PROVINCE OF BRITISH COLUMBIA
MINISTRY OF ENVIRONMENT, LANDS AND PARKS
VANCOUVER ISLAND REGION

SALTSPRING ISLAND

WATER ALLOCATION PLAN

NOVEMBER 1993

written by:

Lyn Barnett,
Bruno Blecic
Walter Van Bruggen

Regional Water Management
Vancouver Island Region
Victoria, B.C.

Approved: _____

Regional Water Manager
Vancouver Island Region

Date: 30 Nov. 93

Table of Contents

Tables

Figures

Appendices

SALTSPRING ISLAND WATER ALLOCATION PLAN

1.0 INTRODUCTION

The Water Management Program's goals are to sustain a healthy water resource through anticipating and planning for water uses. Water Allocation Plans are a means of identifying water demands and ensuring that water use is compatible with the goals of a sustainable environment. Water cannot be allocated beyond the resource ability of the resource to replenish itself. The natural amenities must be maintained for present and future generations. Allocation must be based on reasonable expectations that water will be available for the period required without significantly impacting existing licensed allocations or instream flow requirements. These include fisheries instream flow requirements, water quality maintenance, aesthetic values and cultural uses. Advantages of preparing an allocation plan include:

1. Providing the public with our position on water allocation in advance of water applications (pro-active management, information available to applicants and the public);

2. Reducing response time by having plans in place prior to receiving applications;

3. Eliminating individual studies and reports on each application;

4. Improving the consistency of our approach and decision making;

5. Replacing or reducing most Water Licence Application Reports by pre-defining specific allocation directions and decisions;

6. Being more comprehensive in the plan than in present reports;

7. Eliminating the need for many referrals.

The Vancouver Island Region developed the following policy to provide water allocation direction:

Regional Policy:

The region shall be subdivided into watershed areas and a water allocation plan shall be prepared for each watershed area. Water licence decisions will be made in accordance with approved plans.

SALTSPRING ISLAND WATER ALLOCATION PLAN

Assessments undertaken as part of the water allocation planning process include identifying the surface water resources available, the instream fisheries requirements, existing and potential licensable water demands in order to provide direction for further water licence allocations.

The Saltspring Island Water Allocation Plan is one of a series of allocation plans under development. Completion of this plan will significantly expedite the adjudication of water licence applications.

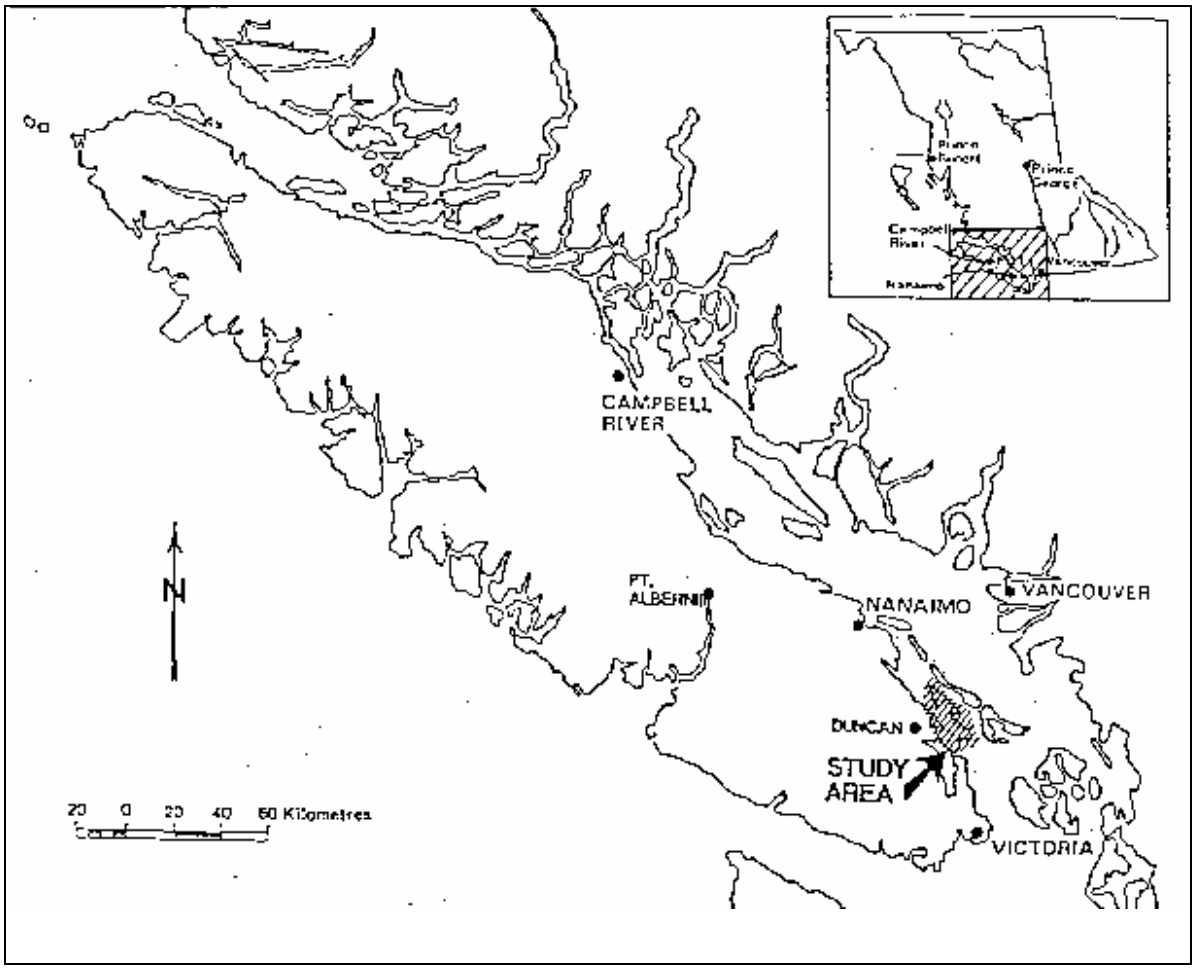
Water Allocation Plans are developed primarily from available in-house information which includes existing Regional Engineer's Reports (R.E.R.'s), information obtained from other reports and information and reports obtained from other agencies. These agencies include Federal & Provincial Fisheries, Regional Districts, Islands Trust and Water Survey of Canada.

The plans are intended to substantially reduce the need to prepare individual reports for each new water licence application. When completed, the Water Allocation Plan will serve as the basis for most licensing decisions. Separate reports should only be necessary for sensitive or complex water licence applications.

It should be emphasized however, that Water Allocation Plans (WAP) are not comprehensive Watershed Management Plans. Water Allocation Plans are less exhaustive and require less time to prepare. They should be updated at least once every five years. When Watershed Management Plans become available, they will replace Water Allocation Plans.

The location of the Saltspring Island Water Allocation Plan is shown in Figure 1: Key Plan Map.

Figure 1: Key Plan Map



2.0 GENERAL WATERSHED INFORMATION

2.1 Plan Area

The Water Allocation Plan area encompasses the whole of Saltspring Island, Prevost Island and the surrounding minor islands. Located off the east coast of Vancouver Island, the plan area lies mid-way between Victoria and Vancouver. Ferries link Saltspring Island to Victoria, Crofton and Vancouver, providing public access for both passengers and vehicles.

Saltspring Island Water Allocation Plan Areas

Islands	Size (km^2)	% Area
Saltspring Island	183.00	94.1
Prevost Island	8.00	4.1
Hawkins Island	0.01	*
Bright Islet	0.01	*
Red Islets	0.01	*
Ackland Islands (2)	0.06	*
Secretary Islands (2)	0.75	0.4
Wallace Island	0.80	0.4
Jackscrew Island	0.08	*
Norway Island	0.15	0.1
Hall Island	0.20	0.1
Mowgli Island	0.04	*
Idol Island	0.01	*
Russell Island	0.15	0.1
Channel Islands	0.01	*
Chain Islands	0.13	0.1
First Sister Island	0.01	*
Second Sister Island	0.01	*
Third Sister Island	0.02	*
Deadman Island	0.02	*
Goat Island	0.06	*
Grace Islet	0.01	*
Piers Island	1.00	0.5
Burial Islet	0.01	*
Isabella Island	0.01	*
Secret Island	0.04	*
Misc.Small Islands (4)	0.01	*
TOTAL AREA	**194.39**	**100.0**

* area less than 0.1%
Source: Islands Trust (1992) and Lesser Islands Atlas

2.2 Topography and Climate

Saltspring Island has a total surface area of 183 km^2 (71.6 mi^2) with a shoreline length of 133 km (83 mi). The highest elevation on the island is Bruce Peak at 704 m (2310 ft) and the lowest elevation is at sea level.

The climate on Saltspring Island is indicated by the climatic records for the station at Ganges (elev. 73 m (239 ft.)) for the period 1951 to 1980. The lowest average mean daily temperature is in January and is 2.9^{0}C; with a mean daily maximum temperature of 5.6^{0}C and a mean daily minimum temperature of 0.2^{0}C. The highest average mean daily temperature is in July and is 17.0^{0}C; with a mean daily maximum temperature of 22.3^{0}C and a mean daily minimum temperature of 11.7^{0}C.

The climate station on Saltspring Island at Vesuvius (elev. 7 m (23 ft.)) indicates similar climatic conditions. The lowest average mean daily temperature is in January and is 3.3^{0}C; with a mean daily maximum temperature of 5.8^{0}C and a mean daily minimum temperature of 0.6^{0}C. The highest average mean daily temperature is in July and is 17.3^{0}C; with a mean daily maximum temperature of 22.9^{0}C and a mean daily minimum temperature of 12.0^{0}C. See **Appendix A** for climatic normals and precipitation records for the period of 1951 to 1980.

2.3 History and Growth

Saltspring Island is the largest and most populated of the Gulf Islands within the Vancouver Island Region. Once called "Admiral Island", it became known as Saltspring Island after the discovery of brine springs in the northern part of the island.

First settled by non-aboriginal people in 1857, population on Saltspring Island increased steadily, especially as marine transportation to Vancouver Island and the Mainland improved.

The following table highlights population growth over the past 25 years:

Population Growth

Year	1966	1971	1976	1981	1986	1991
Population	2,238	3,169	4,410	5,443	6,164	8,017
Increase		931	1241	1033	721	1853
Percent increase		42%	39%	23%	13%	30%
Total population increase 1966 - 1991 is 5779 people (258%) or 231 people/year						

Source: Statistics Canada (1992)

The following table projects the population growth over the next 50 years:

Population Forecast

Year	1991	2001	2011	2021	2031	2041	2061
Population	7,070	9,215	11,131	12,619	13,654	14,321	14,970

Source: Oliver T. Coomes for Islands Trust, 1979.

The Saltspring Island population as of the 1991 census exceeds the 1991 forecast by 13% (947 people). Should the current growth rate over the last 5 years continue, the ceiling of 15,000 would be reached 40 years before the forecast above suggests.

Housing units by type to 1991 are provided in the following table:

Housing Units by Type (1991)

Permanent Dwelling Units:	3,428 *
Seasonal Units (cabins/cottages):	318 **
Mobile Home Units:	283 **
TOTAL UNITS	4,029

* Statistics Canada 1991 Census ** B.C.Assessment Authority 1991

2.4 Groundwater

Saltspring Island bedrock consists primarily of sedimentary rock from the Upper Cretaceous (Nanaimo Group) and Carboniferous volcanic rock (Sicker Volcanics) (Hodge 1977). North of Ganges Harbour and Booth Bay, conglomerates, shales and sandstone result in an area of low porosity and permeability. In the highlands, there are sandstones, shales and conglomerates that are more resistant and less fractured. In the valley areas, particularly in the Ganges-Booth Bay area, less resistant shale beds occur. Hodge (1977) notes that the marine origin of the sedimentary rock in the north partly explains the poor water quality in that area. The southern part of the island consists primarily of older igneous rock where significant fracturing results in greater groundwater renewal and higher quality. Glacio-marine deposits of silt, clay and stoney clay blanket the lowland and bay areas.

Groundwater well use is limited and subject to increasing water quality problems. Although early findings in a current groundwater study suggest a dramatic increase in wells drilled in the past decade, it also appears that the number of abandoned wells equals or exceeds new wells drilled. Saltwater intrusion into aquifers threatens groundwater quality near the coast and in the area southeast of St. Mary Lake where natural brine springs near the ground surface seep into the water table. In the north where groundwater recharge is poor, low summer water tables are further threatened by excessive withdrawals. If well water quality or supply problems increase, this will inevitably lead to a greater demand for scarce surface water supplies[1].

In a report prepared by Oliver T. Coomes for Islands Trust, dated September 1979, a study of water use on North Saltspring Island states that 28% of freshwater demand came from groundwater and 72% from surface water. Most groundwater use is for domestic purpose in rural homes located outside waterworks district boundaries.

2.5 Significant Watershed Areas

For the purpose of assessing water supplies for allocation demands, the following watershed areas where identified and the drainage areas determined. The watershed area, surface area and volume of significant lakes were also determined. The watershed areas were derived from available Ministry of Environment reports or measured by planimeter from 1:50,000 NTS maps. Lake surface

[1] A groundwater study being updated by Water Management's Groundwater Section in Victoria should be available by the summer of 1994 for review.

areas and volumes are from available bathymetric surveys. These watersheds are illustrated in Figure 2.

Saltspring Island Watersheds

SOURCE	WATERSHED AREA	LAKE SURFACE AREA	LAKE VOLUME
DUCK CREEK	2,047 ac 828 ha		
ST MARY LAKE (at outlet)	1,747 ac 707 ha	447 ac 181 ha	12,696 acft 15,666 dam³
MCFADDEN CREEK	750 ac 304 ha		
CUSHEON CREEK	2,498 ac 1,011 ha		
CUSHEON LAKE (at outlet)	1,788 ac 724 ha	67 ac 27 ha	942 acft 1,162 dam³
BLACKBURN LAKE (at outlet)	1,531 ac 620 ha	11.1 ac 4.5 ha	109 acft 134 dam³
BULLOCKS CREEK	1,038 ac 420 ha		
BULLOCKS LAKE (at outlet)	524 ac 212 ha	25.2 ac 10.2 ha	414 acft 511 dam³
MAXWELL CREEK	1,888 ac 765 ha		
LAKE MAXWELL (at outlet)	288 ac 117 ha	69 ac 28 ha	1,752 acft 2,162 dam³
FULFORD CREEK	5,665 ac 2,294 ha		
FORD LAKE (at outlet)	1,927 ac 780 ha	11.1 ac 4.5 ha	114 acft 140 dam³
WESTON CREEK	1,254 ac 508 ha		
LAKE WESTON (at outlet)	420 ac 170 ha	45.7 ac 18.5 ha	582 acft 718 dam³
LAKE STOWELL	961 ac 389 ha	13.8 ac 5.6 ha	211 acft 260 dam³

ac = acres ha = hectares acft = acre-feet dam³ = cubic decametre

3.0 HYDROLOGY

3.1 Precipitation

There are two AES precipitation stations on Saltspring Island. They are located at Ganges and Vesuvius as shown in **Figure 3**. A bar graph showing the monthly precipitation normals during the 1951 to 1980 period for these stations is shown in **Figure 4**. Monthly climatic data is provided in **Appendix A**.

The mean total annual precipitation at Ganges is 1065.2 mm (41.9 in.). The minimum mean monthly precipitation is 23.5 mm in July and the maximum mean monthly precipitation is 193.8 mm in January. The mean number of days with measurable precipitation is 149 days; with 144 days with rain and 8 days with snow.

The mean total annual precipitation at Vesuvius is 908.8 mm (35.8 in.). The minimum mean monthly precipitation is 16.7 mm in July and the maximum mean monthly precipitation is 164.6 mm in January. The mean number of days with measurable precipitation is 147 days with 142 days with rain and 8 days with snow.

3.2 Flow Information

There are five Water Survey Canada (WSC) hydrometric stations on Saltspring Island. Three of these measure stream-flow, namely; Duck Creek at outlet of St. Mary Lake (08HA046), Cusheon Creek at outlet of Cusheon Lake (08HA026) and Fulford Creek on Saltspring Island (08HA055). Cusheon Creek has records for the complete year while Duck Creek and Fulford Creek records cover only a part of a year. The remaining two hydrometric stations measure water levels on St. Mary Lake, Saltspring Island (08HA024) and Cusheon Lake near Ganges (08HA038). **Figure 3** illustrates the locations of the various Saltspring Island stations.

Stream flow and water volume information are available from Ministry of Environment lake studies and Regional Engineer Reports (R.E.R.'S) related to water licence applications. A summary of flow observations and records may be found in **Appendix B**.

Figure 2: Significant Watershed Areas

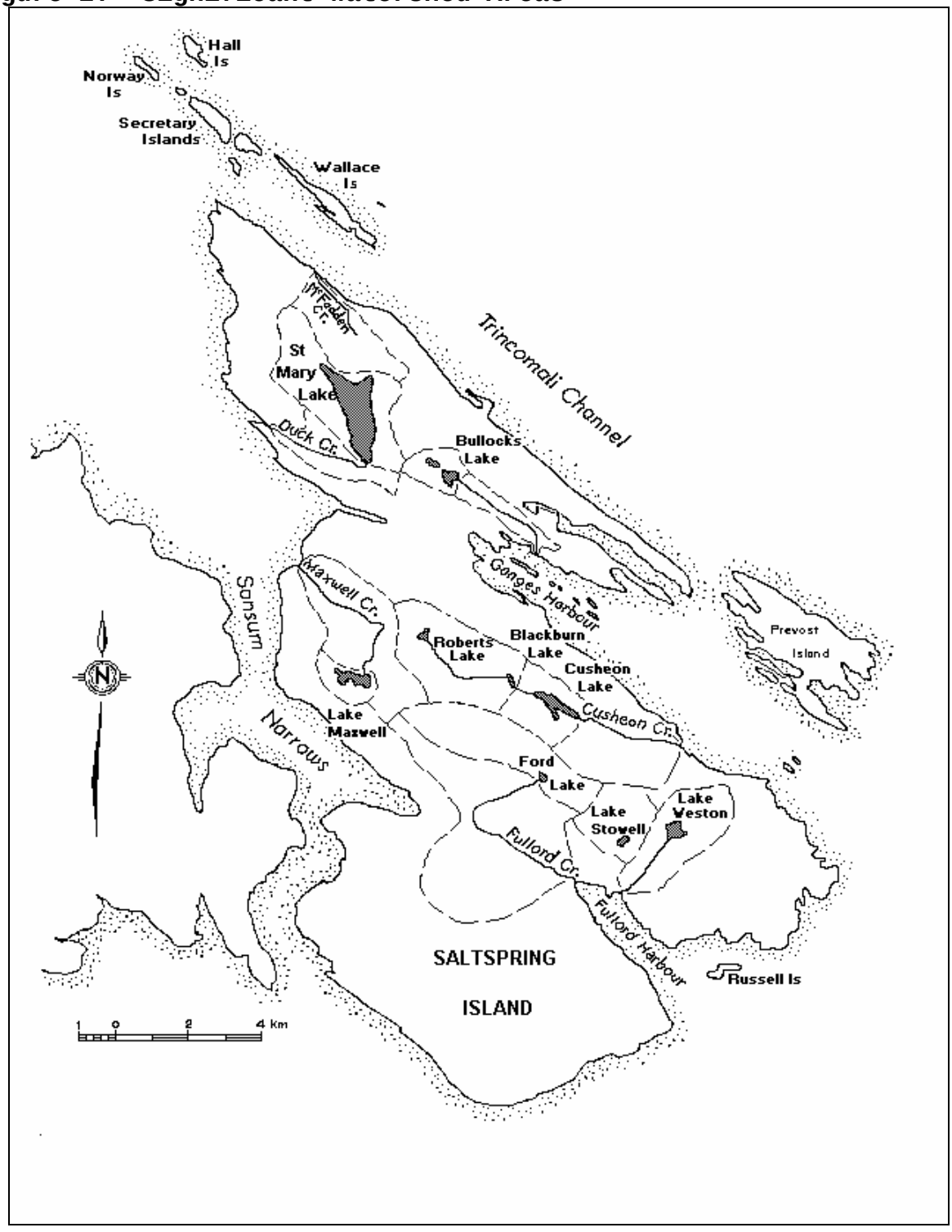


Figure 3: Hydrometric and Precipitation Stations

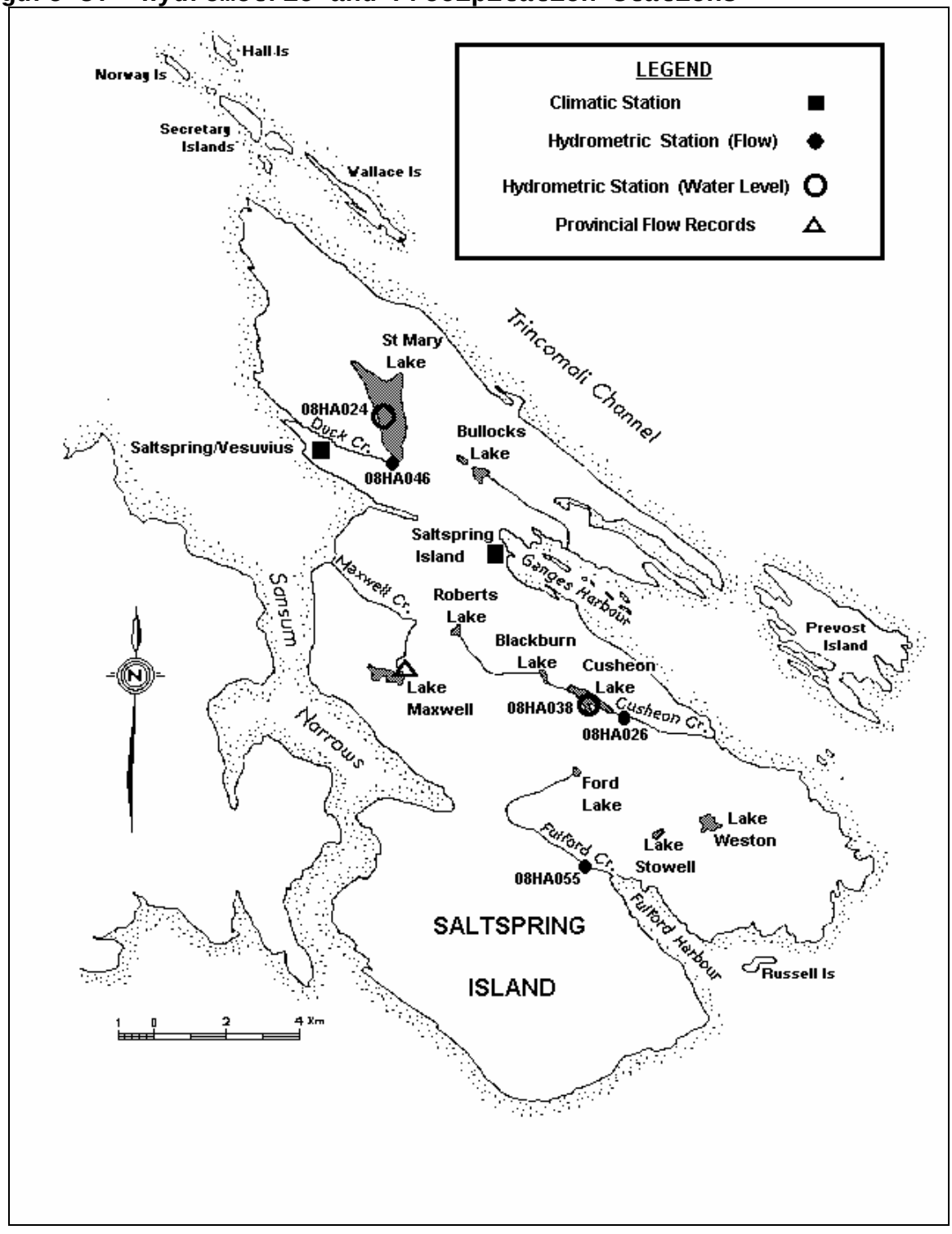
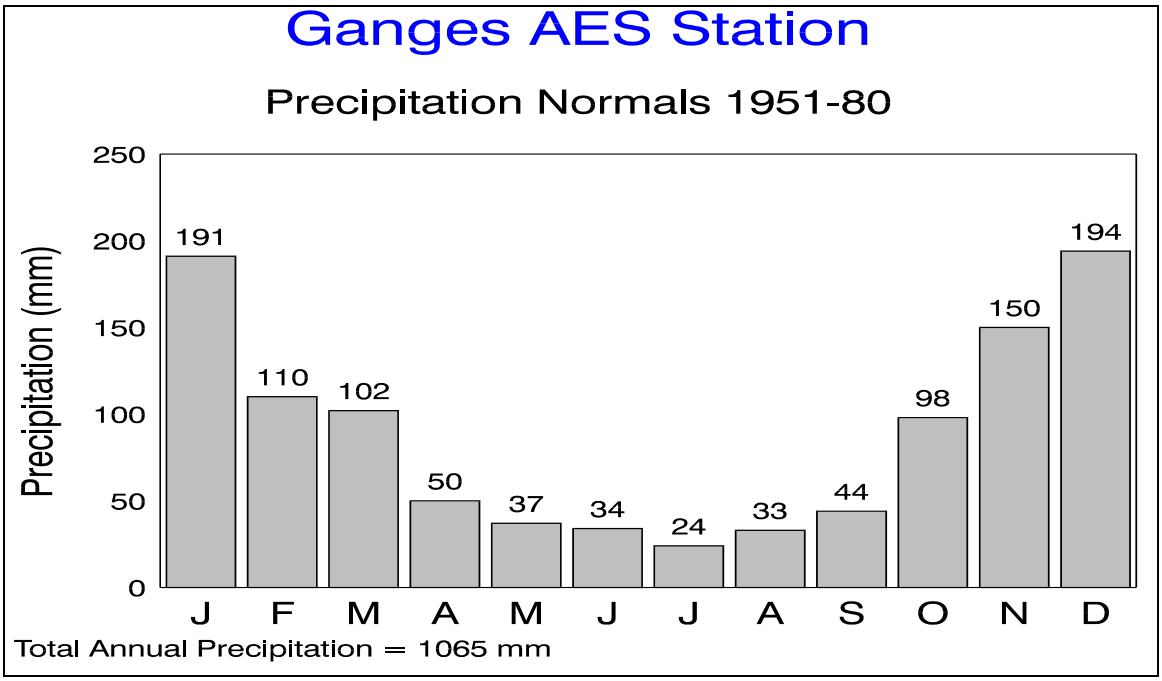
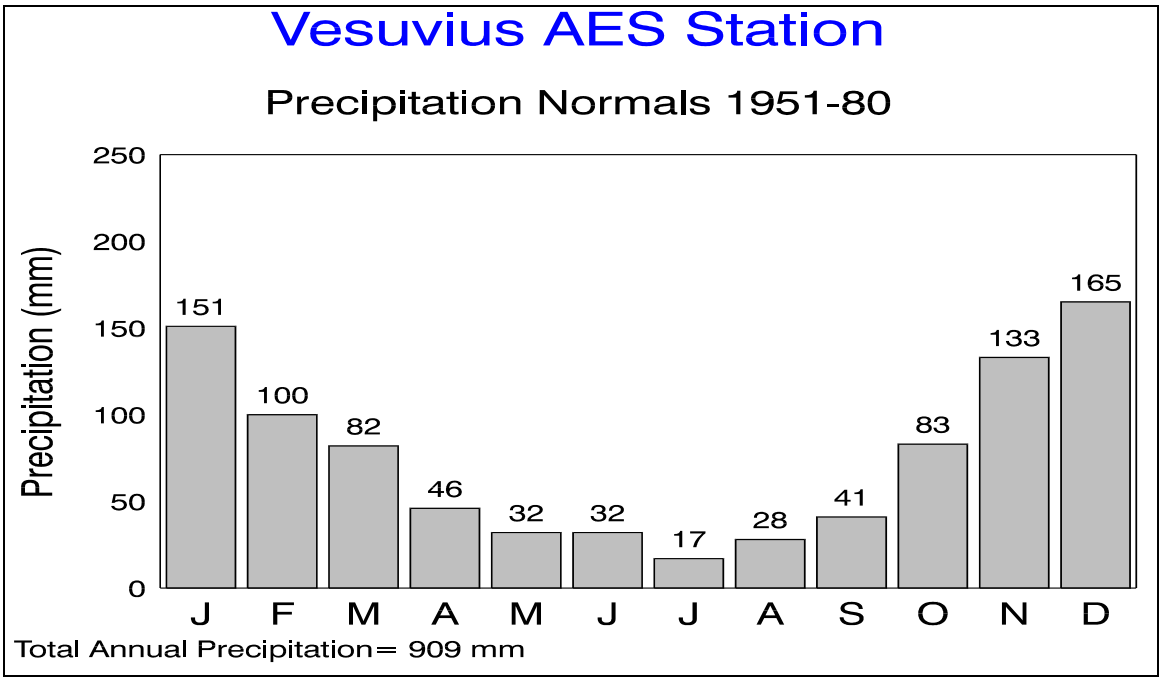


Figure 4: Saltspring Island Rainfall Summary





3.2.1 Low Flow Period

The WSC station **Cusheon Creek** at the outlet of Cusheon Lake (08HA026) indicates that there is zero flow in August, September and October for most years. Monthly mean flows of zero have also been recorded for the months of July 1970, 1977, 1979 and 1985 and in November of 1987. Monthly low flow, below 20% of the mean annual discharge (MAD), generally commence in June and extend through October; a five month period.

Zero flows have been recorded on **Duck Creek** at the outlet of St. Mary Lake during August and September for all years on record (1970, 1980, 1990).

Fulford Creek provides the highest recorded summer flow on Saltspring Island. At the headwaters of Fulford Creek is Ford Lake. The outlet from Ford Lake dries up during the summer period and most of the summer flow contribution is from Kyler and Reid Creeks which are spring fed. WSC flow data is available on Fulford Creek for the months April through September over the period 1983 to 1990 (see **Appendix B**). Mean monthly flow for the Water Survey Canada flow stations on Saltspring Island is as follows:

Water Survey Canada Flow - Saltspring Island

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cusheon Creek Mean Monthly Flow in m^3/sec (08HA026) 1970, 1971, 1976 - 1992											
0.331	0.381	0.235	0.098	0.036	0.010	0.002	0	0	0	0.066	0.271
Duck Creek Mean Monthly Flow in m^3/sec (08HA046) 1980 & 1990-1992											
0.211	0.245	0.212	0.061	0.059	0.013	0.003	0	0			
Fulford Creek Mean Monthly Flow in m^3/sec (08HA055) 1983 - 1992											
			0.275	0.106	0.046	0.021	0.014	0.019			

A mean annual discharge (MAD) has been estimated for Fulford Creek by watershed correlation with Cusheon Creek (08HA026) WSC station as follows:

Watershed Area of Cusheon Creek = 724 ha (1788 ac)
Watershed Area of Fulford Creek = 2294 ha (5655 ac)
Cusheon Creek (MAD) = 0.116 cms (4.11 cfs)

Estimated MAD for Fulford Creek:

$$\frac{2294}{724} \times 0.116 = 0.368 \text{ cms } (13.0 \text{ cfs})$$

Therefore 10% of the mean annual discharge (MAD) for Fulford Creek is 0.037 m^3/sec (1.31 cfs) and 60% MAD is 0.221 m^3/sec (7.80 cfs).

Fulford Creek has the highest recorded mean monthly flows and these mean monthly flows are below the estimated 10% MAD in the July through September period and below the estimated 60% MAD from May through September period. In general flows are below 20% MAD for a five month low flow period from June through October.

Observations noted in reports for water licence applications indicate that there is zero flow in Bullocks Creek, Hoskin Brook, Weston Creek, Sharpe Creek and the lower reaches of McAfee Creek. In creeks that maintain a flow throughout the year, such as Kyler Creek, Reid Creek, Fulford Creek and the lower part of Cusheon Creek, low flows were observed during the June to October period.

These records indicate that there are low flow or zero flow on most streams during the June through October period and significantly increased flows occurring during the remaining months. Therefore it may be assumed that all streams on Saltspring Island experience mean monthly low flow during the June through October five month period.

3.2.2 High Flow Period

Cusheon Creek at the outlet of Cusheon Lake (08HA026) is the only hydrometric station with flow records for the complete year. Duck Creek (08HA046) and Fulford Creek (08HA055) are seasonal WSC stations. Therefore the records for Cusheon Creek were used to estimate the quantity of water available during the high flow period.

The high flow period, for the purposes of developing storage and maintaining fish values, is those months where the flow is above 60% of the mean annual discharge (MAD). Based upon the flow records of Cusheon Creek the high flow period is the six months of November through April for all streams on Saltspring Island.

Figure 5 illustrates the mean monthly discharge of Cusheon Creek at the outlet to Cusheon Lake in relation to 10% and 60% of mean annual discharge (MAD).

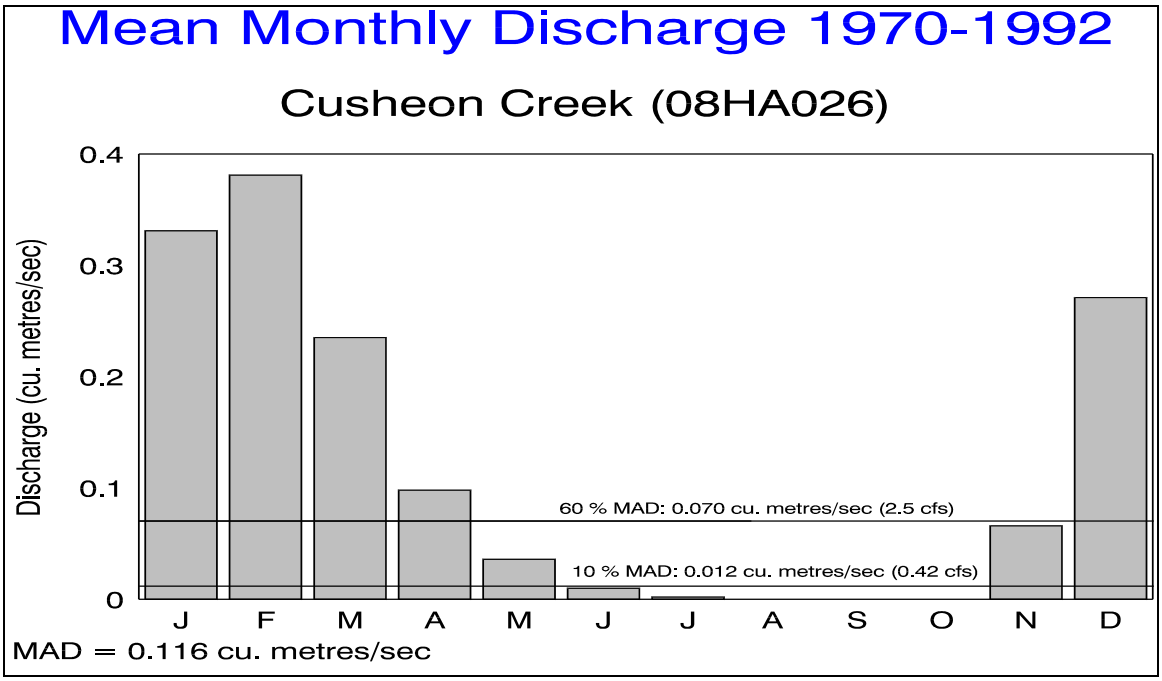
The monthly flow into Cusheon Lake, may be estimated by correcting for the storage effects of Cusheon Lake. The mean monthly inflow to Cusheon Lake and the flow above 60% MAD available for storage is estimated in the table below:

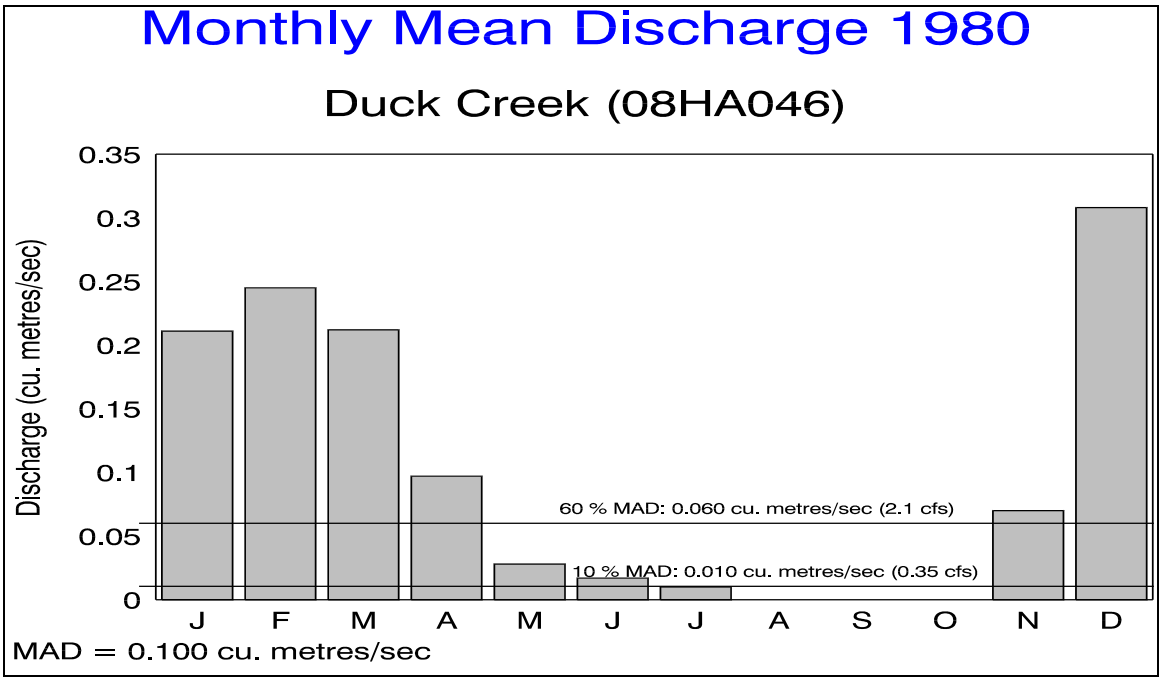
Cusheon Lake Inflow

Month	Mean Monthly Flow (m^3/sec)	Flow in Excess of 60% MAD (0.069 m^3/sec)	Available Monthly Storage Volume (dam^3)
Nov.	0.089	0.017	47
Dec.	0.282	0.210	564
Jan.	0.322	0.251	673
Feb.	0.371	0.299	802
Mar.	0.220	0.149	399
Apr.	0.096	0.024	65
Total Available Annual Storage Volume (Nov - Apr) for Cusheon Creek			2550 dam^3/6.97 km^2 = 3.66 dam^3/ha (1.20 acft/acre)

The water available for storage in the other identified watersheds, during the high flow period of November through April, is estimated using the above estimated unit runoff for Cusheon Creek of 3.66 dam^3/ha (1.20 acft/acre). The following table summarizes the estimated surface water available for storage in the identified watershed areas:

Figure 5: Monthly Flows for Saltspring Island Streams





Water Available For Storage

Watershed	Area		Available Water November to April	
	acres	ha	acre-ft	dam³
Duck Creek	2,047	828	2,456	3,030
St Mary Lake	1,747	707	2,096	2,588
McFadden Creek	750	304	900	1,113
Cushion Creek	2,498	1,011	2,998	3,700
Cusheon Lake	1,788	724	2,146	2,650
Blackburn Lake	1,531	620	1,837	2,269
Bullocks Creek	1,038	420	1,246	1,537
Bullocks Lake	524	215	629	787
Maxwell Creek	1,888	765	2,266	2,800
Lake Maxwell	288	117	346	428
Fulford Creek	5,665	2,294	6,798	8,396
Ford Lake	1,927	780	2312	2,855
Weston Creek	1,254	508	1,505	1,859
Lake Weston	420	170	504	622
Lake Stowell	961	389	1,153	1,424

3.2.3 Other Small Drainages

There are numerous smaller drainages around the coastline of Saltspring Island and associated islands that are not noted above. Information from reports on water licence applications and investigations by staff from Regional Water Management of the Ministry of Environment have indicated there is no surface flow during August and September in most years from springs or in streams associated with these smaller drainages. Also in extreme low flow years there is no surface flows observed or recorded for the months of June, July, August, September and October for these same basins.

3.4 Lake Volumes

On Saltspring Island the majority of the fresh water supply during the summer low flow period is provided by lakes. At present, community water supplies are provided by St. Mary Lake, Lake Maxwell, Cusheon Lake and Lake Weston. Other lakes on Saltspring Island include Blackburn Lake, Bullocks Lake, Ford Lake and Lake Stowell. The supply is however limited from these lakes.

The following table summarizes the area and volumes of Saltspring Island lakes derived from bathymetric surveys by Water Management Branch and Fish and Wildlife Branch.

Lake Area and Volume Summary

	Surface Area		Maximum Depth		Mean Depth		Volume	
	acres	ha	ft	m	ft	m	acft	dam^3
St Mary Lake	447	181	54.1	16.4	28.4	8.7	12,700	15,700
Cusheon Lake	66.5	27.0	30.0	9.1	14.2	4.3	940	1,160
Blackburn Lake	11.1	4.5	16.4	5.0	9.8	3.0	110	135
Bullocks Lake	25.2	10.2	26.2	8.0	16.4	5.0	410	510
Lake Maxwell	69.0	28.0	63.3	19.2	25.4	7.7	1,750	2,160
Ford Lake	11.1	4.5	11.5	3.5	10.3	3.1	110	140
Lake Weston	45.7	18.5	40.0	12.2	19.3	5.9	880	1,090
Lake Stowell	13.8	5.6	24.6	7.5	15.3	4.7	210	260

3.5 Evaporation

The net precipitation for Saltspring Island is estimated in the following table:

Net Precipitation

	Saltspring Island 1951-80 Normalized Precipitation (mm)	Saanichton CDA 1960-90 Mean Evaporation (mm)	Net Precipitation (mm)
Jan	191.0	33.4	157.6
Feb	110.0	8.3	101.7
Mar	102.0	29.5	72.5
Apr	50.0	57.5	-7.5
May	37.0	86.9	-49.9
Jun	34.2	99.5	-65.3
Jul	23.5	114.0	-90.5
Aug	33.3	92.5	-59.2
Sep	44.1	61.1	-17.0
Oct	97.9	30.5	67.4
Nov	150.0	13.9	136.1
Dec	194.0	10.1	183.9
Total	1067.0	637.0	430.0

Therefore the net loss to evaporation during the period between April through September is 289 mm or 11.4". For the purposes of estimating evaporation losses a figure of 12 inches will be used.

4.0 INSTREAM FLOW REQUIREMENTS

Maintaining the natural stream environment and instream uses is of paramount importance for present and future generations. Water for the fisheries resource is a key factor in maintaining instream flow requirements for water quality and recreational, aesthetic and cultural values. The Ministry of Environment's Provincial policy is:

> **In situations where a water allocation decision will significantly impact instream uses of water, the comptroller or regional water manager may refuse the application or**

include water licence conditions to protect the instream use.

Instream fisheries flow requirements are based on a provincially modified version of the Tennant (Montana) Method.

Instream Flow Requirements Modified Tennant (Montana) Method

Flows	Description
30-60% MAD	Excellent spawning/rearing
20-30% MAD	Good spawning/rearing
10-20% MAD	Fair spawning/rearing
5-10% MAD	Poor spawning/rearing
>5% MAD	Severely degraded spawning/rearing

In drainages where fish are present, the minimum flow required to sustain the fisheries resource for fair spawning and rearing habitat is 10% of the Mean Annual Discharge (MAD). Therefore, the Regional policies to implement the Provincial policy are:

The minimum flow required to sustain the fisheries resources for spawning and rearing is 10% of the Mean Annual Discharge (MAD); unless a more rigorous analysis indicates a different minimum flow requirement.

For streams where the natural mean monthly flow falls below 10% of the MAD, extractive licensed demands should only be allowed for the period of months when the mean monthly flow is above 60% of the MAD.

For streams where the mean 7-day average low flow falls below 10% of the MAD, extractive demands should only be allowed for the period of months when the mean monthly flow is above 60% of the MAD (Figure 1.3). Where the mean 7-day average low flow remains above 10%, then the 7-day low flow amount above 10% MAD is available.

Withdrawals from natural water bodies (lakes, ponds, swamps and marshes) supporting natural fisheries resources shall not reduce the shoal area more than 10%.

The shoal area is the area from the lake shore at average summer lake level to a 6 metre depth.

Fish have been identified in all significant main stream channels and lakes. In the north part of the island chum, cutthroat trout, and rainbow trout are the primary fish found in

streams. Duck Creek supports chum, cutthroat trout and rainbow trout. In the middle part of the island the primary fish found in streams are coho, chum and cutthroat trout (resident and sea run). Fish-bearing creeks include Cusheon Creek (coho, cutthroat), Ganges Creek (Salmon Enhancement Program project), Madrona Creek (sea run and resident cutthroat), Mansell Creek (cutthroat), Maxwell Creek (sea run cutthroat) and Sharpe Creek (chum, cutthroat). In the south part of the island coho and cutthroat trout are the most significant fish found in streams. Fulford Creek supports coho and cutthroat trout. In addition salmon enhancement projects supported by the federal government have been constructed. Weston Creek supports cutthroat trout while Lake Stowell has resident cutthroat.

Several Saltspring Island lakes flow into fish bearing streams. The flow from St.Mary Lake, Blackburn Lake, Cusheon Lake, Lake Maxwell, Ford Lake and Lake Weston flow into fish bearing streams. Significant water withdrawals from these lakes can reduce the low flows required to maintain the fisheries resource or extend the period of time of zero flow and thus hinder fish migration. When water withdrawals from a lake may affect the flow required to maintain the fisheries resource, mitigation (storage) will be required to support flow in the outflow stream.

Appendix D is a list of streams that support identified fisheries resources.

On streams that support fish migration, water diversion works need to be constructed so as to ensure fish passage.

To prevent fish and debris entering intakes, adequately designed and constructed fish screens are required on both lakes and streams that support fish.

5.0 WATER DEMAND

5.1 Licensed Demand

The total licensed demand within the Saltspring Island Water Allocation Plan area is summarized in the following table and illustrated in Figure 6.

Licensed Demand by Purpose

Purpose	Licensed Quantity	Equivalent Flow and Volume		
		m^3/sec^*	$acft^{**}$	dam^3
Domestic	174,100 gpd	0.009	234.2	288.8
Irrigation	437.1 acft	0.062	437.1	539.2
Industrial Enterprise	38,700 gpd	0.002	52.1	64.2
Conservation	58,557 gpd	0.003	78.8	97.1
Waterworks	1,564 acft	0.223	1,564.0	1,929.2
Total	2,366 acft	0.299	2,366.2	2,918.5
Storage	430.6 acft	0.061	430.6	531.1

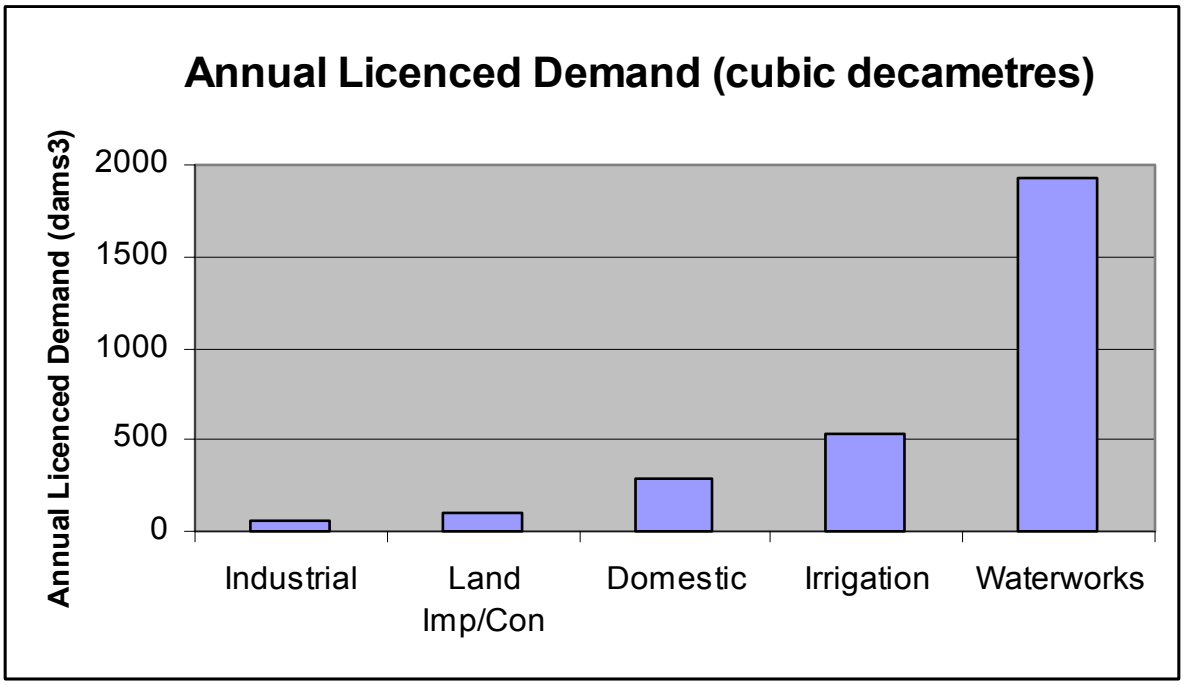
* Irrigation, Waterworks and Storage calculated for 100 day period.
** Domestic, Industrial and Conservation calculated for 365 day period.

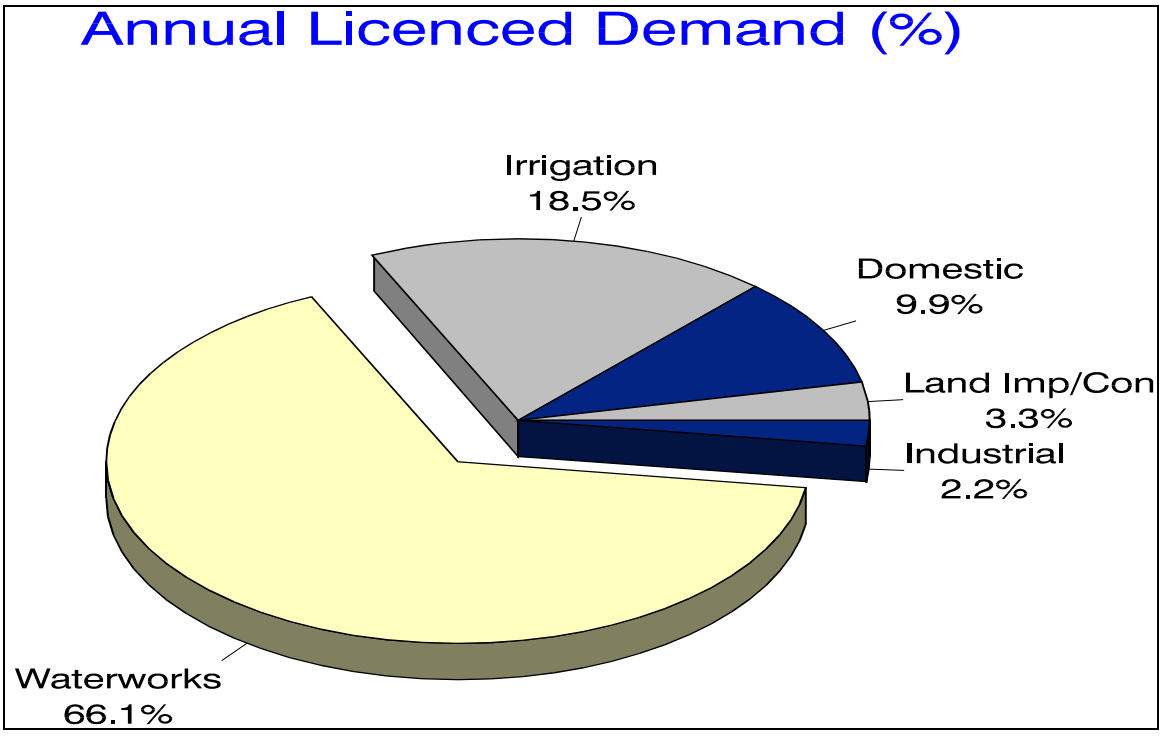
The low flow licensed demand volume for each identified watershed is summarized in the following table and in Appendix E:

Licensed Demand - June to October

Watershed	Water Demand June through October	
	acre-ft	dam^3
Duck Creek	607.0	746.4
St Mary Lake	589.0	724.3
McFadden Creek	12.1	14.9
Cushion Creek	143.8	176.8
Cusheon Lake	84.6	104.7
Blackburn Lake	15.9	19.6
Bullocks Creek	48.6	59.8
Bullocks Lake	39.1	48.1
Maxwell Creek	344.0	423.0
Lake Maxwell	342.3	421.0
Fulford Creek	159.1	195.6
Ford Lake	0.4	0.5
Weston Creek	77.7	95.6
Lake Weston	76.6	94.2
Lake Stowell	22.8	28.0

Figure 6: Saltspring Island Annual Licensed Demand





Comparing the above demands with the Water Available for Storage table in Section 3.2.2 indicates that there is ample water available during the high flow period to supply low flow period demands, however storage is required. Also the above tables indicate that less than 20% of the existing licensed demand is supported by storage. All existing and proposed significant licenced demands should be supported with storage if water withdrawals are not to affect flows required to maintain the fisheries resource.

5.2 Lake Licenced Demand

Licenced surface water sources on Saltspring Island include about 94 springs, 53 creeks and brooks, 13 lakes, and a number of ponds and swamps. A 1979 report by Oliver T. Coomes states that within their North Saltspring Island study area, lakes accounted for 87%, creeks and brooks accounted for approximately 4% and springs and ponds accounted for 9% of the total licensed withdrawal.

Small lakes provide most of the water demand on Saltspring Island. These lakes include St. Mary Lake, Cusheon Lake, Lake Maxwell, Blackburn Lake, Bullocks Lake, Ford Lake, Lake Weston and Lake Stowell. Their combined surface area is 2.65 km^2 representing 1.4% of the island's surface area.

5.2.1 St. Mary Lake

St. Mary Lake is the largest lake on the island and is the most important source of water supply for municipal waterworks, resorts, private residences and some irrigation. St. Mary Lake although the largest lake on Saltspring Island has a relatively small surface area with a small watershed.

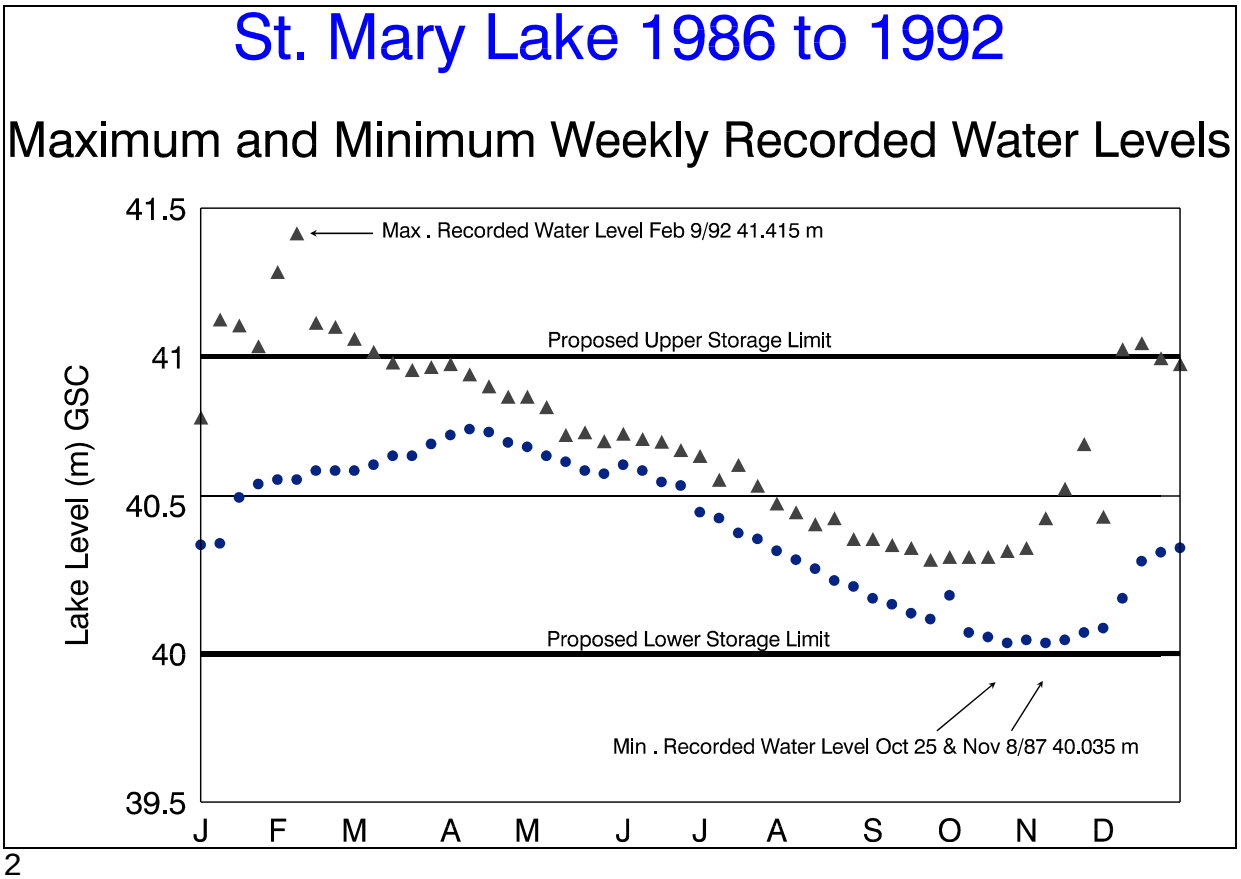
St. Mary Lake flows into Duck Creek. The flow in Duck Creek, as noted in Section 4.0 supports migrating chum, cutthroat trout and rainbow trout. Existing and proposed licenced withdrawals from St. Mary Lake increases the period of zero flow and adversely affects the migration and survival of fish. Figure 5 illustrates the estimated mean monthly flows for Duck Creek in relation to instream fisheries flow maintenance requirement of 10% mean annual discharge (MAD) and 60% of MAD flow level above which water may be withdrawn for storage.

The maximum recorded water level was 41.415 meters on February 9, 1992. The minimum recorded water level was 40.035 meters on October 25, 1987. The normal annual lake water level

fluctuates between 40.00 to 41.00 m GSC (see Figure 7). There is no control on the outflow from St Mary Lake at this time. A storage structure should be required to control water levels within this lake fluctuation range to mitigate the adverse affects on the fisheries resources of existing and future licenced water withdrawals. This natural storage range may provide 1813 dam^3 (1470 acft) of stored water for fish mitigation and would maintain lake levels no higher than the present normal flood levels. This storage range should not adversely affect private land owners not already affected by flooding of low lying lands.

See the report prepared by B. Blecic, May 1988 (water licence files 1000802 and 1000827) for further details.

Figure 7: St Mary Lake Levels and Proposed Storage Range



2

5.2.2 Lake Maxwell

Lake Maxwell has been a source of licenced water supply for waterworks purpose since 1939. An Order-in-Council Reserve exists on Maxwell Lake that reserves all the unrecorded water in the lake for waterworks purpose. A single water licence from the lake for 26 acre-feet (acft) for irrigation purpose is subject to the water reserve and may be cancelled when the water is required for waterworks purposes.

The natural inflow into Lake Maxwell reservoir may be increased by up to 200 acft per year by a licenced diversion of water from Rippon Creek during the period of November 1 to March 31 to supplement water supply in a dry year.

B. Blecic, on Water Licence File 1001170, calculated the annual inflow into Lake Maxwell, including the licenced diversion from Rippon Creek, as follows:

Inflow to Lake Maxwell

Return Interval	Inflow		Unit Runoff	
	acft	dam^3	acft/ac	dam^3/ha
Average Year	837	1032	1.82	5.55
1 in 10 dry year	519	640	1.13	3.44
1 in 20 dry year	443	546	0.96	2.93

The existing potential storage levels are limited by the North Salt Spring Waterworks District's pipeline and intake level at elevation 311.7 metres (1022.5 ft). This elevation is 1.3 metres (4.2 ft) below the natural channel outlet control. Therefore the total volume of water presently available is 340 dam^3 (276 acft). A proposed dam (1993) will raise the storage water level above the natural channel outlet control by 1.0 metre (3.3 ft) to invert of spillway elevation 314.0 metres (1030.0 ft) and could provide a further water volume of 291 dam^3 (236 acft). Thus the total range in water levels could be 2.3 metres (7.5 ft) and the total volume of water that may be available is estimated as 630 dam^3 (510 acft).

5.2.3 Cusheon Lake

Cusheon Lake is a water supply for community waterworks and individual domestic supply to a number of lakeshore residences. There is no control on the outflow from Cusheon Lake at this time. Further significant withdrawals from the lake may extend the period of zero flow in Cusheon Creek and adversely affect the water available to support fish habitat and migration.

5.2.4 Other Lakes

Blackburn Lake, Bullocks Lake, Ford Lake, Lake Weston and Lake Stowell provide licensed water supply for minor domestic, irrigation and industrial. Lake Weston also supplies water to a small community waterworks. Any significant withdrawals from these lakes may adversely affect the water available to support fish habitat and migration.

5.3 Projected Demand

As of January 1, 1993, 38 water licence applications, dating back five years, are pending. The following table and Appendix F provide a summary of pending applications by purpose:

Application Demand by Purpose

Purpose	Application Quantity	Equivalent Flow and Volume		
		m^3/sec^*	$acft^{**}$	dam^3
Domestic	12,000 gpd	0.001	16	13
Irrigation	118 acft	0.017	118	95.7
Industrial	5,800 gpd	0.000	7.8	6.3
Land Imp. & Cons.	4,800 gpd	0.000	6.5	5.3
Waterworks	1,260 acft	0.180	1,260	1,026
Total	1,410 acft	0.198	1,410	1,150
Storage	684 acft	0.098	684	555

* Irrigation, Waterworks and Storage calculated for 100 day period.
** Domestic, Industrial and Conservation calculated for 365 day period.

The above table indicates small increases in domestic, industrial and conservation water demands while a modest increase in irrigation demand is indicated. The largest increase in demand will be for community waterworks where the water demand of the applications almost equals the existing licensed demand. Also the above table indicates that only a little less than 50% of the applications are proposed to be supported by storage. All existing and proposed significant licenced demands should be supported with storage if water withdrawals are not to affect flows required to maintain the fisheries resource.

5.4 Irrigation Demand

The soil type, crop rooting depth and climatic characteristics determine the water requirements for irrigation. According to B.C. Ministry of Agriculture, Fisheries and Food the soils on Saltspring Island are generally silts to loams with an available water storage capacity (AWSC) of approximately 2" per foot of soil. The maximum soil water deficit (MSWD) is closely comparable to the Saanich Peninsula (Saanichton). The crops most commonly grown are shallow soil crops such as hay and those found in small domestic gardens.

For the purpose of assessing the irrigation requirement on Saltspring Island a duty of 3.1 dam^3 of water per hectare (1.0 acft of water per acre) of land to be irrigated has been recommended by the B.C. Ministry of Agriculture, Fisheries and Food (per. comm. T. Van der Gulik 1993). The recommended maximum rate of water withdrawal is 0.6 l/sec per hectare (3.3 Igpm per acre) of land to be irrigated.

In cases where further soil and crop demands are obtained from the applicant more specific water requirements may be determined.

6.0 CONCLUSIONS

1. The population of Saltspring Island has increased from 2,238 people to 8,017 people from 1966 to 1991; an increase of 258%. Indications are that existing community waterworks will need to expand and develop water supplies to service this rapid population growth.

2. There is zero flow or flows are below 20% of the mean annual discharge in all streams on Saltspring Island during the June through October low flow period.

3. There is fish and fish habitat in all identified significant watersheds on Saltspring Island.

4. Existing flows are limiting to fish migration, rearing and habitat maintenance.

5. Existing and projected water licence demands may affect flows required to maintain the fisheries resources unless supporting storage is developed.

6. There is adequate water available during the high flow period (November through April) to support the low flow period (June through October) demands for water without adversely affecting instream fish flow requirements. However storage is required.

7. Water available for storage during the high flow period (November through April) is estimate as 3.66 dam^3/ha (1.20 acft/acre).

8. Storage is not adequate to support existing and projected water demands. All existing and proposed significant licenced demands should be supported with storage if water withdrawals are not to affect flows required to maintain the fisheries resource.

9. Community waterworks demands on Saltspring Island are expected to increase as population rises; particularly in Ganges, Fulford and Vesuvius. To supply future waterworks demands from existing lakes and not to affect the flows required to maintain the fisheries resource, it will be necessary to develop storage to support both existing and projected demands.

7.0 RECOMMENDATIONS

It is recommended that no further significant allocation of water be made unless all existing and proposed significant licenced demands are to be supported with storage. On minor sources of supply, where water withdrawals will not affect flows required to maintain the fisheries resource, supporting storage may not be required.

Domestic demands from the identified lakes is not significant and will not require supporting storage. Also water applications involving non-consumptive or non-extractive uses such as fish fences, land improvement and conservation are not significant and will not require supporting storage.

It is recommended that all streams within the Saltspring Island Water Allocation Plan area should be noted as **"Fully recorded for All Purposes Unless Storage is Provided"** as there is no water available during the summer low flow period.

It is recommended that fish and debris screens be required on all intake or diversion works to prevent fish and debris from entering the works.

It is recommended that fish passage be required, for both juvenile and adult fish, at all dams and diversion works in fish bearing streams.

7.1 Domestic

It is recommended that a 2270 l/day (500 gpd) water licence should be issued for each single rural residential water application demand.

It is recommended that the water supply should be restricted to uses associated with the dwelling(s) located approximately on the plan attached to the water licence.

It is recommended that a domestic water licences not be provided to subdivision and development approving authorities as a proof of an "adequate potable water supply" for subdivision approval purposes.

It is recommended that to ensure an adequate water supply, applicants should be prepared to develop storage or use lake or swamp storage, for the average daily demand of 1140 l/day (250 gpd) for a five month period (150 days), 170 m^3 (6,000 ft^3 or 0.14 acft). This requires a reservoir or dugout approximately 6 m (20 ft) wide by 9 m (30 ft) long, with an average depth of 3 m (11 ft) and with a 0.3 m (1.0 ft) allowance for evaporation loss.

7.2 Irrigation

It is recommended that a duty of 3.1 dam^3 of water per hectare (1.0 acft of water per acre) of land be used for irrigation requirements.

It is recommended that a maximum rate of withdrawal of 0.6 l/sec per hectare (3.3 Igpm per acre) of land to be irrigated be used for all irrigated licenses.

It is recommended that all irrigation water demands must be supported by storage. Off stream dugouts will be encouraged for small storage reservoirs of 12 dam^3 (10 acft) or less. However storage developed on existing lakes, ponds and marshes may be used where there are no fish values or where fish values can be preserved.

It is recommended that the storage required to support irrigation demands is 3.1 dam^3 per hectare (1.0 acft per acre) of irrigation water demand, plus an additional 0.3 m (1.0 ft) of water allowance over the surface area of the body of water for evaporation and other losses from the storage reservoir.

7.3 Industrial

The industrial water licenses and water applications on Saltspring Island are uses associated with small resort (bed and breakfast) establishments, fish farming and stock watering.

It is recommended that industrial demands related to commercial and resort development should be handled similar to multiple domestic demands with the same requirements.

It is recommended that cattle or livestock requiring more 450 l/day (100 Igpd) are to be considered an Industrial (Agricultural) demand. Cattle or livestock requiring 450 l/day (100 Igpd) or less will be considered a Domestic (livestock) demand. Estimated livestock demands are:

Recommended Livestock Water Requirements

Livestock	Water Requirements	
	l/day	Igpd
cattle (beef) per animal	45	10
cattle (dairy) per animal	132	29
chickens per 100 animals	27	6
turkeys per 100 animals	55	12

It is recommended that fish farming water requirements be determined through consultation with Regional Fisheries Management staff.

7.4 Land Improvement and Conservation

It is recommended that water applications involving non-consumptive or non-extractive uses such as fish fences, land improvement channel development and conservation channel development are not significant and will not require supporting storage.

It is recommended that land improvement dugouts, conservation dugouts and lake and pond dam developments for conservation should be handled similarly to other storage developments (see Section 7.7) and through consultation with Regional Fisheries Management staff.

7.5 Waterworks

It is recommended that applicants for community water supply demands be require to assess the proposed demand for a ten year projected demand period and provide evidence that the demand is not excessive in comparison with adjoining community demands; water conservation is being promoted (ie. residential meters, pricing practices, education); adequate system balancing is available for peek hour demands (ie. volume difference between maximum hours and maximum day demands) and, for Water Utilities, evidence that the appropriate requirements for a CPCN have been met and a CPCN will be obtained. Licenced allocations should be limited to a 10 year projected demand except where the applicant can provide satisfactory evidence that a longer projection period is required (ie. because the cost of construction of works must be amortised over a longer period)

It is recommended that the licensee be required to meter or measure and record the water from the source stream.

It is recommended that the licensee be required to treat the water supply in accordance with Ministry of Health requirements.

It is recommended that all community water demands must be supported by storage. Supporting storage is required on all lake sources determined to be suitable for community water demands.

It is recommended that all the unrecorded water on St Mary Lake be reserve, under Section 44 of the Water Act, for community water supply for the rapidly expanding population in the north part of the island.

7.6 Significant Water Supply Sources

7.6.1 St. Mary Lake

It is recommended that all the unrecorded water on St Mary Lake be reserve, under Section 44 of the Water Act, for community water supply for the rapidly expanding population in the north part of the island. The low flow period should also be noted as fully recorded for all purposes except small domestic unless storage is provided.

It is recommended that storage for community waterworks demands be developed within the natural normal low elevation of 40.00 m and natural normal high elevation of 41.00 m GSC.

7.6.2 Lake Maxwell

It is recommended that the OIC reserve on Lake Maxwell, that reserves all the unrecorded water on the lake for community water supply, be retained. The low flow period should also be noted as fully recorded for all purposes except small domestic unless storage is provided.

7.6.3 Cusheon Lake

It is recommended that Cusheon Lake should be noted as fully recorded except for small domestic. Further licences, other than small domestic, should be supported by storage, however storage potential is limited as raising water may affect existing development around the lake.

7.6.4 Lake Weston

It is recommended that Lake Weston should be noted as fully recorded for all purposes except small domestic unless storage is provided.

7.7 Storage

Large storage developments (ie. BC Hydro, pulp & paper or metal processing, city waterworks) will require more specific supply-demand and environmental impact reports.

It is recommended that the applicant be required to submit adequately completed report form entitled "Dam and Reservoir

Information Required in Support of a Water Licence Application for Storage Purpose (Schedule 2)" before the application will be considered.

It is recommended that fish passage be required, for both juvenile and adult fish, at all dams in fish bearing streams. Design of storage dams must consider fish ladders and provide adequate flow release and to maintain fish passage where required.

It is recommended that the applicant must provide proof of a written agreement, right-of-way or easement for works or flooding affecting other lands

It is recommended that the total storage (live & dead) will be licenced.

It is recommended that an additional 0.3 m (1.0 ft) of depth over the surface area of the storage reservoir or natural water body must be allowed for evaporation and other losses when considering supporting storage for licensed demands.

It is recommended that the design plans must be submitted and accepted in writing before construction commences on any proposed dam over 3 m (10 ft) in height or on storage of 12 dam^3 (10 acft) or more.

7.8 Allocation Plan Revision

The Saltspring Island Water Allocation Plan should be reviewed and updated on or before December 1999 (5 years).

APPENDIX A

CANADIAN CLIMATIC NORMALS

1951 -1980

TEMPERATURE and PRECIPITATION

for

SALTSPRING ISLAND

APPENDIX B

STREAMFLOW RECORDS

APPENDIX C

LAKE WATER LEVEL RECORDS

APPENDIX D

STREAMS THAT SUPPORT FISH RESOURCES

APPENDIX E

LICENSED WATER DEMAND

The summary of existing licenses by source provided the basis for converting demand volumes to equivalent litres per second during the low flow period from May to November. This was divided into two segments. The first represents the maximum demand during the 100 day irrigation period, assumed to fall between May and September. The second is the remaining low flow period estimate. This includes the maximum demand during October, November and the period between May and September not affected by irrigation demands (114 days).

APPENDIX F

PENDING WATER LICENCE APPLICATIONS

APPENDIX G

REFERENCES

APPENDIX A

CANADIAN CLIMATIC NORMALS

1951 -1980

TEMPERATURE and PRECIPITATION

for

SALTSPRING ISLAND

BRITISH COLUMBIA/COLOMBIE-BRITANNIQUE

	JAN JAN	FEB FÉV	MAR MAR	APR AVR	MAY MAI	JUN JUIN	JUL JUIL	AUG AOÛT	SEP SEPT	OCT OCT	NOV NOV	DEC DÉC	YEAR ANNÉE	CODE CODE	
SALT SPRING ISLAND - GANGES															
48° 51'N 123° 30'W 73 m															
Daily Maximum Temperature	5.6	7.9	9.2	12.9	16.8	19.3	22.3	21.9	19.5	13.9	9.0	6.5	13.7	2	Température Maximale Quotidienne
Daily Minimum Temperature	0.2	1.6	2.0	4.2	7.2	9.8	11.7	11.7	10.1	6.6	3.3	1.5	5.8	2	Température Minimale Quotidienne
Daily Temperature	2.9	4.8	5.6	8.6	12.0	14.6	17.0	16.9	14.8	10.3	6.2	4.0	9.8	2	Température Quotidienne
Standard Deviation, Daily Temperature	1.7	1.6	1.2	0.9	1.2	1.5	1.3	1.3	1.2	1.1	1.3	1.4	0.7	2	Écart Type de la Température Quotidienne
Extreme Maximum Temperature	14.4	17.2	20.6	27.8	31.7	35.0	38.3	35.6	31.7	26.1	18.9	14.4	38.3		Température Maximale Extrême
Years of Record	68	67	67	67	67	67	66	66	66	66	68	67			Années de Relèves
Extreme Minimum Temperature	-15.0	-15.0	-10.0	-5.6	-0.6	0.6	3.9	3.9	-0.6	-6.7	-13.3	-14.4	-15.0		Température Minimale Extrême
Years of Record	68	67	67	67	67	67	65	65	66	66	67	67			Années de Relèves
Rainfall	159.0	99.9	94.6	49.4	36.8	34.2	23.5	33.3	44.1	97.9	146.4	170.9	990.2	2	Chutes de Pluie
Snowfall	31.8	9.7	7.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	3.2	22.9	75.0	2	Chutes de Neige
Total Precipitation	190.8	109.6	101.9	49.7	36.8	34.2	23.5	33.3	44.1	97.9	149.6	193.8	1065.2	2	Précipitations Totales
Standard Deviation, Total Precipitation	85.2	45.7	42.5	26.2	17.1	19.8	17.8	32.4	30.3	62.9	69.3	51.9	148.6	2	Écart Type des Précipitations Totales
Greatest Rainfall in 24 hours	93.2	52.8	40.1	50.8	46.5	40.1	40.1	78.5	59.9	53.6	85.1	79.8	93.2		Chute de Pluie Record en 24 heures
Years of Record	73	73	73	73	74	74	73	72	72	73	73	73			Années de Relèves
Greatest Snowfall in 24 hours	52.1	57.2	35.6	3.8	0.0	0.0	0.0	0.0	0.0	2.0	36.8	47.0	57.2		Chute de Neige Record en 24 heures
Years of Record	74	73	73	74	74	74	73	72	72	73	74	74			Années de Relèves
Greatest Precipitation in 24 hours	93.2	57.2	40.1	50.8	46.5	40.1	40.1	78.5	59.9	53.6	85.1	79.8	93.2		Précipitation Record en 24 heures
Years of Record	72	73	73	73	74	74	73	72	72	73	73	73			Années de Relèves
Days with Rain	17	14	14	12	9	9	6	7	8	14	16	18	144	2	Jours de Pluie
Days with Snow	4	1	1	*	0	0	0	0	0	0	*	2	8	2	Jours de Neige
Days with Precipitation	19	15	15	12	9	9	6	7	8	14	16	19	149	2	Jours de Précipitation
SALT SPRING I VESUVIUS															
48° 53'N 123° 34'W 7 m															
Daily Maximum Temperature	5.8	6.1	9.7	13.1	17.2	19.8	22.9	22.3	19.2	14.0	8.9	7.0	14.0	8	Température Maximale Quotidienne
Daily Minimum Temperature	0.8	1.8	2.2	4.4	7.7	10.3	12.0	12.0	9.7	6.6	3.2	2.0	6.0	8	Température Minimale Quotidienne
Daily Temperature	3.3	4.9	6.0	8.8	12.5	15.0	17.3	17.2	14.5	10.4	6.1	4.8	10.1	8	Température Quotidienne
Standard Deviation, Daily Temperature	1.7	1.4	0.9	0.7	0.8	1.2	1.0	1.2	1.3	1.2	1.8	1.5	0.5	4	Écart Type de la Température Quotidienne
Extreme Maximum Temperature	15.0	16.7	17.2	23.3	27.8	32.2	32.2	33.9	28.9	23.3	15.6	13.9	33.9		Température Maximale Extrême
Years of Record	18	19	18	19	20	19	19	19	19	19	20	19			Années de Relèves
Extreme Minimum Temperature	-12.8	-10.6	-6.1	-1.7	0.0	5.6	6.7	6.1	0.0	-2.2	-15.6	-14.4	-15.6		Température Minimale Extrême
Years of Record	18	18	18	19	20	19	19	19	19	19	20	19			Années de Relèves
Rainfall	135.6	93.7	78.8	46.3	32.1	31.5	16.7	28.1	40.5	83.0	130.6	153.6	870.5	8	Chutes de Pluie
Snowfall	14.2	4.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	11.2	34.8	8	Chutes de Neige
Total Precipitation	151.4	100.0	82.1	46.3	32.1	31.5	16.7	28.1	40.5	83.0	132.5	164.8	906.8	8	Précipitations Totales
Standard Deviation, Total Precipitation	51.7	45.9	47.1	26.8	13.7	19.3	14.6	19.8	26.5	43.0	55.5	48.6	143.8	4	Écart Type des Précipitations Totales
Greatest Rainfall in 24 hours	80.3	47.0	37.3	53.1	26.4	23.4	17.3	29.7	25.7	52.6	87.1	56.6	87.1		Chute de Pluie Record en 24 heures
Years of Record	19	19	19	20	20	19	18	19	19	18	20	19			Années de Relèves
Greatest Snowfall in 24 hours	31.8	21.6	27.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.4	33.0	33.0		Chute de Neige Record en 24 heures
Years of Record	19	19	19	20	20	19	19	19	19	19	20	19			Années de Relèves
Greatest Precipitation in 24 hours	80.3	47.0	37.3	53.1	26.4	23.4	17.3	29.7	25.7	52.6	87.1	62.7	87.1		Précipitation Record en 24 heures
Years of Record	19	19	19	20	20	19	18	19	19	18	20	19			Années de Relèves
Days with Rain	17	14	15	11	9	8	5	7	9	13	16	18	142	8	Jours de Pluie
Days with Snow	3	1	1	0	0	0	0	0	0	0	1	2	8	8	Jours de Neige
Days with Precipitation	19	15	15	11	9	8	5	7	9	13	17	19	147	8	Jours de Précipitation

APPENDIX B

STREAMFLOW RECORDS

Victoria Water District
Measured-Estimated Flows

pr. 14, 1992

ource	Location	File No	Watershed	Survey Date	Time	Method	Party	Mean G.H.(m)	Flow	Unit
uck Creek	Tributary to Ocean	0323703	4-12-10	1975 05 21		ES	DW		1/2	cfs
uck Creek		0340158	4-12-10	1977 06 02		ES	GF		1/3	cfs
uck Creek	Tributary to Ocean	0364144	4-12-10	1979 02 27		ES	BB		13.00	cfs
uck Creek	Under Tripp Road		4-12-10	1985 07 23		ES	WVB	999999	0.0001	m3/s
uck Creek	Under Tripp Road		4-12-10	1986 09 09		ES	WVB	999999	0.0003	m3/s
uck Creek	Tripp Rd. Bridge		4-12-10	1988 03 22	0300	CM	BB BC WVB	0.288	0.0573	m3/s
oskin Brook	Tributary to McFadden Creek	0290784	4-12-10	1970 06 12			PGO		Seasonal	
eid Creek	Tributary to Fulford Creek	0317703	4-12-10	1973 11 13		ES	WBC, PGO		1/4	cfs
eid Creek	Tributary to Fulford Creek	0317704	4-12-10	1973 11 13		ES	WBC, PGO		1/4	cfs
eid Creek	Tributary to Fulford Creek	0364926	4-12-10	1979 02 22		ES	BB		15	gpm
eid Creek	10 feet above bridge		4-12-10	1984 03 20		ES	WVB	999999	0.0991	m3/s
eid Creek	10 feet below foot bridge		4-12-10	1984 03 26		ES	WVB	999999	0.0878	m3/s
eisner Brook	Trib. to McFadden Creek	0342944	4-12-10	1979 03 13		ES	BB		13,000	gpd

Victoria Water District
Measured-Estimated Flows

...r. 14, 1992

Source	Location	File No	Watershed	Survey Date	Time	Method	Party	Mean G.H.(m)	Flow	Unit
Acland Spring	Flows to ocean	0341236	4-12-20	1979 02 27		ES	BB		50	gpm
Bullock Creek	At Zoltag Property		4-12-20	1985 11 07		-	WVB	999999	--No Flow--	
Burgoyne Creek	Tributary to ocean	0328710	4-12-20	1975 06 27		ES	DW		1/4	cfs
Cusheon Creek	Trib. to Cusheon Lake	0300256	4-12-20	1971 04 30		ES	WDL		2	cfs
Madrona Creek	Upper Ganges Road		4-12-20	1985 08 21		ES	WVB	999999	0.0003	m3/s
Madrona Creek	Upper Ganges Road		4-12-20	1985 10 17		ES	WVB	999999	0.0007	m3/s
Maxwell Creek	100' Upstream of Mouth		4-12-20	1985 07 24		ES	WVB	999999	0.0001	m3/s
McAfee Creek	Tributary to Sharp Creek	0323351	4-12-20	1974 10 30		ES	DW		12,000	gpd
~~McAfee Creek~~	~~N 48 51 W 123 32~~	~~0330339~~	~~4-12-20~~	~~1976 09 15~~		~~ES~~	~~GF~~		~~9d @ Pod X~~	~~gpm~~
McAfee Creek	N 48 51 W 123 32	0330683	4-12-20	1976 09 15		BS	GF		9	gpm
McAfee Creek	N 48 51 W 123 32		4-12-20	1977 08 11		BS	IGL	999999	0.0005	m3/s
McAfee Creek	N 48 51 W 123 32		4-12-20	1977 08 18		BS	IGL	999999	0.0006	m3/s
McAfee Creek	N 48 51 W 123 32		4-12-20	1977 08 23		BS	IGL	999999	0.0005	m3/s
McAfee Creek	N 48 51 W 123 32		4-12-20	1977 08 25		PF	IGL	999999	0.0005	m3/s
McAfee Creek	N 43 51 W 123 32		4-12-20	1977 09 02		BS	IGL	999999	0.0005	m3/s
McAfee Creek	N 48 51 W 123 32		4-12-20	1977 09 12		BS	IM	999999	0.0005	m3/s
McAfee Creek	N 48 51 W 123 32		4-12-20	1977 09 15		BS	WR	999999	0.0005	m3/s
McAfee Creek	N 48 51 W 123 32		4-12-20	1977 09 15		BS	WR	999999	--No Flow--	
McAfee Creek	N 48 51 W 123 32		4-12-20	1977 09 20		BS	JD	999999	--No Flow--	
McAfee Creek	N 48 51 W 123 32		4-12-20	1977 09 27		BS	JD	999999	--No Flow--	
Sharpe Creek	at Canal Road		4-12-20	1977 08 11		CM	WR	999999	--No Flow--	
Sharpe Creek	at Canal Road		4-12-20	1977 08 18		ES	WR	0.189	0.0005	m3/s
Sharpe Creek	at Canal Road		4-12-20	1977 08 23		ES	WR	0.198	0.0005	m3/s
Sharpe Creek	at Canal Road		4-12-20	1977 08 25		PF	WR	0.033	0.0010	m3/s
Sharpe Creek	at Canal Road		4-12-20	1977 09 02		BS	IM	0.204	0.0003	m3/s
Sharpe Creek	at Canal Road		4-12-20	1977 09 12		BS	IM	0.198	0.0001	m3/s
Sharpe Creek	at Canal Road		4-12-20	1977 09 15		BS	IM	0.201	0.0001	m3/s
Sharpe Creek	at Canal Road		4-12-20	1977 09 20		BS	IM	0.207	0.0003	m3/s
Sharpe Creek	at Canal Road		4-12-20	1977 09 27		BS	IM	0.204	0.0003	m3/s

		Duck Creek	MONTHLY MEAN DISCHARGE (cubic metres per second)										
STATION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	MN ANN
08HA046	1990	0.211	0.245	0.212	0.097	0.028	0.017	0.010	0.000	M	M	M	M	M
08HA046	1990	M	M	M	0.051	0.067	0.018	0.000	0.000	0.000	M	M	M	M
08HA046	1991	M	M	M	0.147	0.073	0.018	0.001	0.000	0.000	M	M	M	M
08HA046	1992	M	M	M	0.030	0.067	0.000	0.000	0.000	0.000	M	M	M	M
MEAN		0.211	0.245	0.212	0.081	0.059	0.013	0.003	0.000	0.000	M	M	M	M
		Fulford Creek	MONTHLY MEAN DISCHARGE (cubic metres per second)										
STATION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	MN ANN
08HA055	1983	M	M	M	0.179	0.057	0.029	0.023	0.011	0.021	M	M	M	M
08HA055	1984	M	M	M	0.192	0.277	0.096	0.037	0.029	0.029	M	M	M	M
08HA055	1985	M	M	M	0.229	0.084	0.048	0.017	0.013	0.014	M	M	M	M
08HA055	1986	M	M	M	0.248	0.149	0.027	0.014	0.006	0.006	M	M	M	M
08HA055	1987	M	M	M	0.127	0.05	0.021	0.011	0.007	0.008	M	M	M	M
08HA055	1988	M	M	M	0.516	0.101	0.031	0.016	0.014	0.017	M	M	M	M
08HA055	1989	M	M	M	0.325	0.077	0.035	0.025	0.017	0.016	M	M	M	M
08HA055	1990	M	M	M	0.177	0.097	0.115	0.023	0.009	0.024	M	M	M	M
08HA055	1991	M	M	M	0.634	0.1	0.037	0.024	0.022	0.036	M	M	M	M
08HA055	1992	M	M	M	0.125	0.072	0.021	0.023	0.015	0.015	M	M	M	M
MEAN		M	M	M	0.275	0.106	0.046	0.021	0.014	0.019	M	M	M	M

		CusheonCreek	MONTHLY MEAN DISCHARGE (cubic metres per second)										
STATION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	MN ANN
08HA026	1970	M	M	M	0.084	0.026	0.002	0.000	0.000	0.000	M	M	M	M
08HA026	1971	M	M	M	0.098	0.016	0.005	0.001	0.000	0.000	M	M	M	M
08HA026	1976	M	M	M	M	M	M	M	M	0.000	0.001	0.002	0.004	M
08HA026	1977	0.066	0.080	0.409	0.052	0.010	0.002	0.000	0.000	0.001	0.001	0.051	0.441	0.094
08HA026	1978	0.376	0.275	0.151	0.083	0.033	0.003	0.001	0.000	0.001	0.000	0.001	0.026	0.078
08HA026	1979	0.034	0.366	0.238	0.048	0.015	0.001	0.000	0.000	0.000	0.000	0.001	0.430	0.093
08HA026	1980	0.449	0.464	0.329	0.115	0.028	0.011	0.008	0.001	0.001	0.000	0.111	0.587	0.175
08HA026	1981	0.238	0.553	0.152	0.163	0.048	0.019	0.003	0.000	0.000	0.001	0.198	0.554	0.158
08HA026	1982	0.687	0.462	0.202	0.066	0.019	0.002	0.001	0.000	0.000	0.001	0.001	0.263	0.141
08HA026	1983	0.358	0.588	0.316	0.101	0.016	0.002	0.001	0.000	M	M	M	M	M
08HA026	1984	M	M	0.283	0.094	0.121	0.048	0.006	0.000	0.000	0.001	0.237	0.482	M
08HA026	1985	0.156	0.245	0.142	0.113	0.043	0.010	0.000	0.000	0.000	0.000	0.001	0.039	0.061
08HA026	1986	0.402	0.450	0.248	0.107	0.071	0.014	0.001	0.000	0.000	0.000	0.020	0.147	0.120
08HA026	1987	0.302	0.318	0.261	0.050	0.016	0.002	0.001	0.001	0.000	0.000	0.000	0.103	0.087
08HA026	1988	0.303	0.080	0.147	0.169	0.040	0.011	0.003	0.001	0.001	0.001	0.154	0.329	0.104
08HA026	1989	0.352	0.210	0.335	0.123	0.021	0.005	0.001	0.000	0.000	0.000	0.001	0.051	0.091
08HA026	1990	0.273	0.440	0.162	0.061	0.042	0.035	0.001	0.001	0.001	0.000	0.166	0.590	0.146
08HA026	1991	0.417	0.553	0.269	0.193	0.045	0.008	0.001	0.002	0.003	0.001	0.081	0.189	0.144
08HA026	1992	0.557	0.637	0.117	0.035	0.034	0.004	0.002	0.001	0.000	0.000	0.030	0.102	0.125
MEAN		0.331	0.381	0.235	0.098	0.036	0.010	0.002	0.000	0.000	0.000	0.066	0.271	0.116
% of MAD		287%	330%	204%	84%	31%	9%	1%	0%	0%	0%	57%	235%	100%

Victoria Water District
Measured-Estimated Flows

. 14, 1992

urce	Location	File No	Watershed	Survey Date	Time	Method	Party	Mean G.H.(m)	Flow	Unit
na Spring	Tributary to Garner Creek	0329343	4-12-30	1976 04 14		ES	GF		2 to 3	gpm
rald Creek	Trib.to Fulford Harbour,ocean	0366173	4-12-30	1980 10 06		ES	BB		5.1	gpm
ler Creek	Tributary to Fulford Creek	0285255	4-12-30	1969 04 02		ES	WDL		10	cfs
er Creek	Trib. to Fulford Creek	0285926	4-12-30	1969 08 12		ES	WDL		4	cfs
ler Creek	Culvert -Fulford Ganges Rd.		4-12-30	1985 07 25			WVB	999999	0.0002	m3/s
ston Creek	At the Mouth	0290081	4-12-30	1969 09 05			WDL		--No Flow--	
ule Creek	Tributary to sea	0317112	4-12-30	1973 09 18		ES	WBC		3,000	gpd
ole Creek	Tributary to Fulford Harbour	0322479	4-12-30	1974 05 17		ES	DW		1	cfs
ule Creek	Tributary to Fulford Harbour	0323350	4-12-30	1974 08 21		ES	DW		40,000	gpd
ncer Spring	Trib. to Weston Creek	0285910	4-12-30	1970 03 18		ES	WDL		3	gpm
ston Creek	Trib. to Weston Lake	0285911	4-12-30	1970 03 18			WDL		dry/summer	

APPENDIX C

LAKE WATER LEVEL RECORDS

CUSHEON LAKE NEAR GANGES - STATION NO. 08HA038

MONTHLY AND ANNUAL MEAN WATER LEVELS IN METRES FOR THE PERIOD OF RECORD

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN	YEAR
1975	---	---	---	---	---	---	---	---	0.729	0.695	0.741	0.832	---	1975
1977	0.962	0.997	1.145	0.974	0.924	0.883	0.773	0.648	0.607	0.594	0.838	1.177	0.878	1977
1978	1.130	1.095	1.032	1.003	0.953	0.892	0.765	0.638	0.634	0.518	0.664	0.884	0.857	1978
1979	0.952	1.142	1.080	0.985	0.941	0.833	0.732	0.594	0.552	0.539	0.595	1.076	0.834	1979
1980	1.140	1.128	---	---	---	0.928	0.805	0.785	0.740	0.712	0.931	1.261	---	1980
1981	1.091	1.158	1.029	1.033	0.979	0.954	0.877	0.758	0.678	0.752	1.052	1.210	0.963	1981
1982	1.240	1.158	1.050	0.987	0.927	0.827	0.751	0.659	0.585	0.575	0.677	1.115	0.880	1982
1983	1.155	1.247	1.103	1.000	0.916	0.837	0.785	0.680	0.682	0.655	1.097	1.112	0.937	1983
1984	1.105	1.057	1.076	0.957	1.021	0.974	0.875	0.734	0.648	0.668	1.042	1.211	0.950	1984
1985	---	1.088	1.028	1.018	---	0.812	0.781	0.647	0.550	0.535	---	---	---	1985
1986	---	1.158	1.087	1.018	0.982	0.898	0.818	0.685	0.578	0.535	0.677	1.038	---	1986
1987	1.120	1.110	1.078	0.970	0.902	0.818	0.691	0.542	0.433	0.347	0.372	0.878	0.770	1987
MEAN	1.102	1.121	1.071	1.000	0.952	0.867	0.787	0.670	0.618	0.602	0.790	1.070	0.884	MEAN

WATER LEVELS REFERRED TO ASSUMED DATUM

LOCATION - LAT 48 48 52 N
LONG 123 28 00 W NATURAL FLOW

CUSHEON LAKE NEAR GANGES - STATION NO. 08HA038

ANNUAL EXTREMES OF WATER LEVELS IN METRES FOR THE PERIOD OF RECORD

YEAR	MAXIMUM INSTANTANEOUS WATER LEVEL	MAXIMUM DAILY WATER LEVEL	MINIMUM DAILY WATER LEVEL	YEAR
	---	---	---	1975
	---	1.386 ON MAR 10	0.673 ON OCT 17	1977
	---	1.383 ON JAN 11	0.607 ON OCT 19	1978
	---	1.570 ON DEC 18	0.500 ON OCT 16	1979
1980	---	1.454 ON DEC 27	0.702 ON OCT 23	1980
1981	---	1.410 ON FEB 20	0.552 ON SEP 20	1981
1982	---	1.548 ON JAN 25	0.547 ON OCT 20	1982
1983	---	1.557 ON NOV 21	0.533 ON AUG 27	1983
1984	---	1.524 ON NOV 30	0.606 ON OCT 5	1984
1985	---	1.188 ON FEB 15	0.499 ON OCT 5	1985
1986	---	1.516 ON FEB 25 *	0.516 ON OCT 24	1986
1987	---	1.287 ON FEB 2	0.322 ON OCT 27 *	1987

WATER LEVELS REFERRED TO ASSUMED DATUM

* - EXTREME RECORDED FOR THE PERIOD OF RECORD

ST. MARY LAKE, SALTSPRING ISLAND - STATION NO. 08HA024

MONTHLY AND ANNUAL MEAN WATER LEVELS IN METRES FOR THE PERIOD OF RECORD

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN	YEAR
1969	---	---	---	---	1.104	1.033	0.931	0.808	0.762	---	---	---	---	1969
1970	---	---	---	---	1.208	1.111	1.011	0.914	0.836	---	---	---	---	1970
1971	---	---	---	1.268	1.153	1.105	1.052	0.948	0.880	---	---	---	---	1971
1972	---	---	---	1.282	1.161	1.072	1.006	0.918	0.838	---	---	---	---	1972
MEAN	---	---	---	1.275	1.157	1.080	1.003	0.887	0.829	---	---	---	---	MEAN

WATER LEVELS REFERRED TO ASSUMED DATUM

LOCATION - LAT 48 53 51 N
LONG 123 32 46 W NATURAL FLOW

ST. MARY LAKE, SALTSPRING ISLAND - STATION NO. 08HA024

ANNUAL EXTREMES OF WATER LEVELS IN METRES FOR THE PERIOD OF RECORD

YEAR	MAXIMUM INSTANTANEOUS WATER LEVEL	MAXIMUM DAILY WATER LEVEL	MINIMUM DAILY WATER LEVEL	YEA
1969	---	---	0.747 ON SEP 16 *	19
1970	---	---	---	19
1971	---	---	0.880 ON SEP 26	19
1972	---	1.451 ON MAR 16 *	0.814 ON SEP 18	19

WATER LEVELS REFERRED TO ASSUMED DATUM

* - EXTREME RECORDED FOR THE PERIOD OF RECORD

ST. MARYS LAKE for the period 1986-1992 LAKE LEVEL GSC 0.00 gauge 40.015m			
WEEK		WEEKLY MIN	WEEKLY MAX
1		40.365	40.795
2		40.370	41.125
3		40.525	41.105
4		40.570	41.035
5		40.585	41.285
6		40.585	41.415
7		40.615	41.114
8		40.615	41.100
9		40.615	41.060
10		40.635	41.016
11		40.665	40.980
12		40.665	40.955
13		40.705	40.965
14		40.735	40.975
15		40.755	40.940
16		40.745	40.900
17		40.710	40.865
18		40.695	40.865
19		40.665	40.830
20		40.645	40.736
21		40.615	40.745
22		40.605	40.715
23		40.635	40.740
24		40.615	40.722
25		40.577	40.713
26		40.565	40.685
27		40.475	40.665
28		40.455	40.585
29		40.405	40.635
30		40.385	40.565
31		40.345	40.505
32		40.315	40.475
33		40.285	40.435
34		40.245	40.455
35		40.225	40.385
36		40.185	40.385
37		40.165	40.365
38		40.135	40.355
39		40.115	40.315
40		40.195	40.325
41		40.070	40.325
42		40.055	40.325
43		40.035	40.345
44		40.045	40.355
45		40.035	40.455
46		40.045	40.555
47		40.070	40.705
48		40.085	40.460
49		40.185	41.025
50		40.310	41.045
51		40.340	40.995
52		40.355	40.975

APPENDIX D

STREAMS THAT SUPPORT FISH RESOURCES

SALTSPRING ISLAND FISHERIES REQUIREMENTS
ON LICENCED WATER SOURCES

SOURCE	WATERSHED CODE	FISHERIES CONCERNS	WATERSHED
SUFFOLK ACRES SPRING	4-12-20		BOGEY BR.
TARRASOFF SPRING	4-12-20	COHO CUTTHROAT ON CUSHE	CUSHEON CR.
TYLER BROOK	4-12-20	COHO CUTTHROAT ON CUSHE	CUSHEON CR.
WHITELOCK SPRING	4-12-20		OCEAN
WRIGHT SPRING	4-12-20		OCEAN
YULE SPRING	4-12-20	COHO CUTTHROAT ON CUSHE	CUSHEON CR.
ZZ POND	4-12-20		ACKLAND SPRING
ZZ POND	4-12-20		SCOVELL CR.
ZZ SPRING	4-12-20		SCOVELL CR.
ZZ SPRING	4-12-20		

SALTSPRING ISLAND FISHERIES REQUIREMENTS ON LICENCED WATER SOURCES

SOURCE	WATERSHED CODE	FISHERIES CONCERNS	WATERSHED
ABRAHAM SPRING	4-12-30		GROUND
AKERMAN SPRING	4-12-30	COHO,CUTTHROAT,	FULFORD CR
ARNOLD CREEK	4-12-30		OCEAN
BURGOYNE CREEK	4-12-30		OCEAN
CADORNA,CAINE,SP.SKUCE BR	4-12-30		SKUCE BR.
CAHILL BROOK	4-12-30		OCEAN
CAMPBELL SPRING	4-12-30	COHO,CUTTHROAT PROJECT	FULFORD CR.
CARLEY SPRING	4-12-30		BURGOYNE CR.
CEDARHAVEN SPRING	4-12-30		OCEAN
COLLINS BROOK	4-12-30		OCEAN
CONNORS SPRING	4-12-30		OCEAN
COOMBES SPRING	4-12-30		UNNAMED BR.
DANA SPRING	4-12-30		OCEAN
DANIEL BROOK	4-12-30	COHO CUTTHROAT,ON CREEK	FULFORD CR.
DIRKSON SPRING	4-12-30		OCEAN
DISNEY SPRING	4-12-30	COHO CUTTHROAT,ON FULFO	FULFORD CR.
DITMARS SPRING	4-12-30		BURGOYNE CR.
DONALD SPRING	4-12-30		OCEAN
DOWLING BROOK	4-12-30		OCEAN
DUKES SPRING	4-12-30		OCEAN
DUNBAR SPRING	4-12-30		OCEAN
EAST&WEST HEPBURN SPRING	4-12-30		OCEAN
EDMUND SPRING	4-12-30		OCEAN
EDNA SPRING	4-12-30	COHO,CUTTHROAT,ON FULFO	FORD CREEK
EIS SPRING	4-12-30		OCEAN
FERN CREEK	4-12-30		OCEAN
FIRDAUSI SPRING	4-12-30		OCEAN
FORD LAKE	4-12-30	COHO,CUTTHROAT, ON FULF	FULFORD CREEK
FORSEN BROOK	4-12-30		OCEAN
FRANK BROOK	4-12-30		OCEAN
FROST SWAMP	4-12-30	COHO,CUTTHROAT PROJECT	FULFORD CR.
FULFORD CREEK	4-12-30	COHO,CUTTHROAT ON FULFO	FULFORD CR.
FURNESS SPRING	4-12-30	COHO,CUTTHROAT ON FULFO	FULFORD CR.
GARVEY SPRING	4-12-30		SPENCER BR.
GASPELL BROOK	4-12-30	COHO,CUTTHROAT ON FULFO	FULFORD CR.
GERALD CREEK	4-12-30		OCEAN
GOW SPRING	4-12-30		OCEAN
HARTNELL SPRING	4-12-30		OCEAN
HOREL BROOK	4-12-30	COHO,CUTTHROAT,ON FULFO	FULFORD CR.
KING CREEK	4-12-30		OCEAN
KYLER CREEK	4-12-30	COHO,CUTTHROAT,ON FULFO	FULFORD CREEK
LAKE STOWELL	4-12-30		UNNAMED BR.
LAKE WESTON	4-12-30	RES.CUTTHROAT	WESTON CREEK
LARLOW CREEK	4-12-30		OCEANCR.
LAUTMAN BROOK	4-12-30	COHO,CUTTHROAT,ON FULFO	FULFORD CR.
LAWRENCE BROOK	4-12-30		OCEAN
LEE SPRING	4-12-30	COHO,CUTTHROAT,ON FULFO	FULFORD CR.
LUCY SPRING	4-12-30	COHO,CUTTHROAT,ON FULFO	FULFORD CR.
LYLA CREEK	4-12-30		OCEAN
MACALPINE BROOK	4-12-30		OCEAN
MITCHELL SPRING	4-12-30		OCEAN
MOLLET BROOK	4-12-30	COHO,CUTTHROAT,ON FULFO	FULFORD CR.
MONTY CREEK	4-12-30		OCEAN
MORRISON SPRING	4-12-30		OCEAN
MORTENSON SPRING	4-12-30	COHO, CUTTHROAT ON FULF	FULFORD CR.
NICKERSON SPRING	4-12-30		OCEAN
PENDERGAST SPRING	4-12-30		OCEAN
PERKS SPRING	4-12-30		OCEAN

SALTSPRING ISLAND FISHERIES REQUIREMENTS ON LICENCED WATER SOURCES

SOURCE	WATERSHED CODE	FISHERIES CONCERNS	WATERSHED
ACLAND SPRING	4-12-20	N/A	OCEAN
ACLAND SPRING No.2	4-12-20		OCEAN
ATKINS SWAMP	4-12-20		BESIE BR.
BELL SPRING	4-12-20		OCEAN
BESSIE BROOK	4-12-20		OCEAN
BLACKBURN LAKE	4-12-20	COHO,CUTTHROAT,CUSHEON	CUSHEON CREEK
BOGEY BROOK	4-12-20		OCEAN
BOOTH SPRING	4-12-20		UNNAMED CR.
BRACKETT SPRING	4-12-20		OCEAN
BRIGGS SPRING	4-12-20	SEA.,RES.CUTTHROAT	MADRONA CR.
BUCKLAND BROOK	4-12-20	STICLEBACK	BULLOCKS CR.
BULLOCKS CREEK	4-12-20		OCEAN
BULLOCKS LAKE	4-12-20		BULLOCKS CREEK
BURGESS SPRING	4-12-20	S.E.P. PROJECT	GANGES CR.
BURTT SPRING	4-12-20		OCEAN
CASWELL CREEK	4-12-20	COHO,CUTTHROAT,CUSHEON	CUSHEON CR.
CROFTON SPRING	4-12-20		UNNAMED BR.
CUSHEON CREEK	4-12-20	COHO,CUTTHROAT,ON CREEK	CUSHEON CR.
CUSHEON LAKE	4-12-20	COHO.CUTTHROAT,ON CREEK	CUSHEON CREEK
DIFFIN CREEK	4-12-20		OCEAN
DIFFIN POND	4-12-20		DIFFIN CR.
DONKERSLEY SPRING	4-12-20	S.E.P. PROJECT ON GANGE	GANGES CR.
EDWAL SPRING	4-12-20		OCEAN
EFFIE SPRING	4-12-20		OCEAN
ERIC SPRING	4-12-20	SEARUN CUTTHROAT,ON MAX	MAXWELL CR.
GANGES CREEK	4-12-20	S.E.P. PROJECT	GANGES CR.
GILBERT BROOK	4-12-20	SEA&RES CUTTHROAT ON MA	MADRONA CR.
HARRISON POND	4-12-20		UNNAMED BR.
HERBERT SPRING	4-12-20		LELAND BR.
HOLMES SPRING	4-12-20		OCEAN
HUBBARD SPRING	4-12-20		UNNAMED BR.
INDIAN SPRING	4-12-20		OCEAN
JAMESKI SPRING	4-12-20	COHO,CUTTHROAT ON CUSHE	CUSHEON CR.
JOEJONES SPRING	4-12-20		OCEAN
LAKE MAXWELL	4-12-20	CUTTHROAT ON MAXWELL CR	MAXWELL CREEK
LESLIE SPRING	4-12-20		OCEAN
LIEBERHERR SPRING	4-12-20		OCEAN
MADRONA CREEK	4-12-20	CUTTHROAT ON MADRONA CR	MADRONA CR.
MARCOTTE SPRING	4-12-20	COHO,CUTTHROAT,ON CUSHE	CUSHEON CR.
MAWHINNA CREEK	4-12-20	NO CONCERNS	MAWHINNA CR.
MAXWELL CREEK	4-12-20	SEARUN CUTTHROAT	MAXWELL CR.
MILES SPRING	4-12-20	CUTTHROAT ON MANSELL CR	MANSELL CR.
MOUAT SPRING	4-12-20		OCEAN
McAFEE CREEK	4-12-20	CHUM,SEARUN CUTTHROAT,	SHARPE CR.
McGRIGOR SPRING	4-12-20	COHO,CUTTHROAT,ON CUSHE	CUSHEON CR
McLEOD SPRING	4-12-20		OCEAN
NELSON LAKE	4-12-20	STICLEBACK ON BULLOCKS	BULLOCKS CR.
OLD LOWTHER CREEK	4-12-20		OCEAN
PARADISE SPRING	4-12-20	COHO CUTTHROAT ON CUSHE	CUSHEON CR
PICKUP SPRING	4-12-20		OCEAN
PURDY CREEK	4-12-20		OLD LOWTHER CR
RAINBOW SPRING	4-12-20		UNNAMED CR.
RALPH SPRING	4-12-20	CUTTHROAT ON MADRONA CR	MADRONA CR.
RAM SPRING	4-12-20	CUTTHROAT ON MADRONA CR	MADRONA CR.
RIPPON CREEK	4-12-20	CUTTHROAT ON MAXWELL CR	MAXWELL CR.
SCOVELL CREEK	4-12-20		OCEAN
SHARPE CREEK	4-12-20	CHUM CUTTHROAT	SHARPE CR.
SINCLAIR SWAMP	4-12-20		MAWHINNA CR.
STACEY SPRING	4-12-20		OCEAN

SALTSPRING ISLAND FISHERIES REQUIREMENTS ON LICENCED WATER SOURCES

OURCE	WATERSHED CODE	FISHERIES CONCERNS	WATERSHED
OND SPRINGS	4-12-10		OCEAN
OGSWELL BROOK	4-12-10		OCEAN
URTIS SPRING	4-12-10		OCEAN
ORGELES BROOK	4-12-10	CHUM,CUTTHROAT,etc.ON D	DUCK CR.
UCK CREEK	4-12-10	CHUM,CUTTHROAT,RAINBOW	DUCK CR.
RIN BROOK	4-12-10		OCEAN
REDERICK SPRING	4-12-10	STICLEBACK IN McFADDEN	McFADDEN CR.
OSKIN BROOK	4-12-10	STICLEBACK ON McFADDEN	MCFADDEN CR.
ANE SPRING	4-12-10	CHUM,CUTTHROAT,ON DUCK	DUCK CR.
ATHLEEN SPRING	4-12-10	STICLEBACK ON McFADDEN	McFADDEN CR.
IRKHAM SPRING	4-12-10		OCEAN
AIRD POND	4-12-10	STICLEBACK ON McFADDEN	McFADDEN CR.
ARSON SPRING	4-12-10	CHUM.CUTTHROAT,ON DUCK	DUCK CR.
ILNER SPRING	4-12-10		OCEAN
CCALLION SPRING	4-12-10	STICKLEBACK ON McFADDEN	McFADDEN CR.
ICHARDSON SPRING	4-12-10	STICLEBACK ON McFADDEN	McFADDEN CR.
AUNDERS SPRING	4-12-10	STICLEBACK ON McFADDEN	McFADDEN CR.
IMSON SPRING	4-12-10		UNNAMED CR.
C. MARY LAKE	4-12-10	CHUM CUTTHROAT ON DUCK	DUCK CREEK
ALKER BROOK	4-12-10		OCEAN
EISNER BROOK	4-12-10	STICLEBACK ON McFADDEN	McFADDEN CR.
BROOK	4-12-10		OCEAN
SPRING	4-12-10	RES. CUTTHROAT ON STOWE	STOWELL LK.-?
SPRING	4-12-10	STICLEBACK ON McFADDEN	MCFADDEN CR.

SALTSPRING ISLAND FISHERIES REQUIREMENTS ON LICENCED WATER SOURCES

SOURCE	WATERSHED CODE	FISHERIES CONCERNS	WATERSHED
QUESTO SPRING	4-12-30		OCEAN
RAYNES SPRING	4-12-30	COHO CUTTHROAT ON FULFO	FULFORD CR.
REID CREEK	4-12-30	COHO CUTTHROAT ON FULFO	FULFORD CREEK
ROBERT SPRING	4-12-30	COHO CUTTHROAT ON FULFO	FULFORD CR.
ROBERTSON SPRING	4-12-30	RES. CUTTHROAT ON LK. S	LK STOWELL
ROLAND SPRING	4-12-30		UNNAMED CR.
ROSEMERGY LAKE	4-12-30	COHO,CUTTHROAT, ON FULF	FULFORD CR.
SOTHWELL SPRING	4-12-30		OCEAN
SKUCE BROOK	4-12-30	COHO CUTTHROAT ON FULFO	FULFORD CR.
SMITH BROOK	4-12-30		OCEAN
SOULE CREEK	4-12-30		OCEAN
SPENCER SPRING	4-12-30	CUTTHROAT ON WESTON CR.	WESTON CR.
SPIKERMAN SPRING	4-12-30		OCEAN
SUMMERHILL SPRING	4-12-30		OCEAN
TRENCH CREEK	4-12-30		OCEAN
VANS SPRING	4-12-30		OCEAN
WZ BROOK	4-12-30	RESIDENT CUTTHROAT ON S	STOWELL CR.
WZ SPRING	4-12-30	RES. CUTTHROAT ON STOWE	STOWELL CR.
WZ SPRING	4-12-30		MUSGRAVE CR.
WESTON LAKE	4-12-30	RESIDENT CUTTHROAT	WESTON CREEK
WESTON CREEK	4-12-30	CUTHROAT TROUT	WESTON CREEK

APPENDIX E

LICENSED WATER DEMAND

The summary of existing licenses by source provided the basis for converting demand volumes to equivalent litres per second during the low flow period from May to November. This was divided into two segments. The first represents the maximum demand during the 100 day irrigation period, assumed to fall between May and September. The second is the remaining low flow period estimate. This includes the maximum demand during October, November and the period between May and September not affected by irrigation demands (114 days).

WATERSHED ALLOCATION SUMMARY

SOURCE	WATERSHED CODE	DOM. gpd.	IRR. acft	IND. gpd.	LDIMP.& CONSER. gpd.	WWKS. acft.	TOTAL L/s	STOR. acft.
CLAND SPRING	4-12-20	3000	1.2	2200	0	0	0.445	6.8
CLAND SPRING No.	4-12-20	0	0.0	3300	0	0	0.174	0.0
TKINS SWAMP	4-12-20	500	0.0	0	0	0	0.026	0.0
ELL SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
ESSIE BROOK	4-12-20	500	0.0	0	0	0	0.026	0.0
LACKBURN LAKE	4-12-20	500	10.0	7000	0	0	1.822	0.0
OGEY BROOK	4-12-20	0	12.2	0	0	0	1.742	12.2
ONNET SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
OOTH SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
RACKETT SPRING	4-12-20	1000	0.0	0	0	0	0.053	0.0
RIGGS SPRING	4-12-20	750	0.0	0	0	0	0.039	0.0
UCKLAND BROOK	4-12-20	0	1.0	0	2231	0	0.259	4.0
ULLOCKS CREEK	4-12-20	0	6.4	0	0	0	0.907	3.4
ULLOCKS LAKE	4-12-20	0	39.0	0	0	0	5.568	0.0
URGESS SPRING	4-12-20	500	0.0	0	0	0	0.026	1.0
URTT SPRING	4-12-20	1000	0.0	0	0	0	0.053	0.0
ASWELL CREEK	4-12-20	0	0.5	0	0	0	0.071	0.5
ROFTON SPRING	4-12-20	0	2.0	0	0	0	0.286	2.0
USHEON CREEK	4-12-20	500	0.3	0	33668	0	1.834	0.0
USHEON LAKE	4-12-20	14500	21.3	4500	0	83	7.287	0.0
IFFIN CREEK	4-12-20	0	6.0	0	0	0	0.857	6.0
IFFIN POND	4-12-20	0	0.0	0	0	0	0.000	0.0
ONKERSLEY SPRING	4-12-20	1000	0.0	0	0	0	0.053	0.0
DWAL SPRING	4-12-20	2000	0.0	0	0	0	0.105	0.0
FFIE SPRING	4-12-20	2000	0.0	0	0	0	0.105	0.0
RIC SPRING	4-12-20	1000	0.0	0	0	0	0.053	0.0
ANGES CREEK	4-12-20	0	0.0	0	149	0	0.008	0.0
ILBERT BROOK	4-12-20	0	1.0	0	0	0	0.143	1.0
ARRISON POND	4-12-20	0	17.0	0	0	0	2.427	15.0
ERBERT SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
OLMES SPRING	4-12-20	2100	0.0	0	0	0	0.110	0.0
UBBARD SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
NDIAN SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
AMESKI SPRING	4-12-20	1000	0.0	0	0	0	0.053	0.0
OEJONES SPRING	4-12-20	1000	0.0	0	0	0	0.053	0.0
AKE MAXWELL	4-12-20	0	26.0	0	0	538	24.759	~~410.0~~
ESLIE SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
IEBERHERR SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
ADRONA CREEK	4-12-20	1000	2.5	0	0	0	0.410	3.5
ARCOTTE SPRING	4-12-20	4500	0.0	0	0	0	0.237	0.0
AWHINNA CREEK	4-12-20	2500	0.0	0	0	0	0.132	0.0
AXWELL CREEK	4-12-20	1000	0.0	0	0	0	0.053	0.0
ILES SPRING	4-12-20	0	0.0	0	0	0	0.000	0.0
OUAT SPRING	4-12-20	1500	0.0	0	0	0	0.079	0.0
cAFEE CREEK	4-12-20	3750	0.0	0	0	0	0.197	0.0
cGRIGOR SPRING	4-12-20	1000	0.0	0	0	0	0.053	0.0
cLEOD SPRING	4-12-20	1000	0.0	0	0	0	0.053	0.0
ELSON LAKE	4-12-20	500	0.0	0	0	0	0.026	0.0
LD LOWTHER CREEK	4-12-20	1000	0.0	0	0	0	0.053	0.0
ARADISE SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
ICKUP SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
URDY CREEK	4-12-20	500	0.0	0	0	0	0.026	0.0
AINBOW SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
ALPH SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
AM SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
IPPON CREEK	4-12-20	0	0.0	0	0	0	0.000	200.0

WATERSHED ALLOCATION SUMMARY

SOURCE	WATERSHED CODE	DOM. gpd.	IRR. acft	IND. gpd.	LDIMP.& CONSER. gpd.	WWKS. acft.	TOTAL L/s	STOR. acft.
OND SPRINGS	4-12-10	1500	0.0	0	0	0	0.079	0.0
OGSWELL BROOK	4-12-10	1000	0.0	0	0	0	0.053	0.0
URTIS SPRING	4-12-10	1000	0.0	0	0	0	0.053	0.0
ORGELES BROOK	4-12-10	0	0.5	0	0	0	0.071	0.4
UCK CREEK	4-12-10	0	16.3	0	0	0	2.320	14.3
RIN BROOK	4-12-10	0	0.3	0	0	0	0.036	0.0
REDERICK SPRING	4-12-10	1000	0.0	0	0	0	0.053	0.0
OSKIN BROOK	4-12-10	0	3.0	0	0	0	0.428	3.0
ANE SPRING	4-12-10	1000	0.0	0	0	0	0.053	0.0
ATHLEEN SPRING	4-12-10	500	0.0	0	0	0	0.026	0.0
IRKHAM SPRING	4-12-10	500	0.0	0	0	0	0.053	0.0
AIRD POND	4-12-10	0	1.0	0	0	0	0.143	0.0
ARSON SPRING	4-12-10	500	0.0	0	0	0	0.026	0.0
ILNER SPRING	4-12-10	500	0.0	0	0	0	0.026	0.0
cCALLION SPRING	4-12-10	350	0.0	0	0	0	0.018	0.0
ICHARDSON SPRING	4-12-10	0	0.3	0	0	0	0.036	0.3
AUNDERS SPRING	4-12-10	1500	0.0	0	0	0	0.079	0.0
IMSON SPRING	4-12-10	1000	0.0	0	0	0	0.053	0.0
t. MARY LAKE	4-12-10	14750	63.0	19000	0	849	43.977	0.0
ALKER BROOK	4-12-10	0	0.5	0	0	0	0.071	0.5
EISNER BROOK	4-12-10	0	5.2	0	0	0	0.742	5.2
Z BROOK	4-12-10	0	0.0	0	0	0	0.000	0.0
Z SPRING	4-12-10	500	0.0	0	0	0	0.000	0.0
Z SPRING	4-12-10	0	0.0	0	0	0	0.000	0.0

	DOM. gpd.	IRR. acft	IND. gpd.	LDIMP.& CONSER. gpd.	WWKS. acft.	TOTAL L/s	STOR acft
ALLOCATION TOTALS	25600	90.0	19000	0	849	48.396	23.7

WATERSHED ALLOCATION SUMMARY

SOURCE	WATERSHED CODE	DOM. gpd.	IRR. acft	IND. gpd.	LDIMP.& CONSER. gpd.	WWKS. acft.	TOTAL L/s	STOR. acft.
COVELL CREEK	4-12-20	500	1.0	0	0	0	0.169	13.0
HARPE CREEK	4-12-20	2750	0.0	0	0	0	0.145	0.0
INCLAIR SWAMP	4-12-20	0	2.0	0	0	0	0.286	0.3
TACEY SPRING	4-12-20	500	2.0	0	0	0	0.312	0.0
UFFOLK ACRES SPR	4-12-20	0	10.0	500	0	0	1.454	0.0
ARRASOFF SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
YLER BROOK	4-12-20	0	0.0	0	10765	0	0.566	0.0
HITELOCK SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
RIGHT SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0
ULE SPRING	4-12-20	500	0.0	100	0	0	0.032	0.0
Z POND	4-12-20	0	1.0	0	0	0	0.143	1.0
Z POND	4-12-20	0	0.0	0	0	0	0.000	0.0
Z SPRING	4-12-20	500	0.0	0	0	0	0.000	0.0
Z SPRING	4-12-20	500	0.0	0	0	0	0.026	0.0

	DOM. gpd.	IRR. acft	IND. gpd.	LDIMP.& CONSER. gpd.	WWKS. acft.	TOTAL L/s	STOR acft
ALLOCATION TOTALS	64350	162.3	17600	46813	621	54.212	979.6

−710.0
269.6

WATERSHED ALLOCATION SUMMARY

SOURCE	WATERSHED CODE	DOM. gpd.	IRR. acft	IND. gpd.	LDIMP.& CONSER. gpd.	WWKS. acft.	TOTAL L/s	STOR. acft.
ABRAHAM SPRING	4-12-30	1500	0.0	0	0	0	0.079	0.0
AKERMAN SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
ARNOLD CREEK	4-12-30	1500	6.0	0	0	0	0.936	0.0
BURGOYNE CREEK	4-12-30	2000	0.0	0	0	0	0.105	0.0
CADORNA,CAINE,SP.	4-12-30	2000	0.0	0	0	0	0.105	0.0
CAHILL BROOK	4-12-30	0	0.0	0	2	0	0.059	0.0
CAMPBELL SPRING	4-12-30	200	1.5	0	0	0	0.224	0.3
CARLEY SPRING	4-12-30	500	4.0	0	0	0	0.597	1.0
CEDARHAVEN SPRING	4-12-30	750	0.0	0	0	0	0.039	0.0
COLLINS BROOK	4-12-30	2000	0.0	0	0	0	0.105	0.0
CONNORS SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
COOMBES SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
DANA SPRING	4-12-30	1000	0.0	0	0	0	0.053	0.0
DANIEL BROOK	4-12-30	1000	17.0	0	0	0	2.480	17.0
DIRKSON SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
DISNEY SPRING	4-12-30	1000	0.0	0	0	0	0.053	0.0
DITMARS SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
DONALD SPRING	4-12-30	6000	0.0	0	0	0	0.316	0.0
DOWLING BROOK	4-12-30	1000	0.0	0	0	0	0.053	0.0
DUKES SPRING	4-12-30	1500	0.0	0	0	0	0.079	0.0
DUNBAR SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
EAST&WEST HEPBURN	4-12-30	1000	0.0	0	1000	0	0.105	0.0
EDMUND SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
EDNA SPRING	4-12-30	1000	0.0	0	0	0	0.053	0.0
EIS SPRING	4-12-30	750	0.0	0	0	0	0.039	0.0
FERN CREEK	4-12-30	2500	0.0	0	0	0	0.131	0.0
FIRDAUSI SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
FORD LAKE	4-12-30	500	0.0	0	0	0	0.026	0.0
FORSEN BROOK	4-12-30	1000	0.0	0	0	0	0.053	0.0
FRANK BROOK	4-12-30	1000	0.0	0	0	0	0.053	0.0
FROST SWAMP	4-12-30	0	6.5	0	0	0	0.928	6.5
FULFORD CREEK	4-12-30	1500	100.0	0	10000	0	14.884	35.0
FURNESS SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
GARVEY SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
GASPELL BROOK	4-12-30	0	5.0	0	0	0	0.714	5.0
GERALD CREEK	4-12-30	2000	0.0	0	0	0	0.105	0.0
GOW SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
HARTNELL SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
HOREL BROOK	4-12-30	2500	2.0	0	0	0	0.417	0.0
KING CREEK	4-12-30	1000	0.0	0	0	0	0.053	0.0
KYLER CREEK	4-12-30	1500	0.0	0	0	0	0.079	0.0
LAKE STOWELL	4-12-30	1000	21.5	0	0	0	3.123	0.0
LAKE WESTON	4-12-30	11000	12.5	0	0	94	6.047	40.0
LARLOW CREEK	4-12-30	1000	0.0	0	0	0	0.053	0.0
LAUTMAN BROOK	4-12-30	500	0.0	0	0	0	0.026	0.0
LAWRENCE BROOK	4-12-30	500	0.0	0	0	0	0.026	0.0
LEE SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
LUCY SPRING	4-12-30	1000	0.0	0	0	0	0.053	0.0
LYLA CREEK	4-12-30	1500	0.0	0	0	0	0.079	0.0
MACALPINE BROOK	4-12-30	1000	0.0	0	0	0	0.053	0.0
MITCHELL SPRING	4-12-30	1500	0.0	0	0	0	0.079	0.0
MOLLET BROOK	4-12-30	500	0.0	0	0	0	0.026	0.0
MONTY CREEK	4-12-30	1000	0.0	0	0	0	0.053	0.0
MORRISON SPRING	4-12-30	0	0.3	0	0	0	0.036	0.0
MORTENSON SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
NICKERSON SPRING	4-12-30	0	0.0	0	744	0	0.039	0.0

WATERSHED ALLOCATION SUMMARY

SOURCE	WATERSHED CODE	DOM. gpd.	IRR. acft	IND. gpd.	LDIMP.& CONSER. gpd.	WWKS. acft.	TOTAL L/s	STOR. acft.
NDERGAST SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
RKS SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
ARRINGTON CREEK	4-12-30	500	2.5	0	0	0	0.383	0.0
ESTO SPRING	4-12-30	0	0.5	0	0	0	0.071	0.5
YNES SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
ID CREEK	4-12-30	2750	0.5	0	0	0	0.216	0.0
BERT SPRING	4-12-30	1000	0.0	0	0	0	0.053	0.0
BERTSON SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
LAND SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
SEMERGY LAKE	4-12-30	0	0.0	0	0	0	0.000	31.0
THWELL SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
UCE BROOK	4-12-30	1000	0.0	0	0	0	0.053	0.0
ITH BROOK	4-12-30	500	0.0	0	0	0	0.026	0.0
JLE CREEK	4-12-30	3200	0.0	2100	0	0	0.279	0.0
ENCER SPRING	4-12-30	1500	0.0	0	0	0	0.079	0.0
IKERMAN SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
MMERHILL SPRING	4-12-30	2000	0.0	0	0	0	0.105	0.0
ENCH CREEK	4-12-30	2500	0.5	0	0	0	0.203	0.0
NS SPRING	4-12-30	500	0.0	0	0	0	0.026	0.0
BROOK	4-12-30	0	1.0	0	0	0	0.000	1.0
SPRING	4-12-30	0	0.0	0	0	0	0.000	0.0
SPRING	4-12-30	0	3.5	0	0	0	0.000	0.0

	DOM. gpd.	IRR. acft	IND. gpd.	LDIMP.& CONSER. gpd.	WWKS. acft.	TOTAL L/s	STOR acft
ALLOCATION TOTALS	84650	184.8	2100	11745	94	34.656	137.3

LOW FLOW LICENSED DEMAND BY MAJOR WATERSHED AREA

Watershed Area	Demand Irrig'n. Period (L/sec)	Demand Rem.Low Flow Mos (L/sec)	Demand Volume May-Nov (dam^3)	Existing Storage (acft)	Existing Storage (dam^3)
Duck Creek	2.320	-	20.0	14.3	17.6
Dorgeles Brook	0.071	-	0.6	0.4	0.5
Jane Spring	0.053	0.053	1.0		
Larson Spring	0.026	0.026	0.5		
St. Mary Lake	43.977	34.983	724.3	.	.
	46.447	35.062	746.4	14.7	18.1
McFadden Creek					
Frederick Spring	0.053	0.053	1.0		
Hoskin Brook	0.428	-	3.7	3.0	3.7
Kathleen Spring	0.026	0.026	0.5		
Laird Pond	0.143	-	1.2		
McCallion Spring	0.018	0.018	0.3		
Richardson Spring	0.036	-	0.3	0.3	0.4
Saunders Spring	0.079	0.079	1.5		
Weisner Brook	0.742	-.	6.4	5.2	6.4
	1.525	0.176	14.9	8.5	10.5
Other Small Drainage Areas					
Bond Springs	0.079	0.079	1.4		
Cogswell Brook	0.053	0.053	1.0		
Curtis Spring	0.053	0.053	1.0		
Erin Brook	0.036	-	0.3		
Kirkham Spring	0.053	0.053	1.0		
Milner Spring	0.026	0.026	0.5		
Simpson Spring	0.053	0.053	1.0		
Walker Brook	0.071	-.	0.6	0.5	0.6
	0.424	0.317	6.8	0.5	0.6
Total North Saltspring Island	48.396	35.555	768.1	23.7	29.2

LOW FLOW LICENSED DEMAND BY MAJOR WATERSHED AREA

Watershed Area	Demand Irrig'n. Period (L/sec)	Demand Rem.Low Flow Mos (L/sec)	Demand Volume May-Nov (dam^3)	Existing Storage (acft)	Existing Storage (dam^3)
Bullocks Creek	0.907	-	7.8	3.4	4.2
Buckland Brook	0.259	0.116	3.4	4.0	4.9
Bullocks Lake	5.568	-	48.1		
Nelson Lake	0.026	0.026	0.5		
	6.760	0.142	59.8	7.4	9.1
Cusheon Creek	1.834	1.791	33.5		
Blackburn Lake	1.822	0.394	19.6		
Caswell Creek	0.071	-	0.6	0.5	0.6
Cusheon Lake	7.287	4.246	104.7		
Jameski Spring	0.053	0.053	1.0		
Marcotte Spring	0.237	0.237	4.4		
McGrigor Spring	0.053	0.053	1.0		
Paradise Spring	0.026	0.026	0.5		
Tarrasoff Spring	0.026	0.026	0.5		
Tyler Brook	0.566	0.566	10.4		
Yule Spring	0.032	0.032	0.6		
	12.007	7.424	176.8	0.5	0.6
Ganges Creek	0.008	0.008	0.1		
Burgess Spring	0.026	0.026	0.5	1.0	1.2
Donkersley Spr.	0.053	0.053	1.0		
	0.087	0.087	1.6	1.0	1.2
Maxwell Creek	0.053	0.053	1.0		
Eric Spring	0.053	0.053	1.0		
Lake Maxwell	24.759	21.047	421.0	~~710.0~~	875.8
Rippon Creek	0.000	-	-	200.0	246.7
	24.865	21.153	423.0	~~910.0~~	1122.5
Mawhinna Creek	0.132	0.132	2.4		
Sinclair Swamp	0.286	-	2.5	0.3	0.4
	0.418	0.132	4.9	0.3	0.4
Other Small Areas					
Acland Spring	0.445	0.274	6.5	6.8	8.4
Acland Spr. No.2	0.174	0.174	3.2		
Atkins Swamp	0.026	0.026	0.5		
Bell Spring	0.026	0.026	0.5		
Bessie Brook	0.026	0.026	0.5		
Bogey Brook	1.742	-	15.0	12.2	15.1
Suffolk Ac.Sp	1.454	0.026	12.8		
Bonnet Spring	0.026	0.026	0.5		
Booth Spring	0.026	0.026	0.5		

Storage in Maxwell Lake.

(cont'd next page)

LOW FLOW LICENSED DEMAND BY MAJOR WATERSHED AREA

Watershed Area	Demand Irrig'n. Period (L/sec)	Demand Rem.Low Flow Mos (L/sec)	Demand Volume May-Nov (dam^3)	Existing Storage (acft)	Existing Storage (dam^3)
Other Small Areas: (Cont'd)					
Bracket Spring	0.053	0.053	1.0		
Burtt Spring	0.053	0.053	1.0		
Caswell Creek	0.071	-	0.6	0.5	0.6
Crofton Spring	0.286	-	2.5	2.0	2.5
Diffin Creek	0.857	-	7.4	6.0	7.4
Diffin Pond	0.000	-	-		
Edwal Spring	0.105	0.105	1.9		
Effie Spring	0.105	0.105	1.9		
Harrison Pond	2.427	-	20.9	15.0	18.5
Herbert Spring	0.026	0.026	0.5		
Holmes Spring	0.110	0.110	2.0		
Hubbard Spring	0.026	0.026	0.5		
Indian Spring	0.026	0.026	0.5		
Joejones Spring	0.053	0.053	1.0		
Leslie Spring	0.026	0.026	0.5		
Lieberherr Spring	0.026	0.026	0.5		
Madrona Creek	0.410	0.053	4.1	3.5	4.3
Briggs Spring	0.039	0.039	0.7		
Gilbert Brook	0.143	-	1.2	1.0	1.2
Ralph Spring	0.026	0.026	0.5		
Ram Spring	0.026	0.026	0.5		
McLeod Spring	0.053	0.053	1.0		
Miles Spring	0.000	-	-		
Mouat Spring	0.079	0.079	1.4		
Old Lowther Creek	0.053	0.053	1.0		
Purdy Creek	0.026	0.026	0.5		
Pickup Spring	0.026	0.026	0.5		
Rainbow Spring	0.026	0.026	0.5		
Scovell Creek	0.169	0.026	1.7	1.0	1.2
Sharpe Creek	0.145	0.145	2.7		
McAfee Creek	0.197	0.197	3.6		
Stacey Spring	0.312	0.026	2.9		
Whitelock Spring	0.026	0.026	0.5		
Wright Spring	0.026	0.026	0.5		
ZZ Pond	0.143	-	1.2	1.0	1.2
ZZ Spring	0.026	0.026	0.5	.	.
Tl.Other Areas	10.146	2.092	108.2	49.0	60.5
Total Middle Saltspring Island	**54.283**	**31.030**	**774.3**	**968.2**	**1194.3**

LOW FLOW LICENSED DEMAND BY MAJOR WATERSHED AREA

Watershed Area	Demand Irrig'n. Period (L/sec)	Demand Rem.Low Flow Mos (L/sec)	Demand Volume May-Nov (dam^3)	Existing Storage (acft)	Existing Storage (dam^3)
Fulford Creek	14.884	0.607	134.5	35.0	43.2
Ackerman Spring	0.026	0.026	0.5		
Campbell Spring	0.224	0.010	2.0	0.3	0.4
Daniel Brook	2.480	0.053	21.9	17.0	21.0
Disney Spring	0.053	0.053	1.0		
Ford Lake	0.026	0.026	0.5		
Frost Swamp	0.928	-	8.0	6.5	8.0
Furness Spring	0.026	0.026	0.5		
Gaspell Brook	0.714	-	6.2	5.0	6.1
Horel Brook	0.417	0.131	4.9		
Kyler Creek	0.079	0.079	1.4		
Lautman Brook	0.026	0.026	0.5		
Lee Spring	0.026	0.026	0.5		
Lucy Spring	0.053	0.053	1.0		
Mollet Brook	0.026	0.026	0.5		
Mortenson Spring	0.026	0.026	0.5		
Quarrington Crk.	0.383	0.026	3.5		
Raynes Spring	0.026	0.026	0.5		
Reid Creek	0.216	0.145	3.3		
Robert Spring	0.053	0.053	1.0		
Rosemergy Lake	0.000	-	-	31.0	38.2
Skuce Brook	0.053	0.053	1.0		
Cadorna,Caine, Sp.Skuce Brk.	0.105	0.105	1.9	.	.
	20.850	1.576	195.6	94.8	116.9
Lake Stowell	3.123	0.053	27.5		
Robertson Spring	0.026	0.026	0.5	.	.
	3.149	0.079	28.0	0.0	0.0
Weston Creek					
Lake Weston	6.047	4.262	94.2	40.0	49.4
Spencer Spring	0.079	0.079	1.4	.	.
	6.126	4.341	95.6	40.0	49.4
Other Small Areas (see next page)	5.174	2.866	73.4	2.5	3.0
Total South Saltspring Island	**35.358**	**8.980**	**392.6**	**136.3**	**168.1**
TL.SALTSPRING ISLAND	**138.037**	**75.565**	**1935.0**	**1128.2**	**1391.6**

LOW FLOW LICENSED DEMAND BY MAJOR WATERSHED AREA

Watershed Area	Demand Irrig'n. Period (L/sec)	Demand Rem.Low Flow Mos (L/sec)	Demand Volume May-Nov (dam^3)	Existing Storage (acft)	Existing Storage (dam^3)
Other Small Areas:					
Abraham Spring	0.079	0.079	1.4		
Arnold Creek	0.936	0.079	8.9		
Burgoyne Creek	0.105	0.105	1.9		
Carley Spring	0.597	0.026	5.4	1.0	1.2
Ditmars Spr.	0.026	0.026	0.5		
Cahill Brook	0.059	0.059	1.1		
Cedarhaven Spr.	0.039	0.039	0.7		
Collins Brook	0.105	0.105	1.9		
Connors Spring	0.026	0.026	0.5		
Coombes Spring	0.026	0.026	0.5		
Dana Spring	0.053	0.053	1.0		
Dirkson Spring	0.026	0.026	0.5		
Donald Spring	0.316	0.316	5.8		
Dowling Brook	0.053	0.053	1.0		
Dukes Spring	0.079	0.079	1.5		
Dunbar Spring	0.026	0.026	0.5		
E&W Hepburn Spr.	0.105	0.105	1.9		
Edmund Spring	0.026	0.026	0.5		
Eis Spring	0.039	0.039	0.7		
Fern Creek	0.131	0.131	2.4		
Firdausi Spring	0.026	0.026	0.5		
Ford Creek					
Edna Spring	0.053	0.053	1.0		
Forsen Brook	0.053	0.053	1.0		
Frank Brook	0.053	0.053	1.0		
Garvey Spring	0.026	0.026	0.5		
Gerald Creek	0.105	0.105	1.9		
Gow Spring	0.026	0.026	0.5		
Hartnell Spring	0.026	0.026	0.5		
King Creek	0.053	0.053	1.0		
Larlow Creek	0.053	0.053	1.0		
Lawrence Brook	0.026	0.026	0.5		
Lyla Creek	0.079	0.079	1.5		
Macalpine Brook	0.053	0.053	1.0		
Mitchell Spring	0.079	0.079	1.5		
Monty Creek	0.053	0.053	1.0		
Morrison Spring	0.036	-	0.3		
Nickerson Spring	0.039	0.039	0.7	.	.
Sub-total	3.691	2.227	53.8	1.0	1.2

(more on next page)

LOW FLOW LICENSED DEMAND BY MAJOR WATERSHED AREA

Watershed Area	Demand Irrig'n. Period (L/sec)	Demand Rem.Low Flow Mos (L/sec)	Demand Volume May-Nov (dam^3)	Existing Storage (acft)	Existing Storage (dam^3)
Other Small Drainage Areas Balance Fwd	3.691	2.227	53.8	1.0	1.2
Pendergast Spr.	0.026	0.026	0.5		
Perks Spring	0.026	0.026	0.5		
Questo Spring	0.071	-	0.6	0.5	0.6
Roland Spring	0.026	0.026	0.5		
Rothwell Spring	0.026	0.026	0.5		
Smith Brook	0.026	0.026	0.5		
Soule Creek	0.279	0.279	5.1		
Spikerman Spring	0.026	0.026	0.5		
Summerhill Spr.	0.105	0.105	1.9		
Trench Creek	0.203	0.132	3.0		
Vans Spring	0.026	0.026	0.5		
ZZ Brook	0.143	-	1.2	1.0	1.2
ZZ Creek	0.500	-	4.3	-	-
	5.174	2.866	73.4	2.5	3.0
Total South Saltspring Island	35.358	8.980	392.6	136.3	168.1
TL.SALTSPRING ISLAND	138.037	75.565	1935.0	1128.2	1391.6

APPENDIX F

PENDING WATER LICENCE APPLICATIONS

SALT SPRING ISLAND
CURRENT APPLICATIONS BY WATERSHED AND PURPOSE/USE

SOURCE	LICENCE NUMBER	FILE NUMBER	DOM. gpd	IRR. acft	IND. gpd	LDIMP /CONS gpd	WWKS acft	TOTAL L/sec	STOR acft
North (4-12-10)									
St.Mary Lake	Z101046	1000793		15.0				2.142	
St.Mary Lake	Z101048	1000802					141	5.515	
St.Mary Lake	Z101050	1000827					807	31.565	400.0
St.Mary Lake	Z101052	1000923							15.0
St.Mary Lake	Z101054	1001025							135.0
St.Mary Lake	Z101056	1001036	500	4.8				0.711	
St.Mary Lake	Z101075	1001271		5.0				0.714	
St.Mary Lake	Z103160	1001501	500	10.0	800			1.496	
St.Mary Lake	Z104325	1001550					32	1.252	25.0
St.Mary Lake	Z105124	1001600					269	10.522	25.0
St.Mary Lake	Z105308	1001606				186		0.010	25.0
St.Mary Lake	Z105603	1001637	500					0.026	25.0
ZZ Creek	Z101058	1000914		1.0				0.143	1.0
ZZ Creek		1001622	1000					0.053	
ZZ Spring	Z101062	1000915	500					0.026	
ZZ Spring	Z101082	1001278				372		0.020	
ZZ Spring	Z101671	1001400	500	8.0				1.168	
TOTAL NORTH			**3500**	**43.8**	**800**	**558**	**1249**	**55.363**	**651.0**
Middle (4-12-20)									
Bonnet Spring	Z101386	1001392		30.0				4.283	
Bullocks Lake	Z101151	1001363		0.5				0.071	
Bullocks Lake	Z101153	1001375		0.5				0.071	
Bullocks Lake	Z102756	1001491				0.0		0.000	
Cusheon Lake	Z101072	1001176					15	0.587	
Cusheon Lake	Z101154	1001376	500					0.026	
Cusheon Lake	Z101336	1001414	500					0.026	
Cusheon Lake	Z102700	1001485			3500			0.184	
Cusheon Lake	Z104390	1001551	500					0.026	
Mansell Creek	Z103653	1001515		.3				0.036	.7
Mawhinna Crk	Z102885	1001493		2.0				0.286	
Miles Spring	Z101275	1001366	500	3.0	500			0.481	
Miles Spring	Z102560	1001477	500	4.0				0.597	

SALT SPRING ISLAND
CURRENT APPLICATIONS BY WATERSHED AND PURPOSE/USE

SOURCE	LICENCE NUMBER	FILE NUMBER	DOM. gpd	IRR. acft	IND. gpd	LDIMP /CONS gpd	WWKS acft	TOTAL L/sec	STOR acft
Miles Spring	Z102731	1001483	500	0.8				0.140	
ZZ Pond	Z101059	1001175				1488		0.078	
ZZ Pond	Z101138	1001370		1.0				0.143	1.0
ZZ Spring	Z101069	1001174				2752		0.145	
TOTAL MIDDLE			**3000**	**42.1**	**4000**	**4240**	**15**	**7.180**	**1.7**
South(4-12-30)									
Lake Weston	Z101863	1001626		2.0	500			0.312	
Rosemergey Lk	Z101100	1001341						0.000	31.0
ZZ Spring	Z101060	1000741	5000					0.263	
ZZ Spring	Z101099	1001324	500	30.0	500			4.336	
TOTAL SOUTH			**5500**	**32.0**	**1000**			**4.911**	**31.0**
TOTAL SALT SPRING			**12000**	**117.9**	**5.800**	**4798**	**1264**	**67.454**	**683.7**

APPENDIX G

REFERENCES

SALT SPRING ISLAND
WATER ALLOCATION PLAN REFERENCES

Barr, L. (1986) 7-Day Average Low Flow Estimates for Vancouver Island. Ministry of Environment and Parks, Water Management, Hydrology Section, Nanaimo.

Blecic, B. (1992) Ministry of Environment, Water Management Technician, Victoria Sub-Region. Interviews July, August, October, December 1992 at Victoria.

B.C. Ministry of Environment and Parks (1988) 1987 Monitored and Regulated Water Supplies Vancouver Island Region. Water Allocation and Regulation Section, Regional Water Management, Vancouver Island Region, Nanaimo.

B.C. Ministry of Environment, Lands and Parks (1992) Stream Register Report 1992/07/10: Saltspring Island. Water Licence Information System, Victoria.

B.C. Ministry of Environment, Lands and Parks (1992) Regional Water Allocation Policy, Vancouver Island Region. Water Management-Region 1, Nanaimo, B.C.

Coomes, O.T. (1979) A Methodology for Quantitative Examination of Freshwater Resources on Marine Islands: A Case Study of North Saltspring Island. A Report prepared for Islands Trust, Victoria.

Environment Canada (1989) Historical Water Levels Summary British Columbia 1988. Inland Waters Directorate, Water Resources Branch, Water Survey of Canada, Ottawa.

Environment Canada (1991) Historical Streamflow Summary British Columbia to 1990. Inland Waters Directorate, Water Resources Branch, Water Survey of Canada, Ottawa.

Environment Canada (n.d.) Canadian Climate Normals: Temperature and Precipitation 1951-1980 British Columbia. Canadian Climate Program, Pacific Region, Atmospheric Environment Service, Vancouver, B.C.

Goddard, J.M. (1976) Cusheon Lake, Saltspring Island Data Report for the Water Quality Monitoring Program June 1974 to June 1975. Department of Environment, Water Resources Service, Water Investigations Branch, Victoria.

Grange, P. & Assocs. (1987) Islands Trust Ganges Creek Task Force: Ganges Creek Flood Control Engineering Study (Preliminary). Ganges, B.C.

Hodge, W.S. (1977) A Preliminary Geohydrological Study of Salt Spring Island. B.C. Ministry of Environment, Groundwater Section, Hydrology Division, Water Investigations Branch, Victoria.

Islands Trust (1990) The Policy of the Islands Trust. Victoria.

Islands Trust (1992) These Islands of Ours... Framing Our Common Future Victoria.

Islands Trust (1992) These Islands of Ours... Framing Our Common Future: More Facts, Trends and Food for Thought. Victoria.

Jones, D.P. & Associates (1986) Preliminary Report: Salmon Enhancement Project for Ganges Creek, Saltspring Island. Prepared for Island Stream and Salmonid Enhancement Society, Ganges, B.C.

McKean, C.J.P. (1981) Domestic Water Supply Potential of Blackburn, Bullock's, Ford & Stowell Lakes, Saltspring Island 1981-01-05. B.C. Ministry of Environment, Assessment and Planning Division, Aquatic Studies Branch, Victoria.

SALT SPRING ISLAND
WATER ALLOCATION PLAN REFERENCES

Nordin, R.N. (1986) The Water Quality of Weston Lake Saltspring Island. B.C. Ministry of Environment, Water Quality Unit, Resource Quality Section, Water Management Branch, Victoria.

Nordin, R.N., McKean, C.J.P. and Boyd, I.T. (1982) Water Quality of Lake Maxwell, Saltspring Island. B.C. Ministry of Environment, Assessment and Planning Division, Aquatic Studies Branch, Victoria.

John Motherwell & Associates Engineering Ltd. (1988) North Salt Spring Island Waterworks District 1988 Report on Water Supply. Victoria.

Salt Spring Island Trust Committee (1988) Salt Spring Island Official Community Plan By-Law No.200. Victoria.

Spar Consultants Ltd. (1981) Ganges Improvement Study March 31st, 1981. Prepared for Island Trust Committee, B.C. Ministry of Municipal Affairs, Victoria.

Statistics Canada (1992) 1991 Canadian Census. Supply and Services Canada, Ottawa, Ontario.

Van Bruggen, W. (1992) Ministry of Environment, Water Management Technician, Victoria, Sub-Region. Interviews July, August, October, December 1992 at Saltspring Island and Victoria, B.C. Various DBASE IV Reports and EXCEL charts generated from Water Licence, Fisheries, Habitat and miscellaneous data files.

Water Survey of Canada (1988) Historic Water Levels Summary 1987. Inland Waters Directorate, Water Resources Branch, Water Survey of Canada, Ottawa.