PROVINCE OF BRITISH COLUMBIA
MINISTRY OF ENVIRONMENT
WATER MANAGEMENT BRANCH

# A PRELIMINARY ASSESSMENT OF GROUNDWATER CONDITIONS ON SATURNA ISLAND, BRITISH COLUMBIA

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# A PRELIMINARY ASSESSMENT OF GROUNDWATER CONDITIONS ON SATURNA ISLAND

## 1. INTRODUCTION

### 1.1 Purpose of Study

This report has been written to examine the known groundwater conditions on Saturna Island. Its main objectives are as follows:

(i) To present a compilation of information obtained to date regarding groundwater conditions on Saturna Island for presentation into a format for future referral;

(ii) to provide a general overview of the hydrogeology of Saturna Island;

(iii) to review water quality and delineate water quality problem areas.

### 1.2 Methods of Investigations

In order to formulate this report the sources below were referred to:

(i) Water well records and well location maps in the Groundwater Section files, including unlocated and unplotted well records.

(ii) General groundwater information including informal and formal reports, results of previous field work investigations, surficial and bedrock geology maps, and aerial photography.

### 1.3 Methods of Presentation

Methods employed to present the information within this report include the following:

(i) Examination and tabulation of information on approximately 120 plotted and unplotted well records. This information includes records of wells constructed up to 1982.

(ii) Presentation of various compiled data in map and tabulated format. This includes water quality information and estimates of groundwater recharge and demand within each groundwater region.

### 1.4 Previous Groundwater Investigations

Although no comprehensive reports have been previously written concerning groundwater conditions on Saturna Island, a considerable amount of field inventory work has been conducted in the past by Groundwater Section staff members. Results of this field work constitute a major part of this report.

## 2. LOCATION, SIZE, TOPOGRAPHY AND DRAINAGE AND CLIMATE

Saturna Island is the most southeasterly of the Canadian Gulf Islands located in the Strait of Georgia (Figure 1). It is approximately 8,040 acres (3,347 hectares) in size, 7.5 miles (12 kilometers) in length and 3 miles (4.6 kilometers) wide and can be reached by vehicle ferry from both Vancouver Island and the Mainland and supports a permanent population of 229 (1981 census). This number can triple due to the influx of visitors and part-time residents during the summer months.

As evident with the other Gulf Islands, the topography of Saturna Island generally trends northwest-southeast, reflecting bedrock structure and stratigraphy. The relief slopes sharply to a rugged coastline. Two ridges, along the northeast and southwest portions of the island separated by a valley, form the predominant topographic features of the Island. Maximum relief is 1,425 feet. The ridges slope gently to the north but have bluffs ranging in steepness from 45 to 90 degrees on their southern scarp faces.

As shown in Figure 2, five groundwater regions have been delineated. The boundaries represent the topographic divides or heights of land between natural drainage basins and are considered synonymous with groundwater regions at this time. This is a very simplified division and may be revised when future hydrogeological studies reveal underlying zones of permeability which could alter the size and shape of certain groundwater regions. Groundwater regions in this study have been named after local place names. The southerly Gulf Islands (Saturna, Galiano, Mayne and North and South Pender) lie to the leeward of the Vancouver Island ranges, and thus share a west coast summer dry climate. Wherein (a) marine influence on temperature overshadows the effects of elevation, latitudes and aspect (direction or exposure of slope) and (b) more than 90% of the precipitation falls as rain, over 75% during the winter months. Annual average precipitation over a 15 year period (1967-1981) has been calculated at 29.8 inches (757 mm) (Environment Canada).

## 3. BEDROCK GEOLOGY

### 3.1 Stratigraphy

Bedrock geology of Saturna Island is made up of three principal formations (Figure 3). These formations have been designated as Cedar District Formation, the De Courcy Formation and the Northumberland Formation (Usher, 1952).

Cedar District Formation - this formation has been described by Usher as "thin beds of bluish-grey to dark grey spheroidal weathering, carbonaceous and ferrugenous and in places calcareous sandy shales alternating with brownish grey, fine-grained sandstone." The sediments are well bedded and the shales are commonly laminated. The Cedar District Formation crops out on the south side of Saturna Island at the base of massive cliffs of De Courcy Formation. Shale exposures are visible in Lyall Harbour.

De Courcy Formation - this sandstone formation overlies the shales of the Cedar District Formation and has been estimated to range from 800 to 1000 feet in thickness. While this formation is predominantly sandstone, it becomes shaley near its contacts with the Cedar District shales and the Northumberland Formation.

Beds of conglomerates are interbedded in the sandstone. As a rule, these conglomerate beds tend to form lenses and rarely extend for any lateral distance.

Northumberland Formation - this formation includes sandstones, silty sandstones with minor shales in the Northumberland Formation. Boundaries of this formation, like those of others found in the Nanaimo Basin, are not well defined, and have been chosen on an arbitrary basis. Its estimated thickness is 2,400 feet on Saturna Island.

## 3.2 Structure

Major structural trends are evident along northwest and southeast directions. The valley occupying the central portion of the Island probably represents the top of an anticline which has been inverted to its present low topographic level (Lintott, 1953). Plumper Sound off the southern shore of the Island is considered to have had a similar

origin (Figure 1). The northern limb of Plumper Sound has pronounced plunging to both the northwest and the southeast.

## 4. SURFICIAL GEOLOGY

On the basis of very limited information available, the average depth of overburden on Saturna Island is less than 6 feet. Many well records submitted have no lithology reported. Reports of bedrock at surface are common with shale the most common rock type. Records for wells in the Winter Cove area of Saturna Island indicate surficial deposits are more significant here with reports of overburden as thick as 36 feet and average depth of overburden at 12.5 feet. While there are no known water-bearing gravel deposits of any significant thickness, there are some shallow dug wells that yield small amounts of water. Bedrock at surface is common in the East Point area where the thickest unconsolidated deposit recorded overlying sandstone is 9 feet.

Well records indicate there are only a few dug wells and springs in the Narvaez Bay area and very little is known regarding the thickness or nature of the unconsolidated deposits in this area.

## 5. GROUNDWATER

### 5.1 Groundwater Occurrence

As evident in all Gulf Islands investigated to date, the bedrock on Saturna Island consists primarily of alternating layers of sandstones and shales. Groundwater is reported from fractures and faults within the bedrock and also the contact zones between these two rock types.

## 5.2 Groundwater Development

Well record data has been tabulated and shown in Table 1. Wells have been constructed most readily in the past in the Lyall-Harbour-Boot Cove area and East Point Peninsula. The majority of wells located in the Lyall Harbour-Boot Cove area are now, however, abandoned, as this area is primarily serviced by a surface water system "Money Water System." In 1981 and 1982 a number of wells were constructed in the Winter Cove area. Most of these wells are not being used as very little development has occurred in this area since it was subdivided in 1981. It appears that well construction on Saturna Island has generally declined since 1982. By March 1985, the Groundwater Section had 100 records of wells and springs plotted (Figure 4) and approximately 20 records of wells unplotted on Saturna Island. In comparison to other major Gulf Islands, Saturna Island has the fewest wells constructed. In mid-1985 a well record tabulation for plotted wells was determined for the following Gulf Islands:

| | |
|---|---|
| Gabriola Island | 1,237 |
| Saltspring Island | 1,176 |
| Pender Island | 517 |
| Galiano Island | 495 |
| Hornby Island | 406 |
| Mayne Island | 341 |
| Denman Island | 224 |
| Saturna Island | 100 |

Excluding one 1,000 foot deep hole drilled for the purpose of coal exploration in 1889, the average depth of drilled wells on Saturna Island is 217 feet. Drilling is often discontinued as soon as sufficient water is encountered. Many of the older well records have no yield reported while many of the wells drilled since 1980 report fairly productive yields from the bedrock in the range of 2 to 20 gpm. The greatest reported yield from a drilled well based on a short-term test is 50 gpm (2 wells have reported yields of 50 gpm - one within Section 16 and the other within

Section 18). The area most highly developed is the East Point Peninsula. Approximately 30 percent of wells on Saturna Island are located on this Peninsula. The average depth of drilled wells on the Peninsula is 251 feet. Most wells are completed therefore below sea level. The average depth of drilled wells in the Winter Cove area is 228 feet.

## 5.3 Groundwater Usage versus Groundwater in Storage

There is little information available for Saturna Island regarding thickness of the potable water-bearing zone between the water table and the underlying non-potable zone. Figures given therefore in the estimated "Groundwater in Bedrock Storage" column of Table 1, are based on a model where the potable water-bearing zone is assumed to be 200 feet. This gives a conservative figure for storage because many wells are deeper than 200 feet and supply good quality water. A storage coefficient of $1 \times 10^{-4}$ is adopted in computing groundwater storage on Saturna Island. This figure has been used in groundwater evaluation reports on several Gulf Islands where overburden is thin (Foweraker 1974, Hodge 1978, Chwojka 1979, 1984). Based on this model, the estimated available groundwater stored in the bedrock, employing Tumbo Channel region as an example is given below:

Estimated available bedrock storage -

= Area x thickness x storage coefficient

= Area (acres) x 200 x 0.0001

= 1,632 x 200 x 0.0001 = 32.64 acre-feet

= 32.64 x (no. of ft.$^2$ in acre x no. of USgal/ft$^3$)

= 32.64 x 43,560 x 7.481

= 10,636,474 U.S. gallons of potable groundwater in bedrock storage

and:

The estimated groundwater usage for Tumbo Channel region in U.S. gallons based on 500 gallons per day usage per well for a 100 day little or no recharge period is given below:

46 x 500 x 100 = 2,300,000 U.S. gallons of potable groundwater usage

Therefore:

The estimated actual groundwater usage versus groundwater in storage expressed as a percent is:

$$\frac{2.3 \times 10^6}{10.6 \times 10^6} \times 100 = 21.6\% \quad \text{(Figure 7)}$$

A figure of 21.6 percent indicates that a demand is not exceeding groundwater in storage at this time. As this figure represents the highest demand-storage ratio of the groundwater regions on Saturna Island, it would appear unnecessary at the present time to curtail or severely limit future well development. As noted previously, however, that because of limited hydrogeologic knowledge of Saturna Island, groundwater region boundaries have been defined for simplification and follow the watersheds or topographic divides between natural drainage basins. The natural divide for Tumbo Channel extends to the east to bisect East Point Peninsula between the Tumbo Channel and Narvaez Bay regions. This

simplified division may be unrealistic for this particular area. If for example the East Point Peninsula is examined as a sub-region of the Tumbo Channel and Narvaez Bay regions (Figure 2) the following calculations are derived.

Demand-storage figures have been calculated again assuming 200 feet as the thickness of the potable water-bearing zone, and 0.0001 as the storage coefficient:

Estimated available bedrock storage =

= Area x thickness x storage coefficient

= Area (acres) x 200 x 0.0001

= 276.8 x 200 x 0.0001 = 5.536 acre-feet

and:

5.536 x (no. of $ft^2$ in acre x no. of USgal/$ft^3$)

= 5.536 x 43.560 x 7.481

= 1,804,029.4 U.S. gallons of potable groundwater in bedrock storage within East Point Peninsula.

The estimated groundwater usage for the East Point Peninsula in U.S. gallons based on 500 gallons per day usage per well, for a 100 day little or no recharge period is given below:

27 x 500 x 100 = 1,350,000 gallons estimated usage over 100 day little or no recharge period.

The estimated actual groundwater usage versus groundwater in storage expressed as a percent is:

$$\frac{1.35 \times 10^6}{1.8 \times 10^6} \times 100 = \underline{75 \text{ percent}}$$

This figure suggests that serious consideration should be given to limiting future well development on this peninsula. Considerable well development has occurred here and the potable water-bearing zones could be overpumped resulting in a possible mining situation and sea water intrusion. The area probably receives minimal recharge, and there is presently evidence of water quality deterioration.

## 6. WELL DISTRIBUTION AND USAGE WITHIN EACH GROUNDWATER REGION

A general discussion on the groundwater situation has been given below for each of the five designated groundwater regions. Well distribution on Saturna Island has been shown in Figure 4.

### 6.1 Tumbo Channel Region (including East Point Peninsula)

The Tumbo Channel region (Figure 2) emcompasses the northern part of Saturna Island between Winter Cove and East Point Peninsula. There are basically three areas within this region in which wells have been constructed. These are Winter Cove, East Point Peninsula, and the small peninsula located half way between these two areas (Figure 2). Groundwater Section records indicate there are 46 wells within the boundaries of this region. The majority of wells are located within the East Point Peninsula. As indicated in Section 3.3, the East Point Peninsula has been designated as a sub-region of the Tumbo Channel region because of its shape and probable limited catchment area. A 75 percent demand-storage percent figure was calculated with the East Point Peninsula

considered as a sub-region. A demand-storage figure of 21.6 percent was calculated for the entire Tumbo Channel Region (including East Point Peninsula).

Well depths range between 8 feet and 380 feet (a 1,000 foot depth coal exploration hole constructed in 1889 was not considered in these figures) while reported well yields range from 1/2 gpm (East Point Peninsula) to 50 gpm (Winter Cove). Many of the records for "older" wells do not have well yields reported.

The principal aquifer in the Winter Cove area is fractured shale, while in the East Point Peninsula it is sandstone and shaley sandstone. The majority of wells in the Winter Cove area are capped and not presently used. Due to relatively high well density on the East Point Peninsula, interference between wells may be a problem. Most wells are completed below sea level and the average well depth is 251 feet. No well records are available that suggest persons share a water supply within this region.

## 6.2 Lyall Harbour Region

The Lyall Harbour region encompasses the areas around Lyall Harbour, south of Winter Cove and east of Boot Cove. Thirty wells are reported located within the boundaries of this region. Most wells are located around Lyall Harbour. Most are shallow, generally 50 feet or less in depth and many are now abandoned. Lyall Harbour is a flat, low lying basin and surrounded by mountainous terrain. Most residents in Lyall Harbour are supplied water from a surface water system where runoff from the mountains is stored in a man-made lake. Many wells are capped and presently unused along Winter Cove Road. There are a few good producing wells at higher elevations north of Lyall Harbour. A few wells exist inland at high elevations along Narvaez Bay Road about half-way between

Lyall Harbour and Narvaez Bay Road. This area is, however, generally undeveloped.

Average well depth within the Lyall Harbour region was determined to be 168 feet. While most wells in Lyall Harbour are less than 50 feet in depth, most wells along Winter Cove Road are over 200 feet in depth. The deepest recorded well within this region is 380 feet (same as Tumbo Channel region) while the greatest recorded yield is 40 gpm (Winter Cove Road).

If the entire region is considered in general, a demand-storage figure of 8.3 percent indicates groundwater usage does not exceed recharge. The Lyall Harbour area and the area along Winter Cove Road appear, however, to be specific areas for concern. Wells located in Lyall Harbour appear to be susceptible to water quality contamination (one well has a reported chloride level of 947 mg/L). Fortunately, this area is now serviced primarily by a surface water system. Due to a high well density along Winter Cove Road, wells may be susceptible to water level interference.

### 6.3 Narvaez Bay Region

Narvaez Bay region encompasses the southern half of East Point Peninsula along Cliffside Drive and the area inland around Narvaez Bay. The majority of wells along Cliffside Drive are over 200 feet deep and most wells report yields of 3 gpm or less. One well near Lighthouse Point has a reported yield of 30 gpm. The water quality is unknown at this time. The Narvaez Bay area is undeveloped with only a few records of dug wells and springs in the area.

A demand-storage figure of 8.0 percent indicates groundwater in storage greatly exceeds groundwater usage. The only area where potential

problems presently exist is along Cliffside Drive on East Point Peninsula where there is evidence of water quality deterioration. Consideration should be given to future limiting of well development in this area. As evident in the Tumbo Channel and Lyall Harbour regions there is no record on file of persons sharing a water supply.

## 6.4 Boot Cove Region

The Boot Cove region, as apparent in the Lyall Harbour region, is now primarily serviced by a surface water system. Groundwater files indicate there are only 8 wells and/or springs within the boundaries of this region. One 300 foot deep well (Section 8, No.6) was pump tested in 1971 for a 72 hour period by the Groundwater Section as part of a Gulf Island hydrogeological study at that time. Results indicated a transmissivity of between 126 USgpd/ft. and 171 USgpd/ft. The principal aquifer in the Boot Cove region is sandstone.

A demand-storage figure of 11.6 percent suggests there is no immediate cause for concern. On the basis of limited water quality information, quality appears to be good with no evidence of water quality deterioration or contamination.

## 6.5 Brown Ridge Region

The Brown Ridge region is rugged and undeveloped. Groundwater Section files indicate only one dug well is present within this region. A demand-storage figure of 4.5 percent again indicates groundwater in storage greatly exceeds groundwater usage.

## 7. HYDROCHEMICAL DATA

During the past 14 years a considerable number of wells have been sampled for field and/or laboratory analyses (Figure 5) on Saturna Island. In 1971, numerous wells were sampled using a standard Hach field analysis kit. Between July and September 1974, 37 water samples were collected and sampled for complete laboratory analyses. A number of wells were also sampled for field analysis during this period. Sampling of wells on the East Point Peninsula during the summer of 1982 was carried out by a University of Victoria student working in conjunction with the Groundwater staff. In December 1984 during an investigation to locate and establish a suitable abandoned well on Saturna Island a number of wells were again sampled for field analysis. Although not as evident as in other Gulf Island studies, water quality is affected by moderately high levels of chloride along some coastal areas (Figure 6).

Water quality is also affected locally by the occurrence of hydrogen sulphide and dissolved iron, which is often associated with shale formations, corrosive water and salt water. Flouride concentrations in excess of the acceptable limit (1.5 mg/L) have also been recorded in numerous wells in many of the Gulf Islands. Relatively high fluoride levels have been reported in a number of wells constructed in the Winter Cove area of Saturna Island. The major water-bearing zones are reported to be clay and shale layers in sandstone or soft shale zones. Moderately high levels of chloride (362 mg/L) and the presence of hydrogen sulphide are evident along coastal areas where wells are clustered and/or are continually being used. As mentioned previously, water quality in the majority of areas investigated has not deteriorated to the extent of some of the more densely populated Gulf Islands. The East Point Peninsula, however, is becoming an area of concern. Considerable groundwater development has occurred in this area increasing the probability of sea water intrusion from drilled wells bottomed below sea level. A number of wells located on the Peninsula show

moderate concentrations of chloride indicating a limited fresh water supply is available.

## 8. OBSERVATION WELL WR-290-85

In February 1985, an automatic water level recorder was installed on a well located on Lot 15, North 1/2 of Section 18, Saturna Island. The well is located 60 feet south of Winter Cove Road and on property owned by Oakwood Properties Ltd. of Vancouver, B.C. The location of this well has been shown in Figure 4. The purpose in establishing this well as an observation well is to monitor water level fluctuations in the aquifer. At present the well is located approximately 1,500 feet from the nearest well in an area of numerous unused 6-inch diameter bedrock wells. In 1981, the area around Winter Cove road was subdivided and wells were constructed on approximately 30 lots. Development of these properties was slow, believed to be primarily due to the recession and as a result most wells are presently capped and unused. Collection of regular water level data and periodical water quality data will however be useful in understanding the short and long-term recharge and withdrawal effects on this aquifer.

The well is a 6-inch diameter bedrock well drilled to a depth of 140 feet. Water-bearing fractures were encountered at 45 and 125 feet. The estimated theoretical well yield for short-term pumping has been determined as 5 USgpm.

The well is equipped with a Stevens water level recorder and is serviced on a once per month basis by a field observer. The well will be sampled periodically for complete laboratory analyses.

## 9. CONCLUSIONS

Based on available information, all wells on Saturna Island supply water to individual residences only. It would appear that available groundwater stored in the bedrock is the major limiting factor controlling groundwater availability. Recharge from precipitation is therefore limited to available non-saturated storage at any time. Present groundwater demand does not appear to be exceeding natural recharge or available groundwater supplies in storage in any areas at the present time. The East Point Peninsula is however an area of concern where if the Peninsula is considered as a sub-region of the Tumbo Channel - Narvaez Bay Regions, a demand-storage percentage figure of 75 percent is determined. Serious consideration should therefore be given to limiting future well development on this Peninsula.

The average overall depth of wells on Saturna Island is 217 feet while specifically in the Winter Cove area and East Point Peninsula average well depths are 228 and 251 feet respectively.

Drilling is usually discontinued as soon as an adequate water supply is encountered. The greatest well yield reported is 50 gpm. Well records indicate bedrock aquifers produce moderate amounts of water generally in the range of 2 to 20 gpm. There are, however, few long-term pumping test results available and most reported well yields are given on the basis of short-term bail or air tests.

Groundwater quality on Saturna Island is in most instances benign, particularly in areas inland and away from the coast. There are, however, reports of sulphur odour and taste, moderately high chloride and iron levels. Moderately high chloride levels up to 947 mg/L are evident in wells located near the coast. The East Point Peninsula is an area of particular concern because of the considerable number of wells and the fact that fresh water recharge may be limited to the catchment area on the Peninsula. Most

of the wells on this Peninsula are completed below sea level increasing the probability of sea water intrusion. There is presently evidence of water quality deterioration on the Peninsula.

Locally fluoride concentrations up to several mg/L may be found associated with moderate to higher mineralized groundwaters.

In February 1985, an observation well was established in the Winter Cove area for the purpose of monitoring long-term water level fluctuation in the aquifer. This well is equipped with an automatic water level recorder. Water quality will be monitored on a periodical basis.

## 10. RECOMMENDATIONS

Domestic water supplies are a primary concern for residential development on Saturna Island. It is therefore essential that every precaution be exercised to conserve a sustained supply for the resident population and to prevent contamination of the groundwater by sources such as domestic sewage. Care should be taken in placing of septic tanks and disposal fields so that the effluent does not enter directly into the bedrock. Land use in upland recharge areas should be limited to protect groundwater from contamination.

The possibility of establishing a community water supply well should be investigated outside of East Point Peninsula to supply residents of East Point Peninsula.

Local residents should be interviewed in the future to determine whether specific groundwater problems are occurring in specific areas. Previously sampled wells with hydrogen sulphide, high chloride levels and high iron levels should be sampled again to ascertain possible variations in water quality. Wells should be sampled in the August-October period when

water levels are historically at their lowest level and recharge to the well should be minimal.

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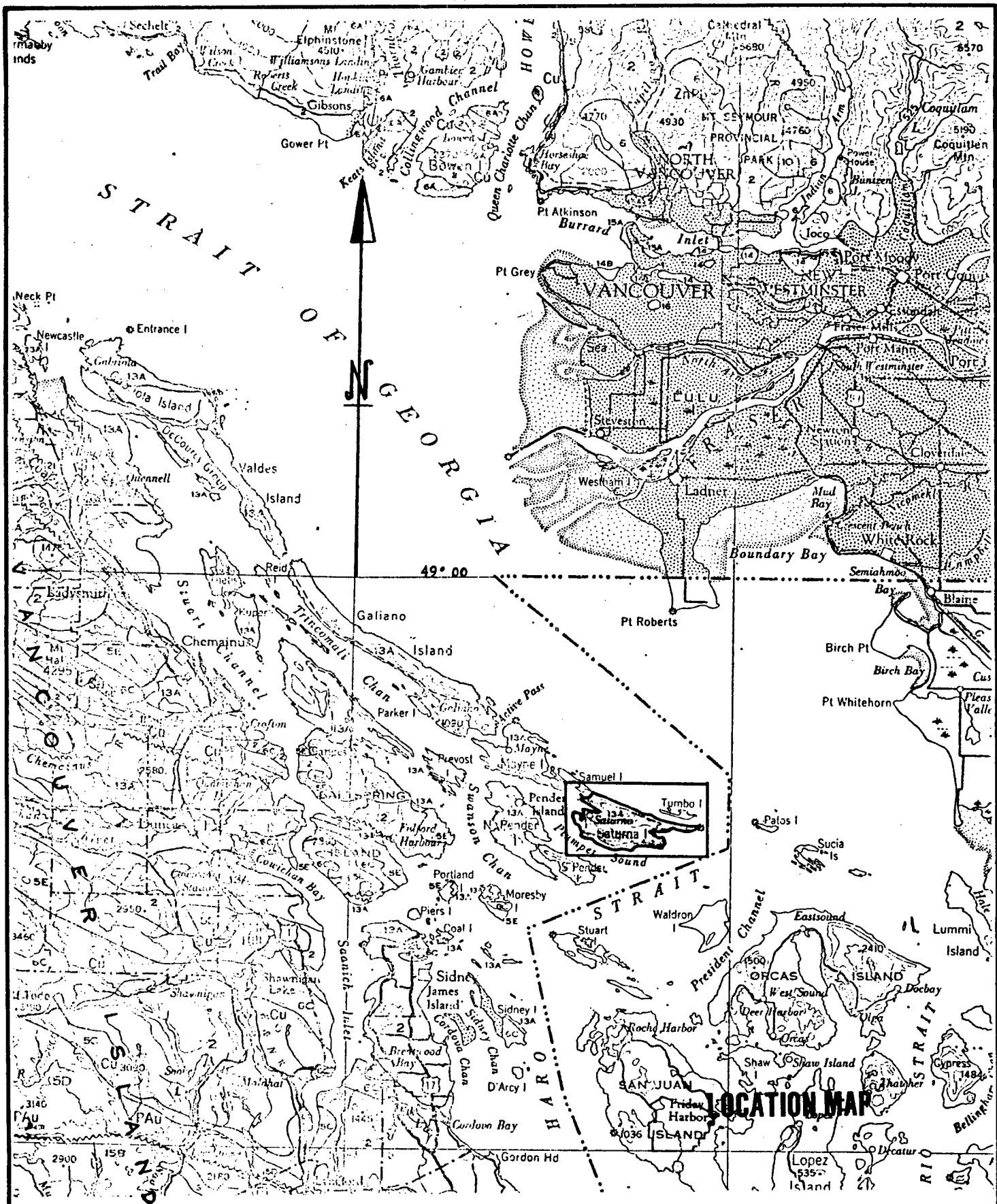


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Preliminary Assessment
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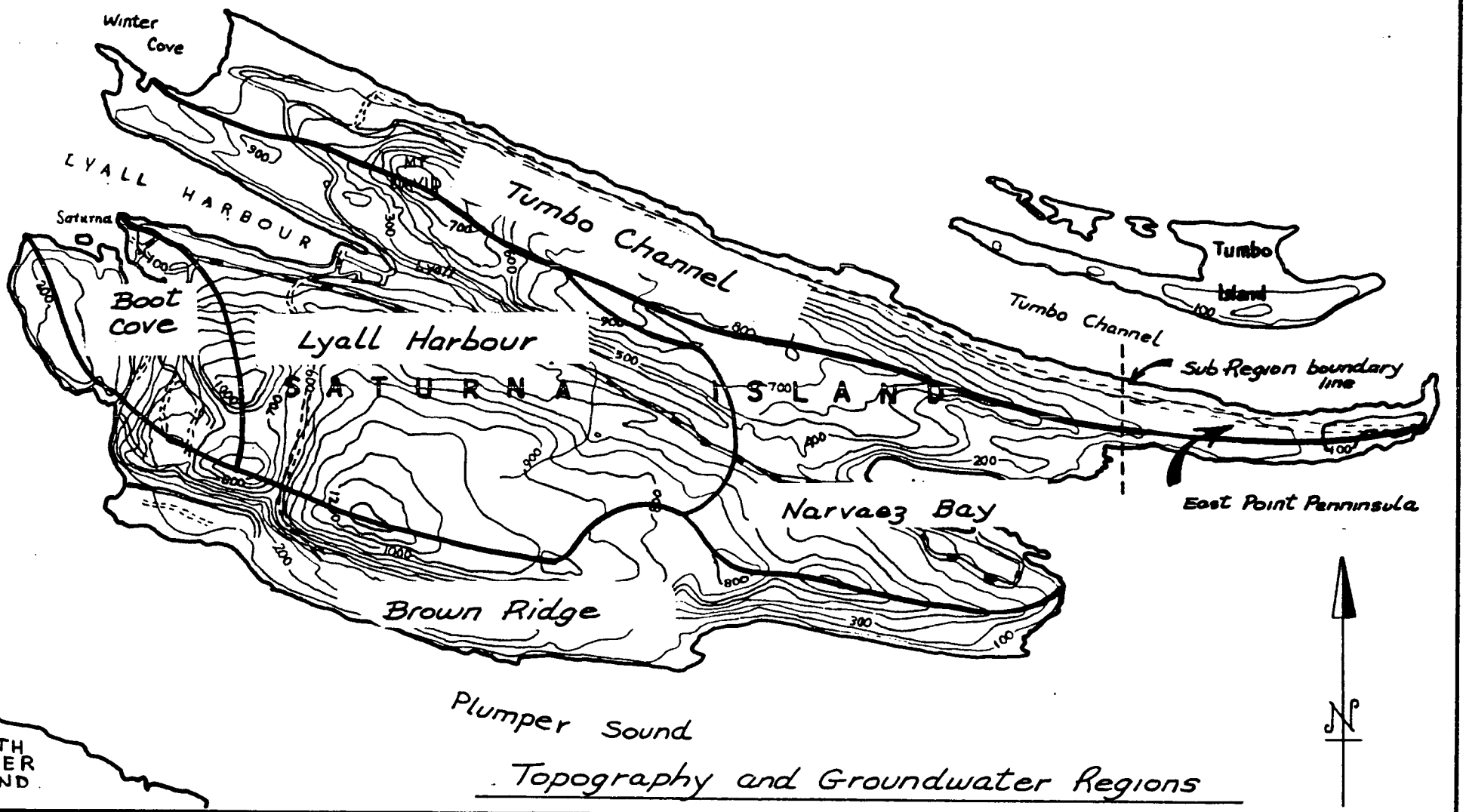


Topography and Groundwater Regions

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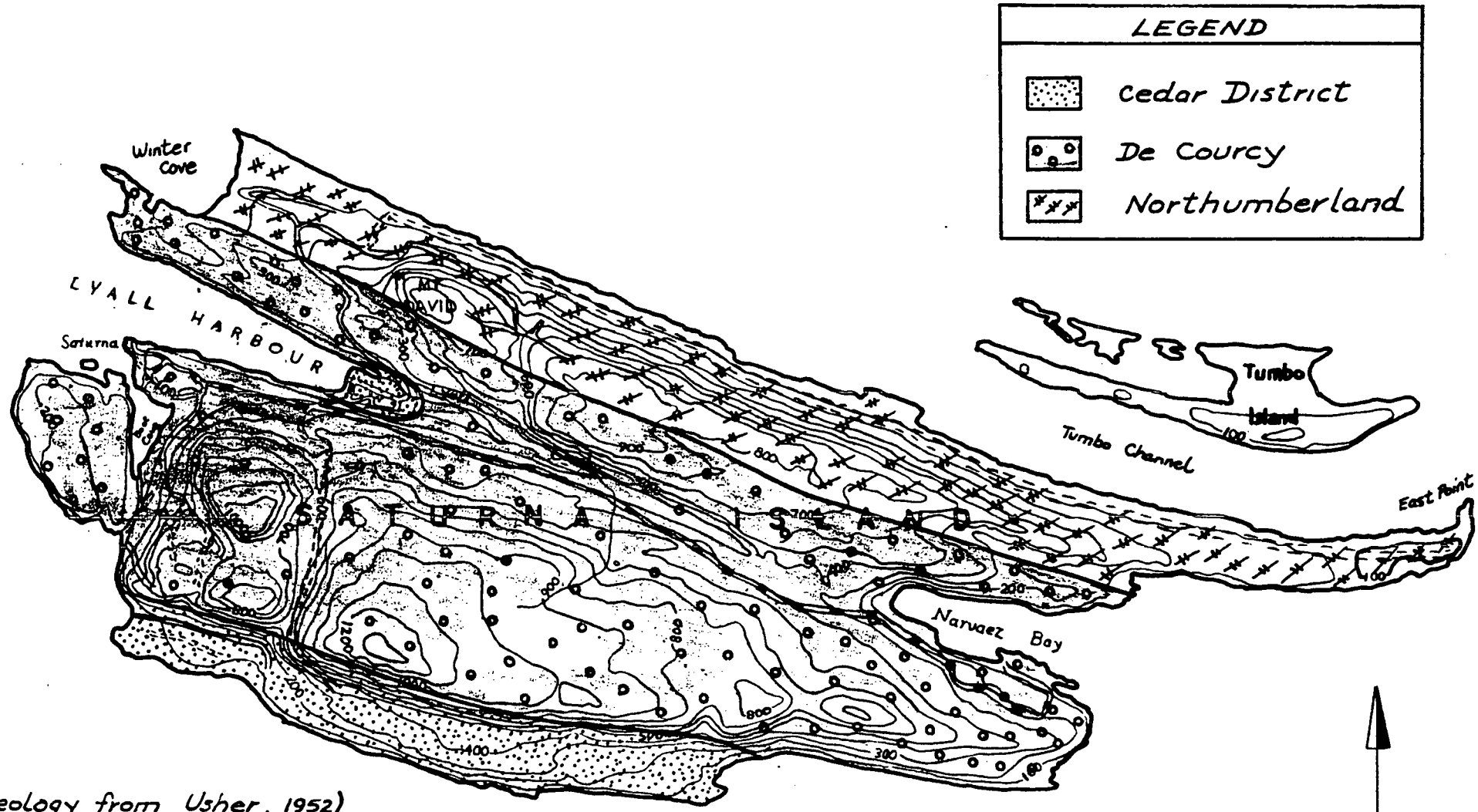


## Saturna Island Bedrock Geology

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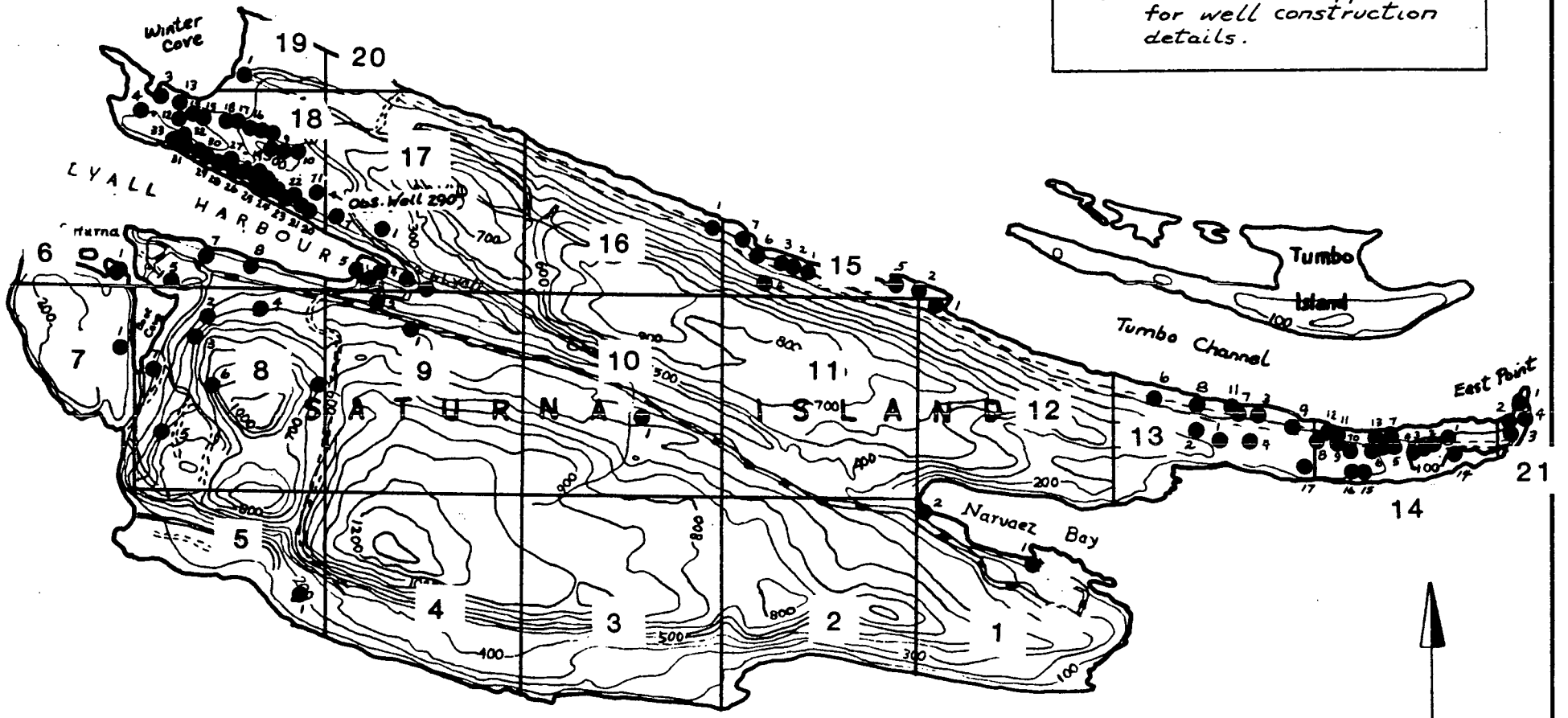


Saturna Island Well locations.

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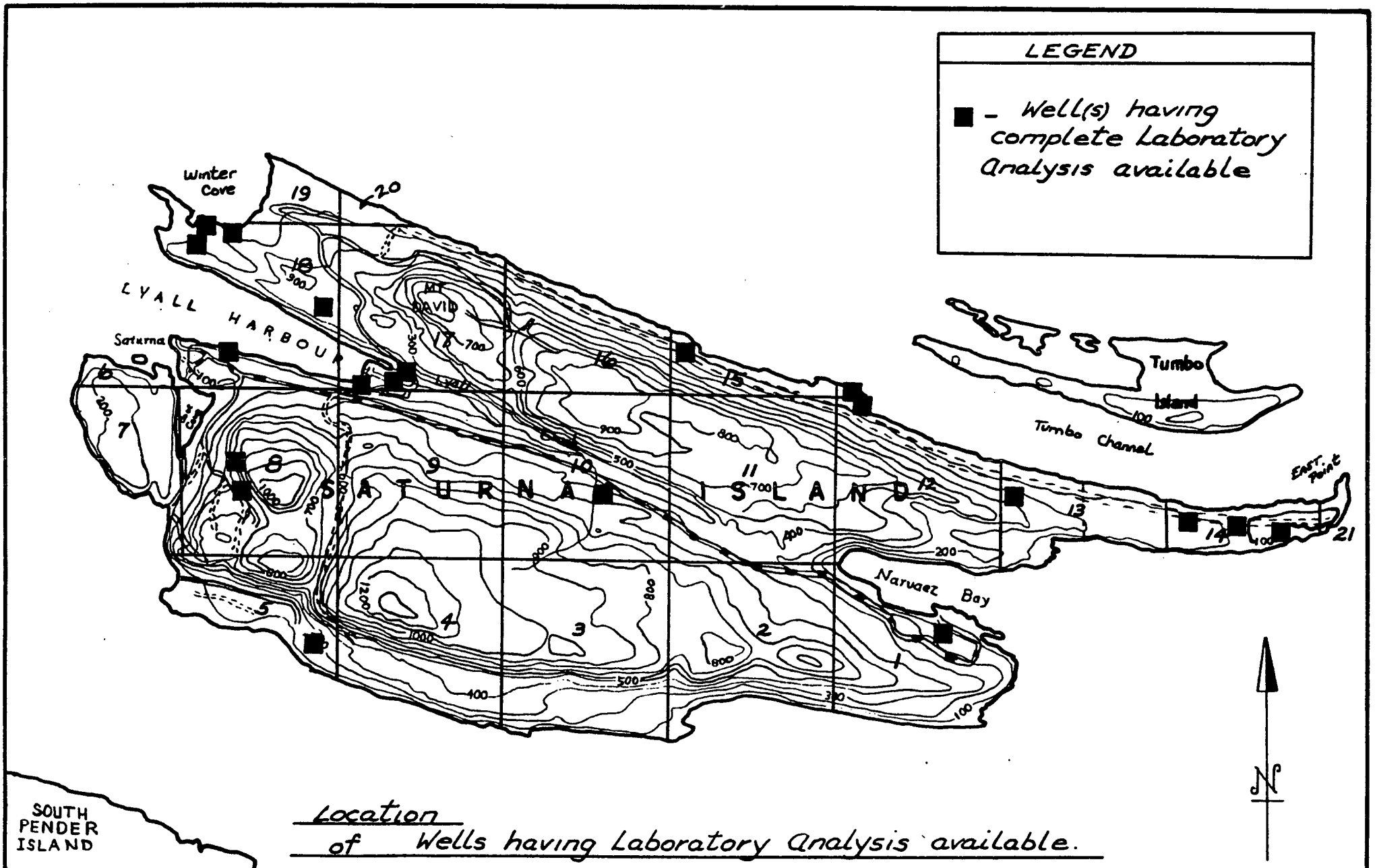


Location of Wells having Laboratory Analysis available.

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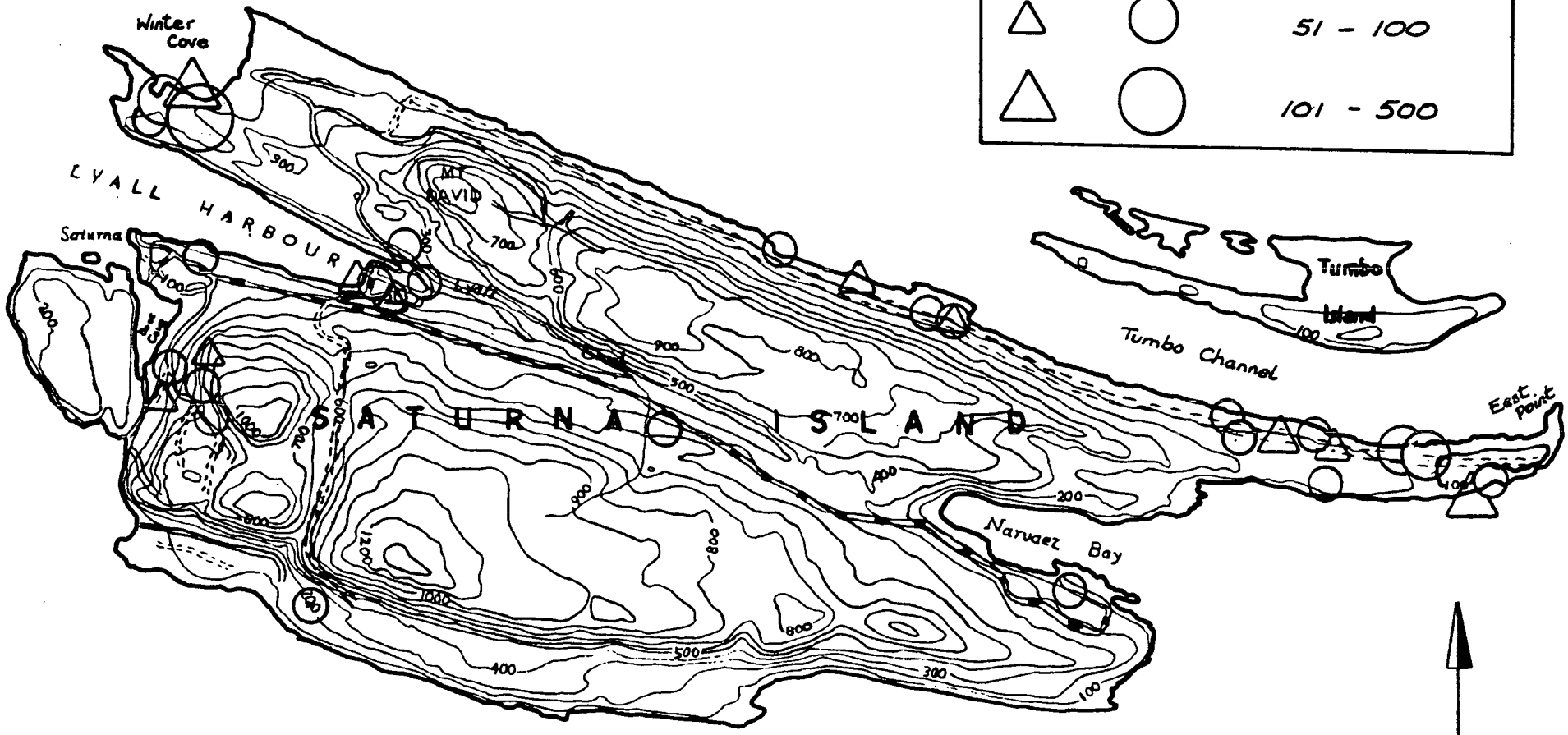


Wells tested for chloride - Lab. & Field (Hach) Analysis

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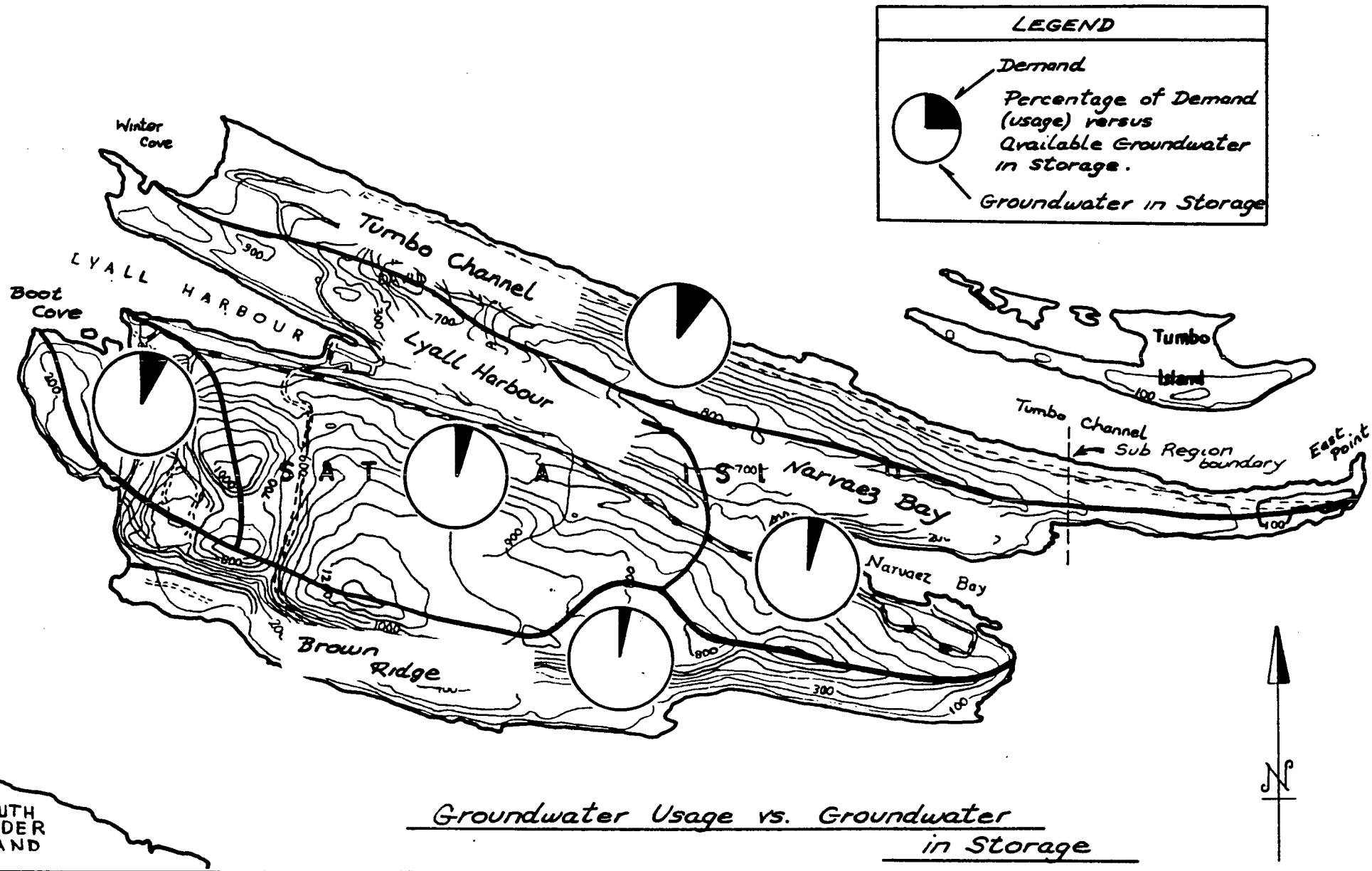


Groundwater Usage vs. Groundwater in Storage

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TABLE 1.

SATURNA ISLAND

**Quantative Estimates of Present Groundwater Usage Versus Groundwater in Storage**

| Groundwater Region | Area in Acres | Area in Hectares | Number of Plotted Wells Within Groundwater Region | Estimated Yield in gpm based on 500 USgpd Usage per Well | Estimated Groundwater Usage in US gallons based on 500 USgpd Per Well Per 100 Days of Pumping | Estimated Groundwater in Storage in Acre-Feet Recoverable by Pumping Assuming Aquifer Depth of 200 ft. and Storage Coefficient of .01% (expressed as % bedrock volume) | Estimated Groundwater in Storage in US gallons Recoverable by Pumping Assuming Aquifer Depth of 200 feet and Storage Coefficient of .01% | Estimated Actual Groundwater Usage Versus Groundwater in Storage Expressed as Percent |
|---|---|---|---|---|---|---|---|---|
| Tumbo Channel | 1632 | 4031 | 46 | 15.97 | $2.3 \times 10^6$ | 32.64 | $10.6 \times 10^6$ | 21.6* |
| Lyall Harbour | 2752 | 6797 | 30 | 10.42 | $1.5 \times 10^6$ | 55.04 | $17.9 \times 10^6$ | 8.3 |
| Narvaez Bay | 1446 | 3572 | 15 | 5.21 | $7.5 \times 10^5$ | 28.92 | $9.4 \times 10^6$ | 8.0 |
| Boot Cove | 531 | 1311 | 8 | 2.78 | $4.0 \times 10^5$ | 10.62 | $3.46 \times 10^6$ | 11.6 |
| Brown Ridge | 1683 | 4157 | 1 | 0.35 | $5.0 \times 10^4$ | 33.87 | $11.04 \times 10^6$ | 4.5 |

* Note: If the East Point Peninsula is considered as a sub-region of the Tumbo Channel - Narvaez Bay Regions, a substantially higher groundwater usage versus groundwater storage figure of 75 percent is determined for this smaller area.

# APPENDIX 1

## Saturna Island Well Inventory

# Saturna Island Well Inventory

| LOCATION SEC. | LOCATION R. | LOCATION NO. | OWNER'S NAME | DEPTH DUG | DEPTH DRILLED | DISTANCE TO WATER | G.P.M. | WATER USE | WELL ENDS IN | DATE COMPL. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 1 | BAVIS | SPR. | | | | | CLAY | | REG. SPR. |
| 1 | | 2 | WILLIAMS LOGGING | 4' | | | | DOMESTIC | SAND | | |
| 5 | | 1 | CAMPBELL | ? | | | | " | | | 1400683 |
| 6 | | 1 | KEENLYSIDE | SPR. | | | | " | | | REG. SPR. (1500 gpd) |
| 7 | | 1 | STAFFORD | SPR. | | | | " | | | REG SPR. (3000 gpd) |
| 8 | | 1 | SATURNA ISL WATER DST | SPR. | | | | " | BEDROCK | | REG SPR. (10 ac ft. |
| 8 | | 2 | " " " " | SPR. | | | 3 gpm | " | BEDROCK | | |
| 8 | | 3 | " " " " | SPR. | | | 3 gpm | | | | |
| 8 | | 4 | J. MONEY | SPR. | | | | DOMESTIC | | | |
| 8 | | 5 | B. SHEFFIELD | SPR. | | | | DOMESTIC | | | 1400682 |
| 8 | | 6 | B. HINDMARCH | | 300' | 230' | | DOMESTIC | SANDSTONE | 1971 | 1400681 |
| 8 | | 7 | BOOT COVE LODGE | | 100' | ? | | | | 1974 | 1400684 |
| 9 | | 1 | BC FOREST PROD. | SPR. | | | | DOMESTIC | | | |
| 9 | | 2 | G.J. SMITH | | 140' | | 7 gpm | DOMESTIC | SANDSTONE | 1979 | |
| 10 | | 1 | T. DAVIDSON | | 120' | 12' | 1 gpm | " | | 1966 | 1400680 |
| 12 | | 1 | R. GAINES | | 260' | | 3 gpm | " | SANDSTONE | 1970 | 1400685 |
| 12 | | 2 | R. GAINES | | 360' | | 6 gpm | " | | 1970 | 1400673 |
| 13 | | 1 | J. MONEY | | 73' | 8 | 2½ gpm | " | SANDSTONE | 1962 | |
| 13 | | 2 | PEAKE | | 230' | | 5 gpm | " | | 1971 | 1400674 |
| 13 | | 3 | CHASE | | 300' | | 5 gpm | " | SANDSTONE | 1966 | |



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|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | | 4 | RICHIE | 8-10' | | | | DOMESTIC | | | |
| 13 | | 6 | IR #7 | | | | | | | | |
| 13 | | 7 | MAYNARD | | 100' | | 20 gpm | DOMESTIC | SANDSTONE | 1971 | |
| 13 | | 7a | MAYNARD | | 270' | | | DOMESTIC | | 1974 | |
| 13 | | 8 | WILDE & PARKER | | 200' | | | DOMESTIC | | 1974 | 1400686 |
| 13 | | 9 | MacDONALD | | 210' | | | " | | 1974 | |
| 13 | | 5 | PUBLICOVER | | 255' | | 7 gpm | " | | 1971 | |
| 13 | | 10 | MONEY BROS. | | | | | " | | | 1400688 |
| 13 | | 11 | R.L. RODWAY | | 350' | | 2 gpm | DOMESTIC | SANDSTONE | 1978 | |
| 14 | | 1 | J. MONEY | | 170' | | DRY | " | SANDSTONE | 1962 | seeps 25 gal/12 hours |
| 14 | | 2 | J. MONEY | 8-10' | | | 100 gph | " | | | |
| 14 | | 3 | J. MONEY | 8-10' | | 5' | 100 gph | " | | | 1400689 |
| 14 | | 4 | J. MONEY | 8-10' | | | | " | | | NOT IN USE |
| 14 | | 5 | MIDDLER | 8 | | 6' | 8 gpm | " | | | |
| 14 | | 6 | DR RADKE & MORGAN | 8'+12' | | | | " | | | HACH ANALYSIS |
| 14 | | 7 | CROSBY | | 272' | 4'-11' | 15 gpm | " | | 1971 | 1400690 |
| 14 | | 8 | VINCENT | 14' | | 8' | | " | ROCK | | |
| 14 | | 9 | TOMLIN | 14' | | + | | " | ROCK | | |
| 14 | | 10 | JAMISON | 14' | | + | | " | | | |
| 14 | | 11 | TOMLIN | | 200' | | | " | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | | 12 | VINCENT | | 265' | | | DOMESTIC | | 1972 | 1400691 |
| 14 | | 13 | MC LELLAN | | 280' | | 8-10 gpm | " | | 1974 | 1400675 |
| 14 | | 14 | BOLTON | | 360' | | 20 gpm | DOMESTIC | | | |
| 14 | | 15 | SEED HOUSE | | 300' | | 3 gpm | " | SHALE | 79 | |
| 14 | | 16 | FONTAINE | | 235' | | .5 gpm | " | SHALE | | |
| 14 | | 17 | NOLLA | | 480' | | 2 gpm | " | SHALE | 1979 | |
| 15 | | 1 | RUCK | | | | | " | SANDSTONE | | |
| 15 | | 2 | FOXE | | 205' | | 2½ gpm | " | | 67 | |
| 15 | | 3 | GENEVA HOLDINGS | | 198' | 18" | 1½ gpm | | | 68 | |
| 15 | | 4 | GENEVA HOLDINGS | | 160' | 5' | 2¼ gpm | | | | |
| 15 | | 5 | R. GAINES | | | | 10 gpm | " | | | |
| 15 | | 6 | WIEDRICH | | | | | " | | | |
| 15 | | 7 | SCANTLAND | | 1000' | | | " | | "1889" | 1400692 |
| 16 | | 1 | DAVID-ELFORD HOLDINGS | | | | 50 gpm | | | | |
| 17 | | 1 | SATURNA ISLAND WATER DIST | | | | | | | | |
| 17 | | 2 | LYALL HARBOUR | 12-30' | | | | " | SANDY MATERIAL | | |
| 17 | | 3 | SAUNDERS | 15' | | 5' | | " | | | 1400676 |
| 17 | | 4 | LYALL HARBOUR SCHOOL | | 50' | | | | | 1972 | |
| 17 | | 5 | MASKOW | | 50' | | 5 gpm | " | | 1972 | |
| 17 | | 6 | AL. KERR | | 125' | | 3 gpm | DOMESTIC | SHALE | 1973 | 1400677 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 17 | | 7 | MONEY BROS. | 15' | | | | " | | | 1400695 |
| 17 | | 8 | | | 140' | | 20 gpm | | | 1980 | |
| 18 | | 1 | BCLA | | 125' | 28' | 2.2 gpm | | SHALE | 1948 | 1400696 |
| 18 | | 2 | BCLA | | 150' | | 15 gpm | | | 1969 | |
| 18 | | 3 | T. COWAN JR. | | 100' | 20' | | | | 1968 | 1400694 |
| 18 | | 4 | BACON, FRASER, GIBBONS | | 150' | | | | | 1969 | 1400679 |
| 18 | | 5 | JOE JARUIS | | 225' | | 2 gpm | DOMESTIC | SANDSTONE | 1971 | |
| 18 | | 6 | B.C. LIGHTWEIGHT AGG. LTD. | | 125' | | 3 gpm | | SHALE | 1975 | |
| 18 | | 7 | DANGERFIELD | | 130' | | 2½ gpm | " | | 1973 | 1400678 |
| 18 | | 8 | CUNNINGHAM | | | | | " | | 1974 | |
| 18 | | 9 | B.C. LIGHTWEIGHT AGG LTD | | 260' | | 4½ gpm | | SANDSTONE | 1975 | |
| 18 | | 10 | " " " " " | | 250' | | 2½ gpm | | SANDSTONE | 1975 | |
| 18 | | 11 | OAKWOOD PROPERTIES | | 140 | 1' | 5 gpm | OBS. WELL # 290 | SHALE | 1981 | 1401959 |
| 18 | | 12 | OAKWOOD PROPERTIES | | 380 | | 3 gpm | DOMESTIC | SHALE | 1981 | |
| 18 | | 13 | OAKWOOD PROPERTIES | | 240 | | 10 gpm | " | SHALE | 1981 | |
| 18 | | 14 | " " | | 120' | | 5 gpm | " | SHALE | 1981 | |
| 18 | | 15 | " " | | 180' | | 50 gpm | " | SHALE | 1981 | |
| 18 | | 16 | " " | | 140' | | 10 gpm | " | SHALE | 1981 | |
| 18 | | 17 | " " | | 275' | | 4 gpm | " | SHALE | 1981 | |
| 18 | | 18 | " " | | 300' | 2' | 5 gpm | " | SHALE | 1981 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | | 19 | OAKWOOD PROPERTIES | | 80' | 2 | 5 gpm | DOMESTIC | SHALE | 1981 | |
| 18 | | 20 | " " | | 240 | | 10 | " | " | " | |
| 18 | | 21 | " " | | 200 | | 10 | " | " | " | |
| 18 | | 22 | " " | | 140 | | 8 | " | " | " | |
| 18 | | 23 | " " | | 380 | | 2.5 | " | " | " | |
| 18 | | 24 | " " | | 360 | | 5 | " | " | " | |
| 18 | | 25 | " " | | 340 | 1 | 40 | " | " | " | |
| 18 | | 26 | " " | | 280 | | 3 | " | " | " | |
| 18 | | 27 | " " | | 200 | | 20 | " | " | " | |
| 18 | | 28 | " " | | 340 | | 15 | " | " | " | |
| 18 | | 29 | " " | | 240 | | 3 | " | " | " | |
| 18 | | 30 | " " | | 240 | | 5 | " | " | " | |
| 18 | | 31 | " " | | 260 | | 4 | " | " | " | |
| 18 | | 32 | " " | | 210 | | 8 | " | " | " | |
| 18 | | 33 | " " | | 250 | | 5 | " | " | " | |
| 19 | | 1 | WINTER COVE REC. PARK | | 50 | | 10 | " | " | 1983 | |
| 21 | | 1 | DEPT. OF TRANSPORT | | 150 | | DRY | PARKS | " | 1961 | |
| 2 | | 2 | " " " | | 276 | | | DOMESTIC | " | 1971 | |
| 21 | | 3 | | | 207 | | 30 | " | SANDSTONE | 1978 | |
| 21 | | 4 | | | 350 | | ½ | " | SANDSTONE | 1978 | |

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