Adopted Regulation Strategy
Lake of the Woods Control Board
March 13, 2020

The Lake of the Woods Control Board held a Regulation Meeting in Kenora on March 13, 2020 where it adopted a regulation strategy for the spring refill period. 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/regguide/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.

Factors pointing towards a risk of higher spring flows include high base flows as a result of extremely high fall precipitation, particularly in Lake St. Joseph, the upper English River, and the upper Rainy River watershed and as well as above-normal snow water in the Rainy River basin and around Lake St. Joseph. However, snowpack around Lake of the Woods and Lac Seul is not substantial and the winter has been relatively mild. With this mix of antecedent risk factors and no strong indicators of above or below normal precipitation or temperature in the early spring, there is not a clear picture of what spring flows will be. However, there is sufficient water in the system presently that a moderate to very wet early spring would likely result in above normal flows in both the English and Winnipeg River systems. For this reason, the strategy below is made with an emphasis on hedging against this possibility.

The strategy covers the period to the end of June 2020. An initial strategy is presented to cover the remainder of the winter drawdown period (nominally March 31st for Lake of the Woods, and April 15th for Lac Seul). A strategy is then proposed for the spring refill period, the most hydrologically volatile period of the year. The goal of balancing conditions across the entire basin is a complex task given the diverse nature of the different, and sometimes conflicting, interests and the largely unpredictable nature of the hydrology that drives the system. In setting an operational strategy for the coming months, it is vital to consider both level and outflow targets together, as well as the interrelationships between the various basin interests. Should basin conditions arise that are not addressed by the adopted strategy, the Board would need to meet and update the strategy.

Lac Seul

A) Seasonal Considerations

At the January Regulation Consultation, the Board set a target level range for March 1 of a maximum of 355.70 m (1167.0 ft). The level was 355.59 m (1166.6 ft) on March 1st, which corresponds to a 75h percentile level with authorized outflow of 475 m³/s. The Root River Diversion has remained open throughout the year. The sustained high winter flows have allowed for a steady drawdown of Lac Seul of 10-12 cm per week, and it remains on track to reach the April 15 target set in the January strategy of 355.20 m (1165.3 ft).

Due to the high level of Lake St. Joseph and concerns over increasing flows into the Albany River, the Board aims to maintain seasonally high Lac Seul outflow through April 15 to achieve as much drawdown as possible without additional risk to downstream interests. The lower snowpack in the Lac Seul vicinity favours a more modest freshet response, although base flows remain at the upper end of the normal range.

To support spawning conditions and navigation in early spring, it is desirable to have the lake level rising after mid-April. This often requires some degree of outflow reductions, but rising lake levels must be balanced against a future risk of high water, usually due to late summer or early autumn rainfall. The points below reflect ideal or desirable regulation objectives over the next few months, based on input provided to the Board.

- Regulation of Lac Seul level and outflow should consider the preferred Lac Seul, Pakwash Lake and English River levels for the fishery and tourist outfitter interests, to provide good spring spawning conditions and adequate navigation levels at the start of the walleye fishing season.
- Lac Seul level should be constant or rising after April 15 for spring spawning fish.
- The minimum spring lake level should be no more than 1.5 m (4.9 ft) below the November 1 level for whitefish. For spring 2020, the recommended drawdown is 1.6 m (5.2 ft).
- The desirable lake level on May 15 is no less than 355.1 m (1165.0 ft) for the walleye fishery.
- The tourist outfitters' preferred summer maximum level is 356.6 m (1170.0 ft).
- Lac Seul level and outflow should be managed to supply water requested by Ontario Power Generation and Manitoba Hydro for hydroelectric energy generation, to avoid spill in wet conditions and violation of low flow constraints in dry conditions.
- A minimum flow of 180 m^3/s below Manitou Falls is desirable during spring spawning. If there is not sufficient water to meet this criterion, Lac Seul discharge should be set to maintain a uniform flow through the spawning period.
- Maintain English River flows that lead to an inflow at Caribou Falls below 550 m^3/s to avoid levels at Grassy Narrows above 319.6 m (1048.6 ft) during the tourist season (May long weekend to after Thanksgiving).
- Lac Seul storage should be used to offset Lake of the Woods high/low outflow for the benefit of users of the Winnipeg River in Manitoba.
- Lac Seul level and outflow should be managed to reduce the need to close the Lake St. Joseph diversion with resulting spill down the Albany River. However, the diversion should nevertheless be closed to reduce impacts in the English and Winnipeg River basins under wet conditions.
- If inflow is above normal by May 15 and Lac Seul level meets the preference for that date, adjust outflow in May and June to target a July 15 elevation of 356.3 m (1169.0 ft), thereby reducing the risk of higher outflows in late summer due to severe storms that have become typical for that time of year.

B) Adopted Strategy

To April 15 (Drawdown Period)

Maintain high outflow from Lac Seul through March and early April to target an end-of-winter (April 15th) level at or below 355.0 m (1164.7 ft). This target is achievable under the expected range of spring conditions without needing to increase outflow beyond the present 475 m³/s or reducing Root River Diversion flows. This target provides some additional buffer for higher flow conditions, while also allowing refill to reach May 15 Lac Seul target level for fisheries without a steep reduction in outflow should inflow remain above median.

The proposed target would yield a winter drawdown of 1.6 m (5.2 ft), based on the November 1, 2019 level of 356.58 m (1169.9 ft). Typically, the drawdown is between 1.5 to 1.7 m (4.9 to 5.6 ft).

If freshet has not begun by this date, adjust outflow to hold the level constant to the extent practical. Should freshet begin before this date and the target has not been reached, the Secretariat recommends beginning the refill period, and adjusting outflow in consideration of the following:

- the inflow rate and volume;
- the potential for ice damage due to level rise on both the lake and the river;
- the need to maintain storage room in the lake to handle higher inflow during refill, and;
- the potential for less-than-normal spring rainfall leading to less-than-normal refill.

After April 15 (Refill Period)

The risk of high water must be balanced against the risk of not meeting refill goals if spring rainfall is below normal. As such the Board should set outflow to be responsive to spring conditions as they arrive. This will allow outflow to be increased or decreased relatively quickly in response to rainfall. Since spring rainfall is highly variable and precipitation forecasts are unreliable beyond horizons of more than a few days, regulation must be continually updated, and outflow adjusted in response to changing conditions and forecasts.

i) Low Inflow Conditions

- Outflow should be managed to ensure that Lac Seul level does not decline, and preferably rises, while providing sufficient outflow to meet downstream hydropower generation and fishery requirements.
- Target for an end-of-June level no lower than 355.46 m (1165.2 ft) with an outflow no lower than 100 m^3/s, provided that flow in Manitoba is no lower than 600 m³/s.
- Target for an end-of-June level no lower than 355.1 m (1165.0 ft) with an outflow no lower than 25 m³/s, provided that flow in Manitoba is no lower than 300 m³/s.
- Consultation with interests, including OMNRF staff, tourist outfitters and the provincial hydro utilities, may be necessary to arrive at the appropriate balance between lake levels and outflows.
- If inflow remains low throughout the refill period, outflow should be adjusted to maintain a balance between upstream and downstream interests. Note that a lower decile outflow for May is approximately 50 m^3/s.

ii) Moderate Inflow Conditions

- Due to concerns of high water, regulate through the refill period to hedge against wetter conditions, so that the risk of outflow above 500 m³/s is reduced.
- Target for a lake level between lower and upper quartile, while supplying water for hydropower production and for English River fishery concerns.
- Use additional water to maintain desired fishery flows in the English River below Manitou Falls, provided this does not cause high flow conditions on the Winnipeg River in Manitoba.
- Target for flow in the Winnipeg River in Manitoba between 675 and 960 m³/s.

iii) High Inflow Conditions

- As above, regulate through the refill period to hedge against wetter conditions, so that the risk of outflow above 500 m³/s is reduced.
- Balance Ear Falls outflow with the rise in Lac Seul level to reduce flood risk both on Lac Seul and on downstream areas such as Pakwash Lake.
- Seek to maintain Lac Seul level (or projected level) below upper quartile through the refill period. Outflow should remain below 450 m^3/s for moderately wet conditions, below 500 m^3/s for most conditions, and below 600 m^3/s in all but extreme conditions.
- Increase outflow to as much as 800 m^3/s to keep the level below 357.1 m (1171.6 ft).
- When Lac Seul is above the level at which the Lake St. Joseph diversion comes under Board jurisdiction [356.01 m (1168.0 ft) until the end of May; 356.31 m (1169.0 ft) for June], the diversion flow should be reduced before increasing Lac Seul outflow to more than 550 m^3/s.

Lake of the Woods

A) Seasonal Considerations

The Lake of the Woods end-of-winter (March 31) target level range set at the January Regulation Consultation was 322.30 to 322.35 m (1057.4 to 1057.6 ft). The current rate of decline, approximately 4 cm per week, if maintained, will result in a level near the upper end of that range.

With several factors indicating potentially higher risk of above normal spring flows within the Lake of the Woods watershed, the Board aims for regulation to hedge to some degree against the potential for higher than normal spring inflow. However, due to several consecutive years of lower summer lake and river levels, this should be balanced against the risk of not achieving refill or maintaining moderate summer flows. Additionally, high flow conditions present and anticipated along the Winnipeg River in Manitoba and areas downstream give should give some weight to storing water in Lake of the Woods provided there is not a significant increase in risk of high water at Lake of the Woods as a result.

The points below reflect ideal or desirable regulation objectives over the next few months, based on input provided to the Board.

- Adjust lake level and outflow to achieve a balance between upstream and downstream interests, as inflow dictates.

- Minimize ice damage when possible. Ice damage is greater in the spring if there are rapid changes in water level (on either the lake or the river) and especially if the level rises while there is still a solid ice cover.
- The preferable end-of-April level for Lake of the Woods fishery is no lower than 322.5 m (1058.0 ft). Higher levels would be beneficial to northern pike.
- Regulate to avoid, to the extent possible, any reductions in outflow or any large increases in outflow during the spring spawning season on the Winnipeg River (late April to early June).
- For loons on the Winnipeg River, flow changes during the incubation period (approximately mid-May to the end of June) should be minimized.
- A peak summer level of about 323.0 m (1059.7 ft) on Lake of the Woods is desired by property owners.
- For wild rice on Lake of the Woods and the Winnipeg River, maintain lower lake and river levels and minimize level and flow increases during the floating leaf stage in June and early July.
- For piping plovers on Lake of the Woods, maintain lower lake levels and minimize lake level increases during their nesting and rearing season of May, June and July.
- Within the regulation parameters for Lake of the Woods, regulate outflow to assist in meeting targets/preferences for the Winnipeg River in Manitoba.

B) Adopted Strategy

Until March 31st (Drawdown Period)

Manage outflow to reach a March 31st level between 322.35 m and 322.40 m (1057.6 to 1057.7 ft) provided freshet does not begin before April. If freshet has not begun by this date, outflow should be adjusted to hold the level within the above range to the extent practicable. Should freshet begin before this date and the target has not been reached, the Secretariat recommends beginning the refill period, and adjusting outflow in consideration of the following:

- the inflow rate and volume;
- the potential for ice damage due to level rise on both the lake and the river;
- the need to maintain storage room in the lake to handle higher inflow during refill;
- the potential for less-than-normal spring rainfall leading to less-than-normal refill;
- balancing the risk of high water with the risk of not meeting refill goals if spring rainfall is below normal; and
- balancing interests on the lake with those on the river during freshet; flow increases while ice remains in place on the river risk damages to shoreline structures while reductions in outflow to raise the lake level would negatively impact spring spawning along the river.

After March 31st (Refill Period)

Historically, the refill rate of Lake of the Woods is a factor more of the timing and magnitude of spring rainfall than of snowpack at end of winter. Since spring rainfall is highly variable and precipitation forecasts are unreliable beyond horizons of more than a few days, regulation must be continually updated, and outflow adjusted in response to changing conditions and forecasts.

i) Low Inflow Conditions

Adjust outflow as necessary (subject to minimum flow requirements) to keep the lake from declining. If possible, have the lake maintain at least a 10^{th} percentile level, with outflow no lower than 100 m^3/s.

- Seek advice from OMNRF on the status of Winnipeg River spawning throughout the spring. Avoid Lake of the Woods outflow reductions during the spawning season (late April to early June), while ensuring the lake level does not decline. Where insufficient inflow to Lake of the Woods does not allow this, balance outflow reductions with the rate of decline of Lake of the Woods.
- Target a lake level above 322.78 m (1059.0 ft) at the end of June, if possible, with outflow no lower than 250 m^3/s. This level corresponds to the lower end of the preferred range stated by the Lake of the Woods District Stewardship Association.
- Lower inflow conditions tend to be favourable for wild rice growth. Under low inflow conditions, prioritize stable conditions for wild rice development on Lake of the Woods and Winnipeg River.
- If inflow remains low throughout the refill period, outflow should be adjusted to maintain a balance between upstream and downstream interests.

ii) Moderate Inflow Conditions

- Assess conditions immediately before spawning, as described under "Low Inflow Conditions" above.
- Outflow increases should be kept moderate during the spawning period and reductions should be minimized.
- Set outflow as high as 800 m^3/s to prevent the peak lake level from exceeding 323.09 m (1060.0 ft) for the benefit of Lake of the Woods shoreline interests.
- Target lake level of 322.7 m (1058.7 ft) at the end of May and 322.9 m (1059.4 ft) at the end of June. Balance this by attempting to avoid outflow above the generation capability at Kenora and by optimizing hydroelectric generation downstream.
- Through late May and June, attempt to limit Lake of the Woods outflow changes that would adversely affect nesting loons on the Winnipeg River.
- Through June (and early July), seek to balance the rate of lake level rise with river level fluctuations for the benefit of wild rice growth on both lake and river. Seek advice from First Nations and Grand Council Treaty #3 on the status of wild rice crops to better inform regulation decision-making.
- Maintain Nutimik Lake levels in the preferred range, to the extent possible, by managing outflow from both Lake of the Woods and Lac Seul.

iii) High Inflow Conditions

- Balance higher water levels on the lake with the impact of increased outflow downstream, both in Ontario and Manitoba.
- Avoid outflow above 800 to 900 m^3/s if the lake level (or projected level) will remain below 323.2 m (1060.4 ft) in June. A flow of 900 m^3/s on the Winnipeg River would cause the level below the Norman Dam to rise 1.4 m (4.6 ft) above normal, whereas a lake level of 323.2 m (1060.4 ft) is only 15 cm (6 in) above median at the end of June.

- 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
- An attempt should be made to keep outflow increases to a maximum of 100 m^3/s per week, except during the spawning season when it would be desirable to not exceed 50 m^3/s per week. Persistent higher inflow could, however, necessitate inflow increases of 200 m^3/s per week or more.
- Seek advice from OMNRF on the status of spawning throughout the spring to better inform regulation decisions.