
**Geology of the Campbellton area,
northern New Brunswick**

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The Campbellton area is underlain by late Ordovician to middle Devonian sedimentary and minor volcanic rocks of the Gaspé Belt successor basin. Basement to the Gaspé Belt is assumed to be Dunnage Zone, represented in the study area by mafic volcanic rocks in the Popelogan Inlier. In northern New Brunswick, the Gaspé Belt consists of three conformable successions separated by late Silurian (Salinic) and early Devonian unconformities. The lower sequence is composed of deep-water turbidites of the Grog Brook and Matapédia groups, and slope and shelf deposits of the lower Chaleurs Group. The early to mid-Ashgillian Grog Brook Group comprises the Boland Brook Formation (thin-bedded mudstone, sandstone, and minor conglomerate), and overlying Whites Brook Formation (thick-bedded sandstone and thin shale interbeds). The Ashgillian to late Llandoveryian Matapédia Group is divided into the Pabos and White Head formations. The Pabos consists mainly of thin-bedded calcareous siltstone and calcilutite, and local calcareous sandstone, whereas the White Head dominantly consists of thin-bedded calcilutite and calcareous shale. The lower part of the Chaleurs Group

comprises late Llandoveryian to early Wenlockian rocks of the Upsalquitch Formation (thin-bedded calcareous siltstone) and Limestone Point Formation (fine-grained sandstone and minor fossiliferous limestone).

Above the Salinic erosional unconformity, the middle sequence forms a transgressive-regressive cycle that is assigned to the upper Chaleurs Group and the Dalhousie Group. The former consists of the Pridolian West Point Formation (limestone bioherms and associated peri-reefal facies) and Pridolian to Lochkovian Indian Point Formation (calcareous mudstone, fine-grained sandstone and calcarenite, with minor limestone and conglomerate). The Dalhousie Group is represented by the Lochkovian to early Emsian Val d'Amour Formation, comprising mafic, intermediate, and felsic subaerial lavas, tuffs, volcanoclastic rocks, subvolcanic intrusions, and locally intercalated fine grained sedimentary rocks. Rhyolite in the upper part of the Val d'Amour Formation has yielded a U-Pb (zircon) age of 407.4 ± 0.8 Ma. A middle Emsian hiatus separates the Val d'Amour Formation from overlying alluvial-lacustrine rocks of the late Emsian Campbellton Formation, which consists mainly of fine- to coarse-grained, locally feldspathic sandstone, mudstone, and conglomerate.

Acadian deformation was characterized by open to closed folds with northeast-trending axial planes and heterogeneous cleavage development, followed by reverse and strike-slip faulting. Between the Sellarsville and McKenzie Gulch-Black Lake faults, poor cleavage development and coincident low organic thermal maturation imply shallow burial depths and (or) long-lived uplift. In this area, maturation values in Devonian, Silurian, and in places upper Ordovician rocks fall within the oil and gas condensate windows. The Salinic orogeny is primarily manifested in uplift and erosional dissection of the Limestone Point, Upsalquitch, and White Head formations. It is proposed that complex patterns of Siluro-Devonian uplift and subsidence may be related to differential vertical movement during Salinic block faulting.