BC Geological Survey
OPEN FILE MAP 2006-5

PRELIMINARY GEOLOGY OF THE NIMPKISH MAP AREA, NORTHERN VANCOUVER ISLAND (92L/07)

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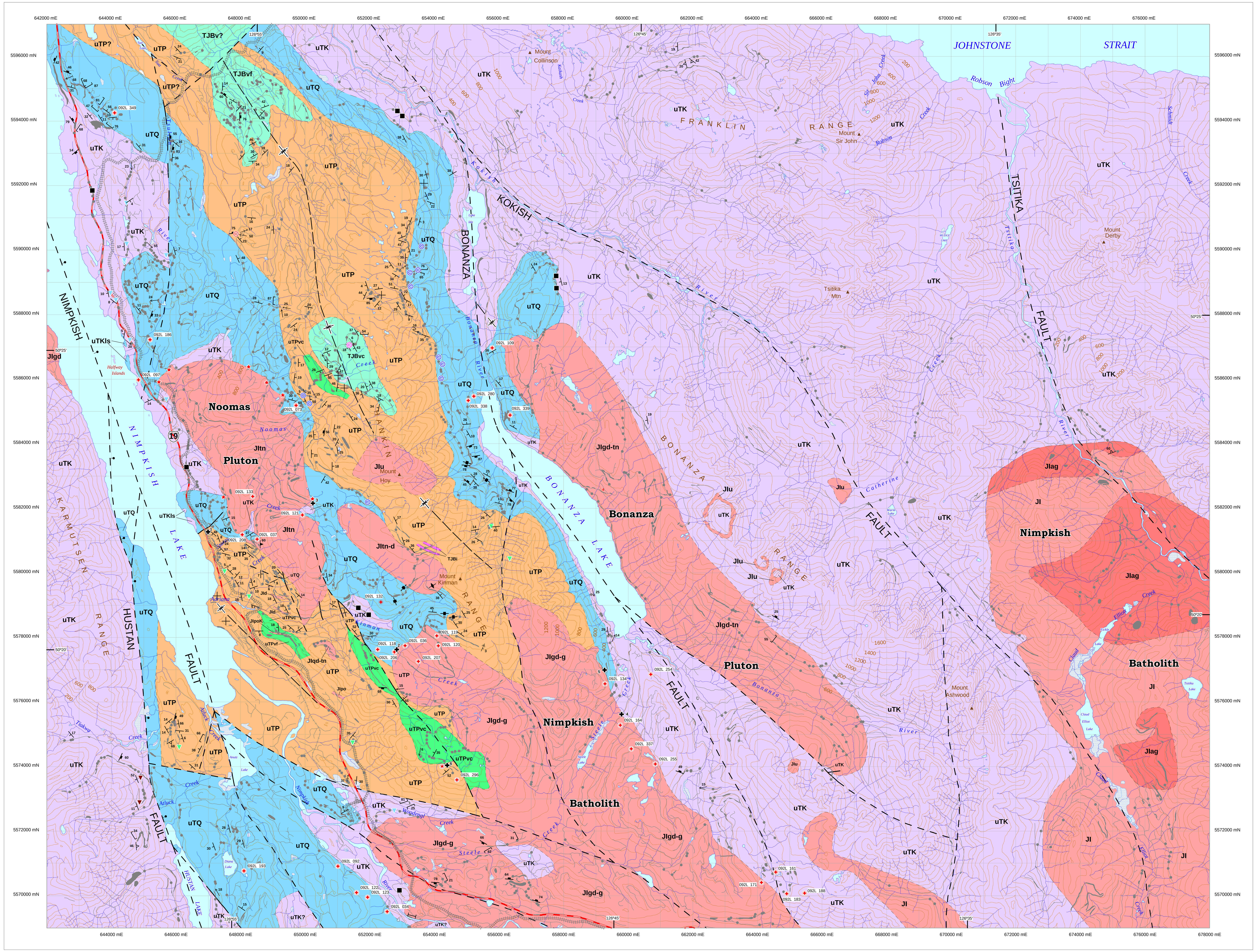

0 — 2.5 — 5
Kilometres
Scale 1 : 50 000

LAYERED ROCKS

UPPER TRIASSIC (CARNIAN) TO MIDDLE JURASSIC (MID-BAJOCIAN)
BONANZA GROUP

Norian or Rhaetian to Hettangian (in Nimpkish area)
"BONANZA VOLCANICS"

TJBv — Dark grey-green clinopyroxene- and lesser plagioclase-phyric basalt-andesite lava and waterlain volcanic breccia; minor interbedded lithic and crystal-lithic tuff, volcanic wacke, calcareous to non-calcareous siltstone, mudstone, shale and limestone

TJBvf - predominantly flows, commonly amygdaloidal

TJBvc - predominantly volcanic breccias

Late Carnian to Rhaetian or possibly Hettangian (in Nimpkish area)
PARSON BAY FORMATION

uTP — Medium grey to black, laminated to medium bedded impure limestone, calcareous to non-calcareous mudstone, siltstone and shale, locally graphitic, interbedded with minor volcanic wacke, tuffaceous wacke, feldspathic sandstone, and rare granule conglomerate

uTPvc — Volcaniclastic rocks: grey-green, mainly waterlain clinopyroxene- and plagioclase-phyric basalt-andesite volcanic breccias; includes minor rhyolite breccias and vitric-crystal-lithic tuff; minor interbedded wacke, siltstone, mudstone, shale and limestone

uTPvf — Lava flows: dark grey to grey-green or maroon, clinopyroxene-phyric basalt-andesite flows; locally amygdaloidal

▼ **uTPvc** - thin interbeds of volcaniclastic rocks too small to show at map scale

UPPER TRIASSIC (CARNIAN TO EARLY NORIAN)
VANCOUVER GROUP

Carnian (in Nimpkish area)
QUATSINO FORMATION

uTQ — Medium grey, laminated to very thickly bedded micritic to bioclastic limestone; rare chert nodules; commonly converted to marble in Nimpkish area

Carnian
KARMUTSEN FORMATION

uTK — Dark grey-green, aphanitic to plagioclase-phyric and locally megacrystic basalt flows; commonly amygdaloidal, minor pillow basalt, pillow breccia and hyaloclastite

uTKls — Thin horizons of grey limestone intercalated with Karmutsen basalt flows near the top of the succession.

▼ **uTKls**- thin interbeds of grey micritic limestone

▼ **uTKs**- thin interbeds of siltstone, mudstone, shale and minor limestone

■ Plagioclase-megacrystic Karmutsen basalt flow

INTRUSIVE ROCKS

EARLY (HETTANGIAN) TO MIDDLE (BAJOCIAN) JURASSIC
ISLAND PLUTONIC SUITE

Jl — Medium grey to pale grey or buff, medium to coarse-grained, equigranular to inequigranular granitoid rocks and porphyry: hornblende and/or biotite-bearing diorite (d), quartz diorite (qd), granodiorite (gd), tonalite (tn), and minor granite (g); plagioclase+/-hornblende dioritic porphyry (po) and minor potassium feldspar porphyry (poK); agmatite (ag)

Jlu - undifferentiated granitoid rocks

Minor Intrusions

JBi — Subvolcanic aphanitic to porphyritic basaltic intrusions, locally amygdaloidal

MAP SYMBOLS

- Geological contact, defined
- Geological contact, approximate
- Geological contact, inferred
- High-angle fault, defined (ball on downthrown side if known)
- High-angle fault, approximate
- High-angle fault, inferred
- Bedding, inclined
- Bedding, vertical
- Bedding, horizontal
- Slickenfibre lineations on fault plane
- Cleavage, fault-induced
- Minor fold with plunge
- Minor fold with axial-plane dip
- Recumbent fold
- Dike, inclined
- Dike, vertical
- Primary flow foliation in plutonic rocks, inclined
- Primary flow foliation in plutonic rocks, vertical
- Primary flow foliation in volcanic rocks
- Axial trace of syncline
- MINFILE 2005 locality (092L 010)
- Calc-silicate skarn ± sulphide (this study)
- Massive sphalerite (manto deposit; this study)
- Lithogeochemical assay locality
- Conodont locality (Early Norian)
- Conodont locality (Late Carnian)
- Conodont locality (barren sample)
- Outcrop examined
- Outcrop, too small to show at map scale

LITHOGEOCHEMICAL ANALYSES

Map ID / Sample		1 05GNX-2-8-1	2 05GNX-7-17-3	3 05DSV-4-1-1	4 05DSV-5-6-1	5 05DSV-6-2-1	6 05DSV-5-7-1	6 05DSV-5-7-1+	GSB Till 99	GSB Till 99	Difference %++
NAD83 (Zone 9)	Easting	646997	652808	650237	659796	654312	659273	659273	internal	Mean of	
	Northing	5581282	5577604	5582166	5575629	5574048	5577002	5577002	standard	10	
Ti	wt%	0.53	0.01	0.04	0.02	0.03	<0.001	0.001	0.54	1.13	71.1
Al	wt%	7.03	0.05	0.51	0.23	0.43	0.77	0.78	6.85	6.40	6.8
Fe	wt%	7.92	59.19	42.92	34.72	15.93	24.80	24.94	8.31	9.20	10.2
Mg	wt%	8.23	0.04	1.20	0.67	0.98	0.03	0.04	3.45	3.61	4.5
Ca	wt%	8.12	0.10	8.27	6.05	15.34	1.97	1.57	1.00	1.00	0.0
Na	wt%	0.97	0.01	0.05	0.01	0.03	0.01	0.01	1.90	1.85	2.6
K	wt%	0.04	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.83	1.57	61.6
P	wt%	0.03	0.03	0.02	0.02	0.02	0.00	<0.001	0.12	0.12	0.9
S	wt%	0.11	>10	5.25	>10	3.46	>10	>10	0.01	0.01	0.0
Mo	ppm	0.3	2.1	1.3	0.7	0.4	19.6	18.9	0.9	0.8	11.8
Cu	ppm	63	1798	2733	>10000	208	>10000	>10000	190	186	2.2
Cu**	wt%				23.27		18.62	18.58			
Pb	ppm	0.8	3.7	4.3	174	4.7	574	656	236	241	2.1
Zn	ppm	63	34	>10000	768	>10000	>10000	>10000	438	388	12.2
Zn**	wt%			2.27		8.06	17.52	17.11			
Ag	ppb	50	919	7511	>200000	487	>200000	>200000	1366	1575	14.2
Ag**	ppm				170		189	201			
Au*	ppb	6	17	51	375	3	170	95	30	36	18.2
Li	ppm	2.7	0.2	0.8	0.1	1.2	0.4	0.4	35		
Cs	ppm	0.2	0.1	0.4	0.1	0.1	0.1	0.1	1.5	1.9	23.5
Ba	ppm	23	2	17	1	20	2	2	784	846	7.6
Rb	ppm	0.9	0.3	0.8	0.1	0.2	0.2	0.2	26	48	57.7
Sr	ppm	200	3	38	1	44	257	266	104		
Sc	ppm	38	0.1	1.7	0.6	1.1	<0.1	<0.1	28.2	13	73.8
V	ppm	261	<1	8	12	10	2	4	197	107	59.2
Cr	ppm	448	6	9	6	5	1	1	323	398	20.8
Ni	ppm	370	5	2	314	2	112	128	220	261	17.0
Co	ppm	67	234	37	1332	300	557	604	50	53	5.0
Mn	ppm	1520	117	17598	726	26017	671	600	1394	1516	8.4
Hf	ppm	0.83	0.02	0.33	0.15	0.10	0.02	<0.02	0.79	3.64	128.7
Zr	ppm	17	0.4	7	4	3	0.6	1	23	108	130.3
Nb	ppm	<1	<1	<1	<1	<1	<1	<1	9		
Y	ppm	18.2	0.2	2.9	1.1	2.8	1.2	1.5	16.7	27	47.1
U	ppm	0.1	10.8	1.8	1.3	0.9	0.2	0.3	0.9	1.4	43.5
Ce	ppm	4.46	0.35	2.67	2.13	1	0.48	0.58	37.74	52.73	33.1
Ga	ppm	13.98	1.11	3.8	4.49	1.63	2.74	2.69	17.69		
Cd	ppm	0.07	0.63	166	81.34	601	2164	2091	1.11	0.74	40.0
As	ppm	2.1	<0.2	11.8	77.4	22	5	5	64.3	70	8.5
Sb	ppm	0.08	0.08	3.21	0.2	1.5	0.52	0.53	13.66	15.28	11.2
Bi	ppm	<0.04	5.87	1.63	16.15	1.36	97.91	118.68	0.22	0.13	51.4
Sn	ppm	0.4	<0.1	0.6	13	0.1	0.5	0.6	1		
W	ppm	<0.1	0.6	58.5	4.8	0.4	8.4	4.3	0.5	0.1	133.3

Samples were jaw crushed at the B.C. Geological Survey (Victoria), then pulverized in a steel mill at Acme Analytical Laboratories (Vancouver). Glass wash between each sample. All analyses were performed by four acid digestion - inductively coupled plasma emission/mass spectrometry.
+Hidden duplicate ++Percent difference calculated as the difference between analyzed value of GSB Till 99 and the mean of ten previous analyses
*Analysis by lead collection fire assay with ICPES finish. **Analysis by four-acid digestion - inductively coupled plasma emission spectrometry
Sample descriptions: 1. Volcanic wacke with diseminations and veins of pyrite + chlorite; 2. Massive pyrrhotite-pyrite ore in calc-silicate skarn; 3. Pyrite-sphalerite-magnetite-malachite in calc-silicate skarn; 4. Pyrite-chalcopyrite-malachite-magnetite in calc-silicate skarn; 5. Massive stratiform sphalerite-greenockite-chalcopyrite-pyrrhotite; 6. chalcopyrite-pyrite-malachite-bornite-Native Cu in calc-silicate skarn.

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Nixon, G.T., Kelman, M.C., Stevenson, D., Stokes, L.A. and Johnston, K.A. (2006): Preliminary geology of the Nimpkish map area (92L/07), northern Vancouver Island; B. C. Ministry of Energy, Mines and Petroleum Resources, Paper 2006-1, pages 135-152.

BASE MAP INFORMATION:

Base map has been produced from digital TRIM (Terrain Resource Inventory Management) 1:20 000 totgraphic database provided by LandData BC

North American Datum (NAD) 1983. Universal Transverse Mercator Projection (Zone 9). Elevation in meters above mean sea level.

CITATION:

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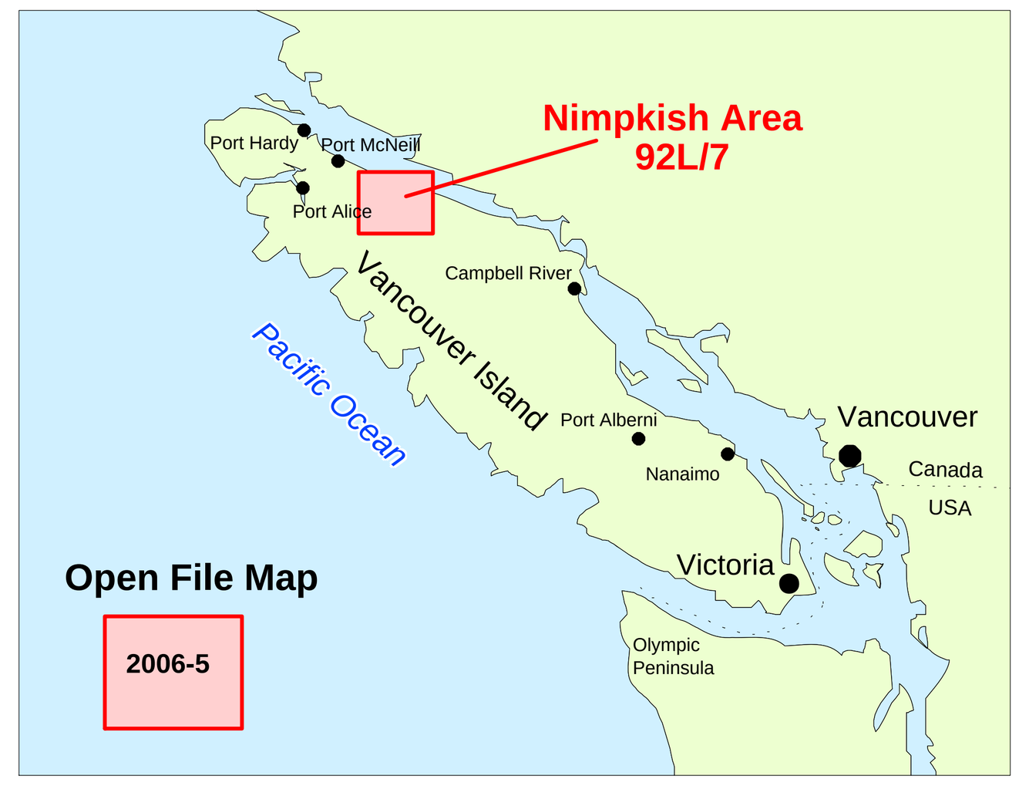
Digital Cartography
K.A. Johnston

Approximate mean magnetic declination 2005 for centre of map area: 19 degrees 28 minutes east decreasing annually 12 minutes per year

N — NM — *Magnetic Declination*

LOCATION MAP



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2006-5