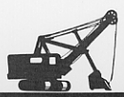
Province of British Columbia
Ministry of Energy, Mines
and Petroleum Resources

MINERAL RESOURCES DIVISION
Geological Survey Branch



# OPEN FILE

OPEN FILE 1995-12

Integrated Geological & Geochemical Map for the
Prediction of Intrusion-Related Mineralization,
Northern Vancouver Island
by S.J. Sibbick & K.A. Laurus
NTS 92L; 102I; Scale 1:250 000

# OPEN FILE 1995-12 Supplement
## Listing of the 141 RGS catchments used to produce Open File 1995-12

| MAP | RGS # | As | Au | Mo | Score | MAP | RGS # | As | Au | Mo | Score | MAP | RGS # | As | Au | Mo | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 92L | **883077** | 15 | 233 | 10 | 9 | 92L | **883160** | 6 | 133 | 1 | 4 | 92L | **881239** | 6 | 3 | 1 | 2 |
| 102I | **883038** | 14 | 280 | 12 | 9 | 92L | **883230** | 16 | 1 | 4 | 4 | 92L | **881246** | 7 | 3 | 1 | 2 |
| 92L | **881100** | 81 | 78 | 3 | 8 | 92L | **883271** | 9 | 2 | 3 | 4 | 92L | **881274** | 9 | 3 | 1 | 2 |
| 92L | **881279** | 100 | 37 | 7 | 8 | 92L | **881037** | 10 | 2 | 1 | 3 | 92L | **881277** | 9 | 2 | 1 | 2 |
| 92L | **881155** | 79 | 30 | 3 | 7 | 92L | **881038** | 15 | 2 | 1 | 3 | 92L | **881280** | 12 | 1 | 1 | 2 |
| 92L | **881156** | 15 | 13 | 7 | 7 | 92L | **881042** | 9 | 14 | 1 | 3 | 92L | **881302** | 9 | 1 | 2 | 2 |
| 92L | **881225** | 55 | 10 | 4 | 7 | 92L | **881045** | 6 | 15 | 1 | 3 | 92L | **883163** | 6 | 2 | 1 | 2 |
| 92L | **881303** | 36 | 9 | 4 | 7 | 92L | **881047** | 9 | 8 | 1 | 3 | 92L | **883164** | 6 | 2 | 1 | 2 |
| 92L | **883073** | 16 | 278 | 3 | 7 | 92L | **881048** | 15 | 2 | 1 | 3 | 92L | **883169** | 7 | 1 | 2 | 2 |
| 92L | **883076** | 11 | 10 | 5 | 7 | 92L | **881051** | 9 | 4 | 2 | 3 | 92L | **883177** | 10 | 1 | 1 | 2 |
| 92L | **881097** | 53 | 161 | 1 | 6 | 92L | **881057** | 11 | 3 | 1 | 3 | 92L | **883185** | 10 | 1 | 1 | 2 |
| 92L | **881120** | 50 | 275 | 1 | 6 | 92L | **881065** | 15 | 3 | 1 | 3 | 92L | **883194** | 20 | 1 | 1 | 2 |
| 92L | **881162** | 38 | 80 | 1 | 6 | 92L | **881068** | 17 | 2 | 1 | 3 | 92L | **883229** | 9 | 1 | 2 | 2 |
| 92L | **881199** | 6 | 27 | 5 | 6 | 92L | **881096** | 11 | 3 | 1 | 3 | 92L | **883232** | 7 | 1 | 2 | 2 |
| 92L | **881223** | 63 | 10 | 2 | 6 | 92L | **881152** | 12 | 3 | 1 | 3 | 92L | **883234** | 4 | 1 | 2 | 2 |
| 92L | **881226** | 24 | 54 | 1 | 6 | 92L | **881154** | 9 | 30 | 1 | 3 | 92L | **883272** | 10 | 1 | 1 | 2 |
| 92L | **881304** | 15 | 450 | 2 | 6 | 92L | **881182** | 23 | 2 | 1 | 3 | 92L | **883298** | 5 | 2 | 1 | 2 |
| 92L | **883171** | 20 | 424 | 2 | 6 | 92L | **881193** | 9 | 4 | 2 | 3 | 92L | **883303** | 9 | 2 | 1 | 2 |
| 92L | **883173** | 20 | 10 | 3 | 6 | 92L | **881198** | 5 | 10 | 1 | 3 | 102I | **881011** | 11 | 1 | 1 | 2 |
| 92L | **881074** | 22 | 12 | 2 | 5 | 92L | **881208** | 10 | 2 | 1 | 3 | 102I | **881012** | 10 | 1 | 1 | 2 |
| 92L | **881200** | 12 | 2 | 4 | 5 | 92L | **881240** | 7 | 19 | 1 | 3 | 102I | **883040** | 12 | 1 | 1 | 2 |
| 92L | **881233** | 12 | 9 | 2 | 5 | 92L | **881243** | 12 | 2 | 1 | 3 | 92L | **883228** | 4 | 1 | 2 | 2 |
| 92L | **881242** | 36 | 1 | 3 | 5 | 92L | **881244** | 10 | 5 | 1 | 3 | 92L | **881035** | 4 | 1 | 1 | 1 |
| 92L | **881282** | 12 | 14 | 2 | 5 | 92L | **881315** | 7 | 2 | 2 | 3 | 92L | **881039** | 6 | 1 | 1 | 1 |
| 92L | **881307** | 15 | 5 | 3 | 5 | 92L | **883118** | 11 | 2 | 1 | 3 | 92L | **881058** | 6 | 1 | 1 | 1 |
| 92L | **883072** | 11 | 147 | 1 | 5 | 92L | **883120** | 11 | 1 | 2 | 3 | 92L | **881059** | 6 | 1 | 1 | 1 |
| 92L | **883136** | 10 | 3 | 4 | 5 | 92L | **883122** | 11 | 2 | 1 | 3 | 92L | **881103** | 4 | 1 | 1 | 1 |
| 92L | **883176** | 41 | 7 | 1 | 5 | 92L | **883140** | 11 | 1 | 2 | 3 | 92L | **881104** | 4 | 1 | 1 | 1 |
| 92L | **881036** | 17 | 13 | 1 | 4 | 92L | **883168** | 9 | 1 | 3 | 3 | 92L | **881105** | 5 | 1 | 1 | 1 |
| 92L | **881050** | 19 | 17 | 1 | 4 | 92L | **883183** | 10 | 1 | 2 | 3 | 92L | **881197** | 4 | 1 | 1 | 1 |
| 92L | **881062** | 23 | 13 | 1 | 4 | 92L | **883184** | 12 | 1 | 2 | 3 | 92L | **881286** | 7 | 1 | 1 | 1 |
| 92L | **881066** | 4 | 101 | 1 | 4 | 92L | **883186** | 10 | 4 | 1 | 3 | 92L | **883057** | 7 | 1 | 1 | 1 |
| 92L | **881099** | 24 | 5 | 1 | 4 | 92L | **883187** | 10 | 2 | 1 | 3 | 92L | **883083** | 6 | 1 | 1 | 1 |
| 92L | **881106** | 4 | 59 | 1 | 4 | 92L | **883211** | 10 | 1 | 2 | 3 | 92L | **883098** | 6 | 1 | 1 | 1 |
| 92L | **881107** | 3 | 107 | 1 | 4 | 92L | **883239** | 9 | 2 | 2 | 3 | 92L | **883126** | 5 | 1 | 1 | 1 |
| 92L | **881119** | 24 | 2 | 1 | 4 | 92L | **883240** | 9 | 2 | 2 | 3 | 92L | **883127** | 5 | 1 | 1 | 1 |
| 92L | **881195** | 14 | 6 | 2 | 4 | 92L | **883273** | 7 | 2 | 2 | 3 | 92L | **883128** | 6 | 1 | 1 | 1 |
| 92L | **881196** | 9 | 105 | 1 | 4 | 92L | **883274** | 10 | 1 | 2 | 3 | 92L | **883129** | 6 | 1 | 1 | 1 |
| 92L | **881204** | 43 | 5 | 1 | 4 | 102I | **881010** | 10 | 2 | 1 | 3 | 92L | **883134** | 7 | 1 | 1 | 1 |
| 92L | **881207** | 14 | 9 | 1 | 4 | 102I | **881035** | 20 | 2 | 1 | 3 | 92L | **883165** | 6 | 1 | 1 | 1 |
| 92L | **881209** | 10 | 1 | 4 | 4 | 92L | **881044** | 6 | 2 | 1 | 2 | 92L | **883167** | 6 | 1 | 1 | 1 |
| 92L | **881273** | 11 | 4 | 2 | 4 | 92L | **881069** | 20 | 1 | 1 | 2 | 92L | **883175** | 9 | 1 | 1 | 1 |
| 92L | **881305** | 11 | 23 | 1 | 4 | 92L | **881083** | 7 | 5 | 1 | 2 | 92L | **883203** | 9 | 1 | 1 | 1 |
| 92L | **881306** | 12 | 24 | 1 | 4 | 92L | **881150** | 6 | 2 | 1 | 2 | 92L | **883238** | 7 | 1 | 1 | 1 |
| 92L | **881310** | 11 | 3 | 2 | 4 | 92L | **881179** | 6 | 2 | 1 | 2 | 92L | **883270** | 6 | 1 | 1 | 1 |
| 92L | **883119** | 10 | 1 | 3 | 4 | 92L | **881188** | 10 | 1 | 1 | 2 | 92L | **883473** | 7 | 1 | 1 | 1 |
| 92L | **883137** | 10 | 2 | 2 | 4 | 92L | **881202** | 9 | 2 | 1 | 2 | 92L | **883159** | 1 | 1 | 1 | 0 |

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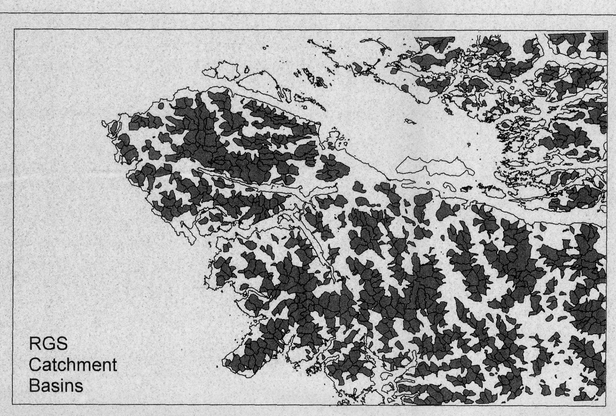
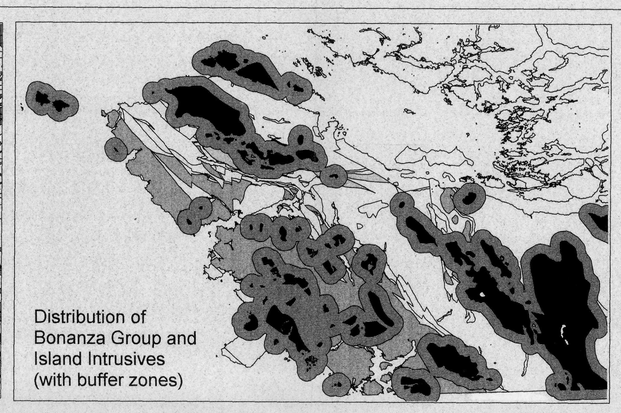
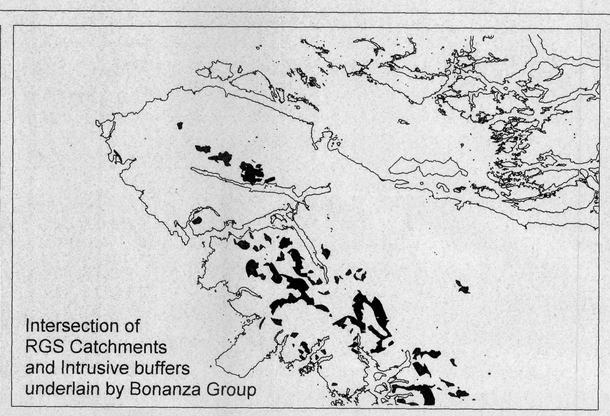


RGS
Catchment
Basins



Distribution of
Bonanza Group and
Island Intrusives
(with buffer zones)



Intersection of
RGS Catchments
and Intrusive buffers
underlain by Bonanza Group

BC
Ministry of Energy Mines and Petroleum Resources

Geological Survey Branch

1895 - 1995
100
YEARS OF GEOLOGICAL SURVEYING

OPEN FILE 1995-12

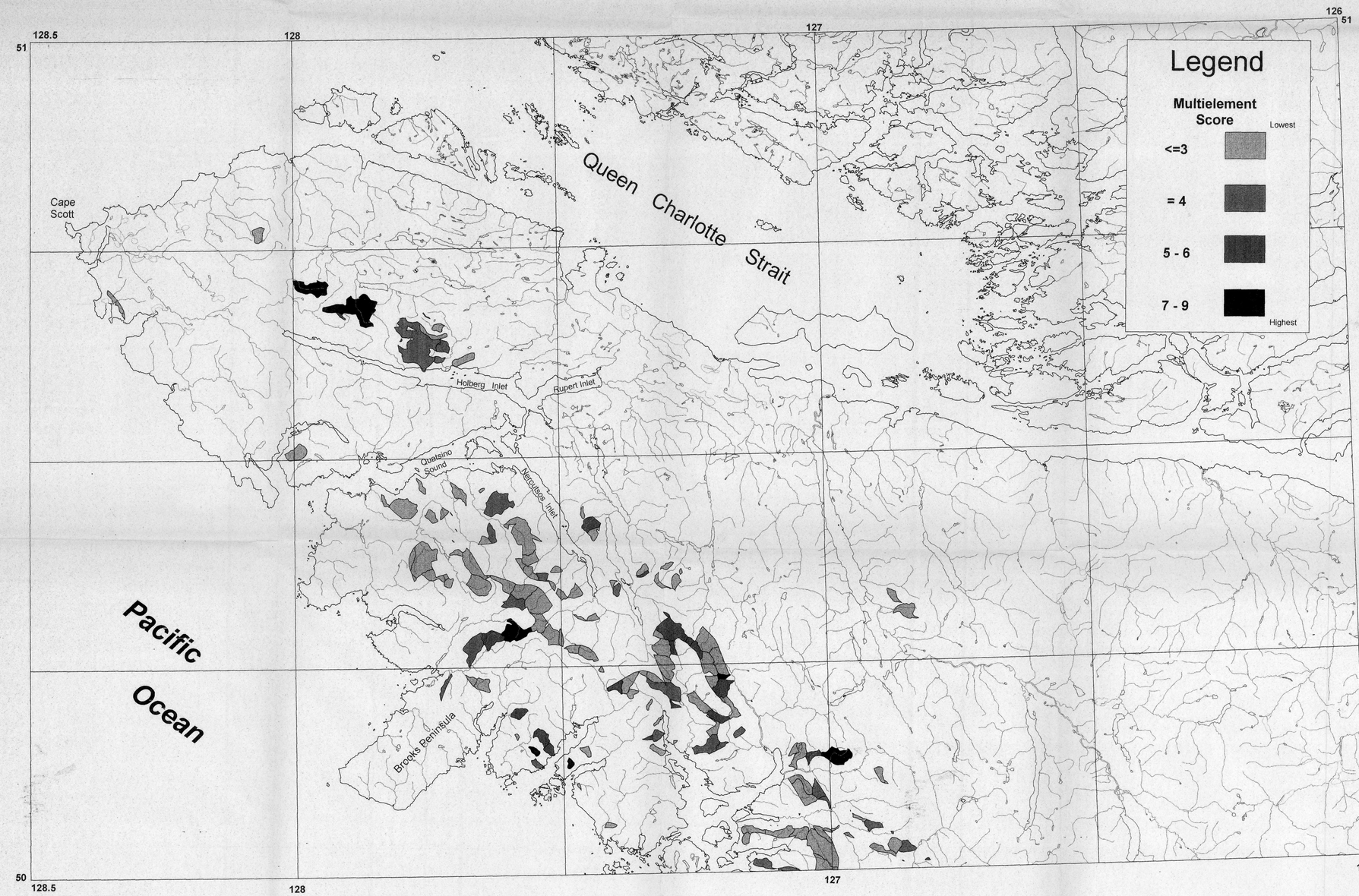
# INTEGRATED GEOLOGICAL AND GEOCHEMICAL MAP FOR THE PREDICTION OF INTRUSION-RELATED MINERALIZATION, NORTHERN VANCOUVER ISLAND

NTS 92L; 102I

By S.J. Sibbick and K.A. Laurus

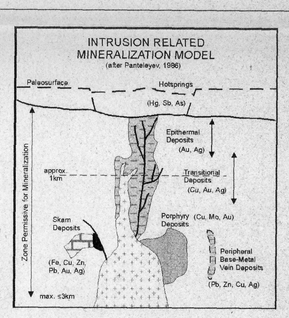
Scale 1:250 000

0 10 20 30 Kilometers




## INTRODUCTION

A primary target for mineral exploration in northern Vancouver Island are the Jurassic volcanic rocks of the Bonanza Group and the coeval rocks of the Island Plutonic Suite (Island Intrusives). Significant mineral deposits in this setting are porphyry coppper-molybdenum-gold, related peripheral base and precious metal vein and replacement deposits, and base and precious metal skarn deposits. These deposits form a near continuum of intrusion related mineral deposits. This open file is an attempt to integrate regional geological and Regional Geochemical Survey (RGS) data to predict areas which may be permissive for intrusion-related mineralization. Geological models (ie. Panteleyev, 1986) suggest that permissive areas for intrusion related mineralization generally lie within three kilometres of the intrusive body, where intrusion-driven hydrothermal activity is sufficient to deposit economic concentrations of metals in a receptive host rock.




## METHODOLOGY

1. Digitized catchment basins from the NTS 92L/102I RGS dataset (Matysek et al., 1988) were produced.
2. The geology of each catchment was determined in a GIS by overlaying the catchments on the Mineral Potential 1:250000 scale geology map (Massey, et al., 1994).
3. Three kilometre buffer zones were established around each Island Intrusive (JI) body - a subset of RGS catchments which intersected these buffers were created.
4. Catchments underlain only by Bonanza Group rocks were subdivided into two groups: A) those not intersecting the intrusive buffer zones, and B) those which intersect the buffer zones. Group A catchments represent background Bonanza Group rocks whereas Group B catchments represent potentially mineralized Bonanza Group rocks.
5. Metal concentrations for both groups were statistically analysed to determine which elements were significantly elevated in those catchments intersecting the intrusive buffers. Elements found to be potential pathfinders were arsenic, gold and molybdenum.
6. Concentration thresholds were calculated using probability plots. These thresholds were applied to the 141 catchments which contain Bonanza Group rocks, a varying percentage of Island Intrusive and intersect the 3 kilometre buffer surrounding the Island Intrusives.
7. Multielement (arsenic, gold and molybdenum) scores for each catchment were generated based on the calculated thresholds (see accompanying table).
8. Polygons depicted on the map are those resulting from the intersection of the RGS catchments and the 3 kilometre buffer zones. A single RGS sample may be represented by more than one polygon depending upon the orientation of the catchment basin and the intrusive body.

### Multielement Scoring Table

| | As (ppm) | Au (ppb) | Mo (ppm) | Score |
|---|---|---|---|---|
| Thresholds | ≤1 | ≤1 | ≤1 | 0 |
| | ≤9.9 | ≤5.7 | ≤2 | 1 |
| | ≤23.8 | ≤39.3 | ≤4.5 | 2 |
| | >23.8 | >39.3 | ≤7.5 | 3 |
| | - | - | >7.5 | 4 |
| | | Total Possible Score | | 10 |

## REFERENCES

Massey, N.W.D., Desjardins, P.J. and Grunsky, E.C. (1994) Geological Compilation Vancouver Island, British Columbia, NTS 92B, C, E, F, G, K, L; 102I; B.C. Ministry of Energy, Mines and Petroleum Resources, Open File 1994-6.

Matysek, P.F., Gravel, J.L. and Jackaman, W. (1988) 1988 Regional Geochemical Survey, Stream Sediment and Water Geochemical Data, NTS 92L/102I - Alert Bay Cape Scott; B.C. Ministry of Energy, Mines and Petroleum Resources, RGS 23.

Panteleyev, A. (1986) A Canadian Cordilleran Model for Epithermal Gold-Silver Deposits; Geoscience Canada, Volume 13, Number 2, pages 101-111.