

CHAPTER 11. RICHMOND COUNTY

LEGEND	
RIVERSDALE GROUP	
LCR	Undivided (LCR): siltstone, sandstone, shale, coal, limestone
LCSM	<i>SILVER MINE FORMATION</i> (LCSM): grey-green and grey sandstone with coaly debris, grey-green and red mudstone and siltstone with rare coal
CANSO GROUP	
CC	Undivided (E-LCC): mudstone, shale, sandstone, conglomerate, limestone
CML	<i>MACKEIGAN LAKE FORMATION</i> (E-LCML): grey shale and siltstone with gypsum, anhydrite, red shale and minor limestone and breccia
WINDSOR GROUP	
ECW	Undivided (ECW): red siltstone, mudstone, sandstone, shale, conglomerate, gypsum, anhydrite, halite
ECU	<i>UIST FORMATION</i> (ECU): red siltstone and minor conglomerate with intercalated marine limestone and dolostone and minor gypsum and anhydrite
~~~~~ disconformity ~~~~~	
<b>ECLL</b>	<i>LOCH LOMOND FORMATION</i> (ECLL): gypsum and anhydrite with red siltstone, sandstone and conglomerate and thin marine carbonate beds; rhythmic alternation and rapid facies change of these rock units are typical
<b>ECE</b>	<i>ENON FORMATION</i> (ECE): gypsum, anhydrite, limestone, with minor dolostone, intercalated with red siltstone, sandstone and conglomerate; rhythmic alternation and rapid facies change of these units are typical
~~~~~ disconformity ? ~~~~~	
ECC	Undivided basal conglomerate: red with minor grey-green conglomerate, sandstone and shale with minor nodular limestone; in part equivalent to basal Windsor Group (Subzone A - Major Cycle 1); in the area south of Loch Lomond it may include conglomeratic facies of the Horton Group, in the Enon area it may include conglomerate laterally equivalent to the Enon or Loch Lomond Formations or both
HORTON GROUP	
ECH	Undivided (ECH): medium to dark grey shale, siltstone, and fine grained sandstone
DC	Undivided DEVONO-CARBONIFEROUS ROCKS: grey and minor red sandstone, shale, mudstone and conglomerate; highly indurated, deformed and locally with fracture cleavage
FOURCHU GROUP	
HF	Felsic and mafic tuff, basalt, andesite, rhyolite, slate, quartzite, chlorite schist, metawacke
H-Cgt	Hadrynian to Ordovician granitoid rocks

after Weeks, 1964; Boehner and Prime, 1985

Figure 11-1. Geological legend for Richmond County gypsum and anhydrite occurrence maps.

SYMBOLS	
Gypsum or anhydrite outcrop	▲
Karst topography	k
Rock sample location	R-253
Drillhole location	J-207
Geological contact	———
Fault	- - - - -
Thrust fault, barbs point down dip	-▲-▲-▲-
Quarry, active	⊗
Quarry, abandoned	⊗
Anticline	∩
Syncline	∪
Unconformity	+ + + + +

Figure 11-1. Continued.

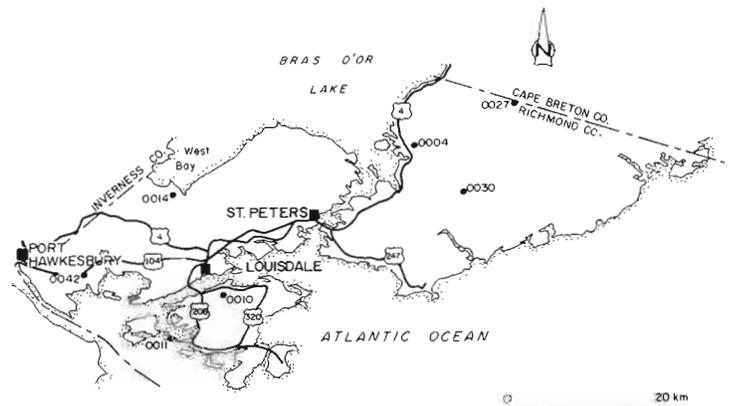
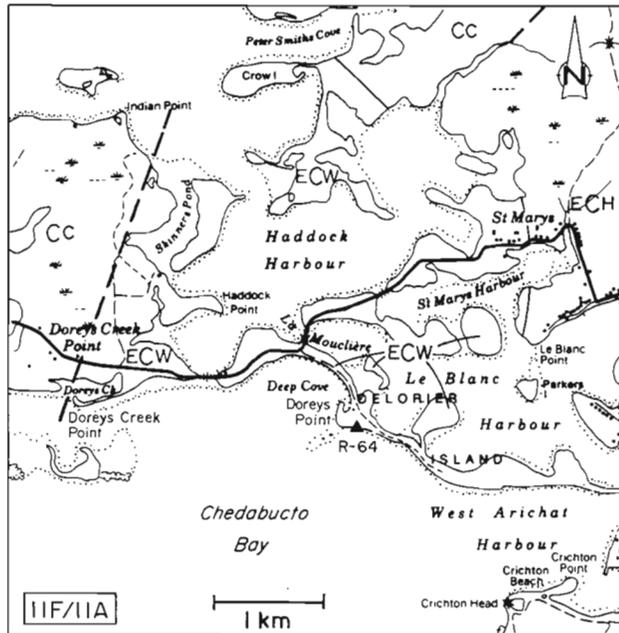


Figure 11-2. Location map for Richmond County gypsum and anhydrite occurrences by reference number.

DOREYS POINT (0011)
NTS 11F/11A
UTM 646580 E 5042935 N

The Doreys Point occurrence is located 10 km south-southwest of Louisdale, Richmond County (Fig. 11-3). It consists of several blocks of light grey, selenite gypsum with intermixed carbonate material. These are found in a small headland which juts out into Chedabucto Bay.

Regional mapping by Collins (1962) suggested that this area is underlain by undivided Windsor Group units. This occurrence is of geological interest only.



Geology modified after Collins, 1962; Keppie, 1979

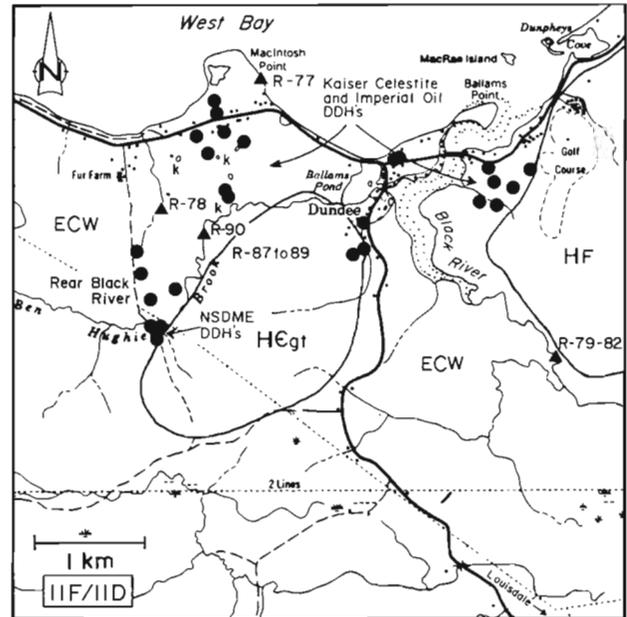
Figure 11-3. Location and geology of the Doreys Point occurrence area. See Figures 11-1 and 11-2 for legend and location.

DUNDEE (0014)
NTS 11F/11D
UTM 646000 E 5061400 N

The areal extent of this investigation is confined to the areas of Dundee and Rear Black River (Fig. 11-4). Collins (1962) mapped this area as part of his Arichat map sheet. He found the geology to be dominated by interbedded evaporites, carbonates and clastics of the Windsor Group. They are underlain by metamorphic rocks of the Fourchu Group to the east and igneous intrusives to the south. The Windsor Group is in turn overlain by the clastics dominated Canso Group to the west and southwest.

Diamond drilling carried out by Imperial Oil Ltd. in 1972 (MacEachern, 1972) and by Kaiser Celestite

Mining Ltd. in 1972-73 (Forgeron, 1972) defined the presence of two distinct Windsor embayments in the area. Although still connected these areas are separated by a north-south trending basement high which extends north towards McIntosh Point.



Geology after Collins, 1962

Figure 11-4. Location and geology of the Dundee occurrence area. See Figures 11-1 and 11-2 for legend and location.

Windsor Group sedimentary rocks dip into these basins at between 10-15°. Although insufficient stratigraphic interpretation has been undertaken to determine which cycles are present, it is probable that they are Cycle 2 and above (B Subzone and above) with no Cycle 1 (A Subzone) present. Forgeron (1972), in logging core drilled by Kaiser Celestite, described some of the limestone members at Dundee as resembling the "Bun" and "B₂" limestones seen at Loch Lomond.

In addition to substantial gypsum and anhydrite beds, a thick basal limestone (probable reef buildup) is present in the western embayment along the western flank of the north-south trending basement high. Also, celestite is known to occur in the eastern embayment under the gypsiferous section which is adjacent to the basement rocks of the Fourchu Group.

Both Windsor embayments at Dundee contain significant gypsiferous sections with over 60 m of mixed gypsum, siltstone and limestone. The eastern section, however, is deeply cut by the Black River which would greatly restrict any opportunity for open-pit mining in this area. Widespread karst topography covers the western area where gypsum thickness exceeds 30 m in

places. Overburden does not exceed 20 m and is generally <15 m. Some solution collapse occurs in the upper parts of the gypsum beds and anhydrite underlies all horizons basinward. Insufficient drillhole information is available to determine reserves in the area, however a conservative estimate, using an average thickness of 18 m thick by 600 m wide by 1500 m long, would yield in excess of 40 Mt. Possible reserves further to the west are unknown because no diamond drilling has been carried out in that direction. This area warrants additional investigation.

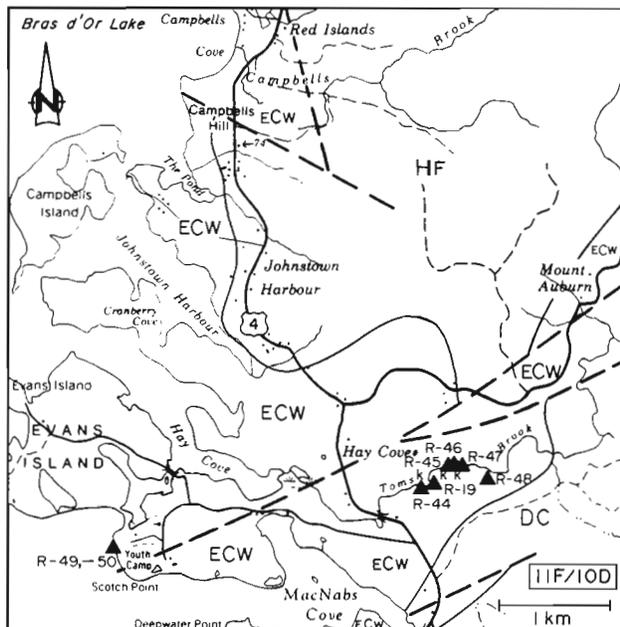
HAY COVE (0004)

NTS 11F/10D

UTM 677000 E 5067750 N

The Hay Cove occurrence area is located along the valley of Toms Brook, 15 km northeast of St. Peters, Richmond County (Fig. 11-5). It consists of numerous exposures of light grey to white gypsum containing minor amounts of intermixed carbonate as well as extensive karst topography along the southern side of the valley.

Regional geological mapping by Weeks (1955; 1964) indicated that this area is underlain by undivided "central basin beds" of the Windsor Group. Shea and Murray (1969) indicated that limestones found upstream on Toms Brook belong to Cycle 1 (A Subzone) of the Windsor Group. Weeks (1955; 1964) suggested that these units are underlain to the south and east by older



Geology after Weeks, 1955; 1964; Keppie, 1979

Figure 11-5. Location and geology of the Hay Cove occurrence area. See Figures 11-1 and 11-2 for legend and location.

clastics of the Horton Group and are in fault contact to the northwest with Upper Windsor Group clastics and carbonates.

Extensive exposures of good quality gypsum and moderate to heavy karst topography along the valley of Toms Brook west of Route 4 generate economic interest in this area. In addition two small white and orange gypsum exposures can be found 2 km to the west of Route 4 at Scotch Point. Further investigation of the area along Toms Brook is warranted and should include diamond drilling. Although some distance from possible shipping points, the area is adjacent to the Bras d'Or Lakes which could permit shipments by barge or small bulk carrier.

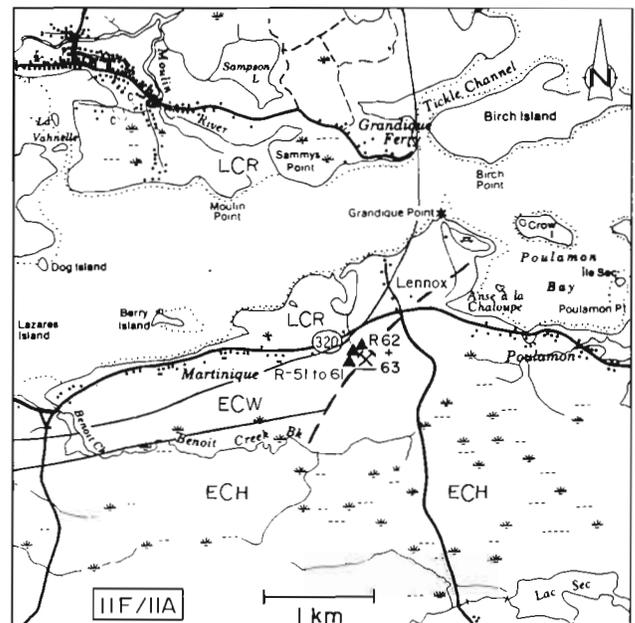
LENNOX (0010)

NTS 11F/11A

UTM 653435 E 5049300 N

The Lennox occurrence is found 7 km by road southeast of the Village of Louisdale, Richmond County (Fig. 11-6). According to Collins (1962) the area is underlain by a narrow band of Windsor Group evaporites which are overlain by clastics of the Riversdale Group to the north and in turn overlie Horton Group clastics to the south.

A large block of gypsum can be found at this locale where 10 200 t of gypsum were mined between 1884 and 1894 (Nova Scotia Department of Mines, Annual



Geology after Collins, 1962; Keppie, 1979

Figure 11-6. Location and geology of the Lennox occurrence area. See Figures 11-1 and 11-2 for legend and location.

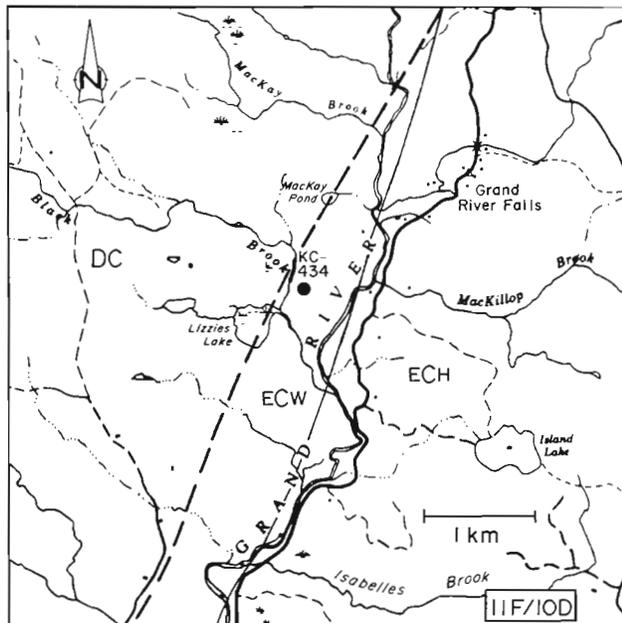
Reports, 1885-1895). Although no drilling has been carried out in the area an approximate estimate of 2 Mt is given for the remaining reserves at Lennox. Additional work is warranted which could determine whether additional development might be possible in the future.

LIZZIES LAKE (0030)
NTS 11F/10D
UTM 683880 E 5062470 N

The Lizzies Lake occurrence is located 21 km east-northeast of St. Peters, Richmond County (Fig. 11-7). The occurrence consists of a section of gypsum and apparent solution infill material intersected in a drillhole located just northeast of Lizzies Lake. The hole was put down in 1975 by Kaiser Celestite Mining Ltd. (Forgeron, 1976) as part of a celestite exploration program.

Keppie (1979) showed that the Windsor Group is in fault contact to the west with the Devono-Carboniferous and underlain by Horton Group to the east.

Insufficient information is available to properly assess the potential of this area. The apparent solution feature encountered by Kaiser's drillhole is encouraging, however the lack of karst topography and remote location of this occurrence makes it of more geological than economic interest.

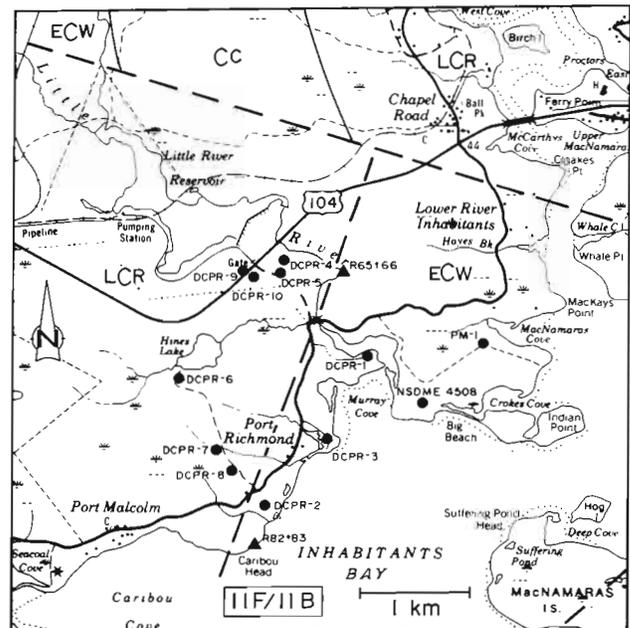


Geology after Keppie, 1979

Figure 11-7. Location and geology of the Lizzies Lake occurrence area. See Figures 11-1 and 11-2 for legend and location.

PORT RICHMOND (0042)
NTS 11F/11B
UTM 637420 E 5050370 N

The Port Richmond occurrence area is located 7 km due east of Point Tupper, Richmond County (Fig. 11-8). Some small gypsum outcrops can be found in this area, but most of the available information is derived from drillhole data. A total of 12 holes were completed in the area as part of salt exploration between 1967 and 1975, 11 by Dow Chemical Company of Canada and one by Dew Mining Corporation (NSDME 4508) (Boehner, 1986).



Geology after Ferguson and Weeks, 1950; Boehner, 1986

Figure 11-8. Location and geology of the Port Richmond occurrence area. See Figures 11-1 and 11-2 for legend and location.

Regional geological mapping by Ferguson and Weeks (1950) and Collins (1962) indicated that this area is underlain by a fault-bound block of undivided Windsor Group rocks. Much younger clastics of the Riversdale Group can be found to the north, east and west of this Windsor Group block.

Boehner (1986) discussed this area in detail. He found that much of the area is underlain at depth by salt and that the overlying Windsor Group strata are intensely deformed. Some gypsum and anhydrite intervals were encountered at depth in a number of holes, however the prospects for discovering economically interesting intervals of either mineral is unlikely.

No additional work on this area is recommended.