Adopted Regulation Strategy – LWCB Regulation Meeting – October 7, 2004

Overview

The short-term strategy in the sections that follow deal primarily with conditions from now until freeze-up. Conditions at freeze-up are a special concern this year because of the current wet conditions in the basin and the problems that can arise if flows and levels are too high at that time. The long-term strategy applies to winter operations through to the end of March. In setting an operational strategy for the coming months, it is vital to consider level and outflow targets together, as well as the interrelationships between the various interests. The impact of the combined operation of Lac Seul and Lake of the Woods on the Winnipeg River in Manitoba is also an important factor.

Lac Seul

a) Overall Objectives
- regulate Lac Seul level and outflow to avert or minimize flood risk on the lake and downstream in Ontario and Manitoba
- regulate Lac Seul level and outflow to minimize ice damage through the winter on the lake and downstream in Ontario and Manitoba
- regulate Lac Seul outflow to assist in providing satisfactory freeze-up conditions on the English and Winnipeg Rivers to avert frazil ice problems
- supply water requested by Ontario Power Generation and Manitoba Hydro for hydroelectric energy generation; try to ensure that at least their minimum requirements are met
- optimize energy use to avoid spill in wet conditions and violation of low flow constraints in dry conditions
- provide optimal Lac Seul, Pakwash Lake and English River levels for the fishery and tourist outfitter interests; limit winter drawdown on Lac Seul to provide good spring spawning conditions and adequate navigation levels at the start of the walleye fishing season
- plan winter drawdown to provide the appropriate balance between the various interests
- use Lac Seul storage to offset Lake of the Woods high/low flows 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) Seasonal Considerations

With Lac Seul near its flood reserve, the over-riding regulation objective should be to minimize the impacts of the excess water in the system, both in the short and longer time horizons. In the near term, current high water levels are problematic on Lac Seul, the English River and in the Whiteshell in Manitoba. Problems will be compounded if freeze-up occurs at these levels. In addition, current flows are well in excess of values that could cause frazil ice problems at freeze-up, possibly exacerbating high water problems.

c) Scenarios

The attached graph for Lac Seul shows scenarios of lake levels that would result from 4 different combinations of assumed inflows and outflows. It should be noted that the scenarios show a range of possible future conditions and are not forecasts. The Lake St. Joseph diversion dam is assumed to be closed in these scenarios, subject to minimal flows for fishery purposes. The scenarios are:

S1 – very high inflow - maximum of record Lac Seul basin inflow
S2 – high inflow - 90 %ile Lac Seul basin inflow
S3 – above normal inflow - 75 %ile Lac Seul basin inflow
S4 – moderate inflow - 50 %ile Lac Seul basin inflow

d) Strategy

The short-term strategy that follows deals with the current high level and flow conditions. This strategy attempts to minimize negative impacts and balance conditions across the basin, a complex problem given the diverse nature of the different interests and the volatile, largely unpredictable nature of the hydrology that drives the system.

The long-term strategy recommends regulation approaches for dealing with recovery to more normal conditions through the winter. In general, flows are more persistent and more predictable through the winter than at other times of the year. By late November, winter predictions should be more reliable and the strategy should be reviewed and possibly adjusted at that time. In setting an operational strategy for the coming months, it is vital to consider level and outflow targets together, as well as the interrelationships between the various interests. The impact of the combined operation of Lac Seul and Lake of the Woods on the Winnipeg River in Manitoba is also important.

i) Short-Term
- Targets – By November 15:
  - Lac Seul level below 356.60 m (1169.9 ft) {to reduce high water impacts}
  - Pakwash level below 346.60 m (1136.2 ft) {to reduce high water impacts}
  - Manitou Falls discharge no higher than 550 m3/s {plant capacity}
  - Grassy Narrows level below 319.70 m (1048.9 ft) {to reduce high water impacts}
  - Caribou Falls discharge below 600 m3/s {plant capacity}
  - Winnipeg River flow in Manitoba below 1400 m3/s {to reduce frazil ice formation}
  - Nutimik Lake level below 275.2 m (903 ft) {to reduce high water impacts}
  - Reopen the diversion from Lake St. Joseph

- Contingency plans – inflows will have to drop quickly and dramatically to achieve the desired targets above; realistically, some (or all) of the above targets will not be met.
  - Continue to release the current discharge of 650 m3/s from Lac Seul until the lake is below 356.75 m (1170.4 ft)
  - Increase outflow to as high as 800 m3/s to prevent the lake from rising above 357.05 m (1171.4 ft)
  - Increase outflow as high as necessary to prevent the lake from rising above 357.2 m (1171.9 ft)
  - If Lac Seul level falls below 356.75 m (1170.4 ft), reduce outflow as much as possible to provide relief downstream while still targeting for a November 15 level of no higher than 356.60 m (1169.9 ft) on Lac Seul
  - Regulate to minimize the risk of a return to higher outflows
  - Keep the diversion closed to help reach lake and downstream targets

ii) Long-Term

a) Low Inflow Conditions
- At the present time, a return to low inflow conditions appears unlikely anytime soon. However, if low inflow conditions do develop, the strategy would be to supply at least minimum energy requirements for the provincial power utilities while drawing Lac Seul to no lower than lower decile at the end of March (354.2 m / 1162.0 ft)

b) Moderate Inflow Conditions
- If moderate inflow conditions return, set outflows to ensure that the lake continues to decline slowly over the winter, with outflows no greater than 500 m3/s and an end of winter level no higher than 355.3 m (1165.7 ft) and no lower than 354.5 m (1163.1 ft)
- Attempt to limit winter drawdown, after November 1, to 1.5 m (4.9 ft) for the benefit of fall-spawning fish species in Lac Seul

- If flows on the Winnipeg River in Manitoba are high, use the storage available in Lac Seul to minimize the water released downstream; Winnipeg River flows in Manitoba at freeze-up should be less than 1400 m^3/s; avoid winter flows in Manitoba in excess of 1800 m^3/s; preferred flows are below 1600 m^3/s
- Maintain Lac Seul outflow within a range of approximately 200 to 500 m^3/s with Winnipeg River flows in Manitoba near 960 m^3/s (optimum for hydropower) and the lake level in the 25 - 90 %ile range.
- If the Board has authority over the diversion, it may still permit it's reopening, subject to Lac Seul level satisfying the above targets for levels and flows.

c) High Inflow Conditions
- Keep diversion closed
- Regulate Lac Seul outflow to as high as 600 m^3/s to prevent the lake exceeding an end of winter level of 355.6 m (1166.7 ft).
- Regulate outflow to as high as 800 m^3/s to prevent the end of winter level exceeding 356.0 m (1168.0 ft)

Lake of the Woods

a) Overall Objectives

- Carry out lake regulation with due regard for the Canada-United States Treaty and Canadian legislation regarding Lake of the Woods levels and outflows.
- Adjust lake level and outflow to achieve a balance between upstream and downstream interests, as inflow dictates.
- Provide winter drawdown sufficient to handle anticipated spring inflow without flooding while still ensuring adequate levels for the spring spawn
- Limit over-winter drawdown to the extent possible to minimize damage from ice and to minimize impacts on fall-spawning fish
- 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)

b) Seasonal Considerations

While water levels in Lake of the Woods are high for this time of year (about 15 cm above median on September 30), conditions in the upper boundary waters basin are much different than in the Lac Seul & Lake St Joseph subbasins. Lake of the Woods inflows have recently been near 90 %ile and inflows to Rainy Lake have been near upper quartile, but Namakan inflows have only been median and Lac La Croix and Basswood inflows are near lower quartile. The main thrust of Lake of the Woods regulation over the short to medium term will be to manage the lake for a satisfactory freeze-up state while helping to balance the adverse impacts of the excess water on the Winnipeg River in Manitoba, providing the best conditions possible for all interests.

c) Scenarios

The attached graph for Lake of the Woods shows scenarios of lake levels that would result from 4 different combinations of assumed inflows and outflows. It should be noted that the scenarios show a range of possible future conditions and are not forecasts. The scenarios are:

S1 – high inflow – 90 %ile total Lake of the Woods inflow
S2 – above normal inflow – 75 %ile total Lake of the Woods inflow
S3 – moderate inflow – 50 %ile total Lake of the Woods inflow
S4 – below normal inflow – 25 %ile total Lake of the Woods inflow

d) Strategy

i) Short-Term

- Target for a freeze-up level on November 15 no higher than upper quartile (323.05 m / 1059.9 ft) with outflow no higher than 700 m^3/s. If this cannot be achieved, target for a freeze-up level no higher than upper decile (323.18 m / 1060.3 ft) with outflows no higher than 900 m^3/s. Attempt to keep Winnipeg River flows in Manitoba below 1800 m^3/s.
- If the lake level continues to decline slowly, maintain the current discharge of 700 m^3/s from Lake of the Woods until the lake has declined to 323.00 m (1059.7 ft) to provide a buffer for the freeze-up target above. Once this target is reached, reduce outflows to assist in meeting downstream freeze-up targets.

ii) Long-Term

a) Low Inflow Conditions

- If inflows drop to below normal, which is certainly a possibility given the conditions in the upper boundary waters basin, conserve water while balancing upstream and downstream interests. Target for an end of winter level between lower quartile and median. (i.e a March 31 level between 322.35 m / 1057.6 ft and 322.46 m / 1057.9 ft) As high flows are likely all winter from the English River system, it may be desirable to keep Lake of the Woods outflows lower and end the winter at the upper end of this range.
- Winter outflows should be maintained above 150 m^3/s for minimum river water quality criteria and Abitibi powerhouse heating.

b) Moderate Inflow Conditions

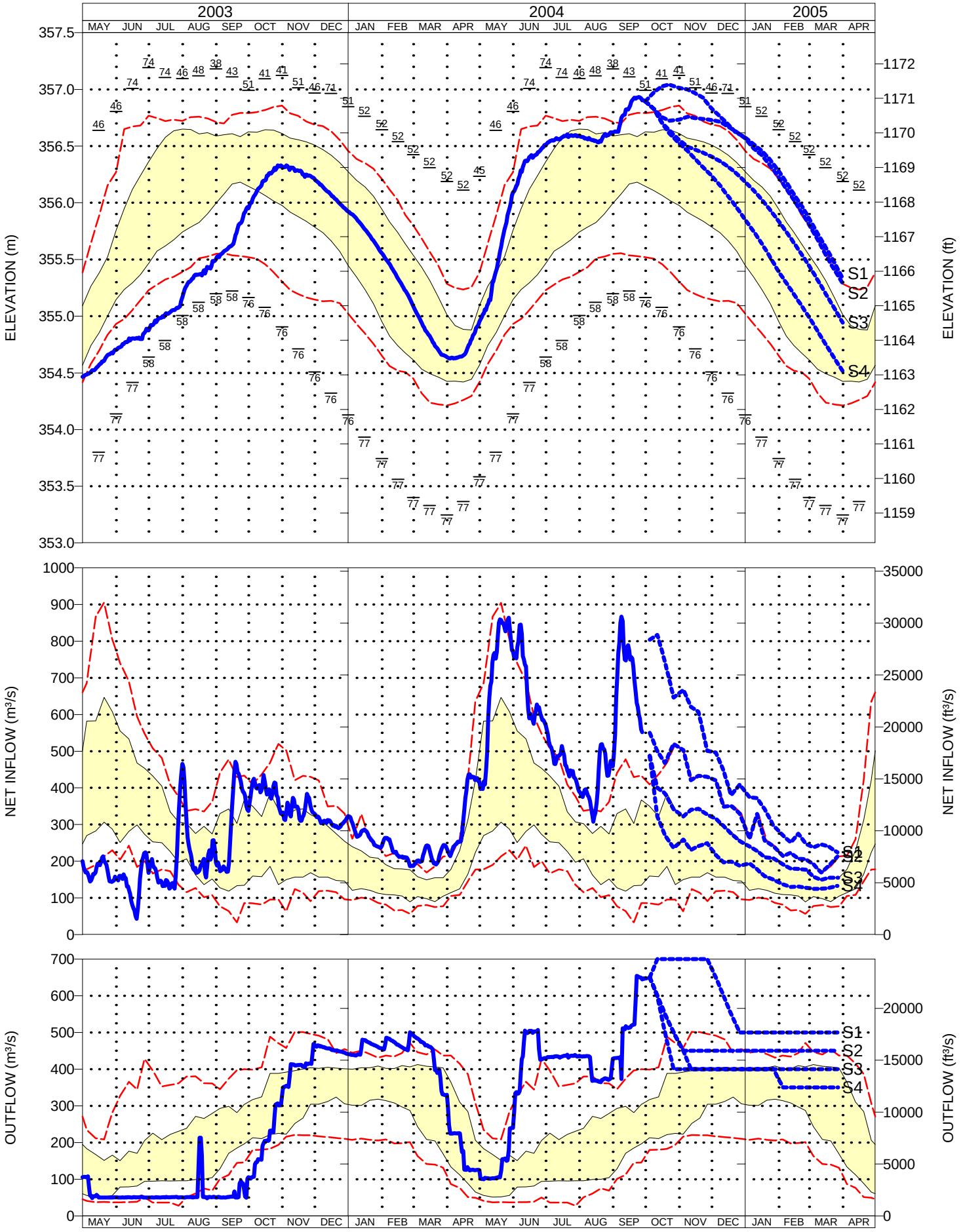
- Given the Board's commitment to work towards achieving somewhat lower summer levels on Lake of the Woods, in the order of up to 15 cm (6 in), target for an end of winter level between lower quartile and median. If inflows remain near normal, attempt to keep the lake to the lower end of this target.
- Winter outflows should be maintained between 200 and 700 m^3/s.
- Strive for Winnipeg River flows in Manitoba below 1400 m^3/s through freeze-up and below 1600 m^3/s through the winter. (A flow of 960 m^3/s is optimal for hydropower in Manitoba.)

c) High Inflow Conditions

- Balance higher water levels on the lake with the impact of increased outflows downstream, both in Ontario and Manitoba.
- If possible, set Lake of the Woods outflows no higher than 700 m^3/s, with an end of winter level no higher than upper quartile (322.59 m / 1058.4 ft)
- Do not increase outflow above 800 - 900 m^3/s to keep the lake level (or projected level) below upper quartile.
- Increase outflow to as high as 900 m^3/s to keep the end of winter level below upper decile (322.7 m / 1058.7 ft).
- Strive for Winnipeg River flows in Manitoba below 1400 m^3/s through freeze-up and below 1800 m^3/s through the winter

LAC SEUL

ISSUED: 2004.10.01
** Provisional Data **



LAKE OF THE WOODS

ISSUED: 2004.10.01
* Provisional Data *