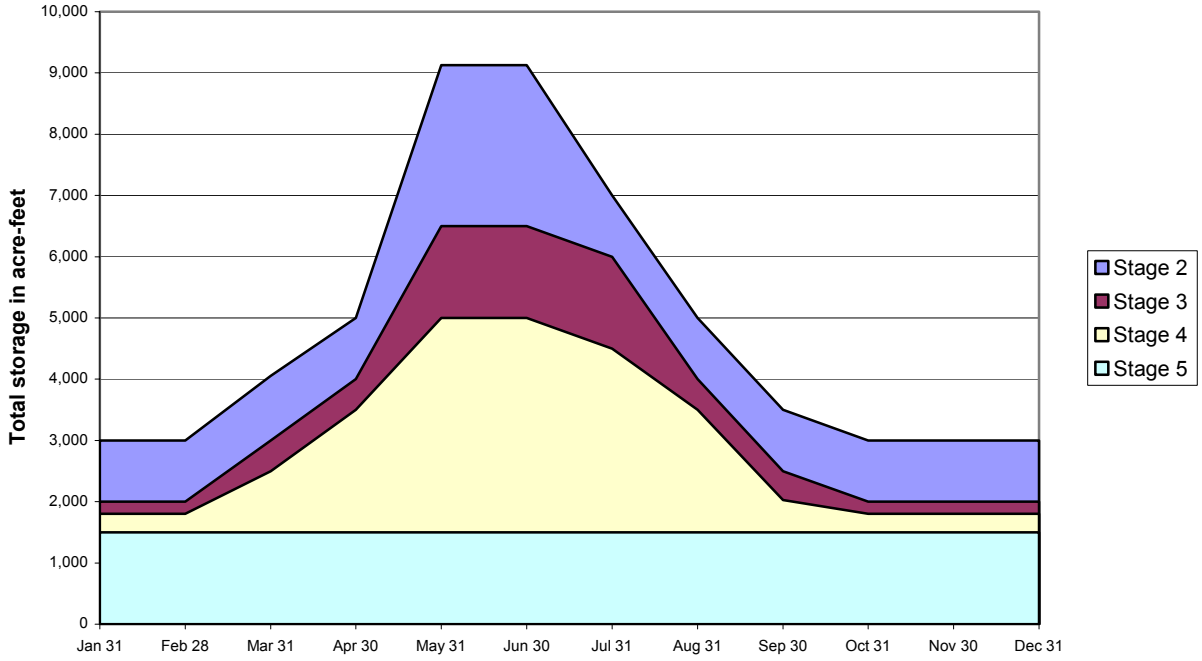
TROUT CREEK WATER USE PLAN

OPERATING AGREEMENT



The Trigger Graph tracks total storage in the Trout Creek Reservoirs and indicates Stage Levels at which water usage reductions will be required.

TROUT CREEK WATER USE PLAN
RESERVOIR OPERATING AGREEMENT

The Trout Creek Water Use Plan Consultative Committee met in 2004 and in early 2005 to develop an Operating Agreement for the Trout Creek Reservoirs. The members included representatives from the District of Summerland, Ministry of Water, Land and Air Protection, Ministry of Agriculture, Food and Fisheries, Fisheries and Oceans Canada, Agricultural Water Users and the Penticton Indian Band

The steps that were taken in developing the proposed Operating Agreement for operation of the Trout Creek water supply system were as follows:

- Each stakeholder on the Trout Creek Water Use Plan Consultative Committee presented their specific objectives in terms of their water requirements.

- It was demonstrated by modelling the Trout Creek water supply over a 67-year period, that it was not feasible to meet the objectives of all stakeholders in full.

- Operations for the "design drought" condition were incorporated in the modelling analysis to ensure that three consecutive years of drought could be managed.

- Compromises were made until a feasible operating regime was developed. This was the basis of the Operating Agreement.

The Trout Creek watershed, which supplies most of Summerland's water, has highly variable flows. They vary during the year and between the years. Drought years with very low flows pose special challenges for users. The water system developed by Summerland is fully allocated to current users. Domestic users, irrigators and fish have all taken a reduction in use to reach agreement on this Water Use Plan.

Summerland holds Water Licences to utilize approximately 15,000 acre feet of water per year from Trout Creek for irrigation and domestic purposes. The maximum use occurred in 1979 with consumption of 13,367 acre feet.

Summerland also holds Water Licences to store approximately 12,500 acre feet of water in 9 reservoirs within the Trout Creek watershed. Actual storage is calculated at 9,373 acre feet in all of the reservoirs combined. During the storage use season from July 1 to October 31 the maximum use was 7,695 acre-feet in 1979.

The Trout Creek aquatic ecosystem also requires water for sustainability, so is another important user of water. Specific flows are required in the creek to sustain fish populations, benthic invertebrates, and maintain a functional stream channel (sediment flushing, gravel recruitment, and development/maintenance of fish habitat features). As is the case with other water users, insufficient water can negatively impact the aquatic ecosystem and can risk sustainability when conditions are extreme.

Most years Summerland has lots of water for all users. It is the dry years that are critical for water use planning. The variability of the flows allows for different seasonal approaches to water use and an understanding of the different seasonal priorities is essential to the success of our efforts in sharing. A trigger graph model has been developed to set usage levels and to help predict periods of shortfall. When storage levels go below specified targets of storage volume over time, usage reductions must occur to ensure equitable sharing of the resource between users.

The required Summerland intake bypass flows in Trout Creek (fish flow) are based on the lesser of a multiplier of Camp Creek flows and fisheries conservation flows. Camp Creek is a tributary watershed of Trout Creek and the Camp Creek flow times a multiplier provides an index (but not an absolute value) of natural flow variations in Trout Creek. Seepage losses from the stream bed in Trout Creek are an additional source of uncertainty regarding natural flows in Trout Creek, particularly in drought years. It is important to note that at a given Camp Creek multiplier the fish flow releases in Trout Creek will reduce as Camp Creek flows decline through the summer.

Agricultural irrigation consumes an estimated 80% of the water used by Summerland. Increased crop water demand during drought years creates additional pressure on the water resource. The Trout Creek hydrology model illustrates that it is simply not possible for the reservoir system to supply irrigation water demands equivalent to 2002 usage and fish flows equivalent to natural flows in Trout Creek during drought years.

For those who lack faith in computer models, the real life indicators of potential problems are storage levels, snowpack conditions and date of entry into use of storage water. The participants to this agreement are hopeful that the increased understanding gained from this process will help us manage this water system for the benefit of all.

Irrigators will conserve early season water to assist in ensuring that the full storage can meet peak crop water demand later in the season. The District will provide a water conservation officer that will work with irrigators to ensure responsible water use by all.

This Agreement recognizes the potential for a 10% increase in irrigation requirement due to global warming and a 9% potential increased draw if all Irrigation Roll commitments are met. Participants to this Agreement recommend increasing water storage in Trout Creek by raising Thirsk Dam to meet those challenges.

Normal Operation

The District of Summerland as the licensee will continue to be responsible for operations of the Trout Creek water supply system under the Water Use Plan Operating Agreement

The basis of the Operating Agreement is to use a Trigger Graph as shown on Page 1 to make water use allocations. The total storage in the system is 9,132 acre-feet (excluding Tsuh Reservoir) and the Trigger Graph indicates what the safe consumption would be for lower storage levels as the irrigation season progresses. The table on Page 5 for **Operating Agreement-A**, indicates the target water usage reductions for the community and the fish flow releases based on a multiplier of Camp Creek flows.

Stage 1 usage reduction targets (based on 90% of 2002 water usage) will be in effect throughout the summer until reservoir storage levels drop below full pool at which time Stage 2 will be introduced. The plan for usage reductions and fish flow releases is based on modelling of the

watershed and supply system over the 67-year period. The modelling indicates that with **Operating Agreement-A**, the system would have avoided dropping into Stage 4 and Stage 5 at any time in the 67-year period.

The Trigger Graph is set so that if the reservoirs are not full in the month of June, Stage 2 will automatically be implemented. This will conserve early season storage water by implementing reductions in usage by both fisheries and the community.

The fish flow releases in **Operating Agreement-A** are less than that required to sustain the aquatic resource. If these multipliers are increased to levels that provide adequate flows for fish habitat, there is a risk of the water supply system dropping into Stage 4. The modelling indicates that this would occur twice in the 67-year period with higher fish flows. The committee concluded that this level of risk was not acceptable for the existing water supply system. However, with the planned expansion of Thirsk Reservoir this risk will be removed, as there will be sufficient storage to avoid the two occurrences of Stage 4 in the 67-year period. Therefore the Committee concluded that after the Thirsk Dam is raised, **Operating Agreement–B** would be used. The Trigger Graph remains the same but the fish flow multipliers are increased in **Operating Agreement-B** as shown in the table on Page 5.

The agricultural water users are accepting water usage reductions to make the current system work for all stakeholders and furthermore, water has not been allocated under the Agreement for land on the Irrigation Roll that is not currently irrigated. Therefore, any additional water realized from raising Thirsk Dam should first be allocated to the agricultural users

Emergency operation

The original design drought condition for the Trout Creek reservoir system was based on three consecutive years of drought with flows at 36% of mean flows. It is understood that this corresponds to the three consecutive drought years that occurred in the Okanagan Basin in 1929, 1930 and 1931. The Operating Agreement was established so that the design condition can be accommodated for both A and B scenarios.

Catastrophic events could occur such as major fires in the watershed, an infestation of mountain pine beetle or dam failures, which would compromise the capability of the system to operate normally. Planning of the system to operate for three consecutive drought years would partially address emergency events. However, more stringent measures could be required if the event resulted in a more serious situation.

Monitoring and Review

The Water Use Plan (WUP) should be reviewed within 5 years to address changing circumstances such as:

- Metering
- Appointment of a water conservation officer
- Climate change
- Thirsk expansion

Any of the parties to this Agreement can initiate the review. Consistent with the current Water Use Plan, the District would lead any review process. In addition, continuation of the flow monitoring program is recommended to improve the understanding of the hydrology of Trout Creek and tributaries.

Water Usage Reductions for **Operating Agreement A**

	Reduction Stage					
	1	2	3	4	5	
June	10	8	6	4	0	Fish flow x Camp
	90	85	80	70	0	Community target factor %
July	9	8	7	4	0	Fish flow x Camp
	90	85	80	70	0	Community target factor %
Aug	10	9	8	4	0	Fish flow x Camp
	90	85	80	70	0	Community target factor %
Sept	10	10	10	4	0	Fish flow x Camp
	90	85	80	70	0	Community target factor %
Oct	10	10	10	4	0	Fish flow x Camp
	50	50	50	50	0	Community target factor %

The District target water usage reductions are expressed as a percentage of the monthly 2002 water use.

Water Usage Reductions for **Operating Agreement B**

	Reduction Stage					
	1	2	3	4	5	
June	10	8	6	4	0	Fish flow x Camp
	90	85	80	70	0	Community target factor %
July	10	10	9	4	0	Fish flow x Camp
	90	85	80	70	0	Community target factor %
Aug	10	10	10	4	0	Fish flow x Camp
	90	85	80	70	0	Community target factor %
Sept	10	10	10	4	0	Fish flow x Camp
	90	85	80	70	0	Community target factor %
Oct	10	10	10	4	0	Fish flow x Camp
	50	50	50	50	0	Community target factor %