

AQUIFER CLASSIFICATION WORKSHEET

DATE:	27-Mar-12
AQUIFER REFERENCE NUMBER:	957
DESCRIPTIVE LOCATION OF AQUIFER:	Sunshine Coast Hwy north of Shuttle Bay to the Malaspina Peninsula
NTS MAP SHEET:	092F15
BCGS MAP SHEET:	092F097

CLASSIFICATION: IIA

RANKING: 9

Aquifer Size:

12.21 km²

Aquifer Boundaries:

The aquifer extents were delineated based on the coastline, topography, well lithology, extent of groundwater development and bedrock geology. In the west the boundary is delineated by the ocean. Elsewhere, the boundary was approximated to represent the potential drainage area surrounding the bedrock wells within the region.

Aquifer Sub-type:

6b

Aquifer Priority Rating for Observation Wells:

29.64

Geologic Formation (overlying materials):

clay, till, sand, and gravel

Thin marine or glacio-marine deposits (silt, clay, sand, gravel, and stones). The overlying material ranges in thickness from 0 to 36.58 m. The average and median thickness of the overlying materials are 8.51 m and 5.49 m, respectively.

Geologic Formation (aquifer):

bedrock

Aquifer material is assumed to be dioritic intrusive rocks from the early Cretaceous era (Massey et. al., 2005). Well logs did not provide detailed descriptions on the type of bedrock or degree of fracturing.

Confined/Partially Confined/Unconfined:

Partially Confined

Confining deposits of till, clay, or silt material was reported in 26 of the 57 wells within this

aquifer (46%). The deposits were not observed at elevations above 180 masl. Where reported, the confining materials range in thickness from 1.22 m to 36.58 m. The average and median thickness of the confining deposits are 9.16 m and 6.55 m, respectively.

Vulnerability:

A - High

The depth to water is shallow. The permeability and porosity of the aquifer is low (fracture bedrock). Confining deposits were reported in 46% of the wells. However, no confining deposits were observed in wells with an top hole elevation greater than 180 masl. As well, where reported, the confining materials are relatively thin. The depth to bedrock is relatively shallow and there are windows of vulnerability. As well, this is a coastal aquifer and it is vulnerable to salt water intrusion.

Productivity:

Low - 0.18 L/s (geomean)

Yields were provided for 50 of the 57 wells with values ranging from 0.03 L/s to 5.68 L/s. The well yielding 5.68 L/s may be erroneous. This well is located at the base of a hill, and may have a high water potential. However, neighbouring wells at a similar depths report low yields around 0.05 L/s. The type of use for this well is unknown, but the diameter of the well is 15.24 cm, which does not necessarily indicate that the well is meant for commercial or agricultural purposes. A pump test in this location would help to verify this yield.

The geometric mean yield, shown above, was used to determine the aquifer rank. The median yield is 0.13 L/s. No studies of transmissivity or specific storage were completed on this aquifer.

Depth to Water:

8.9 m (average)

Depth to water was reported for 15 of the 57 wells (26%) with values ranging from 0.61 m to 28.65 m. The average and median depths to water are 8.9 m and 7.62 m, respectively. There was also one well noted to be flowing.

Direction of Groundwater Flow:

There is insufficient data to determine the direction of groundwater flow at this time. It is estimated that groundwater flow is influenced by the topography and groundwater is discharging at the coast.

Recharge:

Has not been determined. Most likely infiltration of precipitation.

Domestic Well Density:

Low - 3.93 domestic wells/km²

The domestic well density was calculated based on the 16 reported domestic wells and 32 unknown wells with a yield of less than 1 L/s. An unknown well with a yield of less than 1 L/s is

assumed to represent a domestic well as a commercial or irrigation well would require a hire yield.

Type of Water Use:

Drinking Water

It is assumed that most well use is for drinking water. No irrigation or commercial wells were reported and aerial photos do not show agriculture within this region.

Reliance on Source:

Conjunctive. There are springs and surface water licenses within the aquifer extents.

Conflicts between Users:

None documented.

Quantity Concerns:

One dry well documented.

Quality Concerns:

Some comments with respect to some sulphur content in the well. The identification of high arsenic levels in wells in Powell River prompted the Coast Garibaldi Health Unit to initiate a large-scale well water survey. A total of 199 wells in Powell River and 259 wells in the Sunshine Coast area were sampled and analyzed for dissolved arsenic (Carmichael, 1995). Within this region, Arsenic levels were less than 0.025 ppm.

Comments:

Well depths vary from 10.67 m to 167.64 m. The average and median depths of the wells are 64.12 m and 57.91 m, respectively.

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 Vicki, April 1995. Well Water Survey for Arsenic in the Powell River and Sunshine Coast Communities of British Columbia. Environmental Health Assessment and Safety Branch, Ministry of Health.

Massey, N.W.D., D.G. Mac Intyre, P.J. Desjardins, and R.T. Cooney. 2005. Digital Geology of British Columbia: Whole Province. B.C. Ministry of Energy and Mines, Geofile 2005-1.

AQUIFER CLASSIFICATION AND RANKING

AQUIFER LOCATION: Sunshine Coast Hwy north of Shuttle Bay
to the Malaspina Peninsula

AQUIFER REFERENCE NUMBER: 957

AQUIFER SUB-TYPE: 6b

AQUIFER PRIORITY RATING FOR OBSERVATION WELLS: 29.64

CLASSIFICATION: IIA

RANKING: 9

Classification Component:

Level of Development – low demand, low productivity

Level of Vulnerability – depth to water is shallow, permeability of the aquifer is low, and there is only a small inconsistent confining layer reported.

Ranking Component:

Ranking Value:

Productivity: 1

Vulnerability: 3

Size: 2

Demand*: 1

Type Of Use: 2

Quality:

Quantity:

Total: 9

* Demand has been assessed subjectively. Demand is based on domestic well density, the presence of several water supply system 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 is often higher than actual use.

Statistical Summary of Well Data for Aquifer # 957

Total number of wells available for statistical 57

	Depth to Bedrock (m bgs)	Well Depth (m bgs)	Depth to Water (m bgs)	Reported Est. Well Yield (L/s)	Est. Thickness of Confining Materials (m)
Number of Wells	49	57	15	50	26
Maximum	36.58	167.64	28.65	5.68	36.58
Minimum	0.30	10.67	0.61	0.03	1.22
Average	8.51	64.12	8.90	0.44	9.16
Median	5.49	57.91	7.62	0.13	6.55
Geometric Mean	4.92	53.74	6.42	0.18	5.90