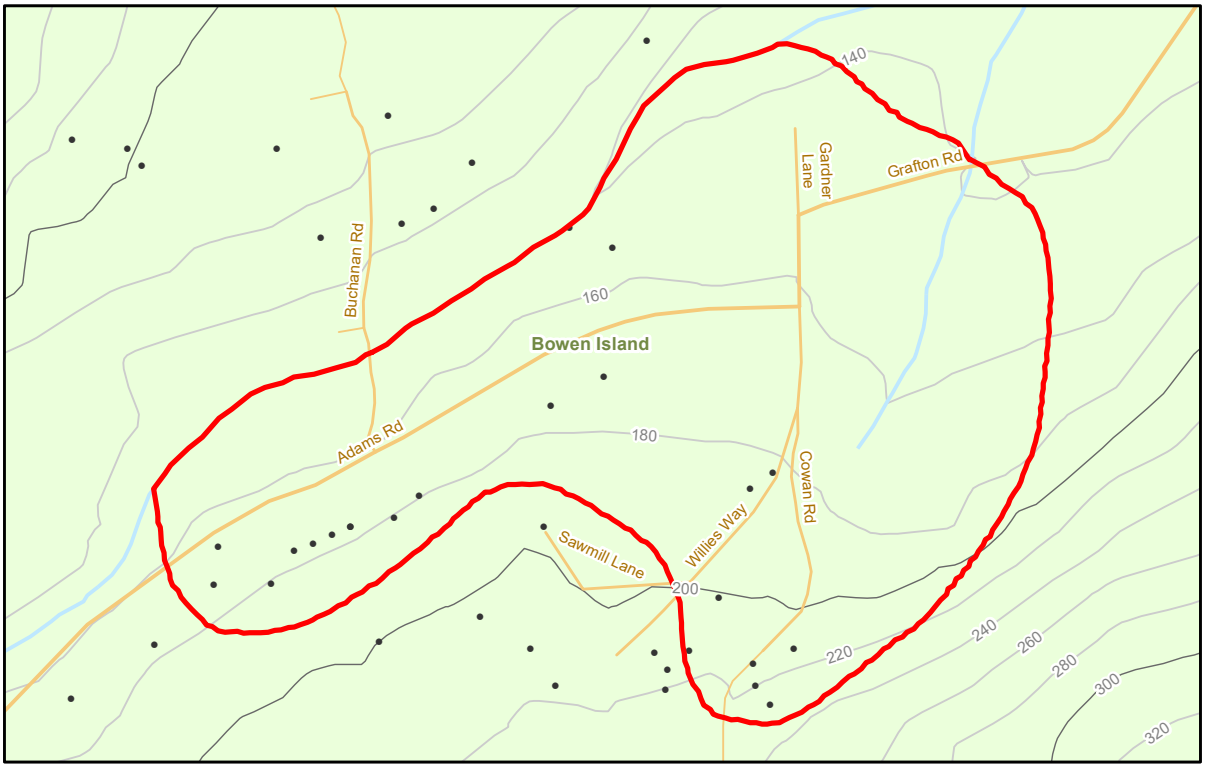
Aquifer #743



Legend

- Registered Water Well
- Aquifer Boundary

0 0.085 0.17 km

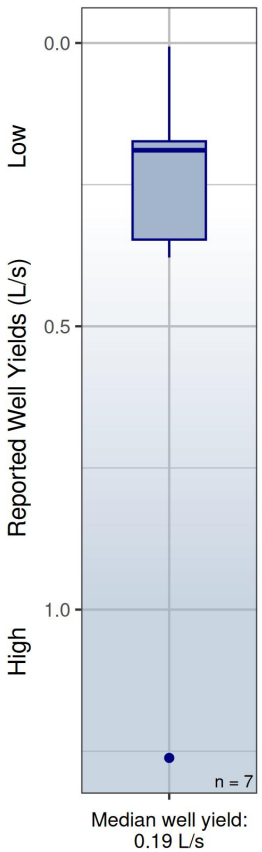
N

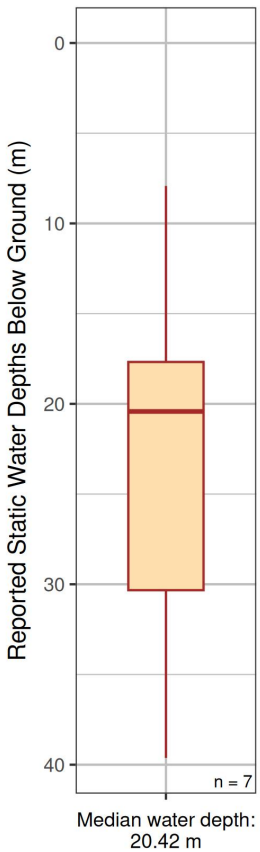
Aquifer Description (Mapping Report - 2006): Confined glacio-fluvial sand and gravel aquifer underneath till, in between till layers, or underlying glacio-lacustrine deposits (subtype = 4b).

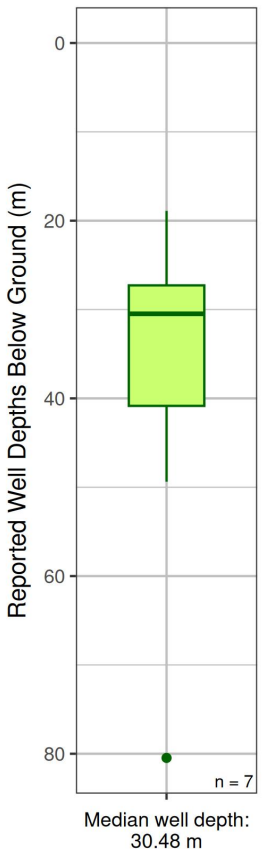
Aquifer Details	
Region	South Coast
Water District	Vancouver
Aquifer Area	0.3 km^2
No. Wells Correlated	7
Vulnerability to Contamination	Moderate
Productivity	Moderate
Aquifer Classification	IIB
Hydraulic Conductivity *	Unknown
Transmissivity *	Unknown
Storativity *	Unknown
No. Water Licences Issued to Wells	Unknown
Observation Wells (**Active**, Inactive)	None

* min - max

For Hydraulic Connection see guidance document







Detailed methods for all figures are described in the companion document (Aquifer Factsheet - Companion Document.pdf).

Factsheet generated: 2025-03-26. Aquifers online: https://apps.nrs.gov.bc.ca/gwells/aquifers.

AQUIFER CLASSIFICATION WORK SHEET

DATE: December 31, 2005

AQUIFER MAPPER: A.P. Kohut

AQUIFER LOCATION: Grafton Lake Valley southwest of Grafton Lake, Bowen Island.

AQUIFER NUMBER: 743

NTS MAP SHEETS: 92G/6

BCGS TRIM Maps (1:20,000): 092G.034

CLASSIFICATION: IIB **RANKING: 9**

Aquifer Size:
Area of aquifer is approximately 0.25 km^2.

Aquifer Boundaries:
The aquifer boundary has been delineated using water well records information (area of development) and available terrain mapping. The aquifer may extend further towards the west and east.

Geologic Formation (overlying): Pleistocene and Holocene deposits including till, boulders, silt and sand, see Ministry of Environment (1978).

Geologic Formation (aquifer): Silty sand, to coarse cemented sand and gravel, fluvial and glacio-fluvial deposits, see Ministry of Environment (1978).

Confined/Partially Confined/Unconfined: Confined.

Vulnerability:
Moderate. The geometric mean (geomean) depth to static water level is 20.99 metres (68.9 feet).
The geometric mean thickness of the confining layer is 23.28 metres (76.4 feet). The range of thickness of the confining layer is from 7.01 to 66.44 metres (23 to 218 Feet).

Productivity:
Moderate. Well yields reported in the well records range up to 3.15+ L/s (50+ USgpm). The geometric mean of 7 reported well yields is 0.42 L/s (6.6 USgpm) and the median well yield is 0.32 L/s (5.0 USgpm).

Depth to Water Table:
The geometric mean static water level is 20.99 metres (68.9 feet) and the median static water level is 18.59 metres (67.0 feet) based on 7 well records.

Direction of Groundwater Flow:
Groundwater likely moves from the west towards the northeast towards Grafton Lake.

Recharge:
Precipitation and infiltration from upland surface sources along the north and south flanks of the Grafton Lake Valley and possibly from the underlying fractured bedrock.

Domestic Well Density:
Moderate. Approximately > 7 wells/km^2. Several bedrock wells also in vicinity of aquifer.

Type of Water Use:
Domestic for individual properties. One low yielding well reported to have been abandoned due to silting.

Reliance on Source:
Important source likely for individual properties.

Conflicts Between Users:
None documented.

Quantity Concerns (type, source, level of concern):
One low yielding well reported to have been abandoned due to silting.

Quality Concerns (type, source, level of concern):
Moderately hard water and presence of elevated iron in one well at 1.1 mg/L., but not a health risk.

Comments:
The geometric mean depth of water wells in this aquifer is 33.38 metres (109.5 feet). The median depth of wells is 29.56 metres (97.0 feet) and the range of well depths is from 17.37 to 80.46 metres (57 to 264 feet). Bedrock was not encountered in any of the wells.

The statistics quoted for this aquifer are based on 7 water well records.

References:

Berardinucci, J. and K. Ronneseth. 2002. *Guide to Using the BC Aquifer Classification Maps for the Protection and Management of Groundwater*. Water, Air and Climate Change Branch. BC Ministry of Water, Land and Air Protection. Victoria, B.C. 54 pp.

Journeay, J.M. and Dunster, J., 2002. *The Bowen Island GeoLibrary; Spinning the web of Community Knowledge (v1.0).* A project of the Bowen Island Forest and Water Management Society. Available on CD and online at: www.bowenisland.info

Ministry of Environment. 1978. *Bowen Island: a resource analysis for land use planning, Volumes 1 and 2,* The Islands Trust, Ministry of Muncipal Affairs and Housing, Victoria, British Columbia. NTS File 092G/06-13, Ministry of Environment,

Victoria, British Columbia.

AQUIFER CLASSIFICATION AND RANKING

AQUIFER LOCATION: Grafton Lake Valley southwest of Grafton Lake, Bowen Island.

AQUIFER NUMBER: 743

CLASSIFICATION: IIB **RANKING VALUE: 9**

Classification Component:

Level of development: Moderate - ***Moderate*** level of demand in relationship to ***moderate*** level of aquifer productivity and water availability. Additional development of the aquifer should be carefully assessed.

Level of Vulnerability: Moderate: ***Moderate*** level of vulnerability to surface contamination.

Ranking Component:

	Ranking Value
Productivity:	2
Vulnerability:	2
Size:	1
Demand*:	2
Type of Use:	2
Quality Concerns:	0
Quantity Concerns:	0
Total:	**9**

- Demand has been assessed subjectively. 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.

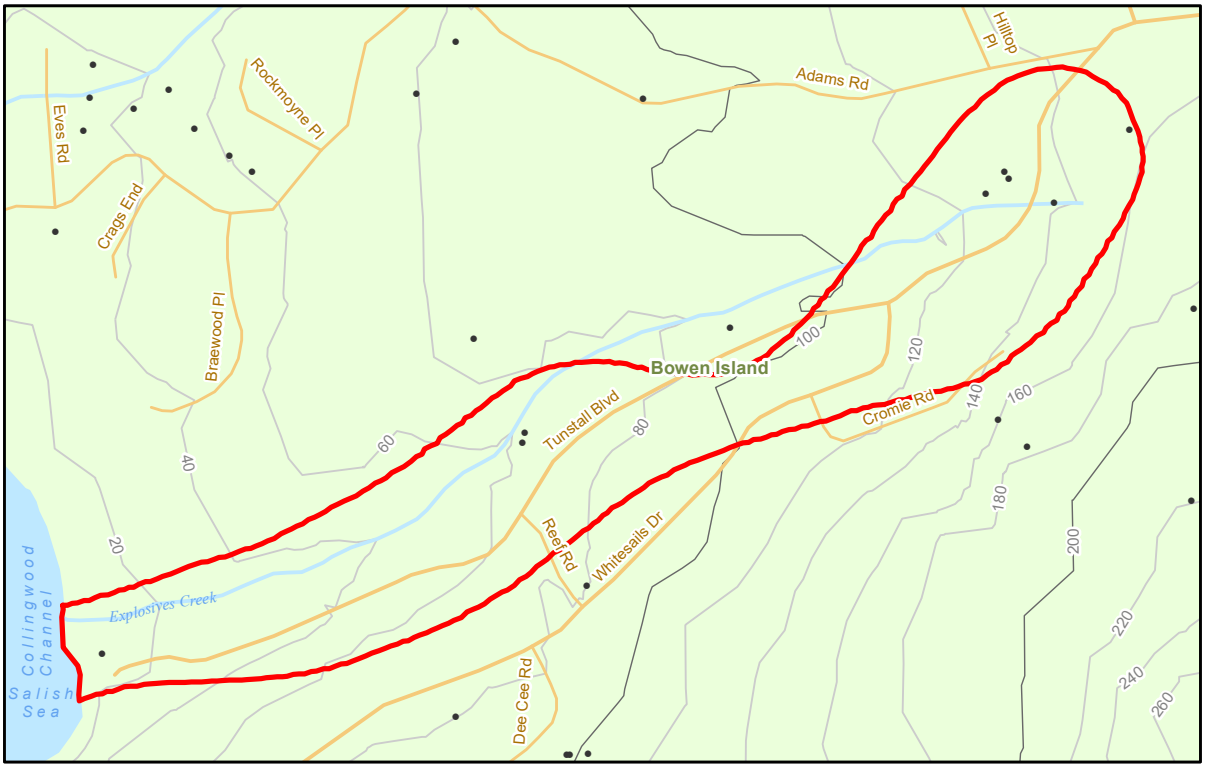
Number of water wells available for aquifer delineation = 7
Statistical Summary of Well Record Data for Aquifer # 743

	Well Depth		***Depth to Water***		***Depth to Bedrock***		***Reported Well Yield ****		***Estimated Thickness of Confining Materials *****	
Number of Wells	7	7	7	7			7	7	7	7
	m	ft	m	ft	m	ft	L/s	gpm	m	ft
Maximum	80.46	264.0	39.62	130.0			3.15	50.0	66.44	218.0
Minimum	17.37	57.0	7.92	26.0			0.16	2.5	7.01	23.0
Average	37.45	122.9	17.86	76.9			0.80	12.6	28.69	94.1
Median	29.56	97.0	18.59	67.0			0.32	5.0	19.81	65.0
Geometric Mean	33.38	109.5	20.99	68.9			0.42	6.6	23.28	76.4

* - USgpm

**

Aquifer #744



Legend

- Registered Water Well
- Aquifer Boundary

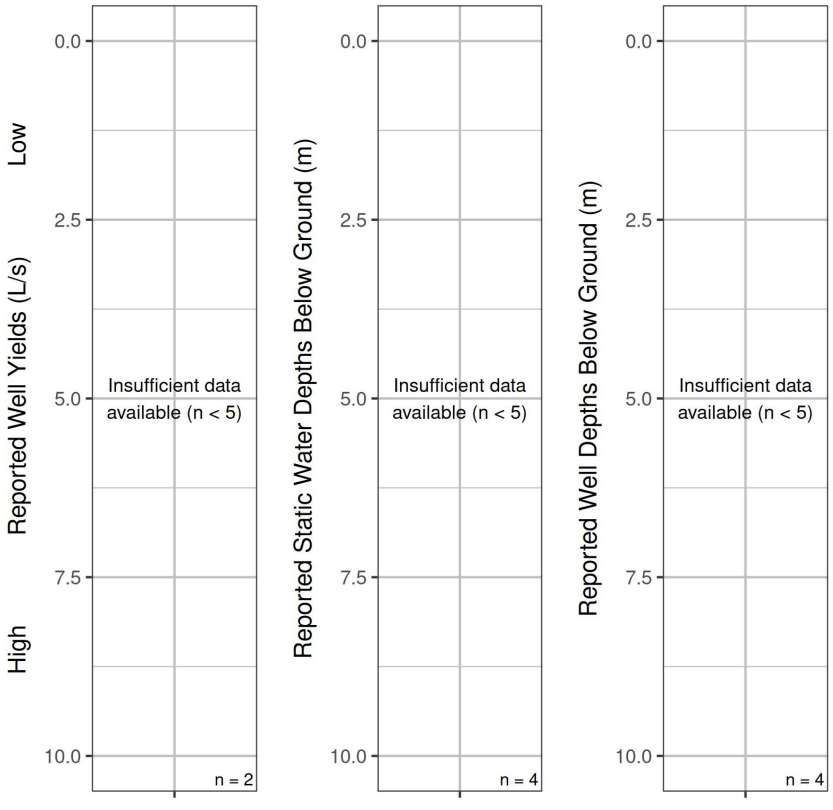
0 0.1 0.2 km

N

Aquifer Description (Mapping Report - 2006): Confined glacio-fluvial sand and gravel aquifer underneath till, in between till layers, or underlying glacio-lacustrine deposits (subtype = 4b).

Aquifer Details	
Region	South Coast
Water District	Vancouver
Aquifer Area	0.2 km^2
No. Wells Correlated	4
Vulnerability to Contamination	Moderate
Productivity	Moderate
Aquifer Classification	IB
Hydraulic Conductivity *	Unknown
Transmissivity *	Unknown
Storativity *	Unknown
No. Water Licences Issued to Wells	Unknown
Observation Wells (**Active**, Inactive)	None

* min - max
For Hydraulic Connection see guidance document



Detailed methods for all figures are described in the companion document (Aquifer Factsheet - Companion Document.pdf).
Factsheet generated: 2025-03-26. Aquifers online: https://apps.nrs.gov.bc.ca/gwells/aquifers.

AQUIFER CLASSIFICATION WORK SHEET

DATE: February 14, 2006

AQUIFER MAPPER: A.P. Kohut

AQUIFER LOCATION: Along Explosives Creek, Southwest side of Bowen Island.

AQUIFER NUMBER: 744

NTS MAP SHEETS: 92G/6

BCGS TRIM Maps (1:20,000): 092G.033

CLASSIFICATION: IB **RANKING: 12**

Aquifer Size:
Area of aquifer is approximately 0.2 km^2.

Aquifer Boundaries:
The aquifer boundary has been delineated using water well records information (area of development) and available terrain mapping. The aquifer may extend towards the east.

Geologic Formation (overlying): Pleistocene and Holocene deposits, silty clay, silty sand, till, boulders and gravel, see Ministry of Environment (1978).

Geologic Formation (aquifer): Silty to coarse sand and gravel, fluvial and glacio-fluvial deposits, see Ministry of Environment (1978).

Confined/Partially Confined/Unconfined: Confined, also reported for some wells as a leaky artesian aquifer by Pacific Hydrology Consultants Ltd. (1983). Pacific Hydrology Consultants Ltd. (1983) also reports 2 shallow wells and 4 well points along Explosives Creek which appear to be completed under unconfined conditions.

Vulnerability:
Moderate. The geometric mean (geomean) depth to static water level is 3.45 metres (11.3 feet).
The geometric mean thickness of the confining layer is 8.25 metres (27.1 feet). The range of thickness of the confining layer is from 4.57 to 18.29 metres (15 to 60 Feet).

Productivity:

Moderate. Well yields reported in the well records range up to 1.26 L/s (20 USgpm). The geometric mean of 3 reported well yields is 0.57 L/s (9 Usgpm) and the median well yield is 0.73 L/s (12 USgpm). One well was tested for 5 hours at 21 USgpm indicating a transmissivity of 1000 USgpd/ft with negative boundary being encountered (Brown and Erdman, 1970).

Depth to Water Table:
The geometric mean static water level is 3.45 metres (11.3 feet) and the median static water level is 6.71 metres (22 feet) base on 5 well records.

Direction of Groundwater Flow:
Groundwater likely moves from east to west along the length of the aquifer. Upward flow of ground water from the fractured bedrock into the aquifer may also occur in places where the aquifer lies directly over the bedrock. Infiltration from shallow unconfined fine sands may also be occurring during pumping of the confined aquifer.

Recharge:
Precipitation and infiltration from surface sources to the east and possibly from the underlying fractured bedrock.

Domestic Well Density:
High. Approximately > 5 wells/km^2. Although the actual well density is moderate, it was designated as high since the aquifer is relatively narrow and water shortages have been reported (see comments under quantity concerns).

Type of Water Use:
Domestic for Tunstall Bay Water System, although not all wells are in use and bedrock wells are also used. One shallow infiltration well reported to be used for emergency purposes only.

Reliance on Source:
Important source for Tunstall Bay Water System.

Conflicts Between Users:
None documented.

Quantity Concerns (type, source, level of concern):
Water shortages for the Tunstall Bay Water System are reported and additional wells are being planned (Bowen Island Municipality , 2005). Cleaning of two wells 1A and 1B in 1992 improved their output. (Bowen Island Municipality, 2005).

Quality Concerns (type, source, level of concern):
None reported. Source water quality protection of interest for community water systems.

Comments:
The geometric mean depth of water wells in this aquifer is 12.26 metres (40.2 feet). The median depth of wells is 12.19 metres (40.0 feet) and the range of well depths is from 7.31 to 20.73 metres (24 to 68 feet). Some wells were also partially completed into the underlying bedrock and equipped with slotted liner pipe below the well screen.

The statistics quoted for this aquifer are based on 3 to 5 water well records. Other shallow wells are reported for this aquifer in (Bowen Island Municipality, 2005), (Brown and Erdman, 1970),

(E. Livingston Associates,1976) and (Pacific Hydrology Consultants Ltd., 1983), but complete well records and all specific locations are not currently available. The confined aquifer may also be connected in part with shallow unconfined fine sand, and sand and gravel aquifers along Explosives Creek.

It appears unlikely that many high capacity wells could be developed within this aquifer due to its limited area and thickness.

References:

Berardinucci, J. and K. Ronneseth. 2002. *Guide to Using the BC Aquifer Classification Maps for the Protection and Management of Groundwater*. Water, Air and Climate Change Branch. BC Ministry of Water, Land and Air Protection. Victoria, B.C. 54 pp.

Bowen Island Municipality. 2005. Tunstall Bay Water System, Drinking Water Quality, Annual Report - Final, Calendar Year 2004.

Brown, W.L., and R.B. Erdman. 1970. Groundwater Development, Tunstall Bay, Bowen Island for Deecee Projects Ltd. Robinson, Roberts and Brown Ltd., North Vancouver, British Columbia. NTS File 092G/06-57 Ministry of Environment, Victoria, British Columbia.

E. Livingston Associates. 1976. Test drilling, gates Campsite Tunstall Bay, Bowen Island. Letter report to Dee Cee Projects Ltd. Vancouver, British Columbia.

Journeay, J.M. and Dunster, J., 2002. The Bowen Island GeoLibrary; Spinning the web of Community Knowledge (v1.0). A project of the Bowen Island Forest and Water Management Society. Available on CD and online at: www.bowenisland.info

Ministry of Environment. 1978. *Bowen Island: a resource analysis for land use planning, Volumes 1 and 2,* The Islands Trust, Ministry of Muncipal Affairs and Housing, Victoria, British Columbia. NTS File 092G/06-13, Ministry of Environment, Victoria, British Columbia.

Pacific Hydrology Consultants Ltd. 1983. Capacity Testing of Wells 1A and 1B and of Well Points and Wells in Explosives Creek Valley. Report for Deecee Prjects Ltd., Tunstall Bay Waterworks Ltd, Bowen Island, British Columbia. NTS File 092G/06-57 Ministry of Environment, Victoria, British Columbia.

AQUIFER CLASSIFICATION AND RANKING

AQUIFER LOCATION: Along Explosives Creek, Southwest side of Bowen Island.

AQUIFER NUMBER: 744

CLASSIFICATION: IB **RANKING VALUE: 12**

Classification Component:

Level of development: **Heavy** - ***High*** level of demand in relationship to ***moderate*** level of aquifer productivity and water availability. Additional development of the aquifer should be carefully assessed.

Level of Vulnerability: **Moderate:** ***Moderate*** level of vulnerability to surface contamination.

Ranking Component:

	Ranking Value
Productivity:	2
Vulnerability:	2
Size:	1
Demand*:	3
Type of Use:	2
Quality Concerns:	0
Quantity Concerns:	2
Total:	**12**

- Demand has been assessed subjectively. 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.

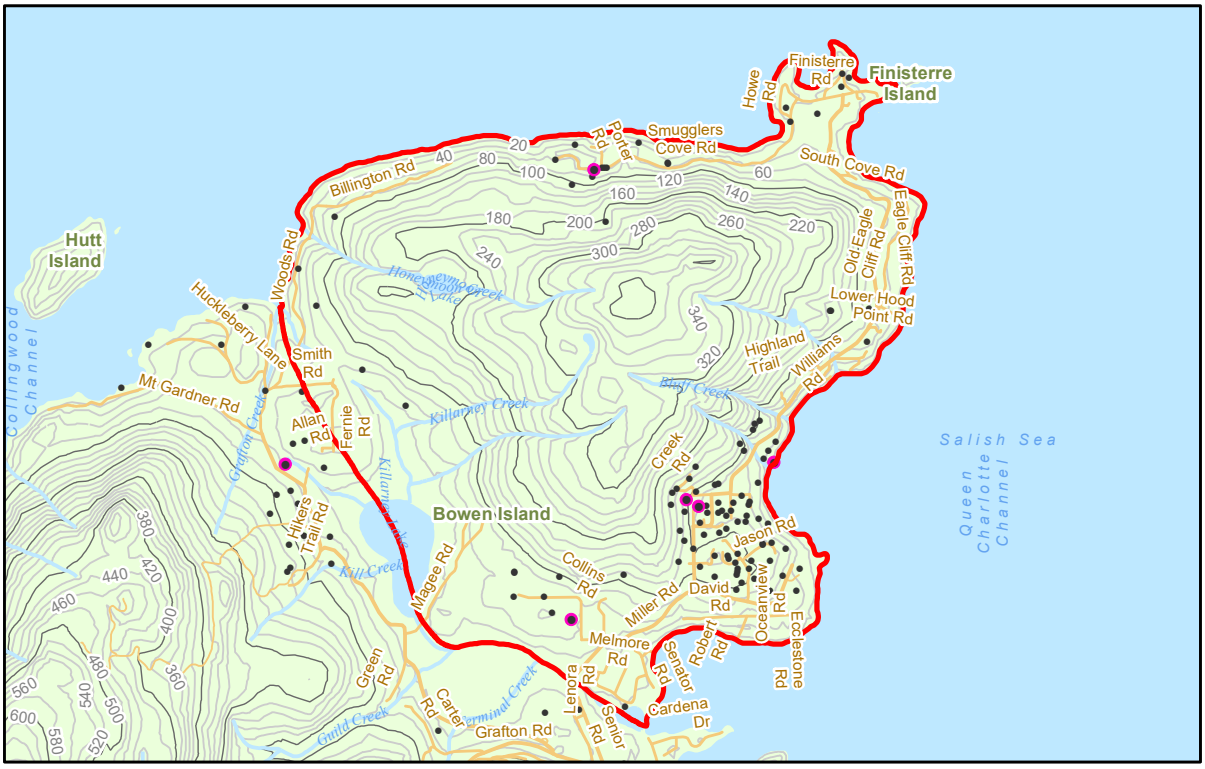
Number of water wells available for aquifer delineation = 5
Statistical Summary of Well Record Data for Aquifer # 744

	Well Depth		***Depth to Water***		***Depth to Bedrock***		***Reported Well Yield ****		***Estimated Thickness of Confining Materials *****	
Number of Wells	5	5	5	5	4	4	3	3	5	5
	m	ft	m	ft	m	ft	L/s	gpm	m	ft
Maximum	20.73	68	7.01	23	20.73	68	1.26	20	18.29	60
Minimum	7.31	24	1.22	4	11.28	37	0.19	3	4.57	15
Average	13.41	44.0	4.63	15.2	15.70	51.5	0.74	11.7	9.45	31
Median	12.19	40.0	6.71	22.0	15.39	50.5	0.73	12	8.53	28
Geometric Mean	12.26	40.2	3.45	11.3	15.14	49.7	0.57	9	8.25	27.1

* - USgpm

** May include shallow unconfined water-bearing deposits.

Aquifer #745



Legend

- Registered Water Well - Artesian
- Registered Water Well
- Aquifer Boundary

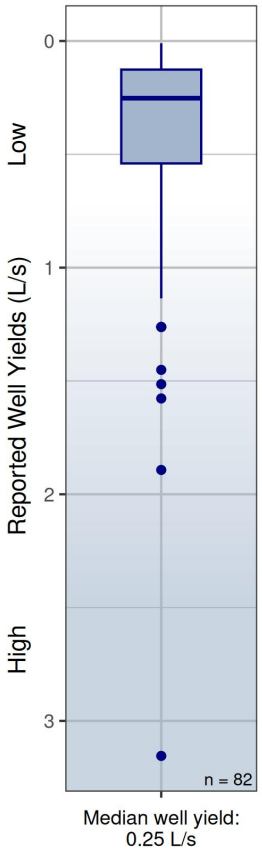
0 0.55 1.1 km

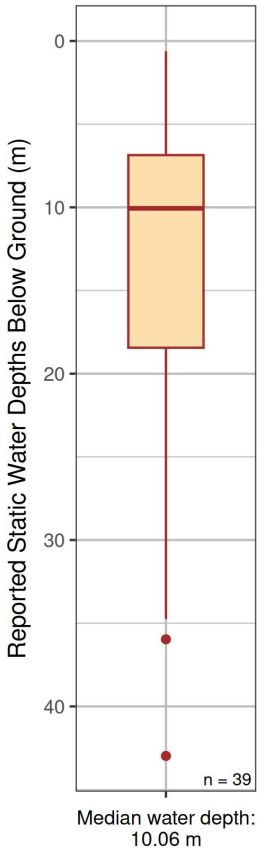
N

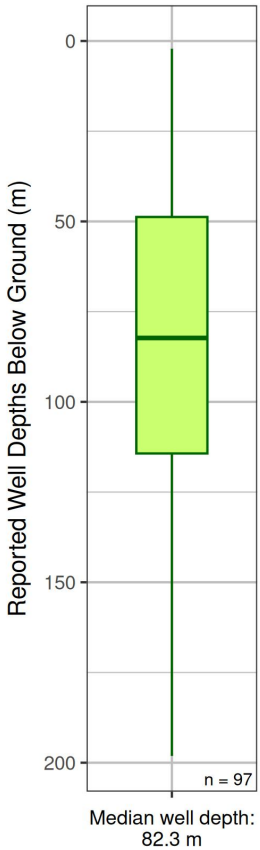
Aquifer Description (Mapping Report - 2006): Fractured crystalline (igneous intrusive or metamorphic, meta-sedimentary, meta-volcanic, volcanic) rock aquifer (subtype = 6b).

Aquifer Details	
Region	South Coast
Water District	Vancouver
Aquifer Area	10.4 km^2
No. Wells Correlated	99
Vulnerability to Contamination	High
Productivity	Low
Aquifer Classification	IIA
Hydraulic Conductivity *	Unknown
Transmissivity *	Unknown
Storativity *	Unknown
No. Water Licences Issued to Wells	2
Observation Wells (**Active**, Inactive)	None

* min - max
For Hydraulic Connection see guidance document







Detailed methods for all figures are described in the companion document (Aquifer Factsheet - Companion Document.pdf).
Factsheet generated: 2025-03-26. Aquifers online: https://apps.nrs.gov.bc.ca/gwells/aquifers.

AQUIFER CLASSIFICATION WORK SHEET

DATE: February 14, 2006

AQUIFER MAPPER: A.P. Kohut

AQUIFER LOCATION: North Bowen Island.

AQUIFER NUMBER: 745

NTS MAP SHEETS: 92G/6

BCGS TRIM Maps (1:20,000): 092G.034 and 092G.044

CLASSIFICATION: IIA **RANKING: 10**

Aquifer Size:
Area of aquifer is approximately 11.5 km^2.

Aquifer Boundaries:
The aquifer boundary has been delineated using water well record information (area of development), topography, surface drainage features, bedrock geology and major geologic structural (fault/lineament) features. The aquifer forms part of the larger fractured crystalline bedrock aquifer system that underlies Bowen Island.

Geologic Formation (overlying): Pleistocene and Holocene deposits including clay, till, boulders, silt, sand and gravel. See Ministry of Environment (1978).

Geologic Formation (aquifer): Late Jurassic fractured granodiorite intrusive rocks bounded to the north and south by fractured Lower Jurassic to Middle Jurassic *Bowen Island Group* comprised of argillite, greywacke and conglomerate turbidites. See Roddick and Woodsworth (1979) and British Columbia Geological Survey (2005).

Confined/Partially Confined/Unconfined: Confined and partially confined.

Vulnerability:
High. The geometric mean (geomean) depth to static water level is 8.45 m (27.7 ft). The geometric mean thickness of the confining layer is 3.15 metres (10.4 feet). The range of thickness of the confining layer is from 0.03 to 19.81 metres (0.1 to 65.0 Feet). A large part of the aquifer and recharges areas on Mt. Collins are covered by a veneer of colluvial and morainal deposits that are highly permeable (Journeay and Dunster, 2002). Thicker unconsolidated deposits cover the lower flanks of the aquifer.

Productivity:
Highly variable from low to high and **low overall** for fractured bedrock. Well yields reported in the well records range up to 1.89 L/s (30 USgpm). The geometric mean of 39 reported well yields is 0.27 L/s (4.2 Usgpm) and the median well yield is 0.28 L/s (4.5 USgpm).

Depth to Water Table:

The geometric mean static water level is 8.45 m (27.7 ft) and the median static water level is 10.06 metres (33.0 feet) based on 29 well records.

Direction of Groundwater Flow:
Groundwater likely moves radially away from Mt. Collins towards the sea and southerly towards the Killarney Lake Valley.

Recharge:
Precipitation and infiltration on the slopes of Mt. Collins.

Domestic Well Density:
Low over aquifer area, (<5well/km^2) but clustered locally at Millers Landing 20wells/km^2.

Type of Water Use:
Bedrock wells for domestic use and community water supply (Bowen Island Municipality, 2005).

Reliance on Source:
Important source for some domestic users, all wells may not be in use.

Conflicts Between Users:
None documented. Potential for well interference may exist where wells are clustered.

Quantity Concerns (type, source, level of concern):
None documented.

Quality Concerns (type, source, level of concern):
None documented.

Comments:
The geometric mean depth of water wells in this aquifer is 77.67 metres (254.8 feet). The median depth of wells is 80.77 metres (265.0 feet) and the range of well depths is from 15.24 to 160.01 metres (50.0 to 525.0 feet).

The statistics quoted for this aquifer are based on 29 to 40 water well records.

References:

Berardinucci, J. and K. Ronneseth. 2002. *Guide to Using the BC Aquifer Classification Maps for the Protection and Management of Groundwater*. Water, Air and Climate Change Branch. BC Ministry of Water, Land and Air Protection. Victoria, B.C. 54 pp.

Bowen Island Municipality. 2005. Eaglecliff Water System, Drinking Water Quality, Annual Report - Final, Calendar Year 2004.

British Columbia Geological Survey. 2005. *Geology Map* at Map Place.ca http://webmap.em.bc.ca/mapplace/minpot/bcgs.cfm

Journeay, J.M. and Dunster, J., 2002. *The Bowen Island GeoLibrary; Spinning the web of Community Knowledge (v1.0).* A project of the Bowen Island Forest and Water Management Society. Available on CD and online at: www.bowenisland.info

Ministry of Environment. 1978. *Bowen Island: a resource analysis for land use planning, Volumes 1 and 2,* The Islands Trust, Ministry of Muncipal Affairs and Housing, Victoria, British Columbia. NTS File 092G/06-13, Ministry of Environment, Victoria, British Columbia.

Roddick, J.A., and G.J. Woodsworth 1979. Geology of Vancouver West Half and Mainland Part of Alberni, Geological Survey of Canada O.F. 611

AQUIFER CLASSIFICATION AND RANKING

AQUIFER LOCATION: North Bowen Island.

AQUIFER NUMBER: 745

CLASSIFICATION: IIA **RANKING VALUE: 10**

Classification Component:

Level of development: Moderate – ***High*** level of demand in relationship to ***low*** level of aquifer productivity and water availability. Additional development of the aquifer should be carefully assessed.

Level of Vulnerability: **High:** ***High*** level of vulnerability to surface contamination.

Ranking Component:

	Ranking Value
Productivity:	1
Vulnerability:	3
Size:	2
Demand*:	2
Type of Use:	2
Quality Concerns:	0
Quantity Concerns:	0
Total:	**10**

- Demand has been assessed subjectively. 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 available for aquifer delineation = 40
Statistical Summary of Well Record Data for Aquifer # 745

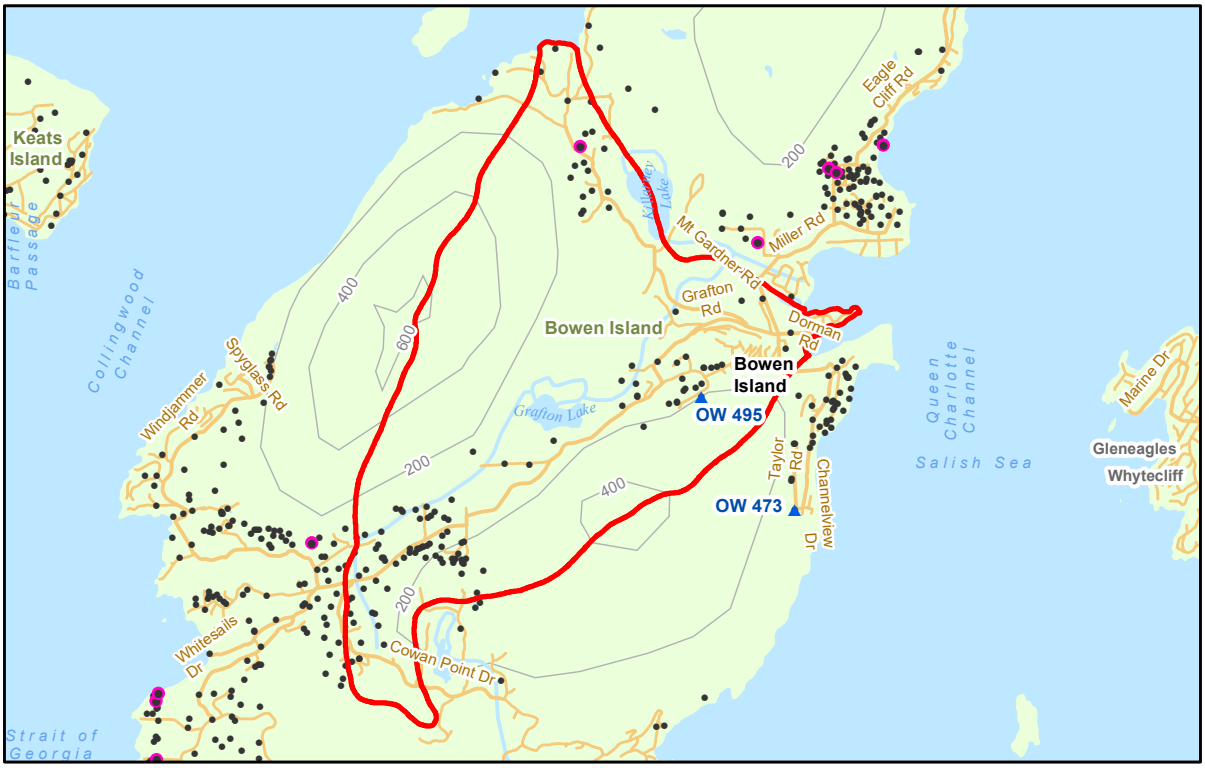
	Well Depth		***Depth to Water***		***Depth to Bedrock***		***Reported Well Yield ****		***Estimated Thickness of Confining Materials *****	
Number of Wells	40	40	29	29	36	36	39	39	36	36
	m	ft	m	ft	m	ft	L/s	gpm	m	ft

Maximum	160.01	525.0	35.96	118.0	19.81	65.0	1.89	30.0	19.81	65.0
Minimum	15.24	50.0	0.03	0.1	0.03	0.1	0.03	0.5	0.03	0.1
Average	85.78	281.5	13.16	43.2	5.45	17.9	0.40	6.3	5.45	17.9
Median	80.77	265.0	10.06	33.0	4.57	15.0	0.28	4.5	4.57	15.0
Geometric Mean	77.67	254.8	8.45	27.7	3.15	10.4	0.27	4.2	3.15	10.4

* - USgpm

** Does not include surficial wells where bedrock was not encountered. Does not include five wells from Journeay and Dunster (2002); where copies of original well records are not available.

Aquifer #746



Legend

- Registered Water Well - Artesian
- Registered Water Well
- Active Observation Well
- Aquifer Boundary

0 0.95 1.9 km

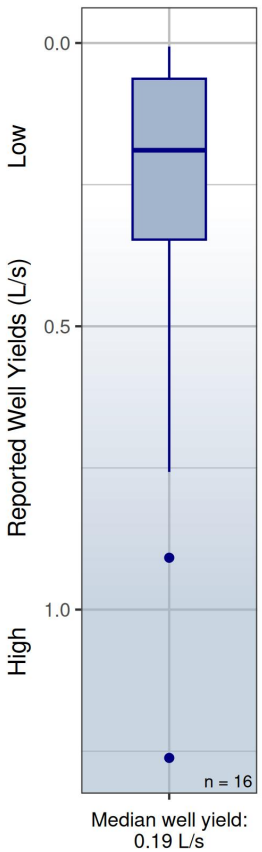
N

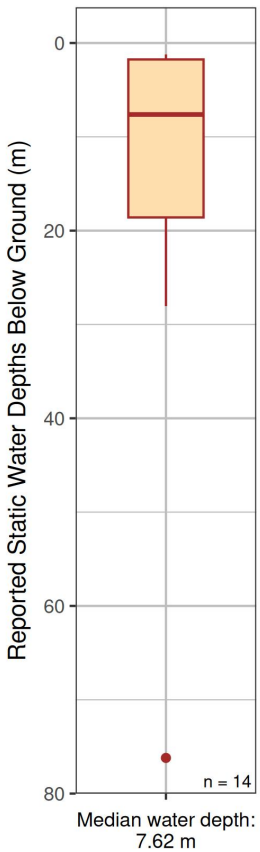
Aquifer Description (Mapping Report - 2006): Fractured crystalline (igneous intrusive or metamorphic, meta-sedimentary, meta-volcanic, volcanic) rock aquifer (subtype = 6b).

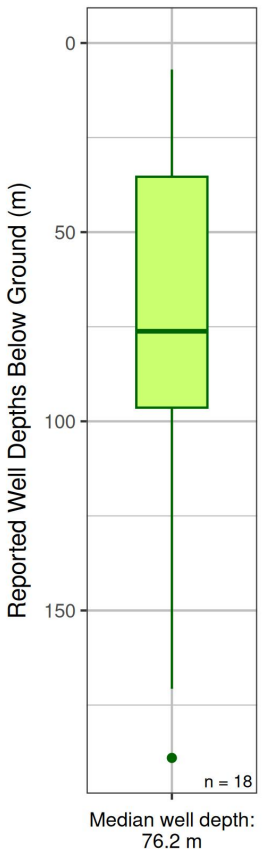
Aquifer Details	
Region	South Coast
Water District	Vancouver
Aquifer Area	14.9 km^2
No. Wells Correlated	18
Vulnerability to Contamination	Moderate
Productivity	Low
Aquifer Classification	IIB
Hydraulic Conductivity *	Unknown
Transmissivity *	Unknown
Storativity *	Unknown
No. Water Licences Issued to Wells	Unknown
Observation Wells (**Active**, Inactive)	**495**

* min - max

For Hydraulic Connection see guidance document





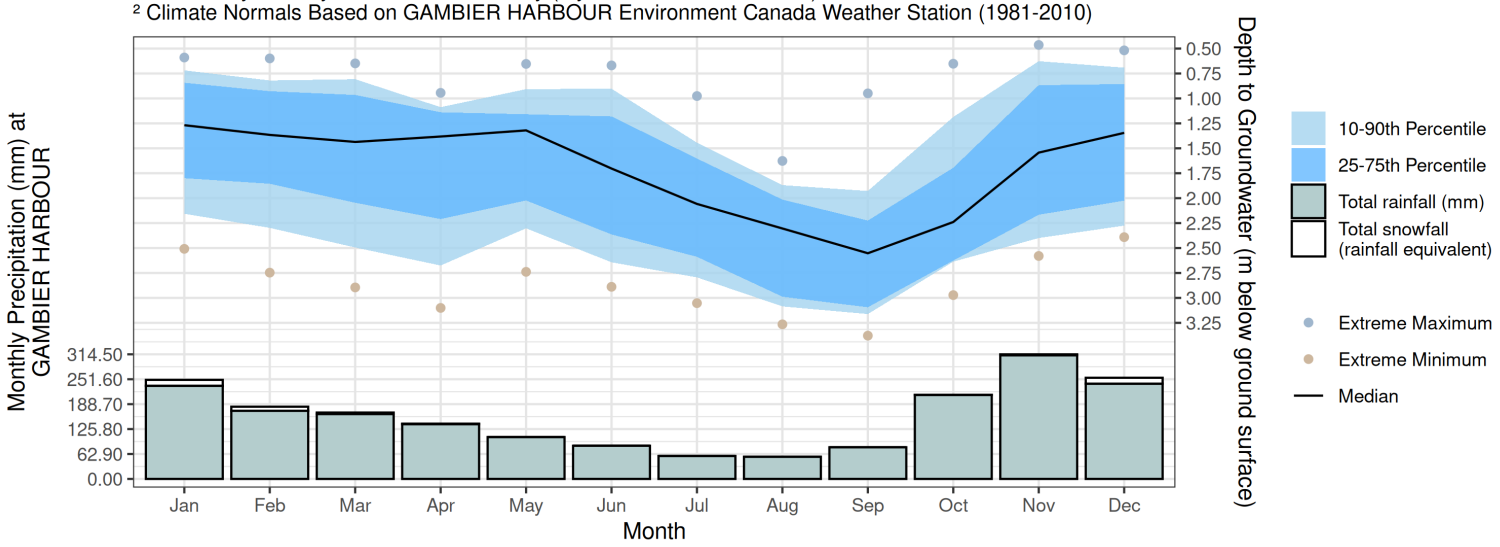


Detailed methods for all figures are described in the companion document (Aquifer Factsheet - Companion Document.pdf).

Factsheet generated: 2025-03-26. Aquifers online: https://apps.nrs.gov.bc.ca/gwells/aquifers.

Monthly Groundwater Level[1] with Precipitation from Climate Normals[2]

[1] Preliminary Monthly Water Level Summary (6 years of data; 2018-2024)
[2] Climate Normals Based on GAMBIER HARBOUR Environment Canada Weather Station (1981-2010)



Groundwater Levels and Long-term Trend

Graph not available
(Not enough data)

For more information regarding trends in groundwater levels see Environmental Reporting BC

Piper Plot

Graph not available
(insufficient chemistry data)

AQUIFER CLASSIFICATION WORK SHEET

DATE: February 14, 2006

AQUIFER MAPPER: A.P. Kohut

AQUIFER LOCATION: Central Bowen Island.

AQUIFER NUMBER: 746

NTS MAP SHEETS: 92G/6

BCGS TRIM Maps (1:20,000): 092G.034 and 092G.044

CLASSIFICATION: IIB **RANKING: 10**

Aquifer Size:
Area of aquifer is approximately 15.8 km^2.

Aquifer Boundaries:
The aquifer boundary has been delineated using water well record information (area of development), topography, surface drainage features, bedrock geology and major geologic structural (fault/lineament) features. The aquifer forms part of the larger fractured crystalline bedrock aquifer system that underlies Bowen Island.

Geologic Formation (overlying): Pleistocene and Holocene deposits including clay, till, boulders, silt, sand and gravel. See Ministry of Environment (1978).

Geologic Formation (aquifer): Fractured crystalline bedrock including Lower Jurassic to Middle Jurassic *Bowen Island Group* comprised of argillite, greywacke and conglomerate turbidites in the central area; bounded to the south and northwest by Late Jurassic quartz diorite and granodiorite. See Roddick and Woodsworth (1979) and British Columbia Geological Survey (2005).

Confined/Partially Confined/Unconfined: Confined and partially confined.

Vulnerability:
Moderate. The geometric mean (geomean) depth to static water level is 9.09 m (29.8 ft). The geometric mean thickness of the confining layer is 5.07 metres (16.6 feet). The range of thickness of the confining layer is from 0.30 to 35.05 metres (1.0 to 115.0 Feet).

Productivity:
Highly variable from low to moderate and **low overall** for fractured bedrock. Well yields reported in the well records range up to 1.26 L/s (20 USgpm). The geometric mean of 16 reported well yields is 0.15 L/s (2.4 Usgpm) and the median well yield is 0.17 L/s (2.8 USgpm).

Depth to Water Table:

The geometric mean static water level is 9.09 m (29.8 ft) and the median static water level is 12.19 metres (40.0 feet) base on 12 well records.

Direction of Groundwater Flow:
Groundwater likely moves northerly and northeasterly from the upland regions and through the Grafton Lake Valley towards the Killarney Lake Valley.

Recharge:
Precipitation and infiltration from upland areas surrounding the Grafton Lake area including the easterly facing slope of Mt. Gardner.

Domestic Well Density:
Low over aquifer area, (<1well/km^2) but clustered locally e.g. west of Grafton Lake 7wells/km^2.

Type of Water Use:
Bedrock wells for domestic use.

Reliance on Source:
Important source for some domestic users, all wells may not be in use.

Conflicts Between Users:
None documented. Potential for well interference may exist where wells are clustered.

Quantity Concerns (type, source, level of concern):
None documented.

Quality Concerns (type, source, level of concern):
Elevated levels of phosphate (1.91mg/L) and dissolved manganese (0.07 mg/L) reported in one well (Brown,1979a), and sulphur odour reported in two wells.

Comments:
The geometric mean depth of water wells in this aquifer is 71.77 metres (235.5 feet). The median depth of wells is 79.24 metres (260.0 feet) and the range of well depths is from 30.48 to 188.97 metres (100.0 to 620.0 feet).

The statistics quoted for this aquifer are based on 12 to 19 water well records.

References:

Berardinucci, J. and K. Ronneseth. 2002. *Guide to Using the BC Aquifer Classification Maps for the Protection and Management of Groundwater*. Water, Air and Climate Change Branch. BC Ministry of Water, Land and Air Protection. Victoria, B.C. 54 pp.

British Columbia Geological Survey. 2005. *Geology Map* at Map Place.ca http://webmap.em.bc.ca/mapplace/minpot/bcgs.cfm

Brown, W.L. 1979a. *Groundwater Development Bowen Island School Production Water Well Chemist's Report*, letter to David Nairne & Associates Ltd,, West Vancouver, British Columbia, August 3, 1979. Brown, Erdman & Associates Ltd., Vancouver, British Columbia. NTS File 092G/06-52 Ministry of Environment, Victoria, British Columbia.

Brown, W.L. 1979b. Groundwater Development Bowen Elementary School Production Water Well, letter to David Nairne & Associates Ltd., West Vancouver, British Columbia, July 24, 1979. Brown, Erdman & Associates Ltd., Vancouver, British Columbia. NTS File 092G/06-52 Ministry of Environment, Victoria, British Columbia.

Journeay, J.M. and Dunster, J., 2002. *The Bowen Island GeoLibrary; Spinning the web of Community Knowledge (v1.0).* A project of the Bowen Island Forest and Water Management Society. Available on CD and online at: www.bowenisland.info

Ministry of Environment. 1978. *Bowen Island: a resource analysis for land use planning, Volumes 1 and 2,* The Islands Trust, Ministry of Muncipal Affairs and Housing, Victoria, British Columbia. NTS File 092G/06-13, Ministry of Environment, Victoria, British Columbia.

Roddick, J.A., and G.J. Woodsworth 1979. Geology of Vancouver West Half and Mainland Part of Alberni, Geological Survey of Canada O.F. 611

AQUIFER CLASSIFICATION AND RANKING

AQUIFER LOCATION: Central Bowen Island.

AQUIFER NUMBER: 746

CLASSIFICATION: IIB **RANKING VALUE: 10**

Classification Component:

Level of development: Moderate – ***Moderate*** level of demand in relationship to ***low*** level of aquifer productivity and water availability. Additional development of the aquifer should be possible, provided productivity can meet the demand.

Level of Vulnerability: Moderate: ***Moderate*** level of vulnerability to surface contamination.

Ranking Component:

	Ranking Value
Productivity:	1
Vulnerability:	2
Size:	2
Demand*:	2
Type of Use:	2
Quality Concerns:	1
Quantity Concerns:	0
Total:	**10**

- Demand has been assessed subjectively. 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 available for aquifer delineation = 19
Statistical Summary of Well Record Data for Aquifer # 746

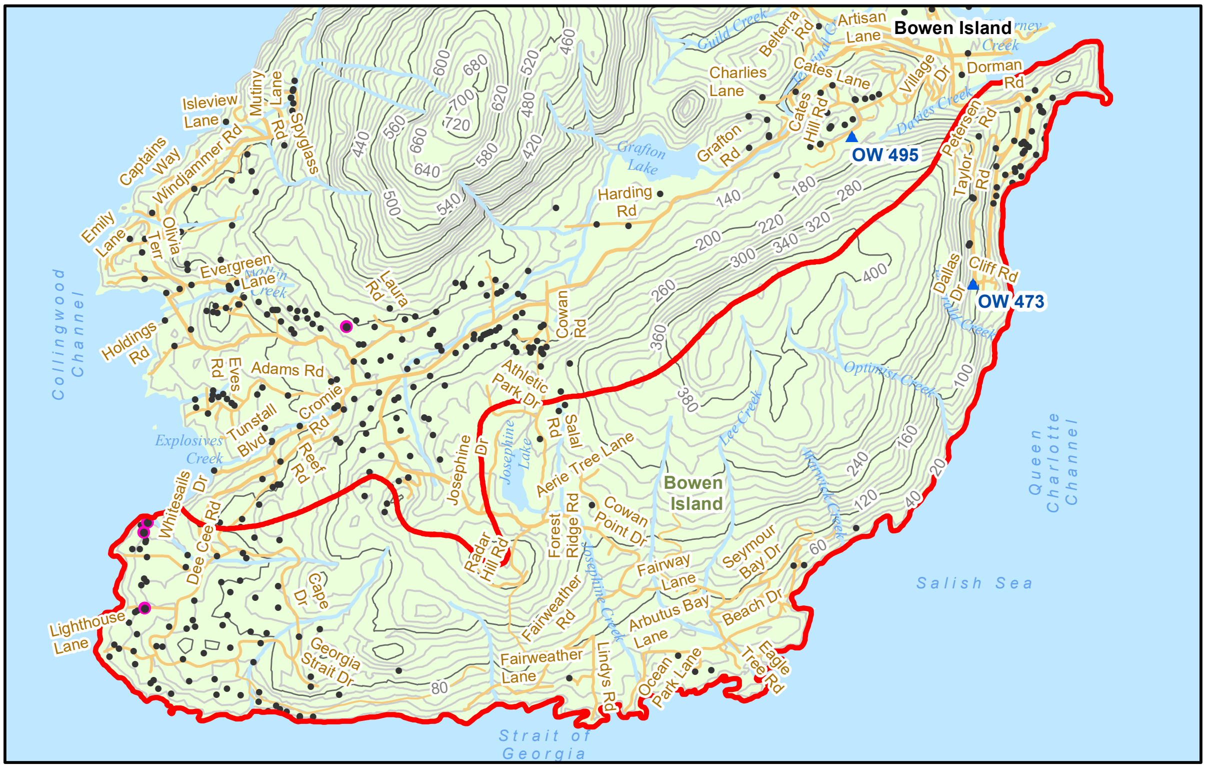
	Well Depth		***Depth to Water***		***Depth to Bedrock***		***Reported Well Yield ****		***Estimated Thickness of Confining Materials *****	
Number of										

Wells	19	19	12	12	17	17	16	16	17	17
	m	ft	m	ft	m	ft	L/s	gpm	m	ft
Maximum	188.97	620.0	76.20	250.0	35.05	115.0	1.26	20.0	35.05	115.0
Minimum	30.48	100.0	1.52	5.0	0.30	1.0	0.01	0.1	0.30	1.0
Average	83.06	272.5	17.25	56.6	11.28	37.0	0.32	5.1	11.28	37.0
Median	79.24	260.0	12.19	40.0	6.71	22.0	0.17	2.8	6.71	22.0
Geometric Mean	71.77	235.5	9.09	29.8	5.07	16.6	0.15	2.4	5.07	16.6

* - USgpm

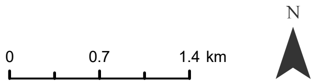
** Does not include surficial wells where bedrock was not encountered. Does not include two wells from Journeay and Dunster (2002); where copies of original well records are not available.

Aquifer #747



Legend

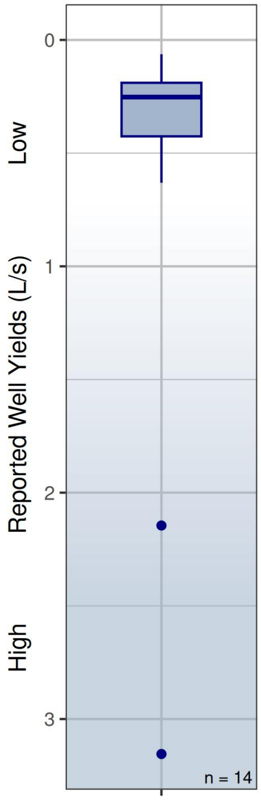
- Registered Water Well - Artesian
- Registered Water Well
- Active Observation Well
- Aquifer Boundary



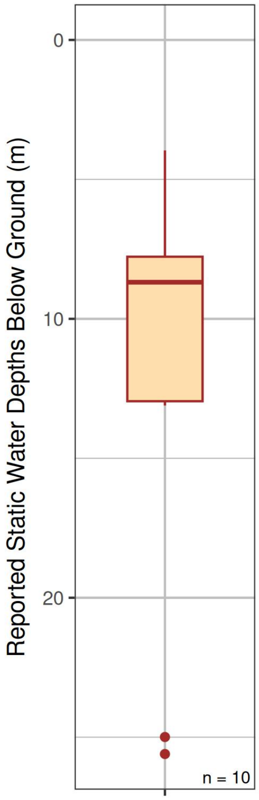
Aquifer Description (Mapping Report - 2006): Fractured crystalline (igneous intrusive or metamorphic, meta-sedimentary, meta-volcanic, volcanic) rock aquifer (subtype = 6b).

Aquifer Details	
Region	South Coast
Water District	Vancouver
Aquifer Area	15.1 km^2
No. Wells Correlated	16
Vulnerability to Contamination	Moderate
Productivity	Low
Aquifer Classification	IIIB
Hydraulic Conductivity *	Unknown
Transmissivity *	Unknown
Storativity *	Unknown
No. Water Licences Issued to Wells	Unknown
Observation Wells (**Active**, Inactive)	**473**

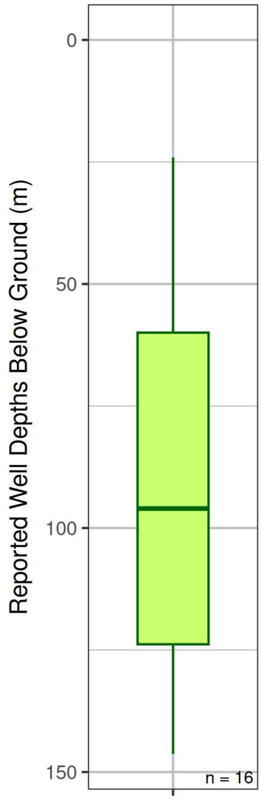
* min - max
For Hydraulic Connection see guidance document



Median well yield: 0.25 L/s



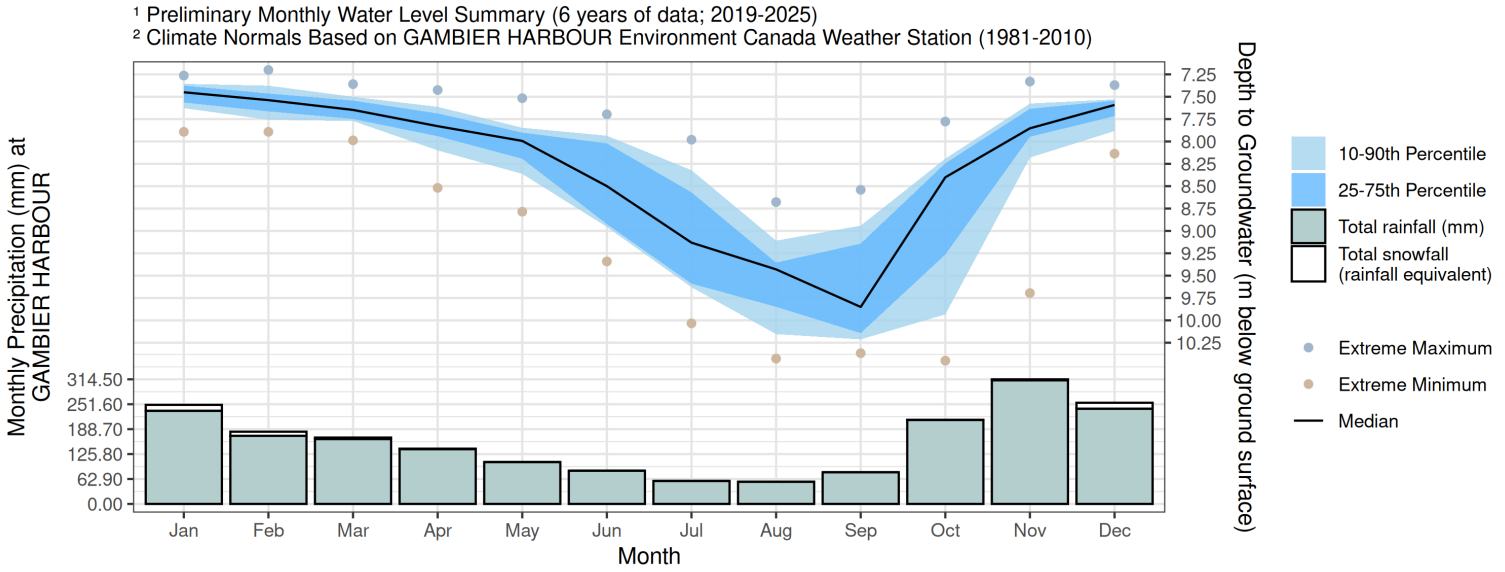
Median water depth: 8.69 m



Median well depth: 96.01 m

Detailed methods for all figures are described in the companion document (Aquifer Factsheet - Companion Document.pdf).
Factsheet generated: 2025-03-26. Aquifers online: https://apps.nrs.gov.bc.ca/gwells/aquifers.

Monthly Groundwater Level[1] with Precipitation from Climate Normals[2]

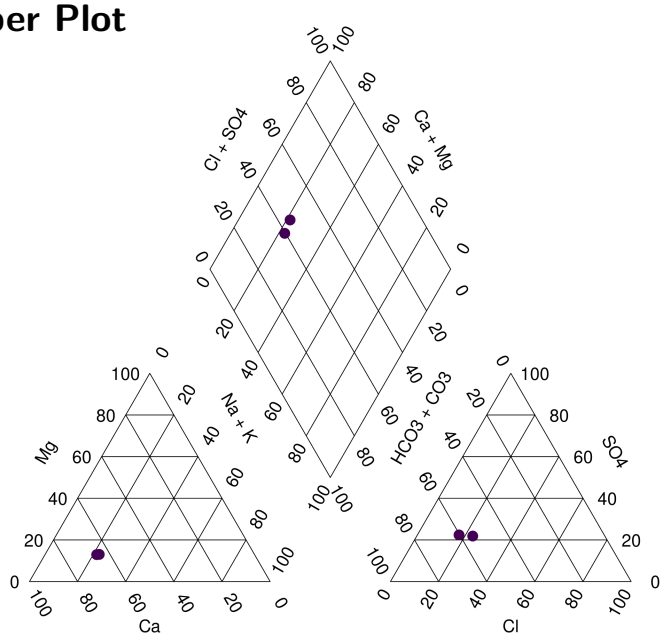


Groundwater Levels and Long-term Trend

Graph not available
(Not enough data)

For more information regarding trends in groundwater levels see Environmental Reporting BC

Piper Plot



The groundwater samples are typically of the Ca-Na-HCO3-Cl-SO4 & Ca-Na-HCO3-SO4 type. Ca is the dominant cation, which indicates a less evolved/short flow path recharge area type of groundwater. The fact that HCO3 is the dominant anion shows the source is primarily recent precipitation in the fractured bedrock coastal aquifer #747. Na enrichment could be attributed to ion-exchange in the bedrock water interaction and/or sea water intrusion and Cl enrichment could be attributed to sea water intrusion. For EMS water chemistry data, see EMS ID E312656.

AQUIFER CLASSIFICATION WORK SHEET

DATE: January 2, 2006

AQUIFER MAPPER: A.P. Kohut

AQUIFER LOCATION: South and southeast side of Bowen Island.

AQUIFER NUMBER: 747

NTS MAP SHEETS: 92G/6

BCGS TRIM Maps (1:20,000): 092G.033 and 092G.034.

CLASSIFICATION: IIIB **RANKING: 10**

Aquifer Size:
Area of aquifer is approximately 16.3 km^2.

Aquifer Boundaries:
The aquifer boundary has been delineated using spatially limited water well record information, topography, surface drainage features, bedrock geology and major geologic (fault/lineament) structural features. The aquifer forms part of the larger fractured crystalline bedrock aquifer system that underlies Bowen Island.

Geologic Formation (overlying): Pleistocene and Holocene deposits including clay, till, boulders, silt, sand and gravel. See Ministry of Environment (1978).

Geologic Formation (aquifer): Fractured crystalline bedrock including Lower Jurassic to Middle Jurassic *Bowen Island Group* comprised of argillite, greywacke and conglomerate turbidites, and Late Jurassic quartz diorite extending in a belt trending northwesterly from Seymour Bay. See Roddick and Woodsworth (1979) and British Columbia Geological Survey (2005).

Confined/Partially Confined/Unconfined: Confined and partially confined.

Vulnerability:
Moderate. The geometric mean (geomean) depth to static water level is 11.15 m (36.6 ft). The geometric mean thickness of the confining layer is 5.81 metres (19.1 feet). The range of thickness of the confining layer is from 0.91 to 24.08 metres (3.0 to 79.0 Feet).

Productivity:
Highly variable from low to high and **low overall** for fractured bedrock. Well yields reported in the well records range up to 3.15 L/s (50 USgpm). The geometric mean of 15 reported well yields in a cluster near Snug Cove – Dorman Bay is 0.23 L/s (3.7 Usgpm) and the median well yield is 0.19 L/s (3.0 USgpm).

Depth to Water Table:

The geometric mean static water level is 11.15 m (36.6 ft) and the median static water level is 9.14 metres (30.0 feet) based on 13 well records.

Direction of Groundwater Flow:
Groundwater likely moves southerly and southeasterly from the upland region towards the sea. Immediately south of Snug Cove ground water flow is likely towards the northeast.

Recharge:
Precipitation and infiltration from upland areas to the north and northeast.

Domestic Well Density:
Low over aquifer area, (<1well/km^2) although the reported bedrock wells are densely clustered together at the north end of the aquifer in the vicinity of Snug Cove – Dorman Bay where density is high at 14 wells/km^2

Type of Water Use:
Bedrock wells for domestic use.

Reliance on Source:
Important source for some domestic users, all wells may not be in use. Cove Bay Water System now supplies water from Grafton Lake for the Snug Cove area (Bowen Island Municipality, 2005).

Conflicts Between Users:
None documented. Potential for well interference may exist.

Quantity Concerns (type, source, level of concern):
None documented.

Quality Concerns (type, source, level of concern):
Elevated levels of arsenic reported locally at Queen Charlotte Heights subdivision, Bowen Island Sustainability Project (2001). Elevated pH (9.0 and 9.35), TDS (924 and 605 mg/L), Na (288 and 195 mg/L), Cl (144.5 and 50 mg/L), and Sulphate (256 and 102 mg/L) reported in one well by Brown and Dakin (1972).

Comments:
The geometric mean depth of water wells in this aquifer is 78.76 metres (258.4 feet). The median depth of wells is 88.39 metres (290.0 feet) and the range of well depths is from 24.08 to 146.30 metres (79.0 to 480.0 feet). Area of the bedrock aquifer includes some small shallow sand and gravel aquifers of limited extent.

The statistics quoted for this aquifer are based on 13 to 15 water well records clustered near Snug Cove - Dorman Bay.

References:

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

Branch. BC Ministry of Water, Land and Air Protection. Victoria, B.C. 54 pp.

Bowen Island Municipality. 2005. Cove Bay Water System, Drinking Water Quality, Annual Report - Final, Calendar Year 2004.

Bowen Island Sustainability Project. 2001. *The State of Bowen Island, Volume 1: Report*.

British Columbia Geological Survey. 2005. *Geology Map* at Map Place.ca http://webmap.em.bc.ca/mapplace/minpot/bcgs.cfm

Brown, W.L., and R.A. Dakin. 1972. Completion Report Water Well Drilling and Testing Program for Dorman Bay Estates Ltd., Bowen Island, British Columbia. Robinson, Roberts and Brown, Ltd., North Vancouver, British Columbia. NTS File 092G/06-41, Ministry of Environment, Victoria, British Columbia.

Journeay, J.M. and Dunster, J., 2002. *The Bowen Island GeoLibrary; Spinning the web of Community Knowledge (v1.0).* A project of the Bowen Island Forest and Water Management Society. Available on CD and online at: www.bowenisland.info

Ministry of Environment. 1978. *Bowen Island: a resource analysis for land use planning, Volumes 1 and 2,* The Islands Trust, Ministry of Muncipal Affairs and Housing, Victoria, British Columbia. NTS File 092G/06-13, Ministry of Environment, Victoria, British Columbia.

Roddick, J.A., and G.J. Woodsworth 1979. Geology of Vancouver West Half and Mainland Part of Alberni, Geological Survey of Canada O.F. 611

AQUIFER CLASSIFICATION AND RANKING

AQUIFER LOCATION: South and southeast side of Bowen Island.

AQUIFER NUMBER: 747

CLASSIFICATION: IIIB RANKING VALUE: 10

Classification Component:

Level of development: **Light** – ***Low*** level of demand in relationship to ***low*** level of aquifer productivity and water availability. Snug Cove area now serviced from Grafton Lake source. Additional development of the aquifer should be possible, provided productivity can meet the demand.

Level of Vulnerability: **Moderate:** ***Moderate*** level of vulnerability to surface contamination.

Ranking Component:

	Ranking Value
Productivity:	1
Vulnerability:	2
Size:	2
Demand*:	1
Type of Use:	2
Quality Concerns:	2
Quantity Concerns:	0
Total:	**10**

- Demand has been assessed subjectively. 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 available for aquifer delineation = 15
Statistical Summary of Well Record Data for Aquifer # 747

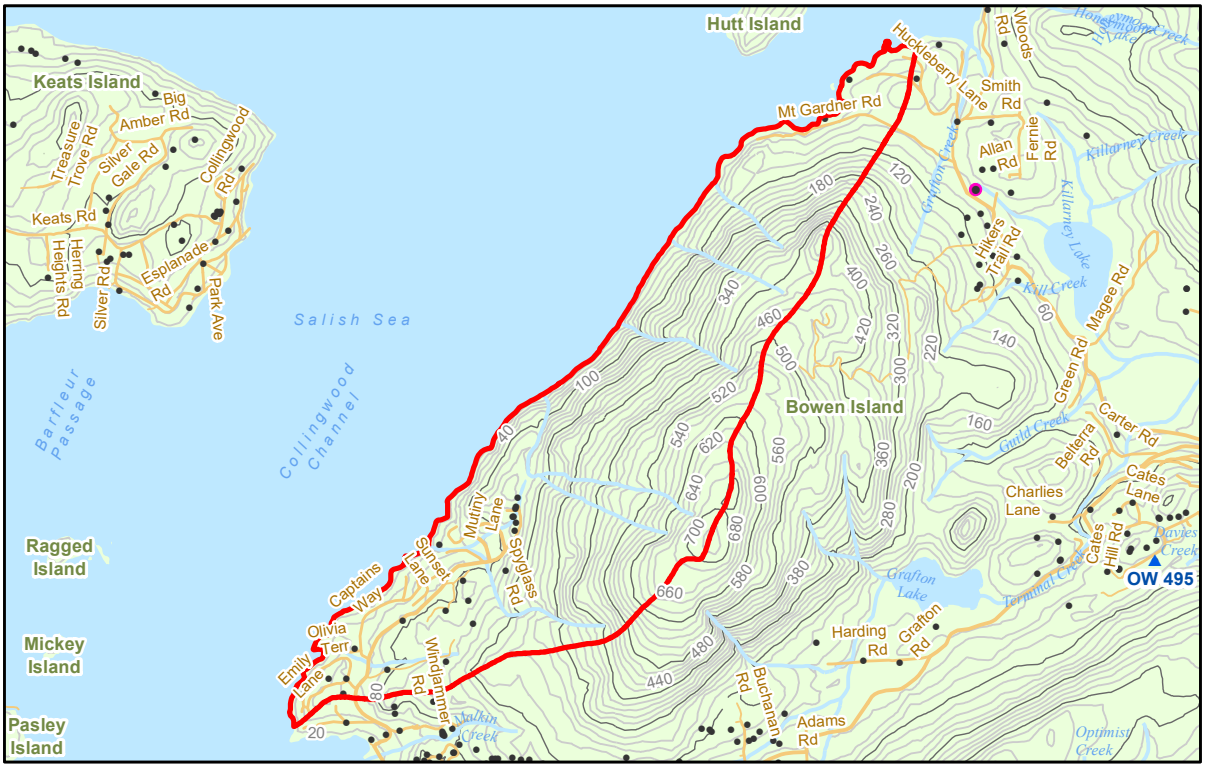
	Well Depth	***Depth to Water***	***Depth to Bedrock***	***Reported Well Yield ****	***Estimated Thickness of Confining Materials *****

Number of Wells	15	15	13	13	15	15	15	15	15	15
	m	ft	m	ft	m	ft	L/s	gpm	m	ft
Maximum	146.30	480.0	39.62	130.0	24.08	79.0	3.15	50.0	24.08	79.0
Minimum	24.08	79.0	3.51	11.5	0.91	3.0	0.02	0.3	0.91	3.0
Average	88.29	289.7	14.07	46.2	7.60	24.9	0.44	7.0	7.60	24.9
Median	88.39	290.0	9.14	30.0	6.10	20.0	0.19	3.0	6.10	20.0
Geometric Mean	78.76	258.4	11.15	36.6	5.81	19.1	0.23	3.7	5.81	19.1

* - USgpm

**

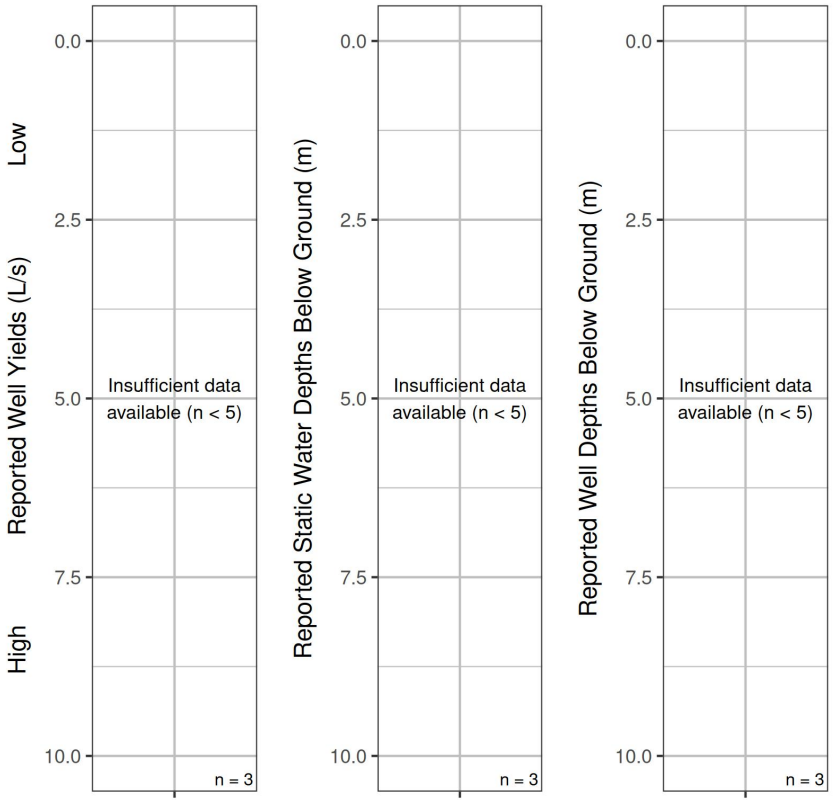
Aquifer #748



Aquifer Description (Mapping Report - 2006): Fractured crystalline (igneous intrusive or metamorphic, meta-sedimentary, meta-volcanic, volcanic) rock aquifer (subtype = 6b).

Aquifer Details	
Region	South Coast
Water District	Vancouver
Aquifer Area	5.8 km^2
No. Wells Correlated	3
Vulnerability to Contamination	Moderate
Productivity	Moderate
Aquifer Classification	IIB
Hydraulic Conductivity *	Unknown
Transmissivity *	Unknown
Storativity *	Unknown
No. Water Licences Issued to Wells	Unknown
Observation Wells (**Active**, Inactive)	None

* min - max
For Hydraulic Connection see guidance document



Detailed methods for all figures are described in the companion document (Aquifer Factsheet - Companion Document.pdf).
Factsheet generated: 2025-03-26. Aquifers online: https://apps.nrs.gov.bc.ca/gwells/aquifers.

AQUIFER CLASSIFICATION WORK SHEET

DATE: January 2, 2006

AQUIFER MAPPER: A.P. Kohut

AQUIFER LOCATION: West side of Bowen Island.

AQUIFER NUMBER: 748

NTS MAP SHEETS: 92G/6

BCGS TRIM Maps (1:20,000): 092G.033, 092G.034 and 092G.044

CLASSIFICATION: IIIB **RANKING: 11**

Aquifer Size:
Area of aquifer is approximately 6.8 km^2.

Aquifer Boundaries:
The aquifer boundary has been delineated using very limited water well record information, topography, surface drainage features, bedrock geology and major geologic structural (fault/lineament) features. The aquifer forms part of the larger fractured crystalline bedrock aquifer system that underlies Bowen Island.

Geologic Formation (overlying): Pleistocene and Holocene deposits including clay, till, boulders, silt, sand and gravel. See Ministry of Environment (1978).

Geologic Formation (aquifer): Fractured crystalline bedrock including Late Jurassic quartz diorite around Bowen Bay and south of Grafton Bay. Also includes Lower Jurassic to Middle Jurassic *Bowen Island Group* along west facing slope of Mt. Gardner, comprised of argillite, greywacke and conglomerate turbidites. See Roddick and Woodsworth (1979) and British Columbia Geological Survey (2005).

Confined/Partially Confined/Unconfined: Confined and partially confined.

Vulnerability:
Moderate. The geometric mean (geomean) depth to static water level is 3.76 metres (12.3 feet) based on 3 well reports. The geometric mean thickness of the confining layer is 5.82 metres (19.1 feet). The range of thickness of the confining layer is from 2.44 to 17.37 metres (8.0 to 57.0 Feet).

Productivity:
Highly variable from low to high and **moderate overall** for fractured bedrock. Well yields reported in the well records range up to 1.26 L/s (20 USgpm). The geometric mean of 6 reported well yields clustered near Bowen Bay – King Edward Bay is 0.32 L/s (5.1 USgpm) and the median well yield is 0.38 L/s (6.0 USgpm).

Depth to Water Table:
The geometric mean static water level is 3.76 metres (12.3 feet) and the median static water level is 3.96 metres (13.0 feet) based on 3 well records.

Direction of Groundwater Flow:
Groundwater likely moves westerly and northwesterly from the Mt. Gardner upland area towards the sea.

Recharge:
Precipitation and infiltration from western facing upland surface on Mt. Gardner.

Domestic Well Density:
Low over aquifer area, (<1well/km^2) although the reported bedrock wells are clustered together at the Blue Water Park Water System at the south end of the aquifer.

Type of Water Use:
Bedrock wells for community water supply.

Reliance on Source:
Important source for Blue Water Park Water System.

Conflicts Between Users:
None documented.

Quantity Concerns (type, source, level of concern):
Water supply capacity of existing wells reported to be limited (Bowen Island Municipality, 2005).

Quality Concerns (type, source, level of concern):
None documented. Source water quality protection is of interest for community water systems, (Bowen Island Municipality, 2005).

Comments:
The geometric mean depth of water wells in this aquifer is 118.20 metres (387.8 feet). The median depth of wells is 121.91 metres (400.0 feet) and the range of well depths is from 92.96 to 147.82 metres (305.0 to 485.0 feet). Area of bedrock aquifer includes some small shallow sand and gravel aquifers of limited extend.

The statistics quoted for this aquifer are based on 3 to 6 water well records.

References:

Berardinucci, J. and K. Ronneseth. 2002. *Guide to Using the BC Aquifer Classification Maps for the Protection and Management of Groundwater*. Water, Air and Climate Change Branch. BC Ministry of Water, Land and Air Protection. Victoria, B.C. 54 pp.

British Columbia Geological Survey. 2005. *Geology Map* at Map Place.ca

http://webmap.em.bc.ca/mapplace/minpot/bcgs.cfm

Bowen Island Municipality. 2005. Blue Water Park Water System, Drinking Water Quality, Annual Report - Final, Calendar Year 2004.

Journeay, J.M. and Dunster, J., 2002. *The Bowen Island GeoLibrary; Spinning the web of Community Knowledge (v1.0).* A project of the Bowen Island Forest and Water Management Society. Available on CD and online at: www.bowenisland.info

Livingston, E. 1972. Letter to Bluewater Park Waterworks District. E. Livingston, P.Eng., Consulting Ground Water Geologist, Vancouver, British Columbia. NTS File 092G/06-05, Ministry of Environment, Victoria, British Columbia.

Ministry of Environment. 1978. *Bowen Island: a resource analysis for land use planning, Volumes 1 and 2,* The Islands Trust, Ministry of Muncipal Affairs and Housing, Victoria, British Columbia. NTS File 092G/06-13, Ministry of Environment, Victoria, British Columbia.

Roddick, J.A., and G.J. Woodsworth 1979. Geology of Vancouver West Half and Mainland Part of Alberni, Geological Survey of Canada O.F. 611

AQUIFER CLASSIFICATION AND RANKING

AQUIFER LOCATION: West side of Bowen Island

AQUIFER NUMBER: 748

CLASSIFICATION: IIIB RANKING VALUE: 11

Classification Component:

Level of development: **Light** – ***Low*** level of demand in relationship to ***moderate*** level of aquifer productivity and water availability. Additional development of the aquifer should be possible, provided productivity can meet the demand.

Level of Vulnerability: **Moderate:** ***Moderate*** level of vulnerability to surface contamination.

Ranking Component:

	Ranking Value
Productivity:	2
Vulnerability:	2
Size:	2
Demand*:	2
Type of Use:	2
Quality Concerns:	0
Quantity Concerns:	1
Total:	**11**

- Demand has been assessed subjectively. 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 available for aquifer delineation = 6
Statistical Summary of Well Record Data for Aquifer # 748

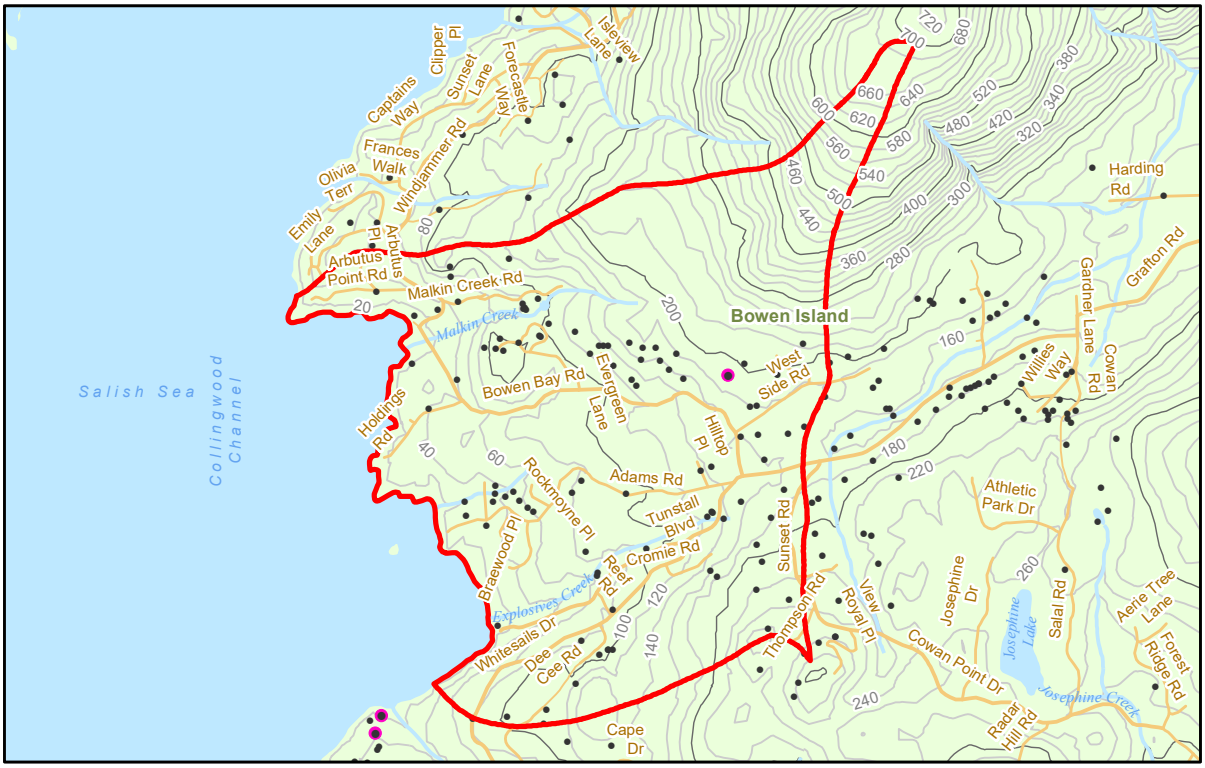
	Well Depth		***Depth to Water***		***Depth to Bedrock***		***Reported Well Yield ****		***Estimated Thickness of Confining Materials *****	
Number of Wells	6	6	3	3	6	6	6	6	6	6
	m	ft	m	ft	m	ft	L/s	gpm	m	ft

Maximum	147.82	485.0	7.31	24.0	17.37	57.0	1.26	20.0	17.37	57.0
Minimum	92.96	305.0	1.83	6.0	2.44	8.0	0.09	1.5	2.44	8.0
Average	119.37	391.7	2.18	7.2	7.16	23.5	0.53	8.4	7.16	23.5
Median	121.91	400.0	3.96	13.0	5.33	17.5	0.38	6.0	5.33	17.5
Geometric Mean	118.20	387.8	3.76	12.3	5.82	19.1	0.32	5.1	5.82	19.1

* - USgpm

** Based on summary information from Journeay and Dunster (2002) and well records with general locations. Copies of original well records not currently available for these reports.

Aquifer #749



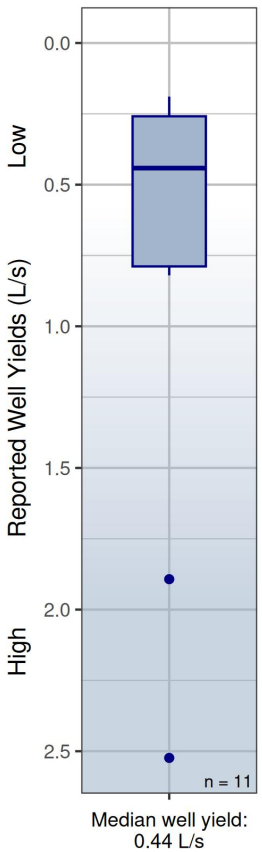
Legend

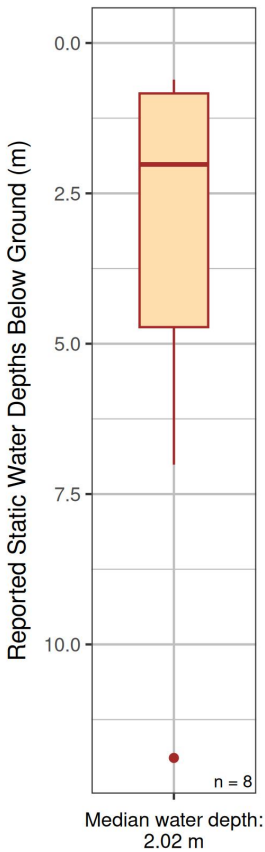
- Registered Water Well - Artesian
- Registered Water Well
- Aquifer Boundary

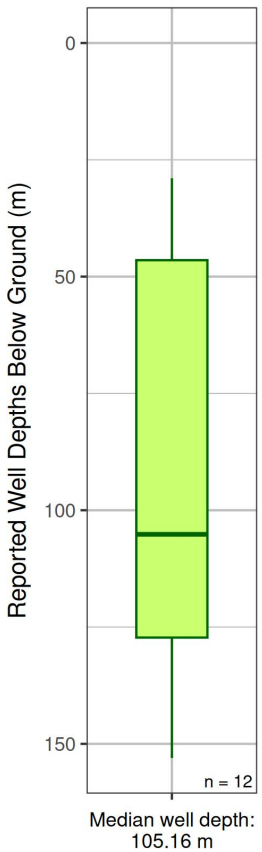
Aquifer Description (Mapping Report - 2006): Fractured crystalline (igneous intrusive or metamorphic, meta-sedimentary, meta-volcanic, volcanic) rock aquifer (subtype = 6b).

Aquifer Details	
Region	South Coast
Water District	Vancouver
Aquifer Area	4.1 km^2
No. Wells Correlated	12
Vulnerability to Contamination	Moderate
Productivity	Moderate
Aquifer Classification	IB
Hydraulic Conductivity *	Unknown
Transmissivity *	Unknown
Storativity *	Unknown
No. Water Licences Issued to Wells	Unknown
Observation Wells (**Active**, Inactive)	None

* min - max
For Hydraulic Connection see guidance document







Detailed methods for all figures are described in the companion document (Aquifer Factsheet - Companion Document.pdf).
Factsheet generated: 2025-03-26. Aquifers online: https://apps.nrs.gov.bc.ca/gwells/aquifers.

AQUIFER CLASSIFICATION WORK SHEET

DATE: January 1, 2006

AQUIFER MAPPER: A.P. Kohut

AQUIFER LOCATION: Tunstall – Bowen Bay, Southwest side of Bowen Island.

AQUIFER NUMBER: 749

NTS MAP SHEETS: 92G/6

BCGS TRIM Maps (1:20,000): 092G.033

CLASSIFICATION: IB **RANKING: 12**

Aquifer Size:
Area of aquifer is approximately 4.1 km^2.

Aquifer Boundaries:
The aquifer boundary has been delineated using water well record information (area of development), topography, surface drainage features and major geologic structural (fault/lineament) features. The aquifer forms part of the larger fractured crystalline bedrock aquifer system that underlies Bowen Island.

Geologic Formation (overlying): Pleistocene and Holocene deposits including clay, till, boulders, silt, sand and gravel, see Ministry of Environment (1978).

Geologic Formation (aquifer): Fractured crystalline bedrock including Lower Jurassic to Middle Jurassic *Bowen Island Group* around Tunstall Bay comprised of argillite, greywacke and conglomerate turbidites, and Late Jurassic quartz diorite around Bowen Bay. See Roddick and Woodsworth (1979) and British Columbia Geological Survey (2005).

Confined/Partially Confined/Unconfined: Confined and partially confined.

Vulnerability:
Moderate. The geometric mean (geomean) depth to static water level is 0.4 metres (1.3 feet). The geometric mean thickness of the confining layer is 6.81 metres (22.3 feet). The range of thickness of the confining layer is from 0.61 to 34.75 metres (2.0 to 114.0 feet).

Productivity:
Highly variable from low to high and **moderate overall** for fractured bedrock. Well yields reported in the well records range up to 2.52+ L/s (40+ USgpm). The geometric mean of 12 reported well yields is 0.43 L/s (6.8 USgpm) and the median well yield is 0.41 L/s (6.5 USgpm).

Depth to Water Table:

The geometric mean static water level is 0.4 metres (1.3 feet) and the median static water level is 0.7 metres (2.3 feet) based on 8 well records. Flowing conditions are reported in three wells near the coast.

Direction of Groundwater Flow:
Groundwater likely moves from eastern upland areas towards the west discharging into Tunstall Bay and Bowen Bay.

Recharge:
Precipitation and infiltration from eastern upland surface sources.

Domestic Well Density:
Moderate. Approximately 4 wells/km^2. Wells are concentrated along the coastal part of the aquifer area.

Type of Water Use:
Domestic for individual properties and community water supplies.

Reliance on Source:
Important source for individual properties and community supplies including Bowen Bay Water System and Tunstall Bay Water System.

Conflicts Between Users:
Unknown.

Quantity Concerns (type, source, level of concern):
Downward trend reported in water levels in some wells, (Bowen Island Municipality, 2005a). This may need further investigation.

Quality Concerns (type, source, level of concern):
Elevated TDS, Iron and Chlorides in some wells along southern boundary of aquifer. Two flowing wells reported with high pH (9.4). Source water quality protection is of interest for community water systems (Bowen Island Municipality, 2005a and 2005b).

Comments:
The geometric mean depth of water wells in this aquifer is 82.98 metres (272.3 feet). The median depth of wells is 105.15 metres (345.0 feet) and the range of well depths is from 28.95 to 153.0 metres (95.0 to 502.0 feet).

The statistics quoted for this aquifer are based on 8 to 14 water well records.

References:

Berardinucci, J. and K. Ronneseth. 2002. *Guide to Using the BC Aquifer Classification Maps for the Protection and Management of Groundwater*. Water, Air and Climate Change Branch. BC Ministry of Water, Land and Air Protection. Victoria, B.C. 54 pp.

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Journeay, J.M. and Dunster, J., 2002. *The Bowen Island GeoLibrary; Spinning the web of Community Knowledge (v1.0).* A project of the Bowen Island Forest and Water Management Society. Available on CD and online at: www.bowenisland.info

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AQUIFER CLASSIFICATION AND RANKING

AQUIFER LOCATION: Tunstall – Bowen Bay, Southwest side of Bowen Island.

AQUIFER NUMBER: 749

CLASSIFICATION: IB **RANKING VALUE: 12**

Classification Component:

Level of development: **Heavy** - ***High*** level of demand in relationship to ***moderate*** level of aquifer productivity and water availability. Additional development of the aquifer should be carefully assessed.

Level of Vulnerability: **Moderate:** ***Moderate*** level of vulnerability to surface contamination.

Ranking Component:

	Ranking Value
Productivity:	2
Vulnerability:	2
Size:	1
Demand*:	3
Type of Use:	2
Quality Concerns:	1
Quantity Concerns:	1
Total:	**12**

- Demand has been assessed subjectively. 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 available for aquifer delineation = 14
Statistical Summary of Well Record Data for Aquifer # 749

	Well Depth		***Depth to Water***		***Depth to Bedrock***		***Reported Well Yield ****		***Estimated Thickness of Confining Materials *****	
Number of Wells	14	14	8	8	14	14	12	12	14	14
	m	ft	m	ft	m	ft	L/s	gpm	m	ft
Maximum	153.00	502.0	11.89	39.0	34.75	114.0	2.52	40.0	34.75	114.0
Minimum	28.95	95.0	0.03	0.1	0.61	2.0	0.01	0.2	0.61	2.0
Average	95.40	313.0	2.3	7.5	10.73	35.2	0.69	11.0	10.73	35.2
Median	105.15	345.0	0.7	2.3	6.40	21.0	0.41	6.5	6.40	21.0
Geometric Mean	82.98	272.3	0.4	1.3	6.81	22.3	0.43	6.8	6.81	22.3

* - USgpm

** Does not include surficial wells where bedrock was not encountered.