Adopted Regulation Strategy
Lake of the Woods Control Board
March 8, 2022

The Lake of the Woods Control Board held a Regulation Meeting via teleconference on March 8, 2022, when it adopted a Regulation Strategy to guide operations through the end of June, 2022. 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.

The two principal factors related to spring runoff this year, drought and snow, were reviewed in detail during the meeting.

First, the long-standing drought conditions remain, with most of the Winnipeg River basin falling under classifications ranging from abnormally dry to severe drought. This is an improvement compared to the summer and early fall of 2021, when categories ranged from severe to exceptional drought and this improvement is attributable to rainfall in the fall of 2021. This rain has also resulted in river flows rising to the lower end of the normal range in most areas. Nonetheless, the ground across the watershed has capacity to store water this spring.

Second, the accumulated snowpack depth this year is higher than in recent years. Some areas have very high snowpack depth, including around Kenora, Ear Falls, and the Fork Rivers south of Rainy River in Minnesota. In the upper Rainy-Namakan watershed, the snowpack is on the high end of the normal range for early March. The LWCB expects that the substantial snowpack will resolve the drought conditions.

When considering potential for spring runoff, the water content of the snowpack is more important than the snow depth. Estimates of snow water equivalent, based on a variety of data sources including direct measurement, indicate moderately high snow water, with estimates of most agencies indicating the highest amounts in pockets around the Fork Rivers, Kenora and north of Ear Falls. Generally, the snow water at this point of the winter is similar to that seen in 2019 and 2020, and substantially less than in the last year with high spring water levels, 2014.

The strategy aims are focused on two periods including regulation until the end of winter (nominally March 31 for Lake of the Woods and April 15 for Lac Seul) and the refill period for the major lakes from the end of winter to June 30. The strategy includes key aims and how the Board intends to balance these under a range of possible flow conditions should they develop during the strategy period. 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.

Lac Seul

A) Seasonal Considerations

Based on the current level, snowpack and antecedent drought conditions, the scenarios presented below indicate an end-of-winter (April 15) Lac Seul level between 354.55 and 354.70 m (1163.2 and 1163.7 ft) is achievable with gradual outflow changes. Starting the refill of Lac Seul from within this range should allow for meeting level targets described below while affording some protection against higher lake levels if high flows develop.

To support spawning conditions and navigation in early spring, it is desirable to have the lake level rising after mid-April. However, 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 (355.80 m / 1167.3 ft) for whitefish. An April 15 level within the target range would result in an overwinter drawdown between 1.1 and 1.25 m (3.6 and 4.1ft).
- 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)

Gradual Lac Seul outflow adjustments should be made through March and early April to target an end-of-winter (April 15th) level range between 354.55 and 354.70 m (1163.2 and 1163.7 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, allow refill to begin, 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 potential for less-than-normal spring rainfall leading to less-than-normal refill, and;
- the need to maintain storage room in the lake to handle higher inflow during 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 develop. 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.
- Communicate with First Nation communities on Lac Seul and the English River, and with Grand Council Treaty #3 to keep communities informed of the low water conditions and to assist in the determination of an appropriate balance of upstream and downstream interests.
- Target for an end-of-June level no lower than 355.46 m (1166.2 ft) with an outflow no lower than 100 m^3/s, provided that flow in Manitoba is no lower than 600 m^3/s.
- Target for an end-of-June level no lower than 355.1 m (1165.0 ft) with an outflow no lower than 25 m^3/s, provided that flow in Manitoba is no lower than 300 m^3/s.
- Consultation with interests, including NDMNRF 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.

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 m^3/s is reduced.
- Communicate with First Nation communities on Lac Seul and the English River, and with Grand Council Treaty #3 to keep communities informed of the potential for

flooding and to assist in the determination of an appropriate balance of upstream and downstream interests.

- 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 m^3/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 m^3/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 in October was 322.30 m to 322.50 m (1057.7 to 1058.1 ft). Over the winter, inflow remained between 15^{th} and 45^{th} percentile and outflow has been gradually increased since late January to increase the rate of lake drawdown while limiting downstream ice effects.
The level of Lake of the Woods was 322.55 m (1058.3 ft) on February 28, the median level for end of February. With the ample snowpack and underlying drought conditions, the Secretariat recommends an end-of-winter (March 31) target of between 322.40 and 322.50 m (1057.7 and 1058.0 ft), with gradual adjustments in outflow in response to developing precipitation, temperature and upstream flow regulation.

The Secretariat recommends that regulation of Lake of the Woods in early spring be based on a balanced risk of above and below normal flow conditions developing depending on spring rainfall.

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.
- 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 322.40 m and 322.50 m (1057.7 to 1058.1 ft) provided freshet does not begin before April 1. 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, 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 potential for less-than-normal spring rainfall leading to less-than-normal refill, and;
- the need to maintain storage room in the lake to handle higher inflow during refill.

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 10th percentile level, with outflow no lower than 100 m^3/s.
- Communicate with First Nation communities on Lake of the Woods and the Winnipeg River, and with Grand Council Treaty #3 to keep communities informed of the low water

conditions and to assist in the determination of an appropriate balance of upstream and downstream interests.

- 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 200 m^3/s. This level corresponds to the lower end of the preferred range stated by the Lake of the Woods District Stewardship Association.
- 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.
- Seek advice from OMNRF on the status of Winnipeg River spawning throughout the spring. 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 a 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.
- If conditions permit through late May and June, limit Lake of the Woods outflow changes that would adversely affect nesting loons on the Winnipeg River.
- 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.
- Communicate with First Nation communities on Lake of the Woods and the Winnipeg River, and with Grand Council Treaty #3 to keep communities informed of the potential for flooding and to assist in the determination of an appropriate balance of upstream and downstream interests.
- Avoid outflow above 800 to 900 m^3/s if the lake level (or projected level) will remain below 323.20 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

- Where feasible, limit 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 outflow increases of 200 m^3/s per week or more.
- Seek advice from NDMNRF on the status of spawning throughout the spring to better inform regulation decisions.