Adopted Regulation Strategy
LWCB Regulation Meeting – October 26, 2006

The following strategy attempts to strike a balance among the various interests in the Winnipeg River Drainage basin, while considering the limitations of hydraulics and hydrology. However, each year is different hydrologically and impacts on interests may vary. Level and outflow targets must be considered together, as well as the impact of the combined operation of Lac Seul and Lake of the Woods on the Winnipeg River in Manitoba.

Basin conditions at the time of the meeting were quite dry. In addition, a moderate El Nino event was being predicted for the Pacific Ocean, which can result in a warmer winter for the basin, followed by a below normal freshet. Based on this, planning for the possibility of continued dry conditions seemed prudent.

Status of the major lakes as of October 20, 2006:

- Lake St Joseph – lake level is at 18 %ile, the lowest level for this time of year since 1998.
- Lac Seul – lake level is at 22 %ile, the lowest level for this time of year since 1998.
- Pakwash Lake – lake level is at 25 %ile for this time of year.
- Basswood Lake – lake level is the minimum of record for this time of year.
- Namakan Lake – lake level is at 26 % of its IJC regulating band, the lowest level for this time of year since 2003, and outflow is just above the IJC minimum.
- Rainy Lake – lake level is 28 cm (11 in) below its IJC operating band and 10 cm (4 in) below its drought line, the lowest level for this time of year since 1998. Outflow is at the IJC specified minimum (100 m^3/s) for below the operating band but could be reduced as low as 65 m^3/s as long as the lake is below its drought line.
- Lake of the Woods – lake level is at 8 %ile, the lowest level for this time of year since 2003.
- Nutimik Lake – lake level is at 15 %ile, the lowest level for this time of year since 1998.

Other statistics:

- Lac Seul precipitation for June through mid-October was the lowest since 1976 and was rank 88/93. For the entire year it has been rank 79/93.
- Lac Seul inflow for June through mid-October averaged 26 %ile and was the lowest since 1998.
- Lake of the Woods precipitation for June through mid-October was the lowest since 1938 and was rank 98/103. For the entire year it has been rank 97/101.
- Lake of the Woods inflow for June through mid-October was the lowest since 1980 and was the third lowest in 91 years of record. Inflow during the period averaged only 85 m^3/s, less than one-quarter of the median amount and less than one-tenth of that experienced in 2001 and 2002.

Lac Seul

a) Seasonal Considerations

There may be competing demands this winter to keep drawdown to a minimum for fishery benefits versus demand for hydropower flows. 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.

- Regulate Lac Seul outflow to assist in providing satisfactory freeze-up conditions on the English and Winnipeg Rivers to avert frazil ice problems.
- Use Lac Seul storage to offset Lake of the Woods high/low flows for the benefit of users of the Winnipeg River in Manitoba.

Additional criteria and preferences can be found in the Board's Regulation Guide at www.lwcb.ca/reg-guide.

b) Strategy

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

- Maintain outflow no lower than 150 m^3/s.
- If the lake level rises above lower quartile, increase outflow (above 150 m^3/s) as appropriate to provide a reasonable balance between increased outflows and increased lake levels, with due consideration of required winter outflows and spring target levels.
- If the lake level continues at or below lower quartile, nevertheless begin to increase outflow in steps as appropriate to blend into required winter hydropower outflows.
- The Lac Seul freeze-up level should preferably be no higher than 356.5 m (1169.6 ft) with outflows no higher than 400 m^3/s and Winnipeg River flows in Manitoba below 1400 m^3/s (to avoid frazil ice problems). If higher inflows preclude these criteria being met, adjust both Lac Seul outflow and the freeze-up level as necessary, while deviating from the ideal as little as possible, but subject to both taking the step below and also ultimately not exceeding a lake level of 356.9 m (1171 ft).
- If the level rises to 356.62 m (1170 ft), the level at which the Board has authority over the Lake St. Joseph diversion, the diversion should then be closed by the amount necessary to hold the lake level without increasing Lac Seul outflow above 500 m^3/s.

ii) End-of-winter Levels

- The preferred minimum end-of-winter level for fishery interests is no lower than 354.8 m (1164 ft) (near upper quartile lake level). In contrast, if Lac Seul were to be operated solely as a hydropower reservoir, 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 and, during a drought, some or all of the defined drought reserve (down to 352.4 m or 1156.17 ft) would also be regarded as available. 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.
- With the current lake level, an inflow greater than median for the winter period would be required to satisfy both the fishery interests (end-of-winter minimum level) and the hydropower interests (winter flows). The preferred Lac Seul winter outflow considering the English River powerplants alone is 400-450 m^3/s (230 m^3/s capacity at Ear Falls but 500-550 m^3/s at Manitou Falls and 560-600 m^3/s at Caribou Falls), while a flow of 960 m^3/s (supplied by both Lac Seul and Lake of the Woods plus local runoff) is preferred on the Winnipeg River in Manitoba. (Note: OPG may prefer somewhat lower English River flows through December due to ongoing maintenance at Caribou Falls.)
- Lac Seul end-of-winter level was below lower quartile (354.42 m / 1162.8 ft) as recently as 2003 (354.31 m / 1162.4 ft) but has not been below lower decile (354.26 m / 1162.3 ft) since

1981 (354.20 m / 1162.1 ft). Since the reservoir was first filled, the lowest end-of-winter level on record is 353.25 m (1158.96 ft) in 1977.

iii) Low Inflow Winter Conditions

- Winter outflow should be between 150 and 450 m^3/s, with a core winter flow between 230 and 450 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 lower decile (354.26 m / 1162.3 ft).
- If flows are greater than 675 m^3/s on the Winnipeg River in Manitoba, the end-of-winter elevation should be no lower than lower quartile (354.42 m / 1162.8 ft).

iv) Moderate Inflow Winter Conditions

- Winter outflow should be between 200 and 450 m^3/s with a core winter flow between 350 and 450 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 354.8 m (1164 ft).

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 355.3 m (1165.7 ft). If 500 m^3/s is insufficient outflow to stay below the target level, request OPG or Manitoba to restrict diversion flow before increasing outflow further. (The Board would only have authority to restrict diversion flow if Lac Seul end-of-winter level reached 356.0 m / 1168 ft; Manitoba can restrict diversion flow when Winnipeg River flows in Manitoba exceed 963 m^3/s.)
- Combined with Lake of the Woods regulation, strive to keep Winnipeg River flows in Manitoba below 1600 m^3/s through the winter.
- If the Lake St. Joseph diversion is under LWCB authority, limit or close the diversion into Lac Seul before increasing Lac Seul outflow above 500 m^3/s to achieve regulation objectives.

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 of these are conflicting and trade-offs may be necessary under some hydrologic conditions. Many factors need to be considered when balancing one interest against another, including the consequences of not achieving the target and how frequently the target has been met (or violated) in the past.

- Plan winter drawdown to provide the appropriate balance between the various interests.
- Regulate Lake of the Woods level and outflow to reduce the risk or the impacts of high or low water on the lake and downstream in Ontario and Manitoba.
- Regulate Lake of the Woods outflow to assist in providing satisfactory freeze-up conditions on

the Winnipeg River to avert frazil ice problems.

- 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.
- Maintain sufficient winter outflows for station heating requirements at the Norman and Kenora powerhouses.
- Within the regulation parameters for Lake of the Woods, regulate outflows to assist in meeting targets/criteria for the Winnipeg River in Manitoba (as noted in the Lac Seul section). These flow targets/criteria depend on the hydropower demands and the severity of the hydrology and range from 450 to 960 m^3/s.
- Flows released from Lake of the Woods provide valuable energy for Abitibi-Consolidated, OPG and Manitoba Hydro.

Additional criteria and preferences can be found in the Board's Regulation Guide at www.lwcb.ca/reg-guide.

b) Strategy

i) Short-Term Regulation

- With the current dry conditions, conserve water to the extent possible, while balancing upstream and downstream interests.
- The preferred freeze-up (mid to end November) condition would be a Lake of the Woods level no higher than 322.78 m (1059 ft) with outflow no greater than 420 m^3/s. If high inflows preclude this, then aim for both higher levels and outflows without deviating from the ideal more than necessary. 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

- The end-of-winter level, based on factors other than winter inflow, is ideally lower quartile (322.36 m / 1057.6 ft) and certainly no higher than median (322.42 m / 1057.8 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.
- 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 outflows. For example, the preferred end-of-winter level for fishery interests as defined by the OMNR is no lower than 322.48 m (1058 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 (12 in). 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 Abitibi-Consolidated, to maximize their hydropower production, is 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.

- Lake of the Woods end-of-winter level has not been below lower quartile (322.36 m / 1057.6 ft) since 1988 (322.25 m / 1057.3 ft) and has not been below lower decile (322.19 / 1057.1 ft) since 1981 (321.99 m / 1056.4 ft). The lowest end-of-winter level on record is 321.79 m (1055.74 ft) in 1931.

iii) Low Inflow Conditions
- Winter outflow should be no lower than 125 m3/s.
- If outflow is greater than 125 m^3/s, the end-of-winter elevation should be no lower than lower decile (322.19 / 1057.1 ft).
- Combined with Lac Seul regulation, winter core period flows on the Winnipeg River in Manitoba should be no lower than 675 m^3/s to meet winter peak period power demands, but Lake of the Woods should not be drawn lower than lower decile to achieve this.

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
- Balance higher water levels on the lake with the impact of increased outflows downstream, both in Ontario and Manitoba.
- Allow an end-of-winter elevation as high as upper quartile (322.62 m / 1058.5 ft) to assist in reducing flows on the Winnipeg River 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.