Adopted Regulation Strategy
Lake of the Woods Control Board
March 15, 2017

The Lake of the Woods Control Board held a Regulation Meeting by teleconference on March 15, 2017 and 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.

Lac Seul

A) Seasonal Considerations

Rather than setting an end-of-winter (April 15) target level at the October Regulation Meeting, the Board set a new target range for March 1. This level range was set as a maximum of 355.5 m / 1166.3 ft, and preferably no higher than 355.15 m / 1165.2 ft. The level on March 1st was 355.38 m / 1165.9 ft, which corresponds to a 52nd percentile level and 5.5 cm (2.2 in) higher than the mid-point of the target range.

To support spawning conditions and navigation in early spring, it is desirable to have the lake level rising after mid-April. This will likely require 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 take into account 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.
- 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 so as 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)

Manage outflow to target an April 15th level at, or below, 354.8 m / 1164.0 ft. Should freshet begin after this date and inflow remains above normal, continue the drawdown to gain additional storage, to as low as 354.6 m / 1163.4 ft. This would yield an over-winter drawdown between 1.56 and 1.76 m (5.1 and 5.8 ft). Should freshet begin before this date and the target has not been reached, the refill should be allowed to begin. In either case, outflow should be adjusted 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)

High baseflows sustained throughout the basin this winter increase the risk of a higher-than-normal freshet response; however, the below normal snowpack has the opposite effect. There are no clear indications of what the freshet response will be due to these competing factors. 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 so as 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 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 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 for the 1981-2010 period was approximately 45 m^3/s while a 5^{th} %ile outflow was below 35 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 m^3/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.
- Target for a 15-May level no lower than 355.1 m / 1065.0 ft.
- 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 at the October Regulation Meeting was ideally 322.38 m/ 1057.7 ft and preferably no higher than 322.49 m / 1058.0 ft. High inflow conditions over the winter make it unlikely that the lake level will be below 322.49 m / 1058.0 ft by the end of March unless inflow drops considerably. Snowpack in the southern portion of the basin ranks below normal and the snow on ground around Kenora is less than in recent years. The lighter snowpack will likely be beneficial once freshet begins but the high baseflow is expected to continue into the spring. Local conditions and forecasts will need to be monitored closely to remain responsive to changing inflows. The risk of high water must be balanced against the risk of not meeting refill goals if spring rainfall is far below normal. Additionally, there is the need to balance interests on the lake with those on the river; flow increases while ice remains in place on the river risk damages to shoreline structures.

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 summer Lake of the Woods level 10 to 15 cm (4 to 6 in) below the summer peak median level of 323.14 m / 1060.2 ft is desired for south shore residents. Satisfying these criteria would result in a summer peak level of about 323.0 m / 1059.7 ft.
- 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 at, or below, 322.49 m / 1058.0 ft. Outflow should not be increased unless prolonged high inflow conditions are projected. Should freshet begin after this date, continue the drawdown to gain additional storage, to as low as 322.38 m / 1057.7 ft. Should freshet begin before this date and the target has not been reached, the refill should be allowed to begin. In either case, outflow should be adjusted 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 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 the end of winter. Since the lake level is higher than preferred heading into freshet, the Secretariat recommends setting outflow towards the upper quartile value to limit the rate of rise on the lake and potentially avoiding very high flows on the river later. 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.
- Assess conditions immediately before spawning begins in the Winnipeg River so that outflow can be set to prevent, as much as possible, the need for further flow reductions during the spawning season (late April to early June), while ensuring the lake level does not decline.
- 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 Property Owners 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.
- 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 323.1 m / 1060 ft for the benefit of Lake of the Woods cottagers, if inflow is no higher than median.
- 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), try to manage lake levels to limit the rate of rise for wild rice.
- 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 less than 10 cm (4 in) above median by 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.