

LEGEND

- WINDSOR GROUP**
- WR Limestone, gypsum, conglomerate
- unconformity
- Devonian**
- GR Granodioritic, mono-granitic
 - Hornfels
- MEGUMA GROUP**
- Halifax Formation**
- FZ FELTZEN MEMBER: grey slate and laminated to thinly-bedded, fine-grained sandstones.
 - CN CUNARD MEMBER: black slate and thin- to thickly-bedded pyritic sandstones.
- Green Bay Formation**
- MI MOSHERS ISLAND MEMBER: laminated, grey-green and green, fine-grained sandstones.
 - WD WEST DUBLIN MEMBER: thin- to thickly-bedded, buff-weathered sandstones with green and grey-green, fine-grained sandstones.
 - TK LANCOOK MEMBER: thickly-bedded, buff-weathered sandstones with green and grey-green, fine-grained sandstones.
- RISSERS BEACH MEMBER:** thinly-bedded, green and grey-green, fine-grained sandstones.
- Goldenville Formation**
- NH NEW HARBOUR MEMBER: mainly thickly-bedded to massive, buff-weathered sandstones, subordinate green laminated sandstones and green slates.

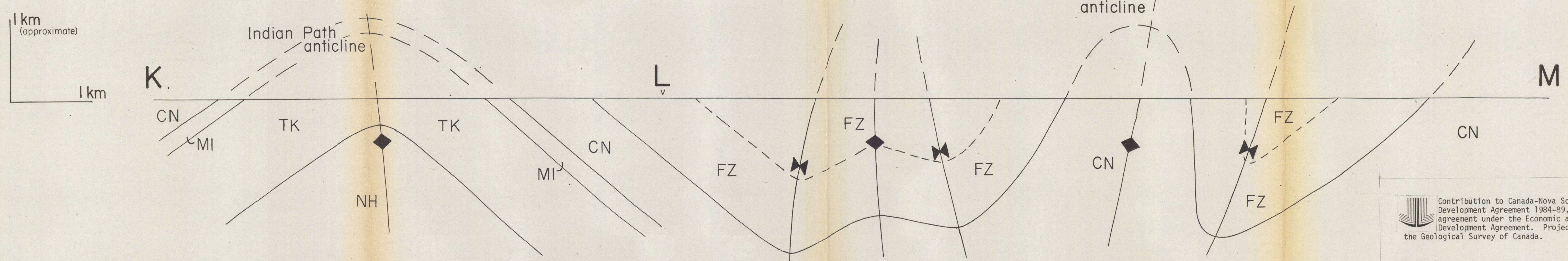
SYMBOLS

- Station outcrop
- Geological boundary (defined, approximate, assumed)
- Bedding (inclined, vertical, overturned)
- Main cleavage (inclined, vertical)
- Late cleavage (inclined, vertical)
- Bedding-main cleavage intersection lineation
- Crenulation lineation
- Mesoscopic fold axis related with main cleavage ("Z", "S", vergence undefined)
- Late mesoscopic fold axis ("Z", "S", vergence undefined)
- Axial trace of macroscopic anticline with plunge direction (defined, approximate, assumed)
- Axial trace of macroscopic syncline with plunge direction (defined, approximate, assumed)
- Axial trace of macroscopic overturned anticline with plunge direction
- Axial trace of macroscopic overturned syncline with plunge direction
- Fault (with displacement direction, displacement unknown)

Note: Map units and symbols not present on this map sheet occur on another map sheet or on the open file map of the Lahave area.



Structural cross-section



DISCUSSIVE NOTES

Map sheet D comprises part of the Mahone Bay area in south-central Lunenburg County, Nova Scotia. Bounded by 44° 30' N, 44° 35' W and 44° 35' W, it adjoins map sheet C to the north, map sheet B to the northeast and GSC Open File Map 1156 to the southwest. The Cambro-Ordovician Meguma Group is here represented by the Halifax Formation. The older Green Bay Formation is partly represented by the Cunard and Mosher's Island members, with the Cunard and Felzen members comprising the younger Halifax Formation.

The Halifax Member of the Green Bay Formation is made up of 25 to 30 m of thick, buff-weathered sandstones of Siderite type intercalated with essentially bedded, green and grey-green, fine-grained sandstones and siltstones. The rhythmic layering is on millimetre to centimetre scales. Thin and brown-colored laminae contain silicified and Mn-carbonates. Stratigraphically related concretions occur in particular in the upper parts of the unit where they define an irregular horizon. In map sheet D the Mosher's Island Member is depicted in the folded core of the Indian Path Anticline. The contact with the underlying Cunard Member is sharply and appears in several places on the map. The contact with the underlying Tancred Member is drawn at the first appearance of thick bedded buff sandstone.

The Mosher's Island Member of the Green Bay Formation comprises rhythmically laminated and well-sorted, green and grey-green, fine-grained sandstones and siltstones. The rhythmic layering is on millimetre and centimetre scales. Thin and brown-colored laminae contain silicified and Mn-carbonates. Stratigraphically related concretions occur in particular in the upper parts of the unit where they define an irregular horizon. In map sheet D the Mosher's Island Member is depicted in the folded core of the Indian Path Anticline. The contact with the underlying Cunard Member is sharply and appears in several places on the map. The contact with the underlying Tancred Member is drawn at the first appearance of thick bedded buff sandstone.

The Cunard Member of the Halifax Formation contains black slate intercalated with buff-weathered, coarse-grained, ripple marked sandstones. These fine-grained, grey sandstones are 20-50 cm thick and they commonly display great irregularities in thickness, coloration and dip. The slate's sedimentary relief is highly variable. In map sheet D the Cunard Member is the only unit in the Halifax Group depicted about its original dip structure. At present structural level has been assumed. It is a highly variable unit, approximately 20 m thick, and is represented by the Cunard Member. However, across strike in the Green Bay Formation, particularly up-plunge in the Lahave area (Open File Map 1156).

The Felzen Member of the Halifax Formation is composed of light grey, ark and blue-grey siltstone rhythmically interbedded with laminae of thin bedded, fine-grained, buff-weathered, grey sandstones. At the base of the member, sandstone beds are 5-10 cm thick, whereas higher up they are 1-2 cm thick. The rhythmic layering is on millimetre to centimetre scales. Thin and brown-colored laminae contain silicified and Mn-carbonates. Stratigraphically related concretions occur in particular in the upper parts of the unit where they define an irregular horizon. In map sheet D the Felzen Member is widely distributed and commonly exposed along the western coast of Lunenburg Bay and on many of the islands in Mahone Bay. It is largely covered over by a microcrystalline, micaceous, argillaceous, in some places, shaly siltstone of the underlying Green Bay Formation in particular over approximately 100 m but also in the vicinity of the Indian Path Anticline. The transition is well exposed on Cross Island, Eastern Point Island and East Ironbound Island, the upper part of the Halifax Formation in the Mahone Bay area in the vicinity of Green Island.

Highly altered, iron-oxidized, silty siltstone of intermediate composition underlies the Felzen Member and is especially near Mosher's Island on Cross Island. They are not shown in this map sheet because of their thinness. The Lahave River area, similar rocks under the Cunard Member near the Ovens.

The disposition of the structural units in the Meguma Group is controlled by large-scale, NW-trending folds. In map sheet D, westward-plunging folds are 2-5 km long and dip 10-20° to the west. They are associated with the underlying Green Bay Formation. The Tancred-Cunard boundary on the southeast end of East Ironbound Island indicates the presence of a very open syncline in the Felzen Member between Green Rock and Green Island. Most of the major folds in section K-L-M are shallowly plunging and open to the west, regardless of whether they are steeply or shallowly plunging. The fold-orientation between the Indian Path and Ovens anticlines in section L-M shows the characteristic shape of the open syncline. The amplitude and axial angle of the Ovens anticline in this section is probably decreasing to the SE near the plunge depression.

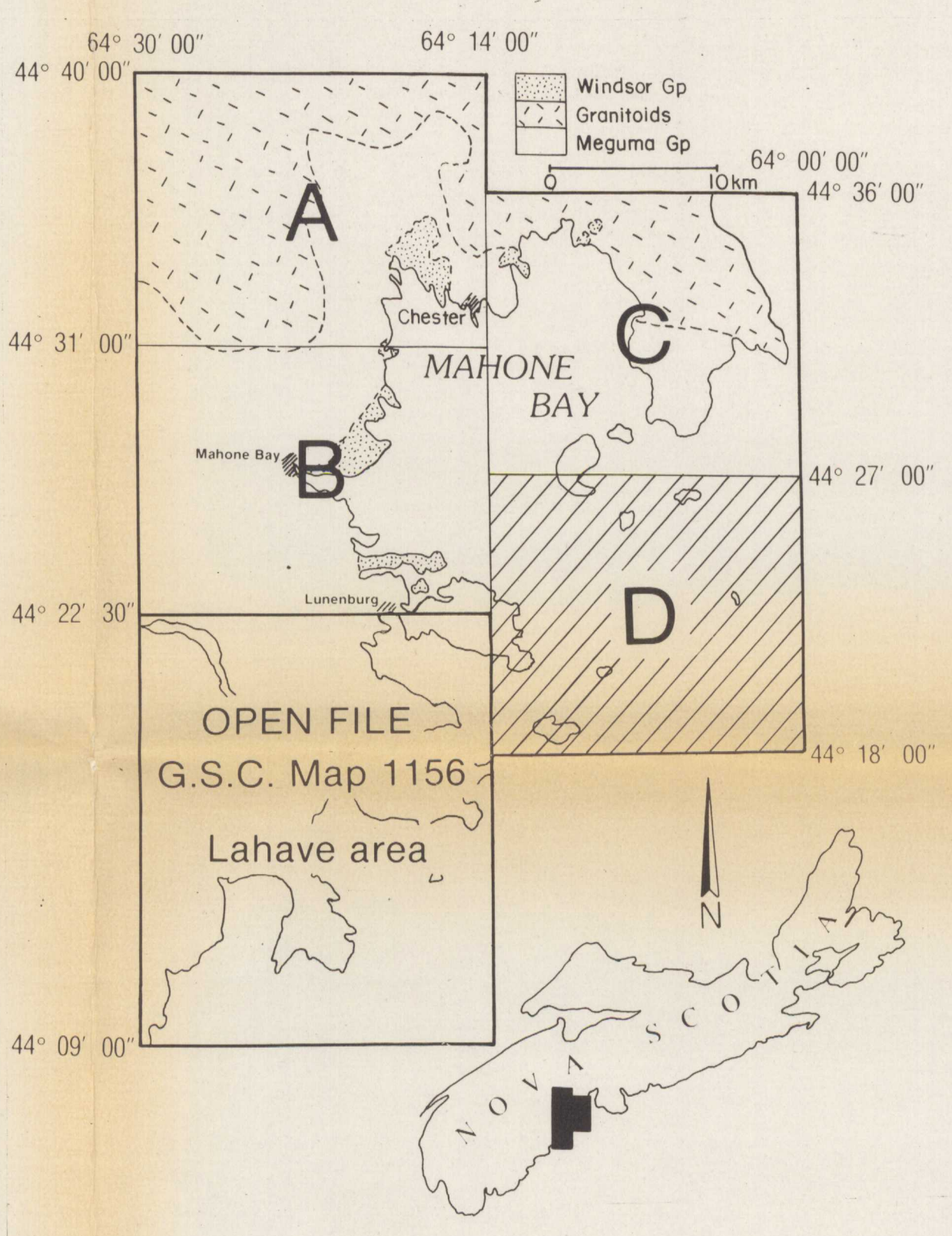
Basaltic, small-scale, fertile cone areas are present in map sheet D. They are commonly developed in the Felzen Member near the contact with the underlying Green Bay Formation. They occur in areas that are otherwise gently folded or cleaved at a high angle to bedding. Ductile shear zones are excellently exposed on Flat Island, Cross Island, East Point Island and the Red Bank.

The main plane foliation in the Meguma Group is a widespread, subvertical, axial cleavage that is axial-plunging in most of the major folds in map sheet D. Such are seen to locally face downwards along the slaty cleavage where it is axial-plunging to northeast, south folds within the ductile shear zones. Rarely, in certain outcrops, the main plane foliation is a widely spaced, non-axial cleavage. A late stage ductile cleavage is present in the upper part of the Halifax Formation in the vicinity of the Indian Path Anticline.

Regional diagenetic metamorphism is witnessed by the preferred alignment of fibrous and small-scale, fertile cone areas in the Felzen Member. Microscopic silicate porphyroblasts are not developed, but, amphibole and perovskite crystals and polymorphic oxides and concretions are rich in carbonates relative to the host sandstones but those in the megacrystic Mosher's Island Member also contain abundant microscopic concretions.

One major fault occurrence is located in the Meguma Group in map sheet D. A variety of spondylotropical veins occur in the Cunard Member near the Southwest Bay project on Cross Island. There, gold quartz veins illustrate complex relations with local folds and foliations.

- REFERENCES**
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 - O'Brien, B.L. 1986. Preliminary report on the geology of the Mahone Bay area, Nova Scotia in Current Research, Part A, Geological Survey of Canada, Paper 86-1A, p. 439-444.
 - O'Brien, B.L., Charbon, G.A., Kowars, R.K., Dineen, G.F. and Hoffstadt, H.E. 1985. Geological map of the Lahave River area, Geological Survey of Canada, Open File Map 1156.



GEOLOGICAL MAP OF THE MAHONE BAY AREA, NOVA SCOTIA.

Sheet D

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