Adopted Regulation Strategy
Lake of the Woods Control Board Regulation Meeting
October 28, 2010

The Lake of the Woods Control Board held a Regulation Meeting in Kenora on October 28, 2010 and adopted the following strategy. The strategy was formulated considering basin conditions, hydrological and meteorological forecasts, and the input of the various interests concerned with basin management. Input was provided in written and verbal reports as well as from the Board's Regulation Guide (http://www.lwcb.ca/reg-guide/index.html).

For an update on current conditions, please refer to the Basin Data section of the Board's web site at http://www.lwcb.ca/waterflowdata.html. For regulation actions and directives taken under the strategy please see the Regulation Actions at http://www.lwcb.ca/regulation/index.html.

Lac Seul

A) Seasonal Considerations

Lac Seul level was at 35th percentile at the time of the meeting and declining slowly. The Lake St Joseph diversion had remained open throughout the year, with diversion flow into Lac Seul at the time of the meeting of 112 m^3/s. Environment Canada's seasonal forecast for the Lac Seul basin is for below-normal precipitation through the end of January, 2011.

The adopted strategy for Lac Seul over the near term is to balance current hydroelectric needs while managing the lake for satisfactory freeze-up levels and planning for desirable winter outflows and drawdown. Over the longer term, regulation of Lac Seul should balance desired winter outflows with a consideration of desirable water levels next spring. Ideal or desirable regulation objectives for the next several months, based on input provided to the Board, include the following:

- Lac Seul level and outflow should be managed to reduce flood risk on the lake and downstream in Ontario and Manitoba.
- Operate Lac Seul primarily as a hydropower reservoir to benefit downstream hydropower plants in Ontario and Manitoba, but with consideration of other interests, such as the fishery.
- To the extent possible, limit winter drawdown on Lac Seul to provide good spring spawning conditions, adequate navigation levels at the start of the walleye fishing season and protection of eggs of fall spawning fish (i.e. to minimize whitefish egg exposure and mortality).
- Regulate Lac Seul outflow to assist in providing satisfactory freeze-up conditions on the English and Winnipeg Rivers (for both level concerns and to avert frazil ice problems) as well as on Lac Seul.
- Use Lac Seul storage to offset Lake of the Woods high/low outflows 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.

B) Strategy

i) Short-term Regulation (up to freeze-up; typically mid to end November)

- Gradually adjust outflows to those desirable for winter outflow and end-of-winter drawdown targets.

- If inflow conditions allow, the Lac Seul freeze-up level should preferably be no higher than 356.50 m / 1169.6 ft with Lac Seul outflows no higher than 450 m^3/s and Winnipeg River flows in Manitoba below 1400 m^3/s (to avoid frazil ice problems).
- Set outflow to no higher than 500 m^3/s and maintain the diversion full open as long as the lake remains below 356.62 m / 1170.0 ft. This is the level at which the Board has authority over the Lake St. Joseph diversion during this period.
- If the level rises above 356.62 m / 1170.0 ft, the diversion should be closed by the amount necessary to hold the lake level without increasing Lac Seul outflow above 500 m^3/s.
- Once the diversion is closed, increase outflows to the extent necessary to ensure that the lake does not rise above 356.9 m /1170.9 ft.
- Through management of the Manitou Falls forebay, maintain Pakwash Lake level no higher than 346.4 m / 1136.5 ft for normal flows, and below 346.6 m / 1137.1 ft, if possible, under higher flow conditions.

ii) End-of-winter Levels (typically mid-April)

- The preferred minimum end-of-winter level for fishery interests is no lower than 354.8 m / 1164 ft, a 55^{th} percentile level. An additional fishery criteria is that drawdown should be limited to about 1.5 m/ 4.9 ft after November 1.
- For the hydropower utilities, the flow available for generation is more important than target water levels. For hydropower operations, water in storage down to 353.60 m / 1160.1 ft, the bottom of the defined "normal operating range", would be regarded as available to supply winter generation flows to the extent needed to augment inflows. During a drought, some or all of the defined drought reserve (down to 352.40 m / 1156.17 ft) might also be regarded as available. In periods of excess water, the hydropower utilities would prefer to store as much water as possible upstream.
- The actual end-of-winter level will vary depending on the winter inflows received and the balances made between the interests, as noted in sections iii) to v) below.
- Due to recent high water events, it is recommended that Lac Seul end-of-winter level be limited to a maximum of 355.00 m /1164.7 ft, and preferably be no higher than 354.7 m/ 1163.7 ft, the target set at the October 2009 Regulation Meeting.

iii) Low Inflow Winter Conditions

- Winter outflow should be no lower than 150 m^3/s, with a core winter flow no lower than 230 m^3/s.
- Combined with Lake of the Woods regulation, winter core period flows on the Winnipeg River in Manitoba should be no lower than 450 m^3/s to meet minimum winter peak power demands with an end-of-winter elevation no lower than 353.60 m / 1160.1 ft.
- If flows are greater than 675 m^3/s on the Winnipeg River in Manitoba, the end-of-winter elevation should be allowed to decline to no lower than lower decile (354.26 m / 1162.3 ft).

iv) Moderate Inflow Winter Conditions

- Winter outflow should be between 200 and 450 m^3/s with a core winter flow between 300 and 400 m^3/s.
- The end-of-winter elevation should be allowed to decline to no lower than lower quartile (354.42 m / 1162.8 ft) to meet Winnipeg River flow targets.
- Combined with Lake of the Woods regulation, winter core period flows on the Winnipeg River in Manitoba should be between 800 and 960 m^3/s.

- If flows are greater than 960 m^3/s on the Winnipeg River in Manitoba, the end-of-winter elevation should be allowed to decline no lower than the fisheries spring target level of 354.80 m / 1164.0 ft or a maximum drawdown of 1.5 m / 4.9 ft, whichever is higher, subject to flood risk constraints.
- If there is excess water downstream, water should be stored in Lac Seul subject to targeting for an end-of-winter level no higher than 355.2 m / 1165.3 ft, and preferably no higher than 355.00 m / 1164.7 ft, subject to flood risk constraints.

v) High Inflow Winter Conditions

- Regulate Lac Seul outflow to as high as 500 m^3/s to prevent the lake exceeding an end-of winter level of 355.20 m / 1165.3 ft.
- If 500 m^3/s is insufficient outflow to stay below the target level, aim to limit or close the diversion into Lac Seul whether or not the Lake St. Joseph diversion is under LWCB authority. (Note: The Board only has authority to restrict diversion flow when Lac Seul exceeds certain levels as defined in the Lake of the Woods Control Board Act. However, Manitoba can restrict diversion flow when Winnipeg River flows in Manitoba exceed 963 m^3/s and OPG can also be requested to restrict diversion flow voluntarily.)
- Once the diversion is closed, increase outflows to the extent necessary to ensure that the end-of-winter lake level is no higher than 355.3 m /1165.7 ft.
- Combined with Lake of the Woods regulation, strive to keep Winnipeg River flows in Manitoba below 1600 m^3/s through the winter.

Lake of the Woods

A) Seasonal Considerations

Inflow to Lake of the Woods at the time of the meeting was 65th percentile following a significant storm event earlier that week. The increase in inflow halted the decline of lake level that had been occurring since mid-October, with a resulting end-of-October level of 322.98 m / 1059.6 ft (65th percentile), the high end of the target range set at the June Regulation Meeting. The Environment Canada seasonal forecast is for below normal precipitation in the basin through the end of January 2011.

Ideal or desirable regulation objectives for the next several months, based on input provided to the Board, include the following:

- Adjust lake level and outflow to achieve a balance between upstream and downstream interests, as inflow dictates. Plan winter drawdown to provide the appropriate balance between the various interests.
- Regulate Lake of the Woods outflow to assist in providing satisfactory freeze-up conditions on the Winnipeg River to avert frazil ice problems and high level freeze-up.
- Limit winter drawdown on the lake to provide good spring spawning conditions and for the protection of eggs of fall spawning fish.
- Limit winter drawdown to the extent possible to reduce damage from ice.
- Within the regulation parameters for Lake of the Woods, regulate outflows to assist in meeting targets/preferences for the Winnipeg River in Manitoba.

B) Adopted Strategy

i) Short-term Regulation (up to freeze-up; typically mid to end November)

- The preferred freeze-up condition would be a Lake of the Woods level between 322.8 m / 1059.1 ft and 323.0 m / 1059.7 ft with outflows between 250 and 500 m^3/s. With Lake of the Woods outflow no higher than 420 m^3/s, and Winnipeg River flows in Manitoba no higher than 960 m^3/s, strive for a freeze-up level no higher than 322.8 m / 1059.1 ft, subject to end-of-winter target level constraints. (The LOWDPOA prefers that the lake level should be no higher than 322.78 m / 1059.0 ft when ice begins to form.) If high inflows preclude this, then aim for both higher levels and outflows without deviating from the ideal more than necessary.
- Set outflow to as much as 700 m^3/s in the near term to target for a freeze-up level no higher than 323.10 m / 1060.0 ft.
- Set outflows as high as necessary to keep the lake from exceeding a freeze-up level greater than 323.3 m / 1060.7 ft.
- Combined with Lac Seul regulation, target to keep Winnipeg River flows in Manitoba below 1400 m^3/s during the critical ice cover formation period to prevent frazil ice problems.

ii) End-of-winter Levels (typically end-March)

- The end-of-winter level, based on factors other than winter inflow, is ideally lower quartile (322.36 m / 1057.6 ft) and preferably no higher than median (322.48 m / 1058.0 ft). The Board's strategy for the past few years has been to aim for somewhat lower summer levels. To achieve this in the long term, the overall level range should be moved downward. However, the actual end-of-winter level will vary depending on the winter inflows received, as noted in sections iii) to v) below.
- The preferred end-of-winter level for fishery interests as defined by the OMNR is no lower than 322.48 m / 1058.0 ft, subject to consideration of potential negative impacts downstream. In addition, for fall spawning fish, the preferred maximum drawdown during the winter is no more than 30 cm / 1.0 ft. However, for south shore property owners, who would like to see lower summer levels, lower end-of-winter levels would be preferable. The Minnesota DNR supports this position and has stated that lower water levels do not negatively impact the fishery in their portion of the lake. The preferred winter flow for ACH Ltd., to maximize their hydropower production, is 400-420 m^3/s at the Lake of the Woods outlet. OPG would prefer flows close to 575 m^3/s at Whitedog Falls and Manitoba Hydro's flow preference is 960 m^3/s for the Winnipeg River in Manitoba.
- The end-of-winter target level should be adjusted upward, to store more water (to no more than 322.60 m / 1058.4 ft) to relieve high flows on the Winnipeg River downstream in Ontario and Manitoba. In contrast to this, avoid storing more water than is necessary if seasonal snowpack accumulation is high. Although the refill of Lake of the Woods is more dependent on spring rainfall than on snowpack, higher snowpack does increase the risk of high early spring freshet runoff.

iii) Low Inflow Conditions

- Winter outflow should be no lower than 125 m^3/s.
- If outflow is greater than 125 m^3/s, the end-of-winter elevation should be no lower than lower decile (322.21 / 1057.1 ft).
- Combined with Lac Seul regulation, try to achieve winter core period flows on the Winnipeg River in Manitoba no lower than 450 m^3/s to meet winter peak period power demands, with Lake of the Woods drawn no lower than lower decile (322.21 / 1057.1 ft) to achieve this. Likewise, augment flows to achieve 675 m^3/s with an end-of-winter Lake of the Woods level no lower than lower quartile (322.36 m / 1057.6 ft).

iv) Moderate Inflow Conditions

- Winter outflow should be between 300 and 700 m^3/s with a preferred end-of-winter level of lower quartile, but not above median.
- Combined with Lac Seul regulation, winter core period flows on the Winnipeg River in Manitoba should be between 800 and 960 m^3/s.

v) High Inflow Conditions

- While trying to target for an end-of-winter level no higher than upper quartile (322.60 m / 1058.4 ft), balance higher water levels on the lake with the impact of increased outflows downstream, both in Ontario and Manitoba.
- Combined with Lac Seul regulation, strive to keep Winnipeg River flows in Manitoba below 1600 m^3/s through the winter.