

AQUIFER CLASSIFICATION WORK SHEET

DATE: February 3, 2007.

AQUIFER MAPPER: William S. Hodge, P. Geo.

AQUIFER LOCATION: Powell River, BC.

AQUIFER NUMBER: 836

NTS MAP SHEET: 92F/16

BCGS TRIM MAP: 092F.078, .079, .088 and .089.

CLASSIFICATION: IIC

RANKING VALUE: 8

Aquifer Size:

19.6 km².

Aquifer Boundaries:

This large shallow unconsolidated aquifer system was delineated based on well log lithology and geologic boundaries. Because the aquifer is associated with a low degree of certainty where it is bounded by well lithology and Lois River to the east, a dashed line has been used. The aquifer is associated with a high degree of certainty where it is bounded by the ocean (e.g. Myrtle Point and Lang Bay).

Geologic Formation (overlying):

Well records indicate that the unconsolidated aquifer system is confined by clay or hardpan.

Geologic Formation (aquifer):

Sand and / or small gravel *intermixed* within clay or hardpan.

Major Aquifer System Type:

4b – Confined sand and gravel aquifer of glacial or pre-glacial origin (glaciofluvial).

Confined / Partially Confined / Unconfined:

Confined by clay or hardpan.

Vulnerability:

Low. The vulnerability of this shallow unconsolidated aquifer system is considered low. Well records indicate that although clay or hardpan exists above the aquifer or aquiclude, the aquifer is reported unconfined in two locations. The depth to the water table is also considered shallow. Confining thickness ranges between 0.9 and 9.7 m (3.0 and 32.0 ft). The average, median and geometric mean confining thickness is 4.7, 4.4, and 3.8 m (15.4, 14.5 and 12.6 ft) respectively.

Productivity:

Low. The productivity of this shallow unconsolidated aquifer system is considered low. Wells are shallow and mostly dug (backhoe). Water-bearing material appears to be primarily thin seams of sand or pockets of sand intermixed within the clay or hardpan. Many wells are reported to go *dry* during the summer or *not enough during entire year*. The aquifer appears to be discontinuous and in many areas can be classified as an aquitard or aquiclude. Only 3 yields have been reported from drilled wells. The majority of well records only have *comments* on the back under lithology (note spreadsheet).

Depth to Water Table:

Shallow. As groundwater levels vary seasonally, these measurements likely do not represent local water table conditions throughout the year. The average, median and geometric mean depth to groundwater is 2.4, 2.1, and 0.76 m (7.8, 6.9 and 2.5 ft) respectively.

Direction of Groundwater Flow:

There is insufficient data to determine the direction of groundwater flow. Groundwater is anticipated to follow the topographic gradient from high elevation to low elevation (likely inland toward the ocean).

Recharge:

Wells are recharged from the infiltration of precipitation (rain and snow).

Domestic Well Density:

Moderate. There are 6.1 domestic wells per km² reported. Several wells are located near the ocean on small lots subdivisions and some wells appear to be very closely spaced (clustered).

Type of Well Use:

Domestic.

Reliance on Source:

Well water is the only reported source of water for domestic use.

Conflicts Between Users:

None documented.

Quantity Concerns (type, source, level of concern):

None documented.

Quality Concerns (type, source, level of concern):

None documented. According to Carmichael, et. al., (1995), none of the arsenic results from the shallow wells exceeded 0.025 mg/L. A total of 199 wells in the Powell River area were sampled and analyzed for dissolved arsenic. Although arsenic may be ubiquitous in the granitic rocks in the study area, local geologic conditions and other factors must be influencing the anomalies identified in the study (Carmichael, et.al., 1995).

Comments:

For the purpose of standardization and to achieve all objectives of the aquifer mapping program, the document *Guide to Using the BC Aquifer Classification Maps* (Berardinucci and Ronneseth, 2002) was referenced in the preparation of this worksheet.

References:

Berardinucci J. and K. Ronneseth, 2002. *Guide to Using the BC Aquifer Classification Maps for the Protection and Management of Groundwater*. BC Ministry of Water, Land and Air Protection, Water, Air and Climate Change Branch, Water Protection Section.

Carmichael, V., L. Clarkson, and L. Ringham, 1995. *Well Water Survey for Arsenic in the Powell River and Sunshine Coast Communities of BC*. Gibsons, BC: Coast Garibaldi Community Health Services Society.

AQUIFER CLASSIFICATION AND RANKING

AQUIFER LOCATION: Powell River, BC.

AQUIFER NUMBER: 836.

CLASSIFICATION: IIC

RANKING VALUE: 8

Classification Component:

Level of Development: Moderate. Moderate level of demand in relation to low aquifer productivity.

Level of Vulnerability: Low level of vulnerability to surface contamination.

Ranking Component:	Ranking Value
Productivity:	1
Vulnerability:	1
Size:	2
Demand:	2*
Type of Use:	2
Quality Concerns:	0
Quantity Concerns:	0
<u>Total =</u>	8

* Demand is based on domestic well density, number and type of wells, and general knowledge of well use and land use in the area. Demand assumes that the reported well capacity is the amount of water used, which can be misleading. The reported well capacity can be higher than actual use.

Number of water wells = 140

Statistical Analyses of Well Data for Aquifer 836

	Well Depth		Depth to Water		Depth to Bedrock		Reported Est. Well Yield		Est. Thickness of Confining Materials	
	m	ft	m	ft	m	ft	L/s	USgpm	m	ft
Number of Wells	140	140	19	19	0	0	2	2	10	10
Maximum	17.1	56.0	4.6	18.0	unk	unk	0.95	15.0	9.7	32.0
Minimum	1.5	5.0	0	0	unk	unk	0.01	0.2	0.9	3.0
Average	6.3	20.8	2.4	7.8	unk	unk	-	-	4.7	15.4
Median	5.5	18.0	2.1	6.9	unk	unk	0.25	4.0	4.4	14.5
Geometric Mean	5.6	18.4	0.76	2.5	unk	unk	-	-	3.8	12.6

unk = unknown or not reported
 - = insufficient data to determine