

Lake Levels and the Beaver Dam *Frank Johnson, President LSRLPOA*

Andrew Kendrick, Lake Steward, has listed a number of options for action over the beaver dam.

This paper reviews recent observations and proposes a resolution for discussion.

The entire year, and especially the past month, have been exceptionally wet. See the RVCA reports at <https://www.rvca.ca/watershed-conditions-statements>. It is considered that this may represent the future trend – unusual weather patterns concomitant with global warming. <https://foca.on.ca/managing-your-waterfront-property-in-a-changing-climate/> gives some valuable pointers

It has been noted that the activity of beavers benefit the land and water systems. Typical of positive media coverage may be found at <http://www.pbs.org/wnet/nature/leave-it-to-beavers-the-benefits-of-beavers-infographics/8865/>

We have long recognised that beaver like to build a modest dam across the outflow of Little Silver Lake.

The practice for many years was to remove the dam and kill the beaver. This permitted a clear run-off of spring waters and produced a very low summer level on the lake.

It also risked flooding on downstream properties and, when the beaver returned, promoted damage to adjacent properties as the dam was rebuilt.

For the past few years we have tried to produce a 'baffler' system which permits a dam to be built but provides drainage.

What amount of drainage is required?

It has been suggested that a baffler system for a lake system with an area of 100 hectares and a watershed of over 1,000ha is impractical. However the owner of the Beaver Pond Estates installed a baffler system in one of his dams which was effective for many years and prevented the CP railroad crew from routinely dynamiting the dam on his property. All of the water from Little Silver Lake flows through that property. So we conclude that a baffler system ought to be feasible given goodwill and maintenance.

Expertise available on the lake.

The owner of Beaver Pond Estates clearly understands the habits of beaver and how to make a workable baffler. Adjacent property owners have developed shorelines which are resistant to flooding or erosion. Many property owners have installed docks which accommodate a wide range of water levels. There are at least two engineers resident on the lake, one of whom is recognised internationally for expertise in water quality measurement. The overwhelming majority of property owners appear to be able to cope with varying lake levels.

Challenges in 2017

Three principle challenges have been mentioned.

1. Flooding of low-lying properties. This needs a head across the dam of below about 8" to mitigate.
2. Some docks need adjustment to be used. Only one property owner has reported this, and many docks have been renewed with floating sections able to adapt to a range of water levels.
3. Trees at the water edge have roots exposed by or in the water. A survey of the south basin showed that about 50-60 trees may fall into that category, but there have been no complaints from the residents affected.

The current baffler.

This has three 4" pipes at low level, three 6" pipes at intermediate level and two 8" pipes which were both intended to provide higher level runoff. One of the 8" pipes was moved without consultation and now is not quite so effective as the other.

This graduated system is intended to provide high flow when the water level is high, and then preserve water when it is low.

Two further high level pipes were installed last fall but removed since they were unsightly.

Apart from a period of about ten days after the exceptional storm system passed through, the level has been maintained at around 8" for most of the month of August.

How much water should be preserved?

Reasons for the benefit of intervention by beaver include: (a) their dam retains water during a dry period and (b) there is a constant flow or flushing of the lake. The benefit of having a more consistent flow is that it permits dilution of any contaminants and enables flushing of those that do enter. Little Silver Lake was showing a trend towards higher levels of nutrients over many years, and Rainbow Lake is even more challenged. Given that all the outflow from Rainbow Lake has to be accommodated by LSL, the benefit of more volume to dilute the water is apparent. The steady flow, especially during the summer, ensures that the benefit persists at precisely the time when the nutrients can promote excess algae growth and precipitate blooms.

Observations

The past month included a "100 year" storm in which 77mm of rain was received in one day. The rise of the lake, which peaked four days after the event, was 100mm. This suggests that the system at the moment is well able to cope with such events.

The slow recovery of the lake level – it is now at 100mm below the peak – is likely to be attributed to continued high precipitation levels (see rainflow data from Bolingbroke:

http://his.rvca.ca/rvcafwi/ISG/StandardGraph_TayRiver_at_Bolingbroke_Hourly.html

From this it may be seen that a further 91mm have fallen in the first three weeks of August

2017, the flow in the Tay River at Bolingbroke Bridge is double the seasonal average.

A predictive model has been produced based on the recordings of lake level following the July 23 event. This showed that a major downpour takes 3 to 4 days to percolate through to the lake, and continues to show effect up to ten days after the event. The total water received by the lake in conditions of waterlogged ground is still only 3 times the area of the lake. In a dry summer the effective watershed is twice the area of the lake.

Proposals for discussion.

1. That we consult widely to obtain a consensus approach. Thus far we have just heard from at most five members of the community.
2. In the absence of any viable alternate input the Directors should do the best it can.
3. That we work through Andrew's Options and examine each one. Comments would be welcome.
4. That we suggest that the present system is working well given the climatic conditions thus far this year.
5. That we propose one high-level run-off pipe to cope with spring freshet. This can be a single length of 8" black pipe which should be arranged close to the top of the dam. It does not need to be installed until the fall.

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