MAP 90-11
CUMBERLAND BASIN GEOLOGY MAP
APPLE RIVER AND CAPE CHIGNECTO
CUMBERLAND COUNTY

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Scale 1:50 000

miles 1 0 1 2 3 miles

kilometres 1 0 1 2 3 4 kilometres

NOVA SCOTIA DEPARTMENT OF MINES AND ENERGY
Jack MacIsaac, Minister — John J. Laffin, D.ENG., FEIC, P.ENG., Deputy Minister
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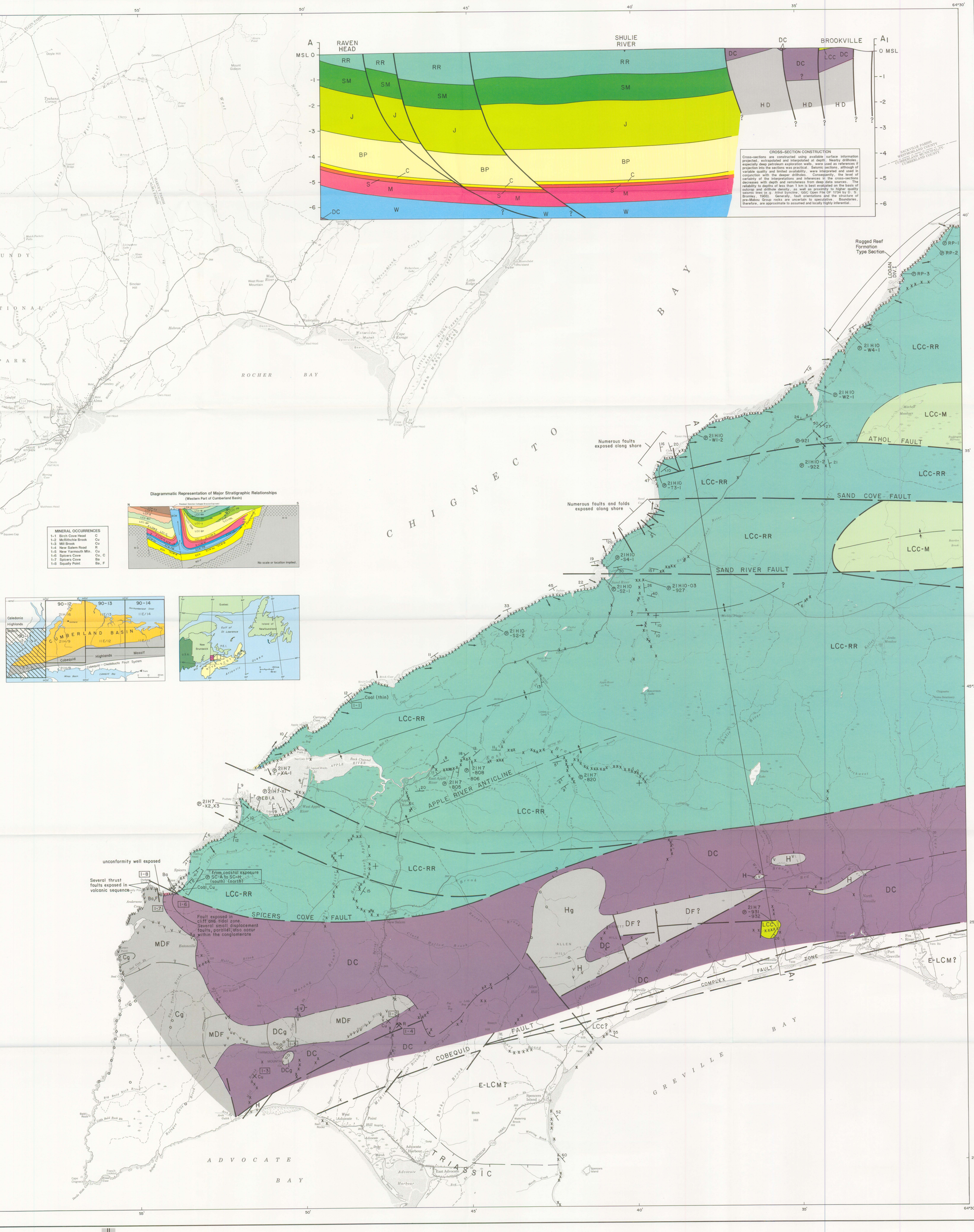
1990



TIME SCALE

SYSTEM	SUBSYSTEM	SERIES	STAGE (BRITISH)	STAGE (BELGIUM)
PERMIAN				
CARBONIFEROUS	SILESIAN	STEPHANIAN	AUTUNIAN	C-D
		WESTPHALIAN		B
		NAMURIAN		A
	DINANTIAN	VISEAN	BRIGANTIAN	WARNANTIAN
			ASBIAN	HOLKERIAN
				LIVIEN
		TOURNAISIAN	COURCEYAN	ARUNDIAN
				CHADIAN
			HASTARIAN	IVORIAN
DEVONIAN				D-C
HADRYNIAN-DEVONIAN				

LEGEND

Note: This is a common legend for Nova Scotia Department of Mines and Energy Maps 90-11, 90-12, 90-13 and 90-14. All references unless otherwise stated refer to the entire Cumberland Basin.

CARBONIFEROUS

PICTOU GROUP (LCP = undivided):

CAPE JOHN FORMATION (LCP-CJ):
red-brown mudrock, pebbly arkosic sandstone, sandstone, minor calcareous mud–chip conglomerate; minor grey beds; rare, thin, laterally persistent limestone beds.
Fine / Coarse – 5 Thickness = 350–400+ m
paraconformity or conformable

TATAMAGOUCHE FORMATION (LCP-T):
red–brown mudrock, sandstone, calcareous mud–chip conglomerate; minor grey beds; rare pebbly sandstone; several thin, laterally persistent limestone beds; thick (up to 30 m) sandstones form sheet–like bodies that are laterally persistent for 10s of km.
Fine / Coarse – 3 Thickness = 300–350 m
paraconformity or conformable

BALFRON FORMATION (LCP-B):
red–brown sandstone, mudrock, minor pebbly sandstone, calcareous mud–chip conglomerate; minor grey beds; rare, thin, discontinuous limestone beds; thick (up to 40 m) sandstones form sheet–like bodies with a lateral extent of up to several km.
Fine / Coarse – 1 Thickness = 800–900 m
paraconformity – angular unconformity

CUMBERLAND GROUP (LCC = undivided or unassigned):
sandstone, grey, bodies up to 30 m thick with interstratified red mudrock and rare, thin coal.

MALAGASH FORMATION (LCC-M):
sandstone, grey and minor red; mudrock, red and grey; rare, thin coal seams and laterally persistent limestone beds.
Fine / Coarse – 0.5 Thickness = 100–400 m

RAGGED REEF FORMATION (LCC-RR):
grey pebbly sandstone, conglomerate, fine grained sandstone; subordinate mudrock, grey and red; rare, thin coal seams and bituminous limestone beds; mudrock may locally predominate.
Fine / Coarse – 0.7 Thickness = 0 (east) to 700–1000 m (west)

SPRINGHILL MINES FORMATION (LCC-SM):
sandstone, grey, sandstone bodies up to 22 m thick; mudrock, grey and sideritic, rarely red; significant coal seams (up to 4 m); thin cone–in–cone limestone locally; (SMm) MacCarrons River Member with poorly developed coal seams; red mudrock increases up section, numerous thin (less than 2 m) sandstones; rhythmic interstratification common.
Fine / Coarse – 0.7 to 4.3 Thickness = 0 (east) to 600–1000 m (west)

JOGGINS FORMATION (LCC-J):
mudrock, grey and minor red (predominant in lower half); subordinate sandstone, grey; numerous, thin (up to 1 m) coal seams closely associated with bivalve–bearing, bituminous limestone and shale.
Fine / Coarse – 2 Thickness = 0 (east) to 1100–1450 m (west)

POLLY BROOK FORMATION (LCC-PB):
red and grey polymictic ortho– and paraconglomerate, boulder – pebble; pebbly sandstone; rare mudrock; variable rounding and sorting; (PBL) Leamington Member with granule conglomerate and silty mudrock, grey, with subordinate red, thinly interstratified, poorly sorted (transitional with the overlying *Springhill Mines Formation*)
Fine / Coarse – very low Thickness = 0 (east and north) to 0–1500? m (west)
conformable – angular unconformity?

BOSS POINT FORMATION (LCC-BP):
sandstone, grey to green–grey, medium– to coarse–grained, locally abundant plant debris; limestone (calcrete); calcareous mud–chip conglomerate; subordinate grey to minor red mudrock.
Fine / Coarse – 0.4 Thickness = 200–600 m (east) 700–1200 m (west)
local disconformity

CLAREMONT FORMATION (LCC-C):
red polymictic conglomerate, pebble to granule, arkosic, pebbly sandstone, weakly cemented, minor grey–green mottle
Fine / Coarse – very low Thickness = 50–1500 m+
local disconformity ?

MABOU GROUP (E-LCM = undivided):

SHEPODY FORMATION (E-LCM-S):
red mudrock and red to grey sandstone with abundant plant debris.
Fine / Coarse – 0.7 Thickness = 0–250 m

MIDDLEBOROUGH FORMATION (E-LCM-M):
red mudrock, minor sandstone, rare fine conglomerate, interstratified; age and facies equivalent, in part, with the upper part of the Windsor Group.
Fine / Coarse = 2–3 Thickness = 200–500 m
local disconformity ?

WINDSOR GROUP (ECW = undivided):
interstratified redbeds, evaporites and carbonates.

LIME–KILN BROOK FORMATION (ECW-LB):
red mudrock, minor sandstone and fine conglomerate; interstratified fossiliferous marine limestone and dolostone; anhydrite, gypsum and locally salt (Borehole PFH C96v).
Fine / Coarse = high Thickness = 300–800 m
structural contact (fault–intrusive)

PUGWASH MINE FORMATION (ECW-PM):
interstratified halite, anhydrite, gypsum, grey and red mudrock; dominantly residual collapse breccia (cap rock) in near surface environment where these complexly–deformed diapiric rocks outcrop and were subject to dissolution by groundwater or formation water.
Thickness = 300–500 m+ ?

Basal Anhydrite (informal) (ECW-ba):
anhydrite with thin interstratified carbonate and mudstone; unit is inferred to be present (seismic data) but has not been confirmed in the map area.
Thickness = 100–200 m ?

MACUMBER FORMATION (ECW-M):
limestone to dolostone, laminated, sparsely fossiliferous, variably organic–rich in basinal settings; unit is inferred to be present but has not been confirmed in the map area.
Thickness = 3–10 m ?
disconformity ?

HORTON GROUP (ECH = undivided):
sandstone, mudrock and conglomerate, red and grey; inferred to be present in the subsurface.
Thickness = 1000 m ?
? unconformity – conformable ?

DEVONIAN–CARBONIFEROUS (D C = undivided):
Late Devonian? to Late Carboniferous (Namurian) conglomerate, pebbly sandstone, minor sandstone and mudrock; lower age limits uncertain; may include rocks previously mapped as Greville River and Rapid Brook formations, Fountain Lake Group, Falls Formation and Millsville conglomerate; outcrops primarily in the eastern and western ends of the Cobequid Highlands, inferred to be present in the subsurface.
Thickness = 0? – 1000 m ?
angular unconformity – nonconformity

COBEQUID HIGHLANDS ROCKS:
stratified; (MDf) undivided middle Devonian Fountain Lake Group, felsic to mafic volcanics, coarse to fine clastics. (See also DC)
(S) undivided Silurian metawacke and metasiltstone.
(H) undivided metavolcanic rocks.
unstratified; Devonian to Carboniferous (D C), Hadrynian (H), granitoid rocks; granite (g), diorite (d).

SYMBOLS

Rock outcrop; siliciclastic, limestone–dolostone, gypsum, granitoid, volcanic
Bedding attitude; inclined (tops known), unknown, overturned, vertical, horizontal
Geological boundary, inferred–approximate
Unconformity, inferred–approximate
Coal seam; inferred, approximate–defined
Fault, inferred–approximate
Fold axis; inferred–approximate, anticline, syncline, overturned syncline
Palaeocurrent indicator, trough axis–intersection; typically a mean of more than 5 measurements
Drillhole or borehole
Water well
Palynology sample
Fossil locality
Type–reference section locality
Mineral or energy resource locality; reference numbers (keyed to list on map), occurrence or prospect, mine or quarry (active), abandoned, locality reported but not verified, coal mine adit (see reference list) 2–10

Cu–copper, Pb–lead, Zn–zinc, Ag–silver, U–uranium, Fe–iron, Mn–manganese, C–coal, G–gypsum, K–potash, Ba–barite, Sr–celestite, L–limestone/dolostone, Na–rock salt, Au–gold, S–sulphur, R–rock or aggregate, B–building stone, P–petroleum (oil), NG–natural gas.

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Geology of the Springhill Coalfield compiled from Calder, NSDME OFM 90–006. Cobequid Highlands geology compiled and/or modified after Donohoe and Wallace (1982, NSDME MAPS 82–6, 7, 8 and 9) and unpublished GSC field maps by D. G. Kelly (1974). Coal mine locations in the Joggins to Styles Brook area after Copeland (1959, GSC Memoir 298, Figure 5). Mapping in the Tatamagouche Syncline area (NTS 11E/11 and 12) based upon Ryan (1985, GSC OFR 1257).

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These final maps contain interpretations that supercede Preliminary Geological Field Maps of the Cumberland Basin (1:10 000 scale map sheets) previously released in 1988 as NSDME Open File Maps 88–39 to 88–42.

MAP NOTES

Planimetric base map derived from 1:50 000 scale, National Topographic System (NTS) maps, Surveys and Mapping Branch, Department of Energy, Mines and Resources, Canada. Universal Transverse Mercator Projection (UTM). Base maps compiled from aerial photography circa 1979 and culture update 1980. Thematic Cartography by Cartographic Services, Nova Scotia Department of Mines and Energy. Colour separation and printing by Land Registration and Information Service (LRIS), Amherst, Nova Scotia.

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