MINERAL COMMODITIES OF NEWFOUNDLAND AND LABRADOR

GOLD

Newfoundland Labrador
Natural Resources
Mines Branch

Geological Survey
Mineral Commodities Series
Number 4

Mineral Commodities of Newfoundland and Labrador

Gold

Foreword

This is the fourth in a series of summary publications covering the principal mineral commodities of the Province. Their purpose is to act as a source of initial information for explorationists and to provide a bridge to the detailed repository of information that is contained in the maps and reports of the provincial and federal geological surveys, as well as in numerous exploration-assessment reports. The information contained in this series is accessible via the internet at the Geological Survey of Newfoundland and Labrador web site: http://www.nr.gov.nl.ca/ mines&en/geosurvey/

Publications in the Series

Zinc and Lead (Number 1, 2000, revised 2008); Nickel (Number 2, revised 2005, 2008);
Copper (Number 3, revised 2005, 2007); Gold (Number 4, 2005, 2008); Uranium in Labrador (Number 5, 2008)

Additional Sources of Information

Further information is available in the publications of the geological surveys of Newfoundland and Labrador and Canada. The Geological Survey of Newfoundland and Labrador also holds a considerable inventory of exploration-assessment files available for onsite inspection at its St. John's headquarters and for download via the Geological Survey of Newfoundland and Labrador web site http://www.nr.gov.nl.ca/mines&en/geosurvey/. Descriptions of individual mineral occurrences are available through the provincial Mineral Occurrence Database System (MODS), which is accessible from the Survey's web site. Up-to-date overviews of mining developments and exploration activity targeting copper are available on-line at http://www.nr.gov.nl.ca/mines&en/

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Compiled by R.J. Wardle, 2005
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Front Cover: Epithermal, low-sulphidation veins of the Stallion prospect showing cockade texture in hydrothermal breccia.

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Introduction

Newfoundland and Labrador has a long history of gold exploration. The first discoveries of gold were made in the late 1870s in the Mings Bight area and were followed ca. 1903 by short-lived mines at Mings Bight (Goldenville Mine) and nearby Sop's Arm (Browning Mine). Neither of these were very successful, and by 1935, there were only 26 recorded occurrences of gold in Newfoundland.

Interest lay dormant until 1976 when significant gold mineralization was discovered near Cape Ray on the south coast of Newfoundland (Figure 1). This was followed in 1984 by the discovery of the Hope Brook deposit, which became the Province's first major gold producer in 1986 and operated, including a brief shut down, until 1997. The Hope Brook discovery ushered in a surge of exploration for gold that was to last until about 1990. This focused initially on dismembered ultramafic belts (following analogies with the Californian Mother Lode deposits) and then broadened to include much of central Newfoundland. Nearly 200 new discoveries were made during this period, two of which formed the basis for the Nugget Pond (1997-2001) and Hammerdown (2001-2004) mines.

The Hope Brook discovery of 1984 ushered in a surge of exploration for gold.

Gold exploration waned as the gold price fell in the late 1990s but began to accelerate in 2002-03 in conjunction with the strong rebound in the price. As of late 2004, with the price continuing to rise, exploration is very active. Previously discovered deposits and prospects are all being re-investigated and several promising new grassroots discoveries have been made.

The Province has produced over 64 tonnes of gold, about half of which has been derived as a by-product of base-metal mining. The remaining undeveloped deposits are listed in Table 1.

Table 1. Undeveloped gold deposits and remaining resources (P = proven/probable; I = indicated; If = inferred). Note that most of these resource figures predate and may, therefore, not be in full compliance with, National Instrument 43-101 (* indicates deposits that have seen advanced exploration and (in most cases) bulk sampling).

DEPOSIT NAME	RESOURCE METRIC TONNES		GRADE GRAMS/TONNE	CONTAINED GOLD KG (OUNCES)	
MASSIVE SULPHIDE-ASSOCIATED DEPOSITS					
*Duck Pond	5,480,000	(I)	0.8	4,400	(141,000)
*Rambler - Ming zone	707,000	(If)	2.0	1,400	(45,000)
*Rambler Main Mine	104,000	(If)	5.8	600	(19,000)
*Rambler Main footwall	360,000	(If)	4.5	1,600	(52,000)
*Point Leamington	1,600,000	(I)	1.5	2,400	(79,000)
Long Lake	560,000	(If)	0.9	504	(16,000)
GOLD-ONLY DEPOSITS					
Orion	270,000	(If)	7.0	1,900	(61,000)
*Cape Ray (04, 41 & 51)	455,000	(I)	8.3	3,800	(121,000)
Kettle Pond	175,000	(If)	3.4	600	(19,000)
*Pine Cove	2,332,676	(P)	2.76	6,440	(207,000)
*Deer Cove	94,093	(I)	6.0	565	(18,000)
*Stog'er Tight	350,000	(If)	4.5	1,600	(51,000)
Valentine Lake	1,300,000	(If)	10.5	13,650	(439,000)

Geology of Newfoundland and Labrador

The Island of Newfoundland forms the easternmost part of the Appalachian Orogen and is divisible into four main tectonic zones (Figure 1). The Humber Zone consists of Precambrian basement of the Laurentian continent overlain by autochthonous Cambro-Ordovician platformal rocks and allochthonous ophiolitic slices. The Dunnage Zone consists of various Cambro-Ordovician island-arc and ophiolitic terranes overlain by turbiditic sedimentary cover and locally by late-orogenic (Late Ordovician–Silurian) molasse sequences. The Gander Zone comprises Cambro-Ordovician turbidites and shales that originally formed marginal to the Avalon Zone. The Avalon Zone consists mostly of Neoproterozoic island-arc volcanic and sedimentary rocks that formed during the Pan-African Orogeny (800 to 550 Ma) as part of the Gondwanan continent. The Newfoundland Appalachians formed through the collision of the Laurentian and Gondwanan continents and the resulting entrapment of the Dunnage Zone (550 to 260 Ma). Gold mineralization took place during both the Pan-African and Appalachian events.

Labrador (Figure 2) forms part of the Precambrian Canadian Shield and comprises a number of Archean cratons and Proterozoic orogenic belts that were assembled between 1900 and 1000 Ma.

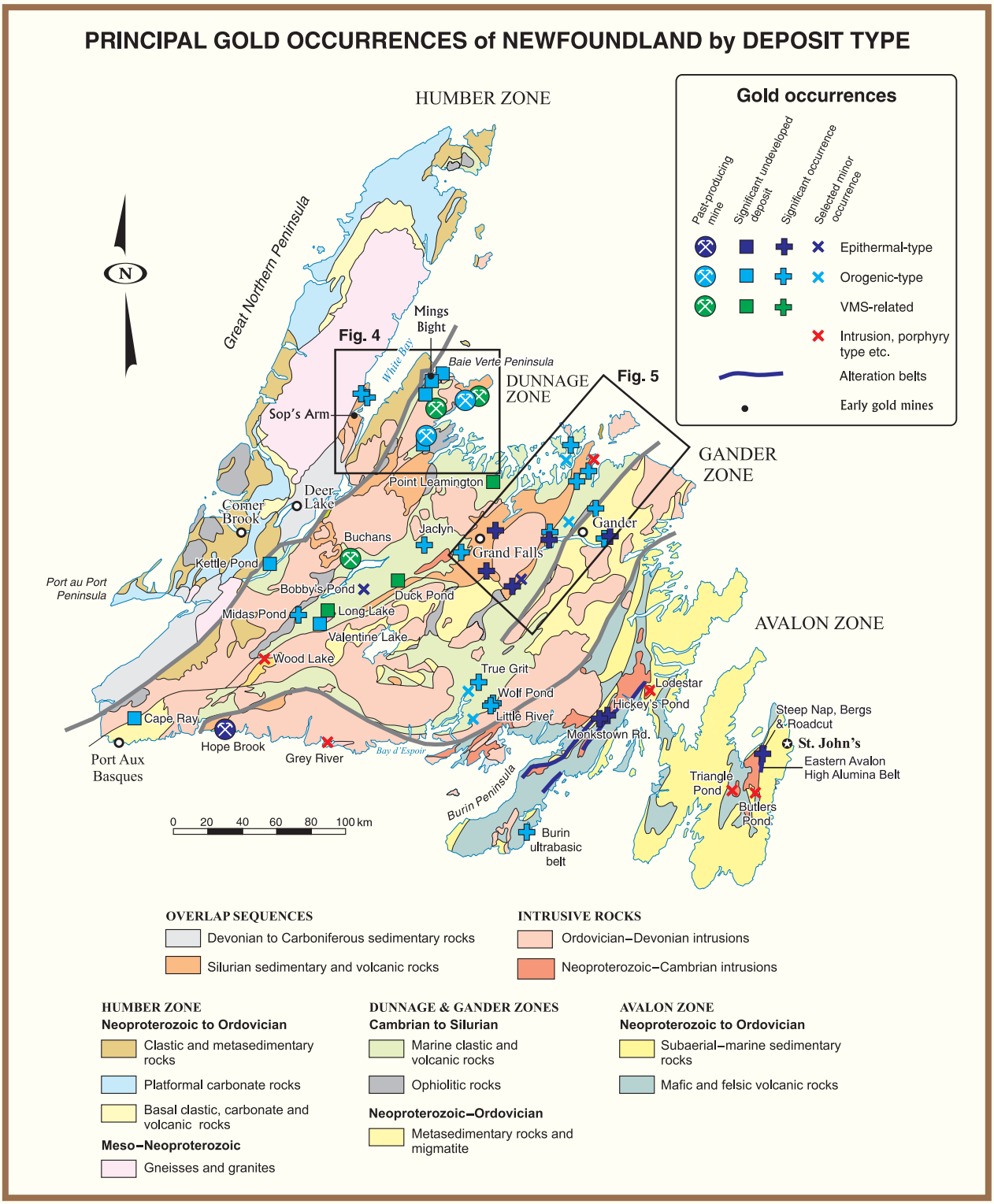

Figure 1. *Principal gold occurrences of Newfoundland by deposit type.*

Types of Gold Mineralization

The principal types of gold mineralization found in Newfoundland are volcanogenic massive sulphide-related, epithermal and orogenic (or mesothermal); minor examples of intrusion-related types also occur. A schematic model linking the various deposit types to crustal level and tectonic setting is shown in Figure 3.

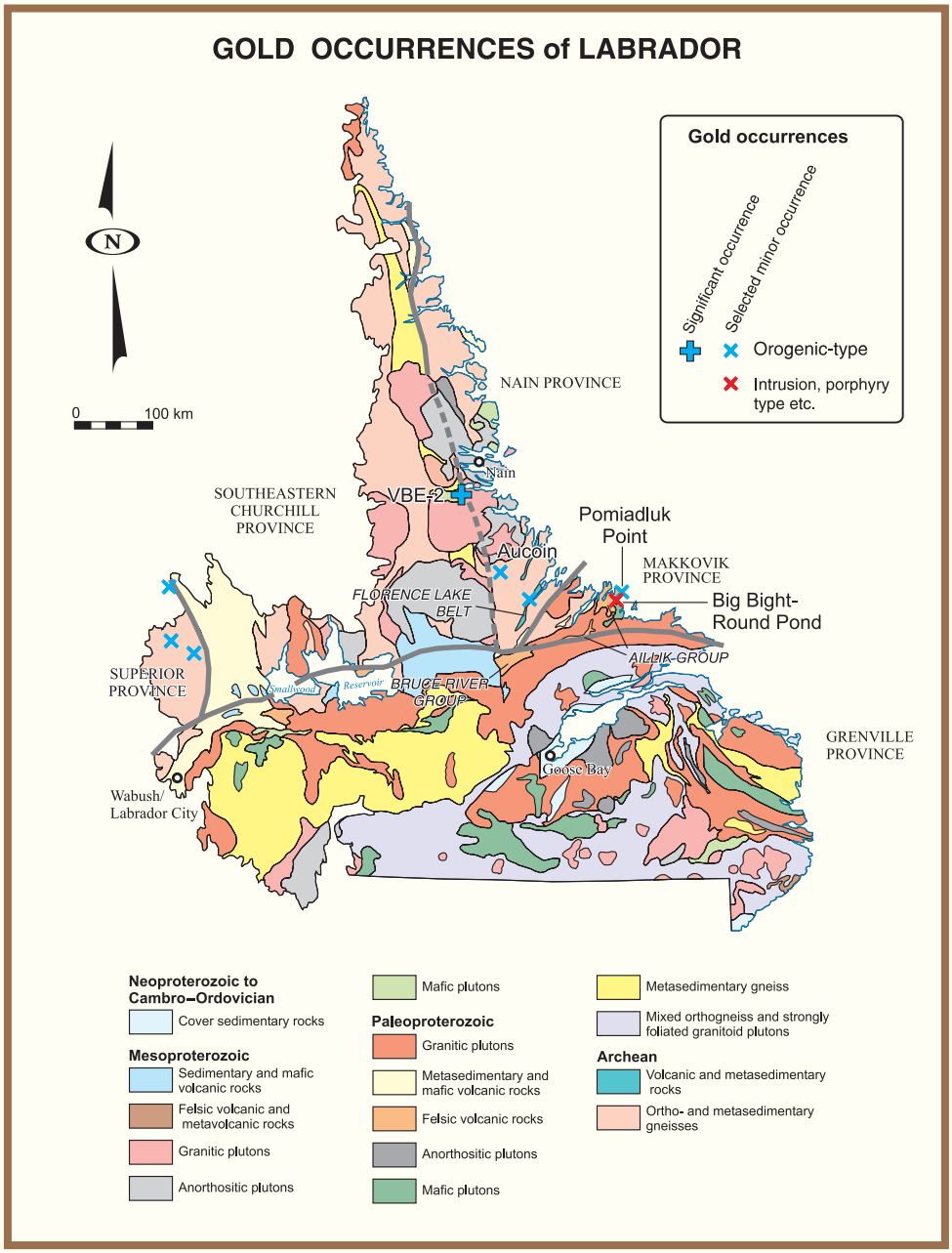

Figure 2. *Gold occurrences of Labrador by deposit type.*

Auriferous Volcanogenic Massive Sulphide (VMS) Environments

These consist mostly of the island-arc-related VMS deposits of the Dunnage Zone. The locations of the main deposits are shown in Figures 1 and 4. More detailed descriptions and additional locations are provided in the companion commodity series reports on zinc–lead and copper mineralization. The VMS deposits are subdivided into the copper-rich ophiolite–primitive-arc environments of Notre Dame Bay, e.g., Tilt Cove and Little Bay deposits (Figure 4), and the polymetallic, more mature arc environments associated with the Baie Verte Peninsula (e.g., Rambler) and interior Dunnage Zone (e.g., Buchans). Buchans (Figure 1) was the main producer of both base metals and gold, having produced 22.2 tonnes of gold at an average grade of 1.37 g/t. The Rambler Camp, however, also contained significant gold, notably in the Main and Ming mines and in the Main Mine footwall deposit (Table 1), which contains grades of around 4.5 g/t, and remains undeveloped below 200 m. Other potential base-metal deposits in the Dunnage Zone also have significant gold contents, e.g., the Duck Pond–Boundary VMS deposit that contains an estimated 4.4 tonnes of gold (Table 1) and entered production in January 2007.

Epithermal Environments

Most examples of epithermal mineralization in Newfoundland are Neoproterozoic and are found in the Avalon

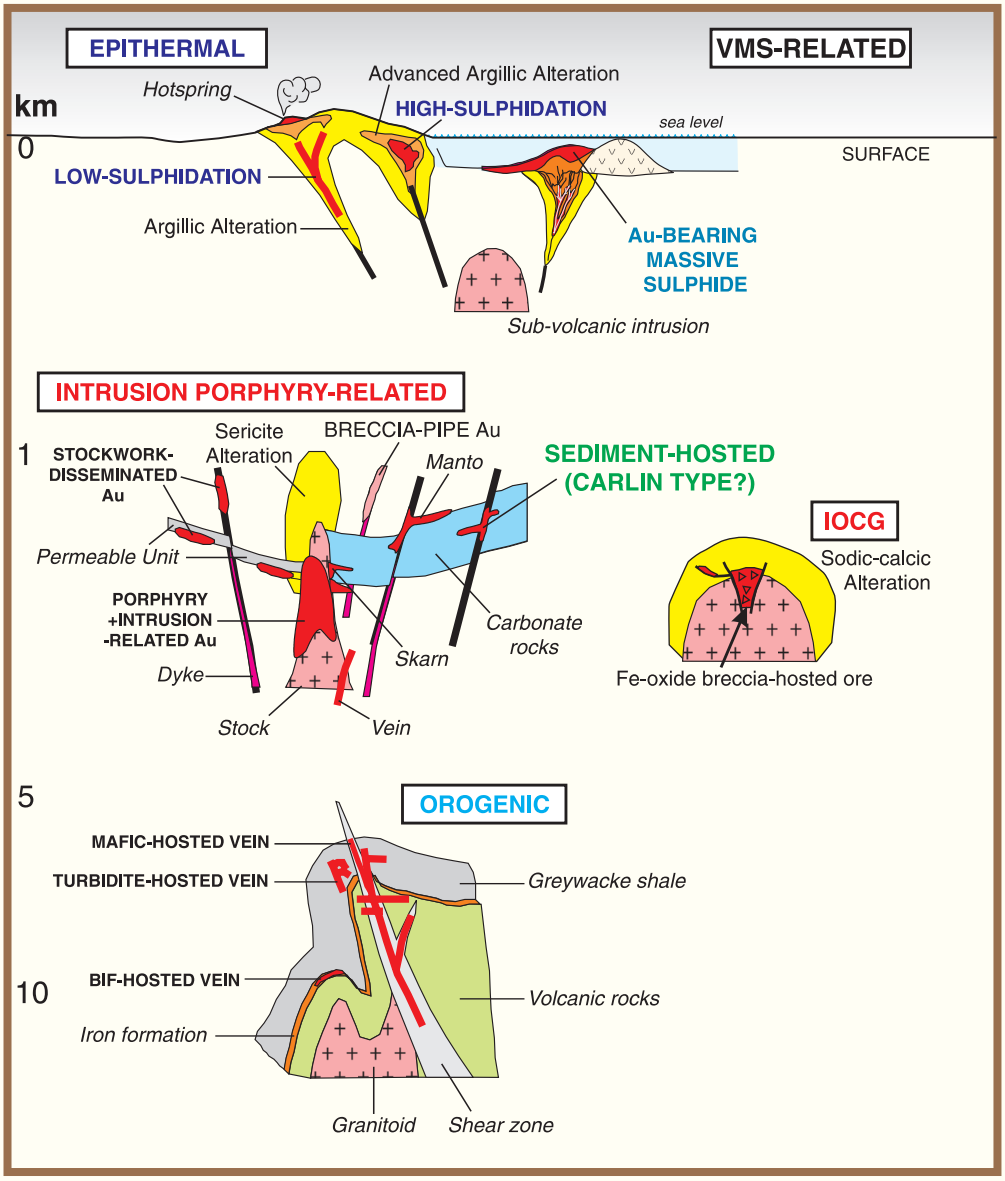

Figure 3. *Generalized model for gold-mineralization environments by crustal level. Modified after Poulsen* et al.*, 2000.*

Zone and equivalent rocks on the south coast of Newfoundland. Appalachian-age examples are found in the Dunnage Zone, notably in and around the Silurian rocks of the (so-called) Botwood basin (Figure 5). The Hope Brook Mine (Figure 1) of the western Avalon Zone is the only example of production from this deposit class. This was the largest deposit ever mined in the Canadian Appalachians and was the Province's second largest gold producer after Buchans. The deposit contained 41 tonnes (not all of which was recovered) of gold in a resource of 10.2 million tonnes grading 4.54 g/t and had a copper content of 12 224 tonnes. It is reputed to represent one of best examples of an epithermal high-sulphidation gold deposit in Canada. It is dated at between 578 and 574 Ma and is located on the hanging wall of a major shear zone within strongly deformed and metamorphosed Neoproterozoic sandstone and quartz-feldspar porphyry. Alteration is intense and consists of an internal zone of silicic alteration giving way to a broad external zone of argillic alteration.

The Hope Brook Mine contained 41 tonnes of gold and was the largest gold deposit ever mined in the Canadian Appalachians.

Epithermal deposits in the Avalon Zone are found principally on the Burin and eastern Avalon peninsulas (Figure 1). The Burin mineralization is a high-sulphidation type and consists of a series of hydrothermal, advanced argillic (pyrophyllite, alunite, specularite, quartz, sericite and locally lazulite) to silicic alteration belts that extend the length of the peninsula, and which are generally located in subaerial felsic volcanic rocks. Examples are the Hickey's Pond and Monkstown Road prospects, which lie within two parallel mineralization belts.

The eastern Avalon mineralization is contained mostly within the Eastern Avalon High-Alumina Belt (Figure 1), which extends along the faulted, eastern side of an uplift cored by the Holyrood Granite. This is the largest hydrothermal alteration zone in the Province and is located within subaerial felsic volcanic rocks. The belt contains examples of both low- and high-sulphidation mineralization. Advanced argillic alteration has produced extensive pyrophyllite alteration in the volcanic rocks, and has provided the basis for the Manuels Mine. Low-sulphidation mineralization (e.g., Steep Nap and Bergs prospects) is developed as zones of hydrothermally brecciated auriferous

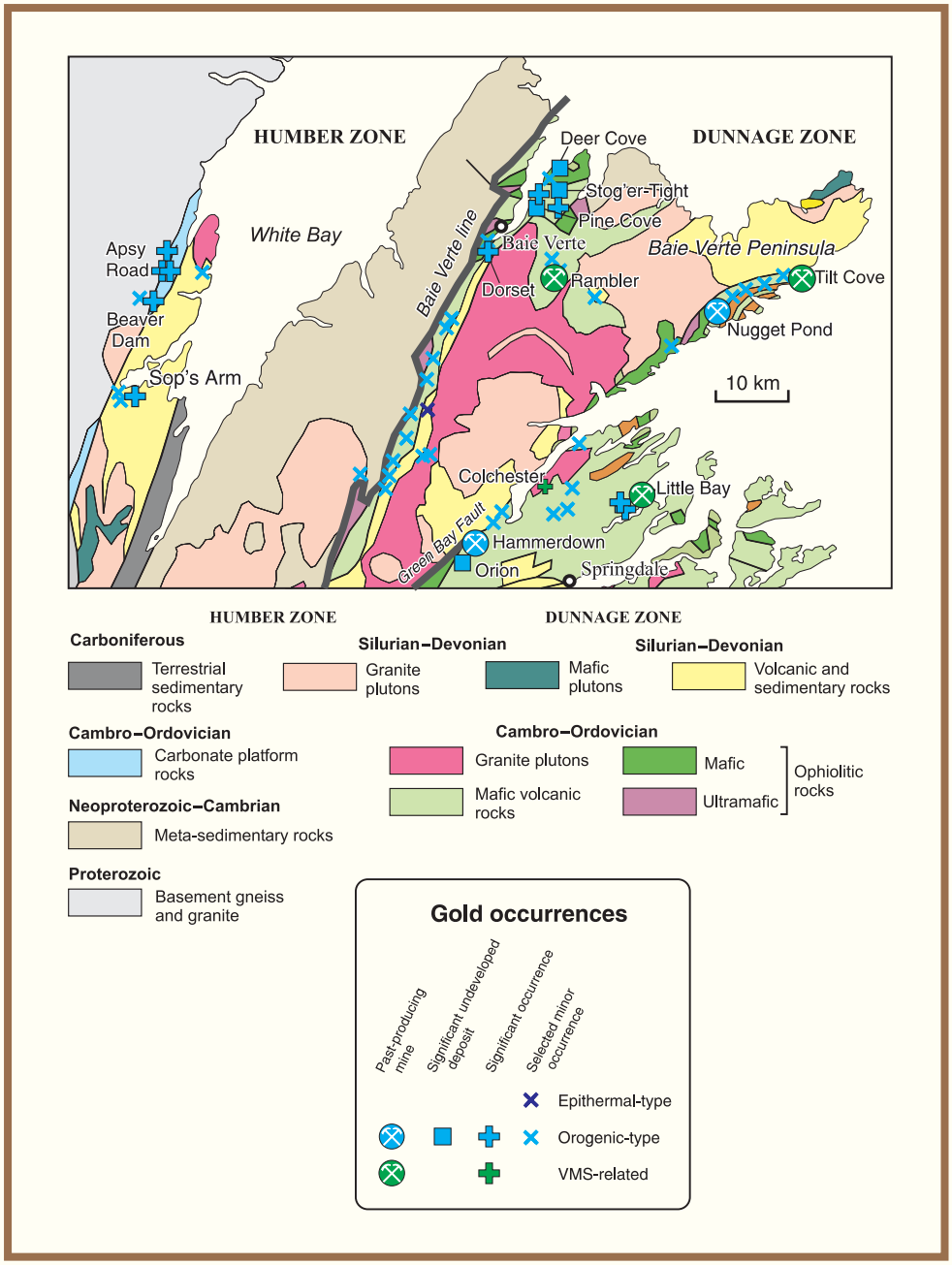

Figure 4. *Gold occurrences of the Dunnage and Humber zones, northeastern Newfoundland.*

quartz veins (Figure 6) of colloform to crustiform texture and typically containing quartz–adularia–hematite assemblages. The Bergs prospect has recently given a grab sample grade of 54.3 g/t. Gold is also found in hydrothermal breccias such as the Roadcut prospect. These are typically developed within zones of silica flooding, have a pyritiferous matrix and have assayed up to 210 g/t silver in grab samples. The eastern Avalon mineralization is believed to be equivalent in age to that of the Burin Peninsula and Hope Brook, and indicates a pan-Avalon period of late Neoproterozoic volcanism and gold mineralization.

Epithermal mineralization in central Newfoundland is focused mainly around the Botwood basin, an area of Silurian shallow-marine to fluviatile sandstones disposed around the Mount Peyton granite pluton (Figure 5). The basin is more a structural preservation of the Silurian rocks than a true depocentre. Significant epithermal occurrences include the Aztec, Rolling Pond, Outflow and Moosehead prospects and several smaller showings. These are of intermediate to low-sulphidation type and associated with silicification, quartz veining and brecciation (Figure 7). Rolling Pond preserves silica sinter indicating formation at, or near, paleo-surface levels. The Moosehead prospect has so far given the best grades of up to 227 g/t over 0.44 m, and is being actively explored.

Other epithermal occurrences (Figure 1) are found in the central Dunnage Zone, e.g., Bobby's Pond, which is a high-sulphidation type and associated with native sulphur and orpiment, and in the Gander Zone, where the best examples are the Stallion trend, low-sulphidation quartz–chalcedony breccia veins (*see* Cover and Figure 8).

Orogenic (Mesothermal) Deposits

This broad class includes a wide variety of occurrences that share the common attributes of being vein-hosted, associated with major faults or shear zones, and late orogenic in timing. Reactive rocks, such as mafic intrusions, iron- or graphite-rich sedimentary rocks, and carbonates, seem to be important as hosts for mineralization. The extensive carbonate alteration, presence of CO_2-rich fluid inclusions, and late orogenic timing have been used to suggest formation by metamorphic fluids. However, the gen-

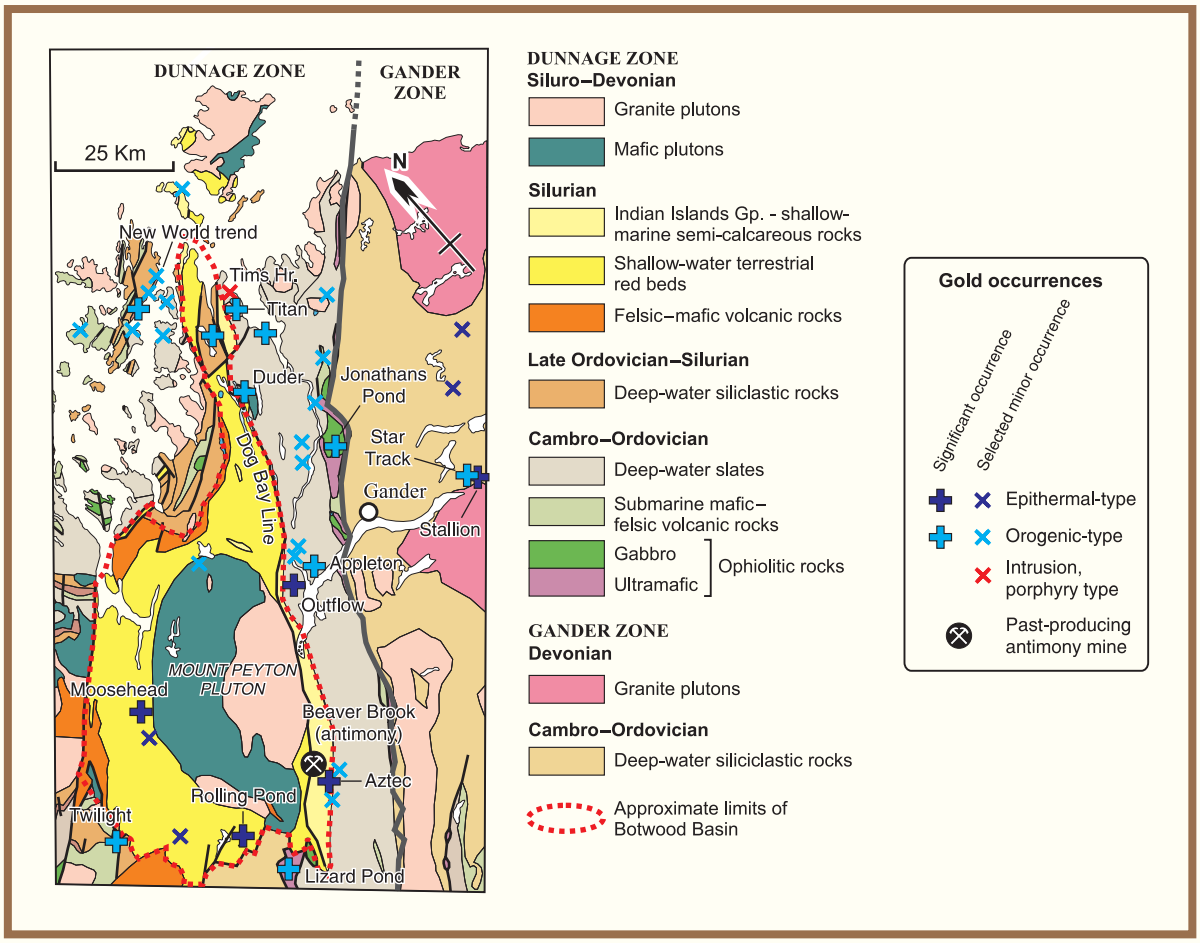

Figure 5. *Gold occurrences of the eastern Dunnage Zone, including the "Botwood basin" area.*

Figure 6. *Low-sulphidation, epithermal quartz–adularia–hematite veining showing boiling textures (stockwork breccia) at the Steep Nap prospect, Avalon Zone.*

etic origin in many cases is uncertain and some occurrences may be intrusion-related rather than orogenic. Some occurrences, particularly in the eastern Dunnage Zone, are also associated with textures that suggest a formation-level transitional to epithermal styles. (Orogenic gold occurrences are described below according to their area of occurrence.)

Humber Zone. Within this zone, the only significant occurrences are in western White Bay (Figure 4), where a sliver of Cambro-Ordovician platformal cover rocks has been thrust against the Precambrian basement granites and gneisses of the Humber Zone. Both basement and cover rocks are intruded by a Silurian plutono-volcanic complex that may have provided the thermal energy for a number of large-scale hydrothermal alteration systems located along the basement–cover fault contact. There are three main areas of gold mineralization: the Beaver Dam, Road and Apsy zones (collectively known as the Rattling Brook prospect). Most of the mineralization is low grade (less than 4.4 g/t) and located within Precambrian basement granites, where it is associated with quartz veining and strong pyrite alteration. However, mineralization has also

Figure 7. *Hydrothermal breccia associated with epithermal, low-sulphidation mineralization, Outflow prospect, central Newfoundland.*

locally affected the overlying Cambro-Ordovician rocks, where gold is found mostly in the basal quartzites but reaches peak values of up to 11 g/t in the basal, iron-rich part of the overlying semi-calcareous Forteau Formation (Figure 9). This mineralization is present, perhaps intermittently, along a 4-km strike length and suggests an attractive stratigraphic target. It has also been viewed as having possible Carlin-type affinities.

The Baie Verte Peninsula hosts several significant undeveloped deposits, e.g., Deer Cove, Stog'er Tight and Pine Cove.

Gold mineralization in quartz–base-metal veins is also found within the Silurian metasedimentary and felsic volcanic rocks of this area where it formed the basis for one of Newfoundland's earliest attempts at gold production at the Browning Mine (Sop's Arm, Figure 1).

Western Dunnage Zone. This is the area west of the Red Indian Line and includes the Baie Verte and Springdale peninsulas, which have been the most prolific areas to date for orogenic gold mineralization (Figure 10). The Baie Verte Peninsula hosts several significant deposits (Deer Cove, Stog'er Tight and Pine Cove; Table 1; Figures 4 and 11), most of which are hosted by quartz–carbonate–pyrite vein systems within ophiolitic mafic rocks and are associated with major structural breaks. These mafic-hosted deposits are also associated with intense carbonate–pyrite wall-rock alteration and have been compared to the Californian Mother Lode deposits. The Pine Cove deposit is currently being tested for development.

Mineralization is also associated with sedimentary rocks. The most notable example is the Nugget Pond deposit, where gold is hosted within a clastic unit overlying pillow lavas of the Betts Cove ophiolite sequence. Mineralization occurs as a strata-bound zone of disseminated pyrite–stilpnomelane alteration in association with veins, irregular clots and pegmatitic zones of quartz–albite–calcite ± pyrite material. The deposit seems to have originated by sulphidation of magnetite-rich zones within the basal sedimentary sequence, with the access of mineralizing hydrothermal fluids being controlled by a crosscutting fault. Another example is the Goldenville deposit (Mings Bight, Figure 1), where vein-style mineralization is found within a banded magnetite iron formation. This was mined briefly ca. 1903.

The Springdale Peninsula contains the recently closed Hammerdown Mine and the Orion deposit. The Hammerdown deposit (including the nearby Muddy Shag and Rumbullion zones), hosted by sulphide-rich, quartz and quartz–carbonate veins, is one of a number of occurrences located within Cambro-Ordovician volcanic and sedimentary rocks along the Green Bay fault, a major regional shear zone. Similar rocks to those of the Baie Verte Peninsula are also found in the Grand Lake area, where Glover Island hosts numerous vein-hosted prospects, including the small Kettle Pond deposit.

The Cape Ray fault zone at the southwestern extremity of the Dunnage Zone (Figure 1) is host to three deposits discovered during the 1980s, namely the 04, 41 and 51

Figure 8. *Low-sulphidation epithermal vein showing multiple generations of chalcedonic veining and brecciation at the Stallion prospect, Gander Zone.*

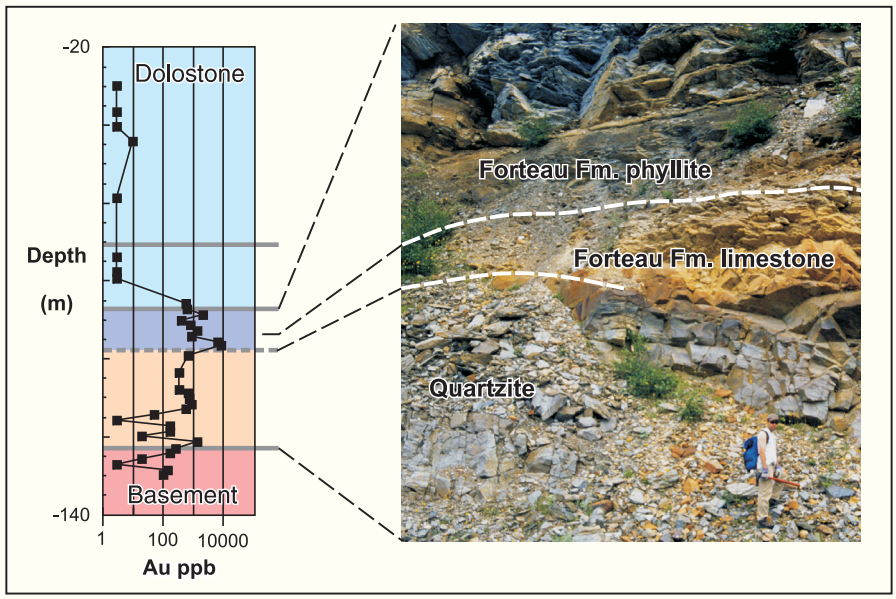

Figure 9. *The platformal Cambro-Ordovician section of western White Bay showing the associated gold values from Apsy prospect drill core. Note gold peak at base of Forteau Formation.*

deposits (grouped as Cape Ray in Table 1). The fault is a major mylonite zone developed during continental collision and suturing in the Late Silurian. The deposits were the subject of feasibility studies in the mid 1980s and in 1990, and are presently being re-explored. They consist predominantly of complex, syn-fault, auriferous quartz–base-metal veins located within Ordovician–Silurian graphitic schists of the Windsor Point Group. Other prospects along the fault zone are hosted by the Windowglass Hill granite and iron-rich meta-sedimentary rocks of the Windsor Point Group.

Eastern Dunnage Zone. The granitic and volcanic rocks of this region host several vein-hosted gold occurrences. Two prominent examples (Figure 1) are Midas Pond (auriferous quartz–pyrite veins in heavily altered felsic volcanic rocks) and Valentine Lake (quartz–pyrite–tourmaline veins in a Neoproterozoic granite). The latter has recently given an inferred resource estimate of 1.3 million tonnes at 10.5 g/t. The thick Ordovician turbidite sequences that overlie the volcanic sequences also locally host gold mineralization. An important recent discovery in this respect is the Jaclyn vein, which consists of a 375-m-long quartz-vein array located within folded greywackes and shales. This has given encouraging drill results of up to 17.69 g/t over 2.3 m. Other sediment-hosted vein examples are True Grit, Twilight and the Appleton prospects (Knob, Bullet and Dome), the latter being associated with northeast-trending topographic linears probably related to faults.

On the southeastern margin of the Dunnage Zone (Figure 1), felsic volcanic rocks near Bay d'Espoir host

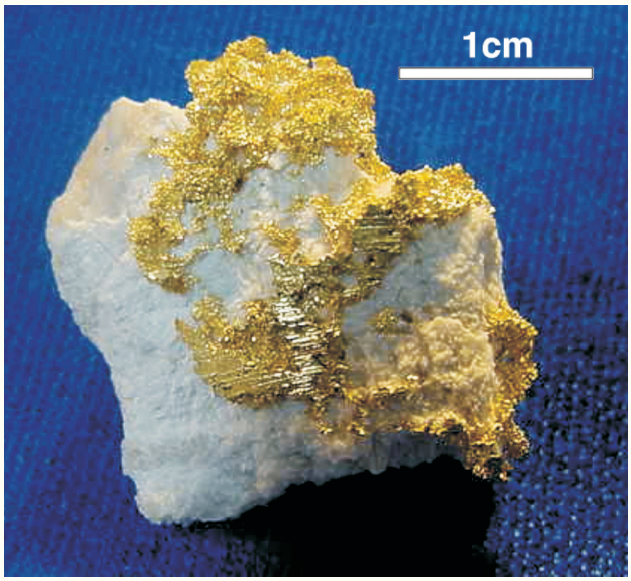

Figure 10. *Native gold from the Dorset prospect, Baie Verte Peninsula (photo courtesy of Paul Crocker and Grayd Resource Corporation).*

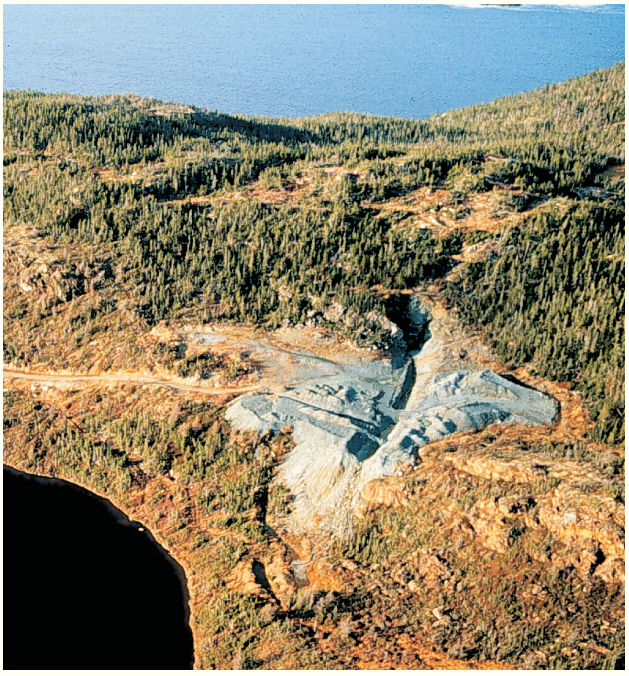

Figure 11. *Aerial view of the Deer Cove deposit showing exploration adit.*

several auriferous quartz-vein occurrences (e.g., Little River and Wolf Pond), generally having a stibnite–arsenopyrite association. More prospects are associated with the northeastern part of the Dunnage Zone where it overthrusts the Gander Zone (Figure 5). This contact is decorated by a string of dismembered ophiolitic rocks and contains several gold prospects (e.g., Jonathans Pond) in a setting similar to that of the Baie Verte Peninsula. Several nearby significant prospects are also hosted by metagabbroic rocks, notably the Duder Lake and Titan prospects (Figure 12). These are associated with strong silica and iron-carbonate alteration and are located close to the Dog Bay Line, a major late-orogenic fault. Also, a number of vein-hosted gold occurrences have been recently discovered along a series of northeast-trending linear features in mid to Upper Ordovician sedimentary sequences (including mélange and associated porphyry intrusions) of eastern Notre Dame Bay, e.g., the New World trend (Figure 5), where values up to 87 g/t over 0.8 m have been recorded in channel samples.

Gander and Avalon Zones. To date, these zones have contained relatively few orogenic-type occurrences; however, exploration is revealing new prospects in the metasedimentary rocks of the Gander Zone (e.g., Star Track, Figure 5). The Avalon Zone contains small occurrences of shear-zone-related mineralization (e.g., the Kitchen prospect) in a belt of ophiolitic rocks belonging to the Neoproterozoic Burin Group at the southern end of the Burin Peninsula. The setting and iron-carbonate alteration of these occurrences are also reminiscent of Mother Lode and Baie Verte mineralization styles.

Figure 12. *Quartz vein and iron-carbonate alteration in metagabbro at the Titan prospect, northeast Dunnage Zone.*

Labrador. This region (Figure 2) contains very few gold occurrences, possibly due to its poorly prospected nature. The Archean Nain Province contains geochemically anomalous gold in association with strong iron-carbonate alteration in the Florence Lake greenstone belt, and also in quartz–base-metal veins at the Aucoin showing. The Superior Province also contains minor gold mineralization, the northern occurrences being associated with metamorphosed iron formation and the southern ones with pyrite–pyrrhotite ± arsenopyrite veining in mafic and metasedimentary gneisses. The eastern Makkovik Province contains a small quartz-vein-hosted occurrence in felsic volcanic rocks at Pomiadluk Point. The southeastern Churchill Province hosts the VBE-2 prospect, which is located within the Tasiuyak metasedimentary gneiss, and contains up to 5.5 g/t gold in sulphide–graphite-rich layers.

Intrusion-Associated Deposits

As used here, this includes all deposit types related to igneous intrusions, including porphyry and intrusion-related (*sensu stricto*) types. There are few examples of these in the Province; however, they may be overlooked deposit types. The Grey River area, which is situated within a Siluro-Devonian batholith on the south coast of Newfoundland (Figure 1), is noted for its quartz-vein-hosted tungsten mineralization but also contains a zone of copper–molybdenum–gold mineralization. Although originally interpreted as a porphyry-style environment, it has been suggested that the co-existence of gold (up to 1.0 g/t) with antimony–bismuth–tungsten mineralization may indicate an intrusion-related environment similar to that of the Alaskan Pogo and Fort Knox deposits. The Wood Lake (Au–As–Cu) and Tims Harbour (Au–As–W–Cu) occurrences, on the western and eastern sides of the Dunnage Zone respectively, may represent additional examples of intrusion-related mineralization. Other examples include the Neoproterozoic Lodestar (Au–As–Cu–Fe), Butlers Pond (Au–Cu–Fe) and Triangle Pond (Au–Cu) occurrences of the Avalon Zone (Figure 1).

The only intrusion-related examples in Labrador appear to be in the Big Bight–Round Pond area of the eastern Makkovik Province (Figure 2), where anomalous gold and silver values are associated with carbonate–base-metal and molybdenite–fluorite veins peripheral to high-level granite stocks.

Exploration Potential

Since 2002, gold exploration in Newfoundland and Labrador has been on an upswing, driven partly by rising metal prices but also by the application of new deposit models at the grassroots level. The fact that many recent discoveries have been made by prospecting further supports the grassroots potential. As a result, nearly all known deposits are undergoing renewed exploration. Gold-rich VMS deposits remain an attractive exploration target, examples being the Colchester property (a copper-rich VMS deposit near Notre Dame Bay), the deep, down-plunge extensions of the Rambler camp deposits and the Mary March prospect near Buchans.

Orogenic gold is currently the most widespread exploration target. Important criteria seem to be 1) proximity to major fault zones, and 2) reactive host rocks such as mafic intrusive–volcanic rocks, and iron- or graphite-rich sedimentary rocks.

For gold-only deposits, orogenic gold mineralization seems to be the favoured target, mainly in the Dunnage Zone where the Pine Cove, Cape Ray and other deposits represent advanced exploration targets. Promising new grassroots targets, such as the Jaclyn vein, Valentine Lake, New World trend and Titan prospects, are also being generated. Some of these are in the previously little-explored sedimentary rocks that overlie the volcanic-arc sequences, indicating considerable potential for further discovery. The deposit model being considered for this type of mineralization is that sometimes known as turbidite-hosted gold and is exemplified by the Bendigo–Ballarat deposits of southeast Australia. Fold–fault control of gold-bearing quartz veins (e.g., as saddle reefs) is probably the most important factor in this type of deposit.

From discoveries to date, the most prospective orogenic gold environments would seem to be those associated directly or indirectly with major faults or shear structures, particularly in structurally competent units where brittle fracturing may produce thick vein development; and with reactive host rocks. In the latter respect, important prospective rock types, together with local examples, are:

Mafic intrusive or volcanic rocks – Pine Cove, Deer Cove, Stog'er Tight, Duder Lake and Titan

Fe-rich sediment or iron formation – Nugget Pond, Goldenville and Beaver Dam-Apsy

Graphitic sedimentary rocks – Cape Ray

Siliciclastic rocks – Appleton, Jaclyn and New World trend.

The epithermal environments have proven potential and the high- and low-sulphidation environments of the Avalon and Dunnage zones will continue to represent attractive targets, both for medium-size deposits (cf. Hope Brook) but also for smaller bonanza-grade ones. Most epithermal occurrences are associated with well-preserved volcano-sedimentary units; however, the Hope Brook deposit indicates that such mineralization can also be preserved in more deformed and highly metamorphosed rocks.

The potential for Carlin-type mineralization, i.e., gold–pyrite mineralization forming stratabound or discordant replacements in semi-calcareous sequences, has recently received much attention. The eastern Botwood basin contains a belt of Silurian semi-calcareous and siliciclastic rocks known as the Indian Islands Group (Figure 5), which has been reported to contain signatures of Carlin-type mineralization including decalcification, silicification and vuggy jasperoid development. Similar interpretations have been applied to the mineralized basal Cambro-Ordovician rocks of the western White Bay area. Exploration is still at a preliminary and confidential stage; therefore it is too early to confirm predictions of Carlin-type environments. There is little doubt, however, that the application of this model has attracted widespread attention and opened up new exploration targets.

Labrador remains a largely unexplored region for gold. Although much of the region is geologically unfavourable, there are areas that may have potential, e.g., the Tasiuyak gneiss of northern Labrador. Recent attention has also focused on the possibility of iron-oxide–copper–gold (IOCG) mineralization in association with the granitoid and cover volcanic rocks (Aillik and Bruce River groups) of the Makkovik Province in eastern Labrador (Figure 2). This is an area noted for its uranium and epigenetic copper mineralization, but recently has been shown to also contain some associated gold mineralization. The caldera-related volcanic sequences of this region (e.g., Bruce River Group) are perhaps also worthy of attention for their epithermal-mineralization potential.

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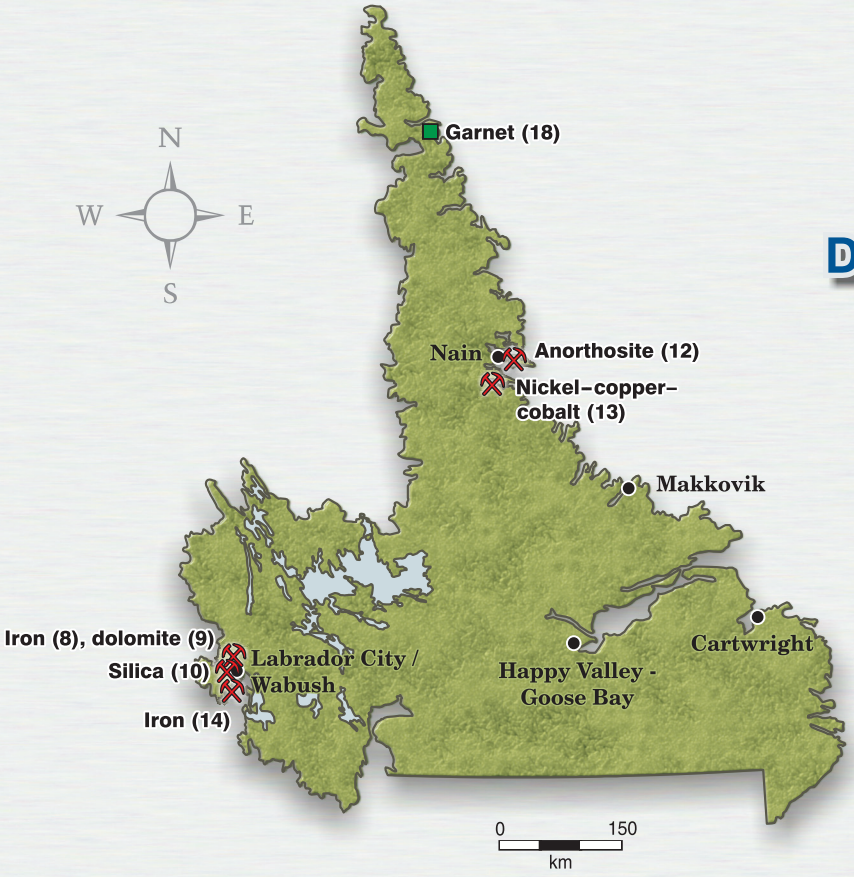
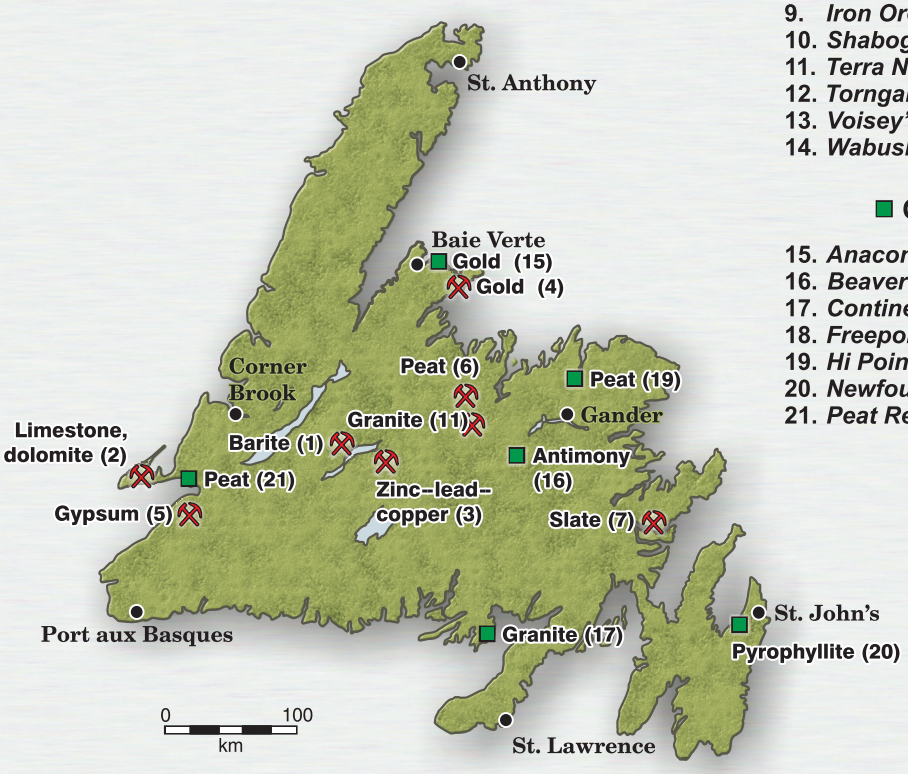
WINTER 2008



** Note scale differences of Labrador and Newfoundland maps*



Commodities in production

1. *Atlantic Barite Ltd.,* Buchans
2. *Atlantic Minerals Ltd.,* Lower Cove
3. *Aur Resources Inc.,* Duck Pond
4. *Crew Gold Canada Ltd.,* Nugget Pond
5. *Galen Gypsum Mines Ltd.,* Coal Brook
6. *Hi Point Industries (1991) Ltd.,* Bishop's Falls
7. *Hurley Slateworks Company Inc.,* Burgoynes Cove
8. *Iron Ore Company of Canada,* Labrador City
9. *Iron Ore Company of Canada,* Labrador City
10. *Shabogamo Mining & Exploration Ltd.,* Labrador City
11. *Terra Nova Granite Inc.,* Jumpers Brook
12. *Torngait Ujaganniavingit Corp.,* Ten Mile Bay
13. *Voisey's Bay Nickel Company Ltd.,* Voisey's Bay
14. *Wabush Mines Ltd.,* Wabush

Commodities in development

15. *Anaconda Mining Inc.,* Pine Cove
16. *Beaver Brook Antimony Mine Inc.,* Beaver Brook
17. *Continental Stone Ltd.,* Belloram
18. *Freeport Resources,* Hutton Beaches
19. *Hi Point Industries (1991) Ltd.,* Gander Bay
20. *Newfoundland Pyrophyllite,* Manuels
21. *Peat Resources Ltd.,* Stephenville