

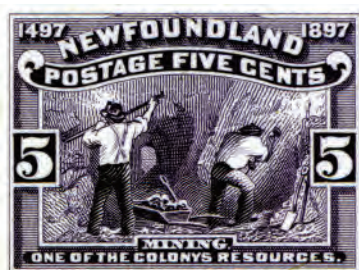
**EXPLORE
DISCOVER
DEVELOP**

VMS

Well-preserved volcano-sedimentary terranes that constitute much of Central Newfoundland comprise a highly prospective, base-metal-rich greenstone belt of early Paleozoic age. This part of Newfoundland includes well-known mining camps dating back to the mid-19th century, as well as deposits in or nearing production, and an array of advanced base-metal exploration projects.

Production has been derived from volcanic-hosted massive sulphide deposits (VMS) formed in a variety of paleotectonic settings. Polymetallic (Zn-Pb-Cu-Au-Ag) deposits occur in calc-alkalic rocks in more mature arc environments, whereas copper-dominated deposits are hosted by primitive ophiolitic and tholeiitic rocks. Although, by their nature, VMS deposits are relatively small, there are two world-class VMS mining camps in the northeast Appalachians; the giant Bathurst camp and the very high-grade Buchans orebodies. Many of those in Central Newfoundland are high-grade and/or gold-rich (e.g., Rambler camp). Thus, they are attractive exploration targets. Newly identified resources are being defined in these prolific volcanic terranes, and active exploration projects are yielding impressive drill results.

VMS IN CENTRAL NEWFOUNDLAND



The Appalachian Orogen in Newfoundland comprises four tectonostratigraphic zones, having distinct geological histories that record the formation and destruction of the early

Paleozoic Iapetus Ocean. Well-preserved relics of that ancient ocean occur in the Central Newfoundland Dunnage Zone, and elements of its opposing continental margins are preserved in Paleozoic rocks of the Gander and Humber zones. Proterozoic rocks of the Humber and Avalon zones are remnants of larger, unrelated Proterozoic terranes that once bordered Iapetus.

Buchans Area

The Early Ordovician Buchans-Roberts Arm belt, is characterized by bimodal calc-alkaline volcanic rocks of mature-arc character. It contains the former-producing Buchans Mine (1928-1984), one of Canada's richest base-metal mines, as well as recently defined resources and a number of prospects.



Zn-Pb-Cu breccia (transported) ore with clasts of massive sulphides (Buchans Mine).

The world-class Buchans deposits were very high-grade polymetallic (Zn, Pb, Cu, Ag and Au) orebodies. Most of the mineralization is associated with submarine felsic volcanic rocks, and conforms to the classic 'Kuroko' model for VMS deposits. Three distinct ore types, termed in-situ, transported and stockwork,

have been mined at Buchans. The historic Lundberg Prospect has been delineated and is now in the early stages of development. In addition, prospects like Clementine West and Buchans North have revealed potential for Buchans-style orebodies.

Rambler Area

Significant VMS deposits in this region occur within the Early Ordovician Pacquet Harbour Group, a strongly deformed mafic-dominated volcanic sequence of primitive-arc affinity. This area is host to the Rambler mine camp, which produced Cu ± Au from five mines between 1964 and 1982. Some of the deposits are stratiform massive sulphide lenses associated with a felsic dome,



Massive sulphides (Ming Mine).

whereas others are of stockwork or

VMS deposits in Newfoundland are predominantly located in the Dunnage Zone, and hosted by a series of Cambro-Ordovician arc and back-arc basin assemblages and ophiolites. The deposits are classified based on their tectonic setting and host-rock types into two broad groups: deposits hosted mainly in ophiolitic rocks, which are generally Cu-dominated (e.g., Little Deer and Betts Cove); and those hosted by bimodal volcanic sequences, which are generally polymetallic (Zn, Pb, Cu, Au and Ag). The bimodal volcanic sequences can be dominated by either mafic (e.g., Rambler) or felsic rocks (e.g., Buchans, Duck Pond). Deposits elsewhere on the Island are either in ophiolites thrust onto the Humber Zone platformal rocks or in Proterozoic arc complexes within the Avalon Zone.

Central Newfoundland VMS deposits can be readily described in terms of a four-fold geographical framework; grades and tonnages of many of these deposits can be found in the table overleaf.

disseminated character. Production from the Ming Mine began in 2012 from high-grade massive sulfides, with subsequent production from a lower grade stringer zone to extend the life of the mine.

Victoria Lake Area

The Victoria Lake area contains two large volcano-sedimentary terranes termed the Tulks and Tally Pond belts. The Cambrian Tally Pond belt hosts



Zn-Cu-Pb-pyrite breccia ore (Duck Pond Mine).

the recently closed Duck Pond Mine.

Mineralization occurred as laminated massive sulphide, sulphide debris flows and replacement sulphides and was hosted in quartz-phyric tuffs. The area remains highly prospective with numerous under-explored targets.

Promising exploration results have been obtained at the Lemarchant Prospect (South Tally Pond), approximately 20 km southwest of the



Zn-Pb-Cu massive sulphides (Lemarchant Prospect).

former Duck Pond Mine. Drilling has intersected high-grade semi-massive to massive sulphide mineralization over significant widths. Subsequent exploration has expanded resources and has identified barite as a potential by-product.

The Early Ordovician Tulks belt contains a number of historic resources including the Tulks Hill, Bobbys Pond, Long Lake and the Tulks South prospects (see table). The latter includes a cluster of high-grade sulphide lenses (Boomerang-Domino-Hurricane) hosted in altered felsic volcanic rocks.

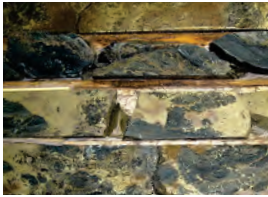
Western Notre Dame Bay

In this area, VMS deposits are hosted by ophiolitic rocks of the Middle Ordovician Betts Cove Complex and the Cambro-Ordovician Lushs Bight Group. These Cyprus-type deposits are

characterized by Cu ± Zn mineralization in stringer and stockwork zones and in massive sulphide lenses. Examples of historical producers in the Betts Cove Complex include the Tilt Cove and Betts Cove mines. Tilt Cove (1864-1917; 1957-1967) was the largest deposit of its

type in the Appalachian Orogen. Early producers in the Lushs Bight Group include Little Bay (1878-1892; 1952-1969) followed by Whalesback and Little Deer in the 1960's.

Other examples of VMS deposits in Central Newfoundland include the large but low-grade, Cu-Zn-dominated Point Leamington deposit hosted in volcanoclastic rocks of the Wild Bight Group; and the Zn-Pb-rich Strickland deposit, which occurs in felsic volcanic rocks along the southern margin of the Dunnage Zone.



Cu-rich stockwork mineralization (Little Deer).

Selected VMS base metal deposits:

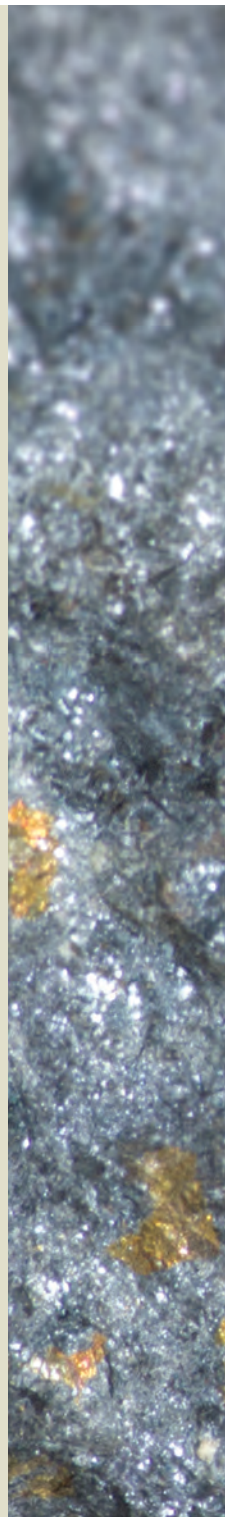
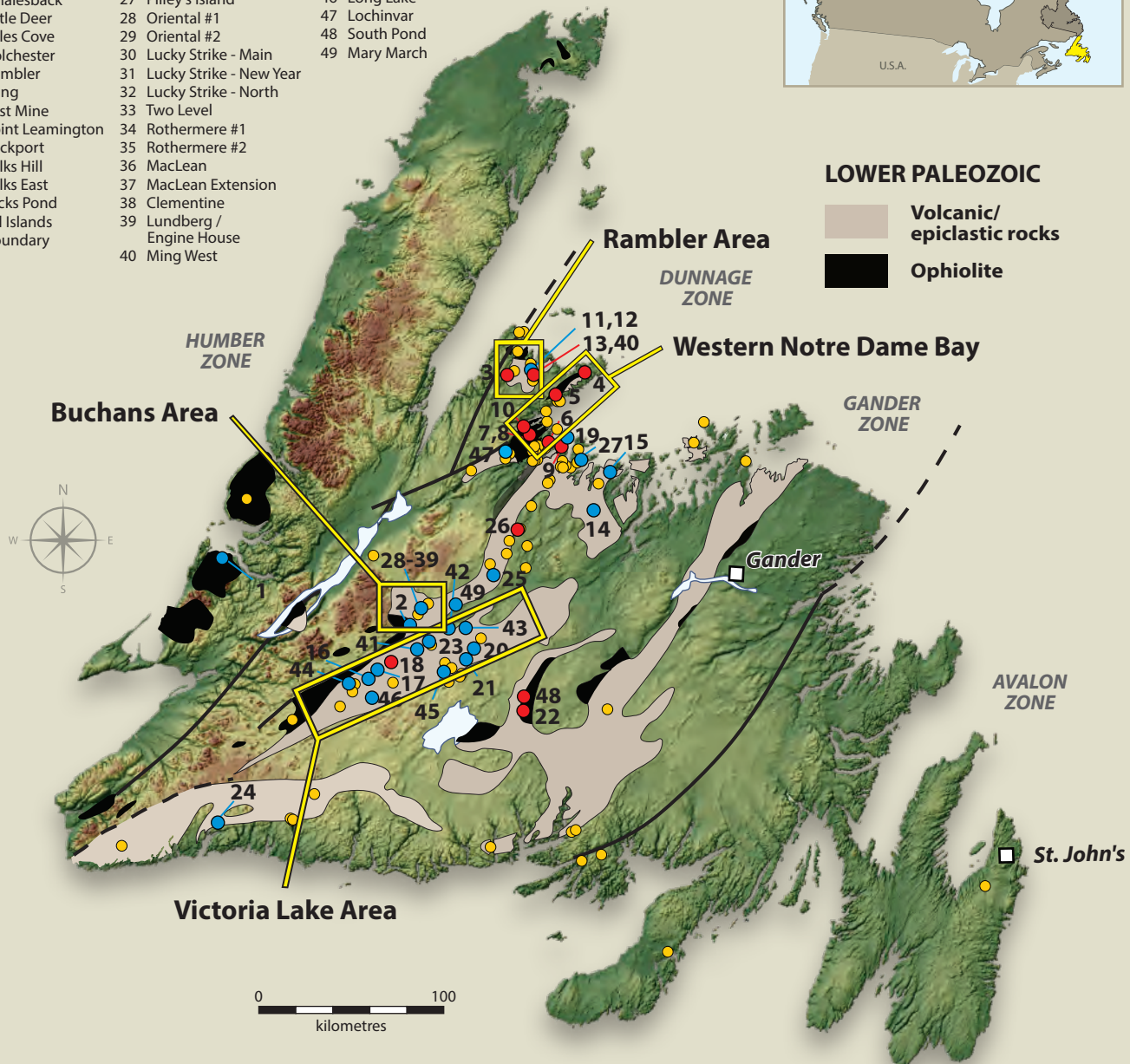
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|---------------------|----------------------------|---------------------------------|
| 1 York Harbour | 21 Duck Pond | 41 Daniel's Pond |
| 2 Skidder | 22 Great Burnt Lake | 42 Victoria Mine |
| 3 Terra Nova | 23 Bobby's Pond | 43 Hungry Hill |
| 4 Tilt Cove | 24 Strickland | 44 Boomerang, Domino, Hurrucane |
| 5 Betts Cove | 25 Lake Bond | 45 Lemarchant |
| 6 Little Bay | 26 Gullbridge | 46 Long Lake |
| 7 Whalesback | 27 Pilley's Island | 47 Lochinvar |
| 8 Little Deer | 28 Oriental #1 | 48 South Pond |
| 9 Miles Cove | 29 Oriental #2 | 49 Mary March |
| 10 Colchester | 30 Lucky Strike - Main | |
| 11 Rambler | 31 Lucky Strike - New Year | |
| 12 Ming | 32 Lucky Strike - North | |
| 13 East Mine | 33 Two Level | |
| 14 Point Leamington | 34 Rothermere #1 | |
| 15 Lockport | 35 Rothermere #2 | |
| 16 Tulks Hill | 36 MacLean | |
| 17 Tulks East | 37 MacLean Extension | |
| 18 Jacks Pond | 38 Clementine | |
| 19 Oil Islands | 39 Lundberg / Engine House | |
| 20 Boundary | 40 Ming West | |

- Polymetallic
- Cu-dominated
- Other VMS occurrences



LOWER PALEOZOIC

- Volcanic/epiclastic rocks
- Ophiolite



Owner/Operator	Property	(Zone) Resource/Drill Intersection
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REPRESENTATIVE CURRENT AND PAST PRODUCERS

Rambler Metals and Mining plc.	Rambler (P)	(Ming) 23,448,000 measured and indicated* @ 1.64% Cu, 0.32 g/t Au and 2.52 g/t Ag
Teck Resources Limited	Duck Pond (PP)	4,100,000 t @ 5.7% Zn, 3.3% Cu, 59 g/t Ag, and 0.9 g/t Au
Asarco Inc. (1)	Buchans (PP)	16,196,876 t @ 14.5% Zn, 7.6% Pb, 1.3% Cu, 126 g/t Ag and 1.4 g/t Au
Atlantic Coast Copper (2)	Little Bay (PP)	180,000 - 545,000 t @ 2.5% Cu; 2,571,964 t @ 0.8-2 % Cu + 6,271 oz Au
Consolidated Rambler Mines Limited (3)	Rambler (PP)	(Main) 399,000 t @ 1.3% Cu, 5.1 g/t Au; (Ming) 1,991,592 t @ 3.7% Cu, 22 g/t Ag and 2.4 g/t Au
First Maritime Mining Corporation (4)	Tilt Cove (PP)	8,160,000 t @ 1-12% Cu + 42,425 oz Au

SELECTED DEPOSITS WITH RESOURCE ESTIMATES

Rambler Metals and Mining plc	Little Deer	1,911,000 t indicated* @ 2.37% Cu; 3,748,000 t inferred* @ 2.13% Cu
NorZinc Ltd.	South Tally Pond	(Lemarchant) 2,420,000 t indicated* @ 6.15% Zn, 1.60% Pb, 0.68% Cu, 1.22 g/t Au, 64.0 g/t Ag and 23.5% barite; 560,000 t inferred* @ 4.68% Zn, 1.08% Pb, 0.45% Cu, 1.06 g/t Au, 44.7 g/t Ag and 13.1% barite
	Tulks South	(Boomerang) 1,364,600 t indicated* @ 7.09% Zn, 3.00% Pb, 0.51% Cu, 110.43 g/t Ag and 1.66 g/t Au
	Long Lake	407,000 t indicated* @ 7.82% Zn, 1.58% Pb, 0.97% Cu, 49 g/t Ag and 0.57 g/t Au; 78,000 t inferred* @ 5.77% Zn, 1.24% Pb, 0.70% Cu, 34 g/t Ag and 0.48 g/t Au
Buchans Resources Limited	Buchans	(Lundberg) 16,790,000 t Indicated* @ 1.53% Zn, 0.64% Pb, 0.42% Cu, 5.69 g/t Ag and 0.07 g/ Au; 380,000 t inferred* @ 2.03% Zn, 1.01% Pb, 0.36% Cu, 22.35 g/t Ag and 0.31 g/t Au
	Bobbys Pond	1,095,000 t indicated* @ 4.61% Zn, 0.86% Cu, 0.44% Pb, 16.6 g/t Ag and 0.2 g/t Au; 1,177,000 t inferred* @ 3.75% Zn, 0.95% Cu, 0.27% Pb, 10.95 g/t Ag and 0.06 g/t Au
Spruce Ridge Resources Ltd.	Great Burnt	(Great Burnt Deposit) 381,300 t indicated* at 2.68% Cu; 663,100 t inferred* at 2.31% Cu
Callinex Mines Inc.	Point Leamington	14,100,000 t inferred @ 1.86% Zn, 0.42% Cu, 0.02% Pb, 1.07 g/t Au and 17.12 g/t Ag

SELECTED VMS PROSPECTS WITH DRILLING RESULTS

Buchans Resources Limited	Lucky Strike	DDH: 8.0m @ 12.88% Zn, 6.81% Pb, 0.69% Cu, 1.254 g/t Au, 159.94 g/t Ag
Canstar Resources Inc.	Mary March	DDH: 9.23m @ 10.33% Zn, 118.1 g/t Ag, 1.62% Pb, 4.1 g/t Au and 0.66% Cu; 11.6m @ 3.62% Zn, 0.1% Cu, 0.8% Pb, 25 g/t Ag and 1.5 g/t Au
Champion Iron Limited	Powderhorn	DDH: 4.46m @ 5.2% Zn, 0.48% Cu and 22 g/t Ag
Vulcan Minerals Inc.	Colchester	DDH: 5.8m @ 2.81% Cu and 3.91 g/t Au; 4.5m @ 2.30% Zn and 5.60 g/t Au

KEY: P=Producer PP=Past Producer *43-101 compliant Resource Estimate
Current holder (1) Buchans Resources (2) Vulcan Minerals Inc.
(3) Rambler Metals and Mining plc (4) Metals Creek Resources Corp.



The Lucky Strike Glory Hole - Buchans Mine