM 463440 E 5012550 N

The South Maitland occurrence area is located 17 km southwest of the Town of Truro, Colchester County (Fig. 8-31). It consists of a number of exposures including two sites where some gypsum and anhydrite appear to have been extracted at some time in the past. Approximately 19 305 t of plaster were produced at



Geology modified after Stevenson, 1958; Giles and Boehner, 1982

Figure 8-31. Location and geology of the South Maitland occurrence area. See Figures 8-1, 8-2 and 8-3 for legend and location.

Maitland between 1872 and 1879 (Nova Scotia Department of Mines, Annual Reports, 1873-1880). The most likely location for this production would be an old quarry site on the western bank of the Shubenacadie River just south of Eagles Nest Point.

This area straddles the boundary between regional geological mapping carried out by Giles and Boehner (1982) to the south and that by Stevenson (1958) to the north. Stevenson (1958) distinguished the basal carbonates Pembroke (not shown on map) and Macumber Formations and differentiated the Windsor Group into upper and lower parts. Much of the gypsum and anhydrite seen in this area belongs in the Carrolls Corner Formation with the exception of a few outcrops on both sides of the Shubenacadie River found south of the new highway bridge which Giles and Boehner (1982) placed in the MacDonald Road Formation. The area appears to be highly faulted with most contacts being faulted. Where this is not the case the sulphate-dominated Carrolls Corner Formation is underlain by the carbonates of the Macumber Formation which are underlain by Horton Group clastics.

The southernmost exposure in the South Maitland area can be found just north of Rowe Lake, where a large 7 m high head of fine grained, white gypsum can be seen. Moderate karst topography is also present to the north and west of the outcrop for a short distance. Rowe Lake is probably a dissolution feature lying along the base of the Carrolls Corner Formation. Approximately 1300 m north of Rowe Lake, an area of karst topography as well as a small abandoned quarry can be found in the woods. It appears as if some stripping had been undertaken and a small tonnage of gypsum removed, however, this site was never developed further. One possibility may be that the light grey, variably silty gypsum found here, which is probably part of the MacDonald Road Formation, was not white enough to be salable in the 1800s when gypsum was produced in this area. Similar units occur along strike to the east on both sides of the Shubenacadie River where interbedded sulphates, carbonates and clastics occur.

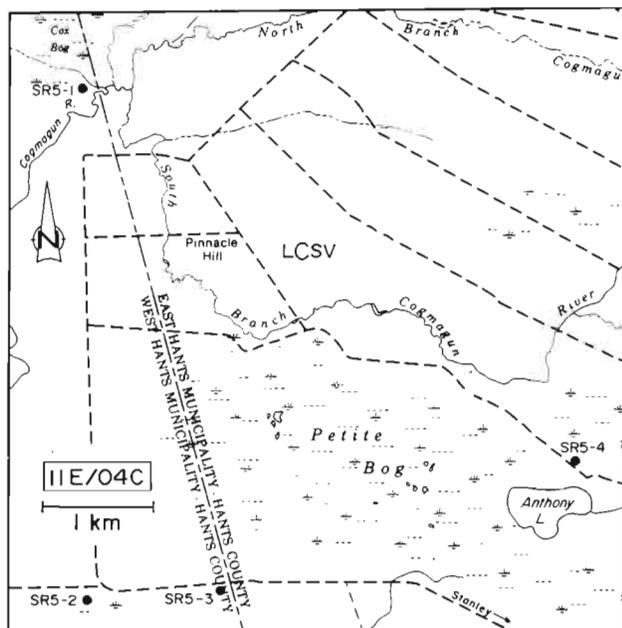
North of Five Mile River, two more outcrop areas can be found, both of which appear to belong to the Windsor Group Carrolls Corner Formation. The first is a series of rounded heads of light grey, fine grained gypsum with abundant selenitic crystals found along a steep bank 200 m southwest of Withrows Lake. The second is the old quarry site on the western bank of the Shubenacadie River. Stevenson (1958) believed this to be part of a fault-bound block of Windsor Group. The quarry is roughly horseshoe shaped, open to the north towards the River. The quarry section consists of white

to light grey, fine grained, massive to nodular, mosaic gypsum. Intermixed, light brown silt is common in part to minor throughout. Hydration appears to extend below the high tide mark. The quarry area covers approximately 3 ha and heads up to 20 m in height still remain. This thick sulphate unit is apparently underlain by a dark grey limestone, massive to laminated at base which is up to 5 m thick. The limestone is underlain by a light to medium grey, massive, selenitic gypsum and the section is concealed below. Horton Group clastics are observed across a fault 300 m northwest of the quarry area.

Despite the number and quality of gypsum exposures in the South Maitland area, it is not considered a good candidate for future development. Most of the known exposures are of the Carrolls Corner Formation and appear to be hydrated to shallow depths. Although the highly faulted geology of the area may promote deeper hydration, it also limits the lateral extent and potential minability of these units.

STANLEY (0184)
NTS 11E/04C
UTM 424000 E 4998000 N

The Stanley occurrence area is located 10 km south-southeast of the Village of Walton, Hants County (Fig. 8-32). Regional geological mapping by Stevenson (1959) indicated that the entire area is underlain by clastics



Geology after Stevenson, 1959

Figure 8-32. Location and geology of the Stanley occurrence area. See Figures 8-1 and 8-3 for legend and location.

belonging to the Pictou Group Scotch Village Formation. Gypsum has been encountered at depth in exploration drillholes.

Scurry-Rainbow Oil Ltd. drilled a series of four rotary holes in this area in 1966 as part of a regional sulphur exploration program (Kawase, 1967). Holes SR5-2 and SR5-3 penetrated through the Scotch Village Formation into interbedded clastics, carbonates, calcium sulphate and halite horizons of the Windsor Group. The drillholes were not cored and chip samples of lithologies were used to log the strata. Boehner (1986) discussed this drilling in the Stanley salt occurrence writeup.

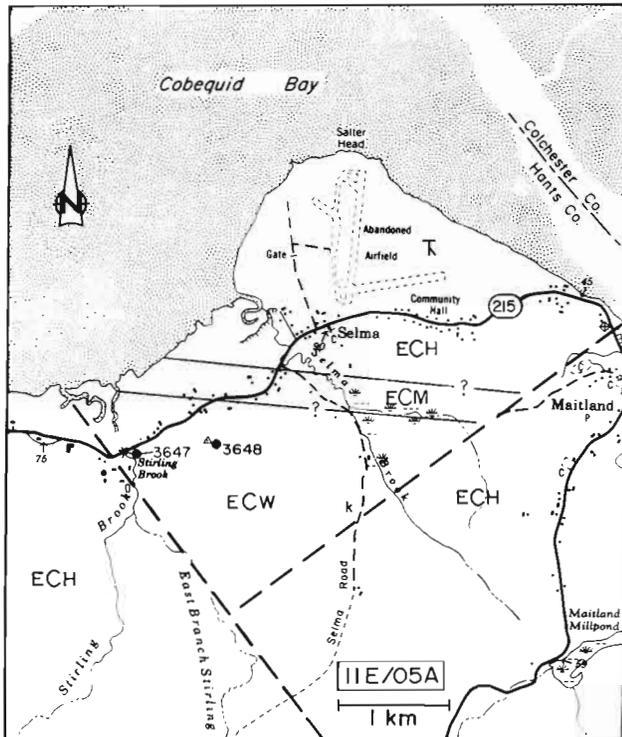
With regard to gypsum and anhydrite, the interbeds described in Scurry Rainbow's report (Kawase, 1967) are generally <10 m thick although one in hole SR5-3 is 27.4 m thick. Unfortunately, the top of this unit is at a depth of 228.6 m. This area is strictly of geological interest for gypsum and anhydrite.

STIRLING BROOK (0185)
NTS 11E/05A
UTM 456500 E 5017500 N

The Stirling Brook occurrence area is located 4 km west of the Village of Maitland, Hants County (Fig. 8-33). Regional geological mapping by Weeks (1946a) indicated that the immediate vicinity is underlain by Windsor Group strata. Outcrops are rare and one small area of moderate karst topography occurs just west of the Selma Road, 1.4 km southeast of Route 215. Two diamond-drill holes, put down by the Nova Scotia Department of Mines in 1962, intersected some gypsum and anhydrite at depth (Nova Scotia Department of Mines, 1962).

Hole 3647 (T.D. 141 m) was drilled immediately east of Stirling Brook and hole 3648 (T.D. 137 m) was drilled 800 m east of the Brook. Both encountered thick sequences of red and grey shales with thin gypsum and anhydrite interbeds. No stratigraphic interpretation of these holes appears to have been undertaken, however they were probably drilled in the Upper Windsor Group or even the Watering Brook Formation of the overlying Canso Group. Outside of the triangular block of Windsor Group as mapped by Weeks (1946a), the rest of this area is underlain by clastics of the older Horton Group.

The Stirling Brook occurrence is of geological interest only. The calcium sulphate units, seen in drilling, are thin and separated by thick clastic units. Karst topography in the area probably reflects a gypsum bed below the surface, but the limited areal extent of the karst and lack of other evidence suggests that it is small in size and holds little potential for development.



Geology modified after Weeks, 1946a

Figure 8-33. Location and geology of the Stirling Brook occurrence area. See Figures 8-1 and 8-3 for legend and location.

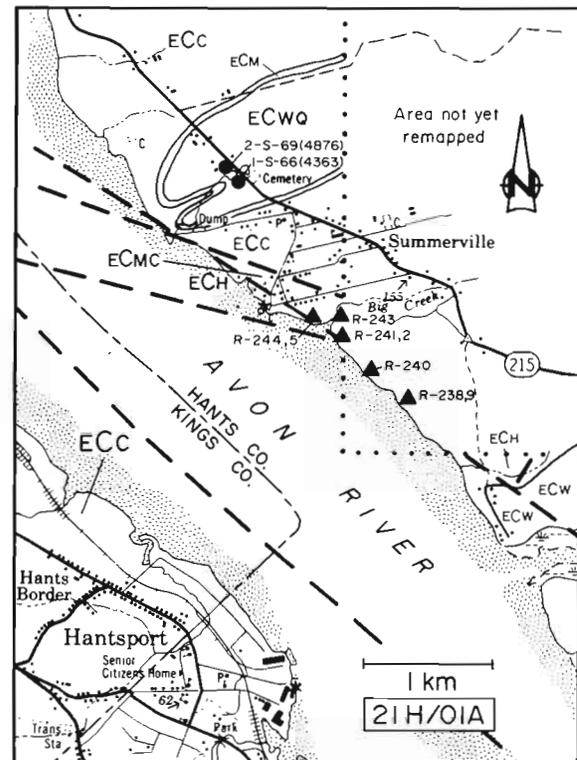
SUMMERVILLE (0053)
 NTS 21H/01A
 UTM 407100 E 4994700 N

The Summerville area is located 23 km north of the Town of Windsor, Hants County, on the eastern shore of the Avon River (Fig. 8-34). There are two separate occurrences in this area. One, in fault-bound rocks of the Miller Creek Formation, can be seen along the shore of the Avon River just south of the Village of Summerville where a number of gypsum outcrops can be seen. The second, just northwest of the Village, consists of a small basin of thick sulphates of the White Quarry Formation which are underlain by the Macumber Formation and clastics of the Cheverie Formation (Ferguson, 1983).

The gypsum outcropping along the shore was mapped by Ferguson (1983) in a highly faulted sequence with Horton Group clastics in contact with the interbedded sulphates, carbonates and clastics of the Miller Creek Formation. There appears to be little lateral extent to this section and therefore no opportunity for economic development.

The occurrence northwest of Summerville was intersected by two diamond-drill holes completed by

New Jersey Zinc Exploration Co. (Canada) Ltd. in 1966 (McMurray, 1966) and 1969 (Cunningham, 1969). Hole 2-S-69 passed through 427.8 m of sulphates before encountering the underlying Macumber Formation. The drill site area had an overburden thickness of 17.7 m and only the topmost 12.7 m of the basal sulphate was found to be gypsum. Additional work should be carried out along the White Quarry Formation-Cheverie Formation contact in the area east of these drillholes where it might be possible to develop a small quarry, should sufficient reserves exist.



Geology after Ferguson, 1983; Moore and Ferguson, 1986

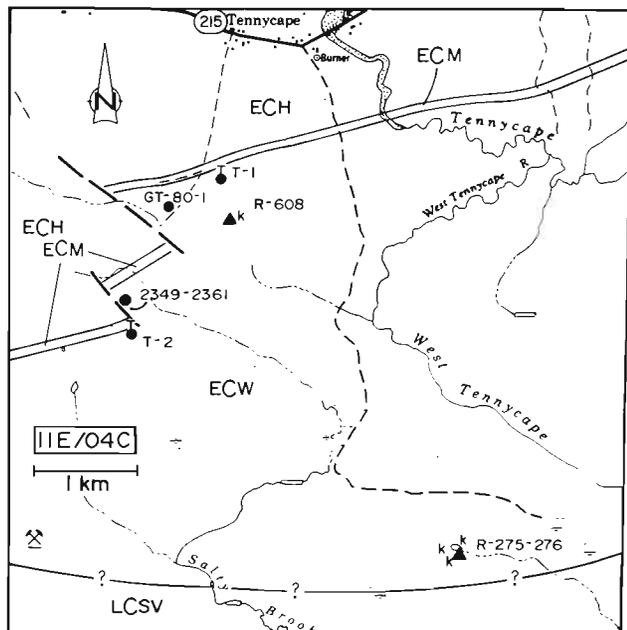
Figure 8-34. Location and geology of the Summerville occurrence area. See Figures 8-1 and 8-3 for legend and location.

TENNYCAPE (0060)
 NTS 11E/04C
 UTM 432600 E 5007800 N

The Tennycape occurrence area is located between 1 and 5 km south of the Village of Tennycape, Hants County (Fig. 8-35). Available information includes several areas of karst topography, some with outcrop, as well as a number of diamond-drill holes.

Regional geological mapping by Weeks (1946b) and Stevenson (1959) established that much of this area is underlain by undivided units of the Windsor Group. The northern boundary of the Windsor Basin runs

northeastward through the northern part of the Tennycape area and it deepens to the south. These units are underlain by Horton Group clastics to the north and are overlain by much younger clastics of the Pictou Group Scotch Village Formation to the south. Due to the lack of outcrops in the area, Stevenson's (1959) Windsor/Scotch Village boundary is uncertain. Drillhole evidence in an area just to the south suggests that the geology of this portion of the basin may be structurally complex.



Geology modified after Weeks, 1946b; Stevenson, 1959

Figure 8-35. Location and geology of the Tennycape occurrence area. See Figures 8-1 and 8-3 for legend and location.

Two widely separate exposures of gypsum have been found in this area; both appear to have been quarried, on a small scale, for local use at some time in the past. A small face 7 x 3 x 10 m can be found 1900 m south-southwest of the bridge over the Tennycape River on Route 215. Here, light to medium grey, medium- to coarse-grained gypsum is found on the northern side of an area of light karst 50 m north-south by 100 m east-west. The second area is found 3800 m to the south-southeast where gypsum heads can be seen immediately south of two east-west elongate ponds. An area of moderate to heavy karst covers approximately 2 ha south of the ponds. At the northeastern corner of the karst area, heads up to 8 m high and 20 m long contain white to light brown, fine grained, high purity gypsum.

B. A. Parsons Ltd. used a Nova Scotia Department of Mines drill to explore for gypsum at Stevens Mountain (historical name) in 1956 (Province of Nova

Scotia, 1957c). Thirteen holes were put down, eight of which hit bedrock. The best hole (2354) collared and stopped in grey gypsum at a depth of 30 m. Accurate locations are not available for these holes, but they are believed to be located near the Windsor-Horton boundary. In 1978, Preuvier Mines Ltd. drilled two inclined diamond-drill holes (T-1 and T-2) which collared in the Windsor and penetrated into the Horton Group along the northern margin of the Basin. Both intersected gypsum and anhydrite sections, however these are overlain by clastic horizons of 20 m or greater thickness (Hudgins, 1978). Gulf Minerals Canada Ltd. also drilled an inclined exploration drillhole (GT-80-1) in the area in 1980 (Boyd, 1981) which encountered 84.3 m of gypsiferous section overlain by 30.9 m of overburden. The true thickness and purity of the section is unknown as it is in part anhydrite.

Insufficient information is presently available to properly assess the potential of the Tennycape area for gypsum and anhydrite. The evidence indicates that some blocks of high purity gypsum can be found near surface, however the complex structure would probably hinder the discovery of extensive bodies of gypsum that might be quarried on a large scale. Further work should be undertaken to determine the extent of resources adjacent to those known exposures. The nearest point of shipment is located at Walton which is 10 km to the west.

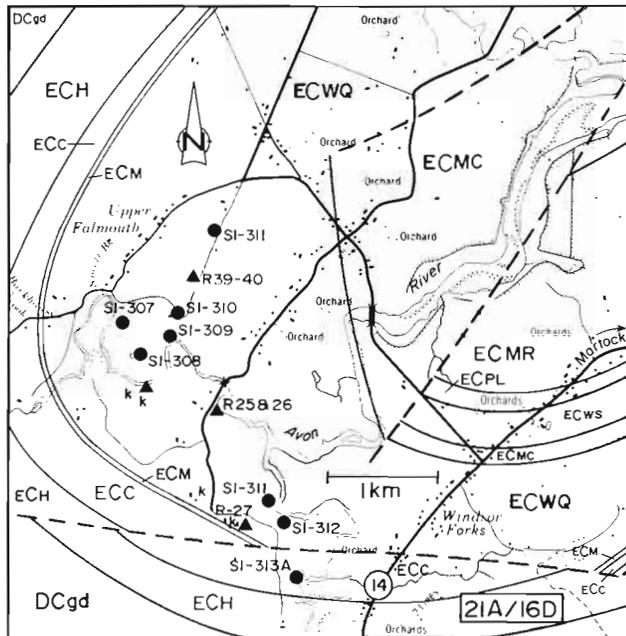
THREE MILE PLAINS (0009)

NTS 21A/16D

UTM 410870 E 4978945 N

This area is located 2.5-3 km south-southeast of the Town of Windsor, Hants County, and extends from Martock in the west to the Gypsum Mines area in the east (Fig. 8-36). Bedrock is dominated by the White Quarry Formation which is overlain by the Miller Creek, Wentworth Station and Pesaquid Lake Formations to the north and west and underlain by Horton Group rocks to the south.

A limited number of drillholes (Saarberg Interplan Canada Ltd., confidential files) have penetrated the sulphate section in the area; they indicate that a thickness in excess of 170 m is attained, most of which is anhydrite. Numerous outcroppings and minor karst can be seen here as can several abandoned quarries, the DeWolfe Quarry on Lebreau Creek, the Parsons and Meadow Pond Quarries beside the 101 Highway and the Wilkins and Windsor Plaster Quarries. Quarries still under operation in part of the area are the Wentworth Dark Quarry and Quarry 4A of the Fundy Gypsum Company's Wentworth Creek operations (0182).



Geology after Moore and Ferguson, 1986

Figure 8-39. Location and geology of the Upper Falmouth occurrence area. See Figures 8-1 and 8-3 for legend and location.

URBANIA (0145)
NTS 11E/03C

UTM 467000 E 5006000 N

The Urbania occurrence area is located 10 km northwest of the Town of Stewiacke, Colchester County (Fig. 8-40). No drillhole information is available on the sulphate horizons in Windsor Group in this area, however extensive outcrops as well as karst topography can be found on both sides of the Shubenacadie River.

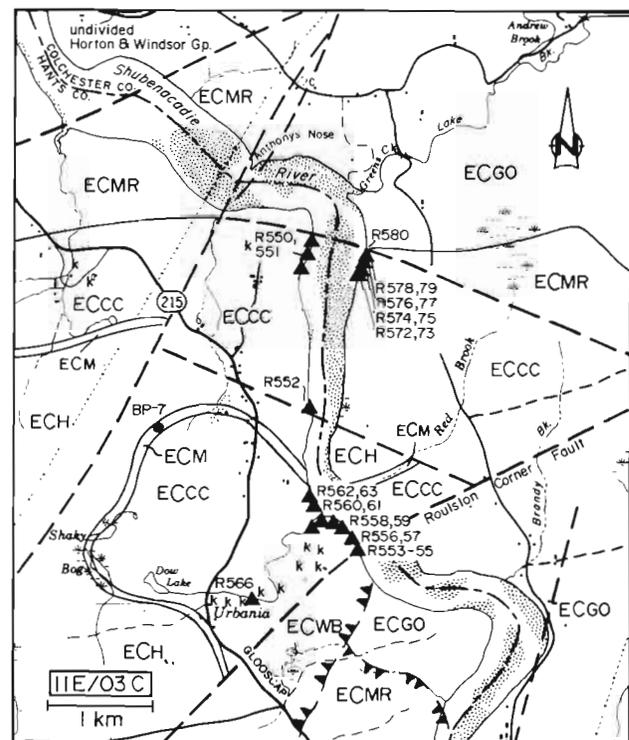
Regional geological mapping by Giles and Boehner (1982) indicated that much of this area is underlain by the sulphate dominated Carrolls Corner Formation. Many of the contacts noted by Giles and Boehner (1982) are faulted along northwest-southeast or northeast-southwest faults. The Carrolls Corner Formation is underlain or in fault contact with clastics of the Horton Group to the west and in fault contact with interbedded carbonates, clastics and sulphates of the MacDonald Road and Green Oaks Formations to the north and east. Finally, the Carrolls Corner Formation is also believed to be in fault contact to the south with the much younger Watering Brook Formation of the Canso Group across the Roulston Corner Fault.

Extensive karst topography with common gypsum heads can be found between Route 215 and the Shubenacadie River in the southern portion of this area. Gypsum and anhydrite are also exposed along the River

at this point. Most of the gypsum is fine grained, white with minor intermixed dark grey carbonate material. The anhydrite is generally light blue grey, fine grained and massive. Outcrops are generally low lying with occasional heads up to 5 m high and can be continuous over distances of up to 200 m. Usually only the upper one-third of exposed outcrops is seen to be hydrated to gypsum.

In the northern portion of the Urbania occurrence area, a discontinuous outcrop area approximately 340 m long can be found along the eastern side of the Shubenacadie River. Outcrops consist of fine grained, white gypsum, with some remnant blocks of light blue, fine grained anhydrite, overlying massive, fine grained, light blue anhydrite. Small, white, borate nodules are locally abundant along the exposure. Dark grey limestone is commonly intermixed with the gypsum and anhydrite and where still intact limestone interbeds appear to be flat lying. Selenitic zones, which possibly represent fault zones, are also present. Where the anhydrite is fine grained and massive, only the top third of the outcrop is hydrated to gypsum.

The sulphates here are massive and very pure and appear to belong to the Carrolls Corner Formation. However, hydration in outcrop is restricted to the



Geology after Giles and Boehner, 1982

Figure 8-40. Location and geology of the Urbania occurrence area. See Figures 8-2 and 8-3 for legend and location.

uppermost surface of the thick basal sulphate. Deeper hydration is in evidence along the basal contact and near major faults, but is not extensive enough to yield economically interesting volumes of gypsum. High purity gypsum and anhydrite, as well as borate nodules, should make this area of greater interest to mineral collectors and stone carvers.

WALTON (0179)

NTS 11E/04C

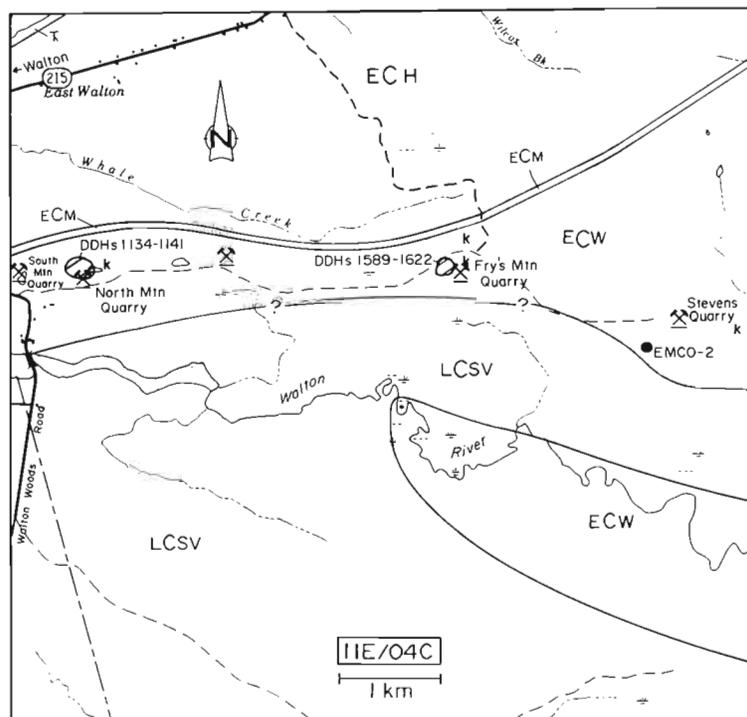
UTM 426600 E 5008500 N

The Walton occurrence area extends east from the Village of Walton for a distance of 7 km along the Horton-Windsor contact (Fig. 8-41). This area was actively quarried for a period of about 150 years between the early 1800s and 1966 when activities finally ceased.

Available historical documents are incomplete in recording the production of gypsum and anhydrite from the Walton Quarries prior to 1872. Jennison (1911) indicated that gypsum had been produced for export in the area for a century prior to his investigations. Actual production figures are difficult to determine because they were combined with production from quarries in the Cheverie area. Several different companies ran the Quarry operations over the years (King, 1985). National Gypsum Canada Ltd. was the last operator between 1936 and 1971 when a number of different sites were quarried in the area. Early production centred around the North and South Mountain Quarries located just east of the Walton Woods Road until 1948 when a new quarry was opened 800 m east of these Quarries. Two years later another quarry was opened at Frys Mountain 3.2 km east of the original quarries and by 1952 all production from the Walton area was coming out of Frys Mountain. Finally,

a small quarry (Stevens Quarry) was developed 1.6 km east of Frys Mountain in 1957.

National Gypsum began producing gypsum at East Milford (0134), Halifax County, in the late 1950s and gradually reduced production elsewhere. By 1965, all gypsum production at Frys Mountain ceased and only anhydrite continued to be produced from the North Mountain Quarry. Finally in 1971, all large-scale production of gypsum and anhydrite ceased in the Walton Quarries. Since that time, small amounts of material have been taken from waste piles for local use as road fill.



Geology modified after Stevenson, 1959

Figure 8-41. Location and geology of the Walton occurrence area. See Figures 8-1 and 8-3 for legend and location.

Regional geological mapping of the area by Stevenson (1959) indicated that the northern edge of the Windsor Basin runs roughly east-west through the Walton area, turning to the northeast past Frys Mountain. More recent work (Boyle, 1972) suggested that the Horton-Windsor contact geology is more complex along this edge of the Basin. Much of the area is underlain by the calcium sulphate-dominated units of the Lower Windsor Group which overlie the carbonate Pembroke and Macumber Formations to the north. These in turn overlie clastics of the

Horton Group. Clastics of the Late Carboniferous Scotch Village Formation of the Pictou Group unconformably overlie the Windsor strata to the south, however a lack of outcrop or drillhole information in this area makes it difficult to accurately locate the contact.

Significant areas of karst topography can be found adjacent to all the old quarry sites at Walton. The largest is immediately east of the Stevens Quarry where heavy to moderate karst with rounded exposures extends several hundred metres east of the Quarry. Several drill-

ling programs have been undertaken in this area in the past; two in the areas of the quarries to delineate reserves and one to explore for barite. Eight holes were put down by National Gypsum in the North Mountain Quarry in 1946 (DDHs 1134-1141) (Province of Nova Scotia, 1947a); and, in 1950, the company drilled 34 holes in the area of the Frys Mountain Quarry (DDHs 1589-1622) (Province of Nova Scotia, 1951). Finally, in 1969 the Magnet Cove Barium Corp. drilled a single hole just southwest of the Stevens Quarry (EMCO-2) (Magnet Cove Barium Corp. Ltd, 1967-1969).

Most of these holes encountered interbedded gypsum and anhydrite with clay, limestone and shale units. Lacking exact locations and elevations, it is impossible to construct geological sections from National's drilling, however field observations indicate that numerous interbeds of carbonates and fine grained clastics as well as anhydrite must have made large scale gypsum quarrying difficult at Walton.

Although much of the quarried area at Walton contains interbedded carbonate and clastic horizons and significant remnant anhydrite lenses, not enough is known about the stratigraphy and structural geology of the area to rule out its development potential. Additional drilling should be undertaken at Walton to determine whether reserves exist which might be amenable to a large scale mining operation. Possible shipments can be made out of the wharf at Walton which could accommodate vessels up to 6400 t.

WALTON RIVER (0181)
NTS 11E/04C
UTM 433000 E 5005640 N

The Walton River occurrence area is located 10 km southwest of Walton, Hants County (Fig. 8-42). Stevenson (1959) mapped this area as an erosional 'window' underlain by Windsor Group strata which are surrounded (and overlain) by much younger clastics of the Pictou Group Scotch Village Formation. Outcrops are very sparse over this area and, even with the evidence from 13 widely spaced drillholes, geological contacts are assumed.

Magnet Cove Barium Corp. Ltd. drilled a series of five holes in this area in 1969 in search of base metals (Magnet Cove Barium Corp. Ltd. 1967-69). Holes WRX-1 to WRX-4 were all shallow and exact collar locations are unknown. Hole WR-1 was drilled to a depth of 609 m where it stopped in salt. Gulf Minerals Canada Ltd. drilled eight holes in this area in 1975 as

part of a regional base metal exploration program (Carpenter, 1975). Bohner (1977a) undertook a stratigraphic interpretation of the deepest of these holes (GM-5) which penetrated to a depth of 287 m and bottomed in salt. He concluded that this hole contained a faulted and tightly folded sequence containing a single section which is repeated a total of 12 times. Bohner (1986) suggested that this unit belongs to the B Subzone and that the structure may be related to gravity sliding. Details of the stratigraphy of the other drillholes are unknown, however the interbedded cyclic sequences of carbonates, redbeds and evaporites are typical of Cycles 2 to 5. Further information on the area can be gained from Bohner (1986).

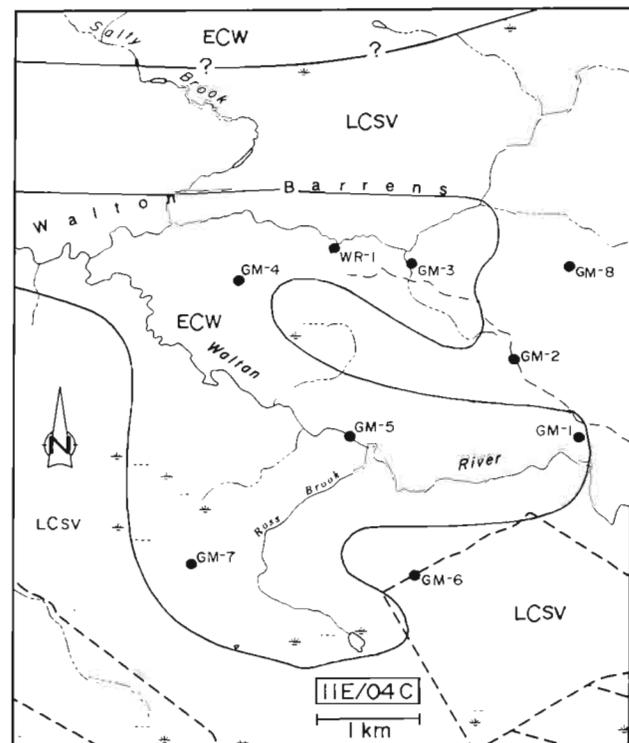


Figure 8-42. Location and geology of the Walton River occurrence area. See Figures 8-1 and 8-3 for legend and location.

Most of the drillholes put down in the Walton River area encountered some gypsum and anhydrite. Unfortunately, most of these intersections are thin, steeply dipping and were made at depth. The most interesting hole was GM-3 where 14.6 m of gypsum is overlain by a similar thickness of overburden (Carpenter, 1975), however the structural complexity of the area as well as lack of other surface or subsurface evidence make this area a poor exploration target. The Walton River occurrence area is of geological interest only.

WENTWORTH CREEK (0182)
 NTS 21A/16D
 UTM 414000 E 4982000 N

Lewis and Holleman (1983) stated that quarries located at Wentworth Creek, Hants County, 3 km east of the Town of Windsor (Fig. 8-43) have produced gypsum and anhydrite for over 150 years, however, production records, as well as ownership details, are not clear before the early 1900s.

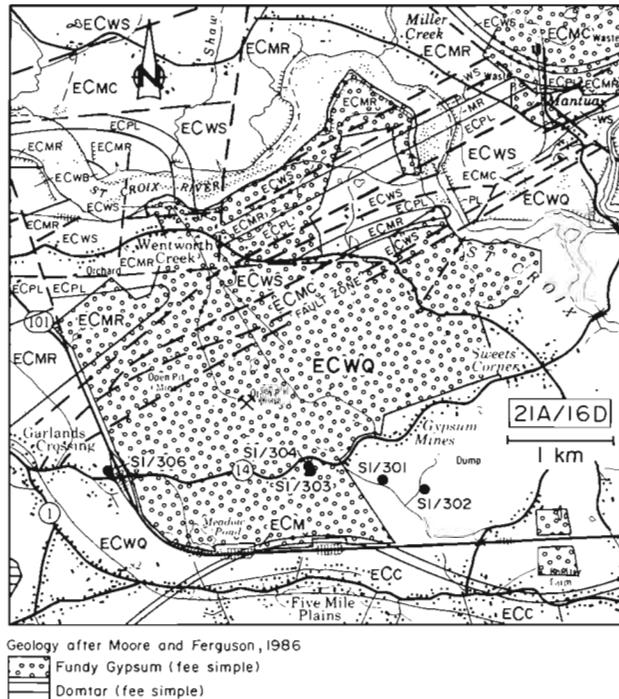


Figure 8-43. Location and geology of the Wentworth Creek occurrence area. See Figures 8-1 and 8-3 for legend and location.

Prior to 1875 operations here were run by the Wentworth Gypsum Co. which became the Canadian Gypsum Co. in 1926 and subsequently the Fundy Gypsum Company Ltd. in 1962 (King, 1985). Intermittent records, as well as several quarries in the same area reported by the same company, made production figures even more difficult to determine, although a total figure in excess of 25 Mt would be conservative.

Production continues today under the Fundy Gypsum Company Ltd. Most of the gypsum produced by Fundy is from a newer quarry located 4 km to the northeast at Miller Creek (0183). The Wentworth Creek Quarries still produce high purity white gypsum for specialty plasters and anhydrite products for agriculture and cement industries. The Wentworth operation is unusual in that a heavy media liquid sink-float plant is

used to separate gypsum from anhydrite. Although production figures are unclear because totals are combined with those of the Miller Creek Quarry before being reported to the Department, the Wentworth Quarries produce about 200 000 t of gypsum and anhydrite each year. Products are transported from the site by rail 16 km to the Company's loadout facilities at Hantsport. Company owned and chartered vessels carry gypsum and anhydrite to various points in the United States from Boston, Massachusetts, to Houston, Texas.

Recent geological mapping by Moore and Ferguson (1986) indicated that much of the Wentworth area is underlain by the calcium-sulphate dominated White Quarry Formation. These units are underlain at depth by the basal Windsor carbonate Macumber Formation which is in turn underlain by clastics of the Horton Group. The White Quarry Formation is in fault contact with the overlying interbedded clastics, carbonates and calcium sulphate bearing Miller Creek and Wentworth Station Formations. Although these Formations are complexly deformed, some portions of them have been mined for gypsum at Wentworth Creek in the past.

In spite of the long history of gypsum and anhydrite production in this area there has been an absence of any other mineral exploration over the lands owned by Fundy Gypsum. Although some theses pertaining to certain carbonate horizons found in the quarried areas are available to interested parties, geological reports or deep drillhole records are not available. Some shallow drilling was carried out in the area by government drills in the 1910s and 1920s, however these are of little use in defining the detailed geology of the White Quarry and Miller Creek Formations because the holes exact locations and collar elevations are unknown.

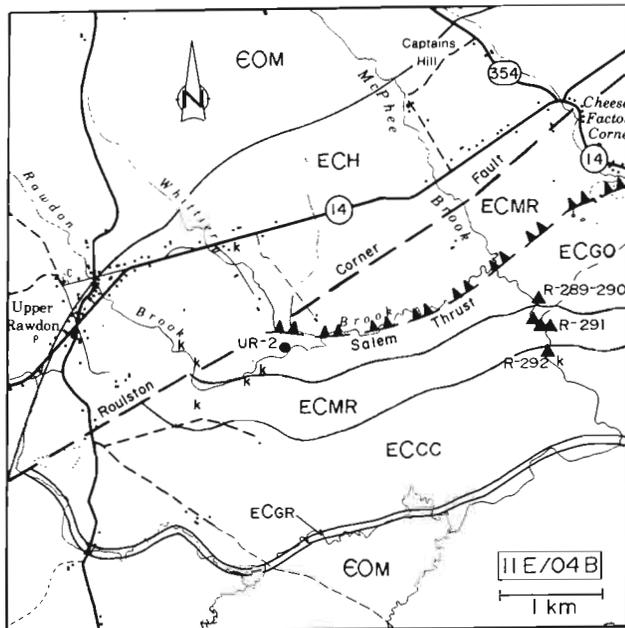
Typically, hydration of the massive calcium sulphate horizons of the White Quarry is limited to depths of a few metres down to 20 m as observed in other areas. This can increase to depths in excess of 50 m in conjunction with faulting or porous interbedded horizons. Although the volumes of gypsum available in these units cannot be estimated, the gypsum quality is known to be of high purity and white in colour which is similar to McKay Section (0056).

Gypsum reserve estimates at Wentworth in Fundy Gypsum's Quarry are unavailable, however it is probable that there is sufficient high purity stone to maintain current low rates of production for many years to come. Anhydrite reserves available beneath the Quarry floor would easily exceed 150 Mt based in part on using deep drilling carried out by Saarberg Interplan Canada Ltd. just south of the Quarries to approximate the thickness

of the White Quarry Formation (Nova Scotia Department of Mines and Energy, confidential reports). It is unlikely that there will be large scale development of this anhydrite resource in the foreseeable future.

WHITTIER BROOK (0066)
NTS 11E/04B
UTM 448300 E 4990400 N

The Whittier Brook occurrence consists of two small areas of moderate karst topography and small outcrops (Fig. 8-44). These are located 1.2 km southeast and 4.0 km east of the Village of Upper Rawdon, Hants County.



Geology after Giles and Boehner, 1982

Figure 8-44. Location and geology of the Whittier Brook occurrence area. See Figures 8-2 and 8-3 for legend and location.

The area is believed to be underlain by the Green Oaks, MacDonald Road and Carrolls Corner Formations of the Windsor Group. These are underlain to the south by Meguma Group metasedimentary rocks and are in fault contact with Horton Group clastics to the north (Giles and Boehner, 1982).

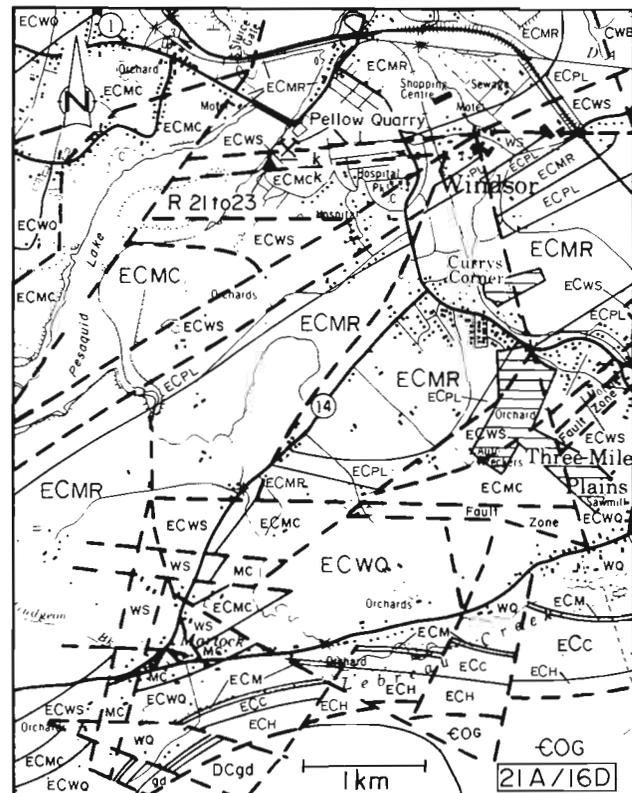
One diamond drillhole, UR-2, was completed for Rio Tinto Canadian Exploration Ltd. in the western end of the Whittier Brook occurrence area (Shewman, 1973d). The hole, collared in the interbedded clastics and carbonates of the Green Oaks Formation, passed through a fault reduced section of sulphate-rich MacDonald Road Formation, through +310 m of the sulphate dominated Carrolls Corner Formation, through

the Macumber Formation and stopped at 422.76 m in clastics of the Horton Group. It would appear that the areas of karst at Whittier Brook reflect the underlying units of the MacDonald Road Formation. The Carrolls Corner Formation outcrops along the Brook in the eastern portion of this area. Hydration is shallow with gypsum and anhydrite exposed in cliffs 3-5 m high along the western side of the Brook.

Although this area is distant from shipping terminals it does warrant some additional investigation. The depth of hydration and lateral extent of these units in the immediate area could be established by a small drilling program.

WINDSOR (0006)
NTS 21A/16D
UTM 409620 E 4982100 N

The Windsor occurrence area is found within the limits of the Town of Windsor, Hants County (Fig. 8-45). It includes a number of small exposures of gypsum in the area of the Haliburton House Museum and along the valley of Pesauqid Lake. This area includes a past



Geology after Moore and Ferguson, 1986

□ Domtar Gypsum (fee simple)

Figure 8-45. Location and geology of the Windsor occurrence area. See Figures 8-1 and 8-3 for legend and location.

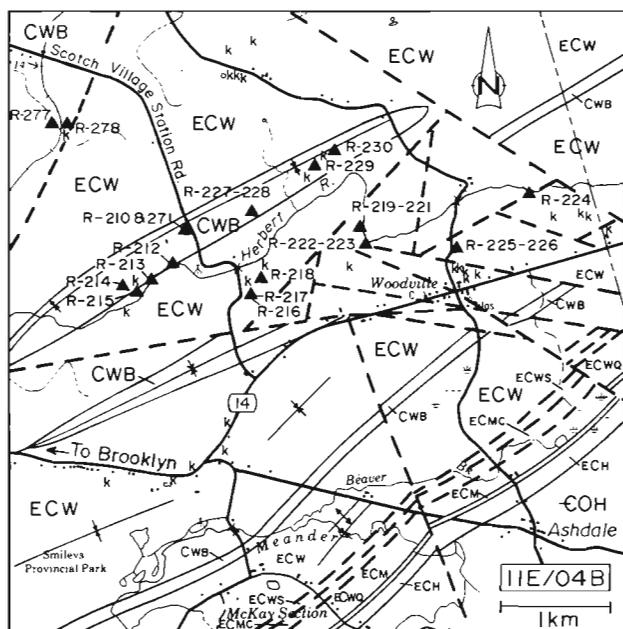
producer. Jennison (1911) mentioned the Pellow Quarry, abandoned in 1911, which produced '500,000 tons'.

Recent geology mapping Moore and Ferguson (1986) indicated that this area is structurally complex, underlain by fault-bound blocks of interbedded gypsum, carbonates and clastics of the Miller Creek and Wentworth Station Formations of Cycle 2 (B Subzone) and the Murphy Road Formation of the Upper Windsor Group.

Little or no economic interest exists in this area.

WOODVILLE (0026)
NTS 11E/04B
UTM 423700 E 4987000 N

The Woodville area is located 5 km northeast of the Village of Brooklyn, Hants County (Fig. 8-46). A recently published preliminary geology map of the area



Geology after Moore, 1986

Figure 8-46. Location and geology of the Woodville occurrence area. See Figures 8-1 and 8-3 for legend and location.

(Moore, 1986) showed moderate deformation with a series of synclines, anticlines and many faults. The underlying rocks are dominated by the Wentworth Station, Pesaquid Lake and Murphy Road Formations of the Windsor Group (included in undivided Windsor Group on Figure 8-46) as well as the Watering Brook Formation of the Canso Group (Moore, 1986).

Most of the gypsum outcrops found in this area have been mapped by Moore (1986) as belonging to either the Pesaquid Lake or Watering Brook Formations. The most extensive area of karst topography lies south of the Herbert River and east of the Scotch Village Station Road.

This area warrants further investigation as a potential location for a small sized gypsum deposit. Some previous drilling (Moore, personal communication) north of Herbert River encountered much interbedded red siltstone between gypsum beds in the Watering Brook Formation.

Domtar Gypsum holds gypsum rights on a small block of land on the western end of this area (Domtar Gypsum, confidential company report). Other companies have worked in the area in the past, but presently do not hold any rights.