Adopted Regulation Strategy
Lake of the Woods Control Board Regulation Meeting
October 25, 2012

The Lake of the Woods Control Board held a Regulation Meeting October 25, 2012 in Kenora. 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

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

- 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 outflow 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) Proposed Strategy

The Secretariat recommends that the regulation of Lac Seul over the winter balance drawdown for fishery benefits and hydropower flow requirements and preferences. Compared to the fall of 2011, current lake levels and inflows in the English and Winnipeg River basins are more favourable for meeting both the drawdown targets and hydropower needs. Preferred hydropower flows on the English system -330 m^3/s capacity at Ear Falls until March, 500-550 m^3/s at Manitou Falls and 560-600 m^3/s at Caribou Falls – look to be achievable under the current normal inflow conditions. Should dry conditions exist between now and freeze-up, this outlook could change.

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.
- Maintain outflow no lower than 150 m³/s.
- The Lac Seul freeze-up level should preferably be no higher than 356.5 m (1169.6 ft) with outflow no higher than 400 m^3/s and Winnipeg River flows in Manitoba below 1400 m³/s (to avoid frazil ice problems). With current conditions, these criteria should be easily met.
- If the lake level rises above median, increase outflow as appropriate to provide a reasonable balance between increased outflow and increased lake levels, with due consideration of required winter outflow and spring target levels.
- 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)

- For fishery interests, the preferred minimum end-of-winter level is no lower than 354.8 m / 1164 ft, a 55^{th} percentile level and the preferred drawdown limit is 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 353.6 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 inflow. During a drought, some or all of the defined drought reserve (down to 352.4 m / 1156.17 ft) would be regarded as available. The actual end-of-winter level will vary depending on the winter inflow 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 355.0 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 353.6 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 354.3 m / 1162.3 ft (lower decile).
- Core winter minimum outflow requirements for the Winnipeg River in Manitoba should not prevent accomplishing drawdown targets in the spring under this scenario. However, achieving both the lake level drawdown targets and preferred Winnipeg River flow in Manitoba (combined flows of 675 m³/s at Seven Sisters for full winter generating capacity) could be a challenge given the drier conditions in the Lake of the Woods basin. Under these conditions,

the Secretariat recommends operating Lac Seul primarily as a hydropower reservoir, with regulation decisions balancing fisheries concerns.

iv) Moderate Inflow Winter Conditions

- Winter outflow should be between 200 and 450 m^3/s with a core winter flow of between 300 and 400 m^3/s.
- The end-of-winter elevation should be allowed to decline to no lower than 354.4 m / 1162.8 ft (lower quartile) 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 354.8 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 355.0 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 355.2 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 outflow 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

The points below set out a number of ideal or desirable regulation objectives. As for Lac Seul, some
objectives are incompatible and trade-offs may be necessary under some hydrologic conditions.

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 outflow to assist in meeting targets/preferences for the Winnipeg River in Manitoba.

B) Proposed Strategy

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

- If dry conditions persist, conserve water to the extent possible, while balancing upstream and downstream interests.
- Target for a Lake of the Woods level at freeze-up of between 322.6 - 322.8 m / 1058.4 -1059.1 ft with outflow preferably between 150 and 420 m^3/s and Winnipeg River flows in Manitoba no higher than 960 m^3/s. If high or low inflow precludes the preferred conditions, then adjust both levels and outflows without deviating from the target range more than necessary.
- 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. As with Lac Seul, this should be easily satisfied given current conditions.

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

- The end-of-winter level, based on factors other than winter inflow, is ideally 322.35 m/ 1057.6 ft (about lower quartile) and preferably no higher than 322.5 m / 1058.0 ft (about median). 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 inflow received, as noted in sections iii) to v) below.
- With the current lake level, an inflow of approximately median for the winter period would be needed to best satisfy the many interests for Lake of the Woods levels and outflow. The preferred end-of-winter level for fishery interests as defined by the OMNR is no lower than 322.5 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 H2O Power LP, 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 and preferably no lower than 200 m^3/s.
- If outflow is greater than 125 m^3/s, the end-of-winter elevation should be no lower than 322.21 / 1057.1 ft (lower decile).
- 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 outflow 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.