Adopted Regulation Strategy – LWCB Regulation Meeting – June 17, 2004

Overview

The regulation strategy for the short term is "simply" to discharge the excess water from the basin, minimizing negative impacts and balancing conditions across the basin. Of course, the strategy to balance flows and levels across the basin and to deal with changing hydrology is certainly not simple. The short-term strategy deals with the high flow conditions. The long-term strategy recommends regulation approaches for dealing with recovery to more normal conditions. In setting an operational strategy for the coming months, it is vital to consider level and outflow targets together, as well as the interrelationships between the various interests. The impact of the combined operation of Lac Seul and Lake of the Woods on the Winnipeg River in Manitoba is also an important factor.

Lac Seul

1) Overall Objectives
   - supply water requested by Ontario Power Generation and Manitoba Hydro for hydroelectric energy generation; try to ensure that at least their minimum requirements are met
   - optimize energy use to avoid spill in wet conditions and violation of low flow constraints in dry conditions
   - provide optimal Lac Seul, Pakwash Lake and English River levels for the fishery and tourist outfitter interests
   - regulate Lac Seul level and outflow to avert or minimize flood risk downstream
   - use Lac Seul storage to offset Lake of the Woods high/low flows for the benefit of users of the Winnipeg River in Manitoba
   - avoid closing the Lake St. Joseph diversion with resulting spill down the Albany River

2) Seasonal Considerations

   With the rapid rise in Lac Seul levels through May, and the continuing high inflow to the lake, the Board must strive to balance Lac Seul levels with river flows downstream. With the high inflows, it has been necessary to order the partial closure of the Lake St. Joseph diversion into Lac Seul and, if inflow remains high, full closure may be necessary. Diversion closure will likely lead Ontario Power Generation to open the Albany dams to control the level of Lake St. Joseph. This latter action may have adverse implications for the environment and First Nations people who use the Albany River.

3) Scenarios

   The attached graph for Lac Seul shows scenarios of lake levels that would result from 3 different combinations of assumed inflows and outflows. It should be noted that the scenarios show a range of possible future conditions and are not forecasts. The Lake St. Joseph diversion dam is assumed to be closed in these scenarios, limiting diversion discharge to 10 m^3/s (by June 22). The scenarios are:

   S1 – very high inflow – 10 m^3/s diversion flow with 95 %ile Lac Seul basin inflow
   S2 – high inflow – 10 m^3/s diversion flow with 90 %ile Lac Seul basin inflow
   S3 – above normal inflow - 10 m^3/s diversion flow with 75 %ile Lac Seul basin inflow

4) Strategy

i) Short-Term

- Continue to release water from Lac Seul with the goal of preventing the lake from rising above 356.75 m (1170.4 ft) with an outflow no more than 500 m^3/s.
- Before increasing discharge above 500 m^3/s to limit the lake level to 356.75 m (1170.4 ft), the Lake St. Joseph Diversion should be fully closed. (The diversion is being partially closed the week of June 14, reducing discharge to approximately 70 m^3/s.)
- If necessary, increase discharge above 500 m^3/s, as discussed in the high inflow strategy below, to prevent the lake level from exceeding the top of the flood storage zone at an elevation of 357.2 m (1171.9 ft). The diversion should remain closed until the lake level is below 356.62 m (1170 ft) and there is little risk of returning to lake levels in the flood storage zone.

ii) Long-Term

a) Transition from High Inflow Conditions

On the assumption that the current high inflows will eventually give way to more moderate conditions, the following is the proposed strategy for this transition period:

- The recommended strategy through September, if Winnipeg River flows in Manitoba remain high, is to use the storage available in Lac Seul to minimize the water released downstream. From late June through August, Lac Seul should be maintained in the range of 356.6 to 356.75 m (1169.9 to 1170.4 ft).
- If inflows to Lac Seul decline, outflows should be reduced to further minimize downstream flows. Lac Seul levels should be targeted for the range of 356.6 to 356.75 m (1169.9 to 1170.4 ft) at the end of September. The risk of high water conditions on Lac Seul increases in the late summer/early fall period, so it is desirable to reduce lake levels in late summer to lower this risk. The end of September levels should preferably be at the lower end of the range specified.
- If English and Winnipeg River flows return to the normal range, Lac Seul regulation can be governed by the appropriate regulation strategy below.

b) Low Inflow Conditions

- At the present time, a return to low inflow conditions appears unlikely anytime soon. However, conditions could change quite quickly if warmer, drier weather predominates over the summer.
- Reduce outflows as necessary to maintain the lake level above lower quartile. If the reductions lead to English and/or Winnipeg River flows less than minimum requirements of the provincial power utilities, consultations would be necessary with the OMNR in Red Lake and Sioux Lookout, as well as with the two provincial power companies, to determine an appropriate balance between upstream and downstream conditions.
- Severely restrict outflow to maintain lake levels above lower decile. In 1988 Lac Seul outflow was reduced to 25 m^3/s and in 1981 and 1977, outflow was reduced to 0 for an extended period. Again, consultations would be necessary to appropriately balance upstream and downstream interests.

c) Moderate Inflow Conditions

- If moderate inflow conditions return, the first goal would be to ensure that Lac Seul level is no higher than 356.75 m (1170.4 ft) and that Ear Falls discharge is reduced below 450 m^3/s.

- If flows on the Winnipeg River in Manitoba are high, use the storage available in Lac Seul to minimize the water released downstream. From late June through August, Lac Seul should be maintained in the range of 356.6 to 356.75 m (1169.9 to 1170.4 ft).
- Maintain Lac Seul outflow within a range of approximately 100 to 400 m^3/s to satisfy the overall objectives and maintain the lake level in the 25-75 %ile range.

d) High Inflow Conditions
- Regulate Lac Seul outflow to as high as 500 m^3/s at Ear Falls to prevent the lake level exceeding 356.75 m (1170.4 ft) from June 30 to September 30; the Lake St. Joseph diversion should be reduced to the extent necessary to achieve this.
- Once the diversion is closed, regulate outflow to as high as 600 m^3/s to prevent the lake exceeding 356.9 m (1170.9 ft), to as high as 800 m^3/s to prevent the lake exceeding 357.05 m (1171.4 ft) and as high as necessary to ensure that the upper storage limit of 357.2 m (1171.9 ft) is not exceeded.

Lake of the Woods

1) Overall Objectives

- Carry out lake regulation with due regard for the Canada-United States Treaty and Canadian legislation regarding Lake of the Woods levels and outflows.
- Adjust lake level and outflow to achieve a balance between upstream and downstream interests, as inflow dictates.
- Work towards achieving somewhat lower summer levels on Lake of the Woods, in the order of up to 15 cm (6 in) as per the Board commitment made following the 2001 high water year.

2) Seasonal Considerations

As for Lac Seul, the driving consideration for Lake of the Woods is to manage the large excess of water currently within the basin. The upper boundary waters have not been as wet as the lower basin, and have been a source of some optimism for the longer term outlook. However, recent rainfall has impacted the upper basin and, while still in the normal range, inflows have begun to increase.

Unfortunately, other seasonal considerations such as maintaining stable flows on the Winnipeg River for the fishery and loon nesting have become unattainable goals this year. The main thrust of regulation over the short to medium term will be to balance the adverse impacts of the excess water across the basin, providing the best conditions possible for all interests.

3) Scenarios

The attached graph for Lake of the Woods shows scenarios of lake levels that would result from 4 different combinations of assumed inflows and outflows. It should be noted that the scenarios show a range of possible future conditions and are not forecasts. The scenarios are:

S1 – very high inflow – 95 %ile total Lake of the Woods inflow
S2 – high inflow – 90 %ile total Lake of the Woods inflow
S3 – above normal inflow – 75 %ile total Lake of the Woods inflow
S4 – moderate inflow – 50 %ile total Lake of the Woods inflow

4) Strategy

i) Short-Term
- Continue to release the current discharge from Lake of the Woods at least until the lake level is projected to decline to 323.24 m (1060.5 ft). If the level is projected to rise above

323.47 m (1061.25 ft), increase outflow to maximum discharge capability. Note that regulation decisions of the LWCB are subject to the approval of the International Lake of the Woods Control Board (ILWCB) when Lake of the Woods levels are above 323.39 m (1061 ft). (International authority is determined by the level of the gauges at the south end of the lake at Warroad and Springsteel Point, with wind effects factored out. At the current time, this level is considered to be at least 6 cm higher than the normal average level used by the Board as determined from the Hanson Bay, Cyclone Island and Clearwater Bay gauges.)

ii) Long-Term

a) Transition from High Inflow Conditions

On the assumption that the current high inflows will eventually give way to more moderate conditions, the following is the proposed strategy for this transition period:

- An over-riding goal is to balance conditions by providing relief to downstream Winnipeg River residents as soon as possible, while ensuring that there is a storage buffer on the lake to minimize the risk of a return to increased outflows. Setting specific lake level versus outflow targets at this point in time is not possible. These values depend on conditions when a decision is being made. Influencing factors are the magnitude of inflow, its rate of decline, the projected risk of having to increase outflows again, conditions in Lac Seul and the English River, etc.
- A reduction in the high flows on the Winnipeg River is a high priority but flow reductions are subject to the approval of the ILWCB if Lake of the Woods level remains above 323.39 m (1061 ft). It should also be noted that erosion on the south end of Lake of the Woods becomes a significant issue at sustained high lake levels. Outflow reductions should not be made unless there is a strong indication that the lake level will remain below 323.39 m (1061 ft).
- Decisions to reduce outflow, once lake levels begin to decline, should be made under the overall objective of striving for lower summer lake levels as noted above. While a high priority should be to provide some relief to the Winnipeg River, once initial flow reductions have been made, further reductions should be made in balance with the objective of lower summer levels.
- Note that, by mid-July, a 90 %ile inflow is only 1060 m^3/s and by the end of July is only 810 m^3/s so that the risk of higher lake levels incurred by reducing outflows is significantly reduced.

b) Low Inflow Conditions

- Although a return to low inflow conditions appears unlikely at this time, conditions can change dramatically.
- Reduce outflow to as low as 200 m^3/s to prevent the lake from declining below 322.7 m (1058.7 ft) and to as low as 150 m^3/s to prevent to lake from declining below 322.6 m (1058.4 ft)
- If Lake of the Woods level drops below 322.4 m (1057.7 ft), reduce outflow to 100 m^3/s.
- If Lake of the Woods level drops below 322.2 m (1057.1 ft) reduce outflow to 70 m^3/s, following consultations with OMNR and OMOE regarding fishery and water quality concerns.
- In 1988 and 1987, Lake of the Woods outflow was reduced to 100 m^3/s and in 1977 it was reduced to 63 m^3/s.

c) Moderate Inflow Conditions

- Attempt to keep the summer lake level 10-15 cm (4-6 in) below the summer peak median level of 323.14 m in accordance with the commitment made by the Board

following the high water year of 2001. Try to balance this with downstream interests.

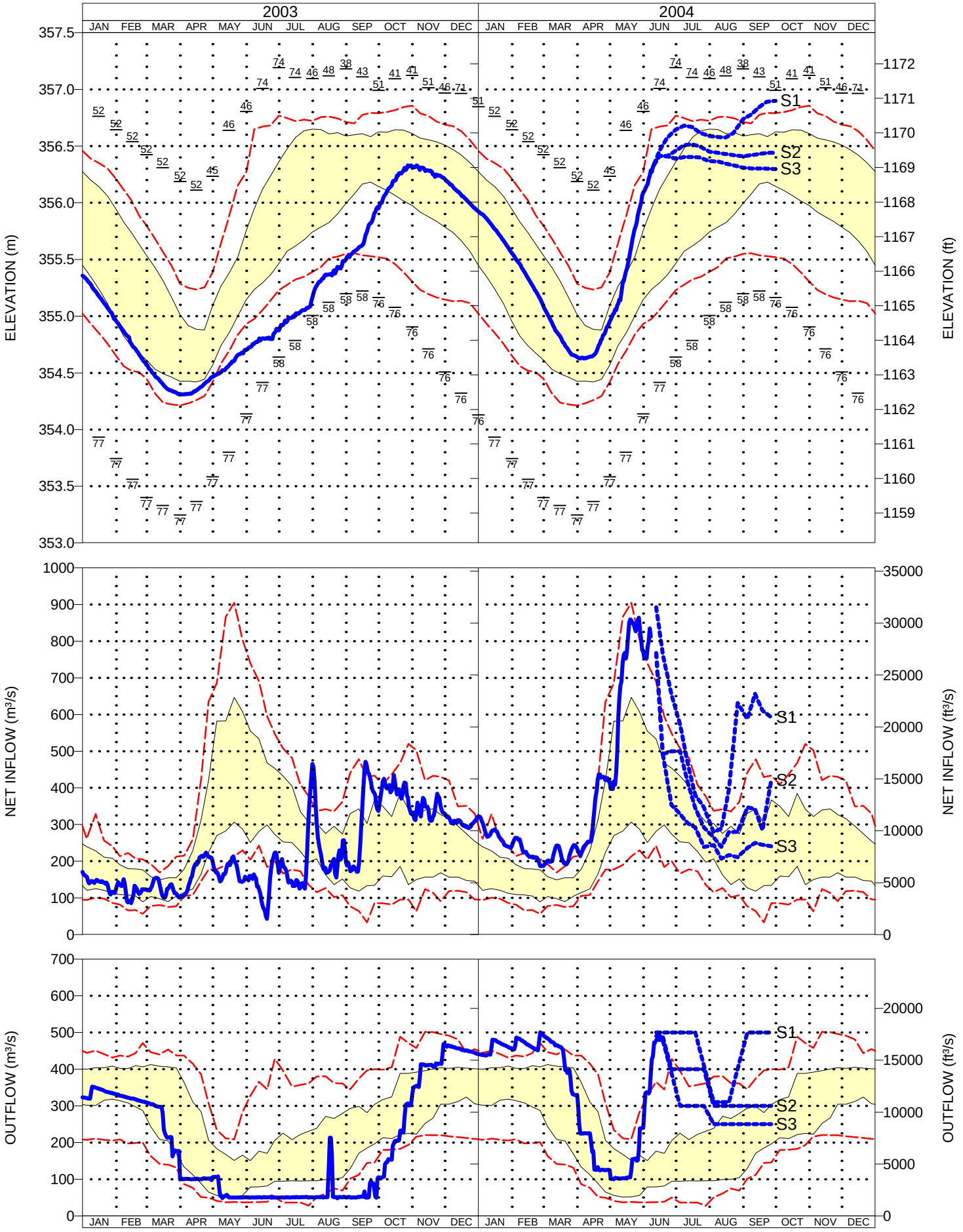
- Set outflow to as much as 800 m^3/s to prevent the peak lake level from exceeding 323.09 m (1060 ft) for the benefit of Lake of the Woods cottagers and south shore residents, if inflow is no higher than median.
- Lake of the Woods should be regulated to target for an end of September water level between 322.8 m (1059.0 ft) and median (322.9 m/1059.4 ft) with outflow between 300 and 700 m^3/s.

d) High Inflow Conditions

- Balance higher water levels on the lake with the impact of increased outflows downstream, both in Ontario and Manitoba.
- Do not increase outflow above 800 - 900 m^3/s to keep the lake level (or projected level) below upper quartile.
- Increase outflow as necessary to prevent the lake level (or the projected level) from rising above 323.47 m (1061.25 ft), which is the legislated top of the normal operating range. (Note however, that the Convention and Protocol states "during periods of excessive precipitation the total discharge from the lake shall, upon the level reaching 1061 sea-level datum, be so regulated as to ensure that the extreme high level of the lake shall at no time exceed elevation 1062.5 sea level datum". In future years, the Board may wish to consider making use of this flood storage during periods of high inflow.)

LAC SEUL

ISSUED: 2004.06.11
** Provisional Data **



LWCB
Lake of the Woods Control Board

LAKE OF THE WOODS

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