A Description of Plan 2007

Objectives

Plan 2007 is a benefit balancing plan for Lake Ontario and the St Lawrence River that uses short-term forecasting of contributing water supplies. The intent of this plan is to increase the net economic and environmental benefits of regulation compared to previous practice under the so-called Plan 1958D with Deviations, but without disproportionate loss to any interest. In many cases, Plan 2007 codifies benefits that have generally been provided by deviations, but were not guaranteed in the deviations of future Boards of Control.

Approach

The release decision each week strikes a mathematical balance among a set of water level and flow objectives for the interests based on expected water conditions. The particular balance struck in the Plan 2007 rules were evaluated using supplies of the past and a much larger, more varied set of water supplies to make sure that the plan achieves its objectives.

The benefit balancing considers the major interests in the system from Lake Ontario and the St. Lawrence River downstream to Lac St. Pierre, including (in no particular order):

- Municipal and industrial water supply
- Ecosystem
- Shoreline property
- Recreational boating
- Seaway navigation (Lake Ontario, and St. Lawrence River from Lake Ontario to Lake St. Louis)
- Ontario Power Generation and New York Power Authority
- Hydro Quebec
- Port of Montreal navigation

A computer algorithm calculates the mix of benefits that would occur over a broad range of releases each week, then chooses a release that best meets the implicit balancing assumptions of the plan. These relationships are shown in Figures 1 to 10. Releases are constrained by ice formation and ice roughness factors similar to the present practice under 1958D with deviations and multi-stage minimum and maximum flow limits that vary with the hydrologic conditions. The limits are similar to, but not exactly the same, as were used in Plan 1958D with deviations. Some flexibility was added to the limits to address varying climate conditions.

The parameters, target levels and scaling factors of the relationships for the other interests were adjusted iteratively to improve environmental impacts. In addition, logic was added to Plan 2007 to cause the target Lake Ontario level to be lower in the growing season for up to two consecutive years if there has not been two consecutive years with peak summertime Lake Ontario levels below 74.7[1] m in the previous 20 years, and if the outflows from Lake Erie were low enough that levels below 74.7 m are a good possibility. This periodically provides some needed variation to the growing season Lake Ontario levels for the ecosystem. (This is described in more detail following the Lake Ontario level score curve)

Short-term (next week) forecasts of Lake Ontario net basin supply, Lake Erie outflow, Ottawa River and local tributary flows to Lake St Louis, and the expected relationship between flows and water levels are used in the computer calculations to determine system water levels for a range of trial flows. The supply forecasts are based on time-series models. During the spring freshet, Plan 2007 flows will be modified within the week as needed, in a similar manner as is done under Plan 1958D with Deviations, to minimize downstream flooding.

Plan 2007 incorporates maximum outflow assumptions under ice conditions that are similar to those used in Plan 1958D with Deviations.

Steps in the Plan

To determine the Lake Ontario release for the coming week, the following steps are taken:

1. Forecast the water supplies to Lake Ontario, Ottawa River and local flows to Lake St. Louis, the annual net total supplies, and the expected relationship between flow and water levels.
2. Calculate the smallest trial Lake Ontario release (typically, the present flow minus 400 m^3/s or the minimum flow limit, but this may be less to assist the formation of a stable ice cover or in more extreme level conditions. See Examples.)
3. With the trial flow, the forecast hydrology, and initial Lake Ontario water level, calculate the trial water levels for Lake Ontario and downstream river levels using known stage-storage and stage-discharge relationships
4. Calculate the benefit score for each relationship for this trial flow.
5. Sum the individual benefit scores to determine the total score for the trial flow.
6. If the trial flow is less than the maximum flow, (typically, the present flow plus 400 m^3/s or the maximum flow limit, but this may be more in extreme level conditions) increase the trial flow by 10 m^3/s to get the next trial flow and repeat steps 2 through 6.

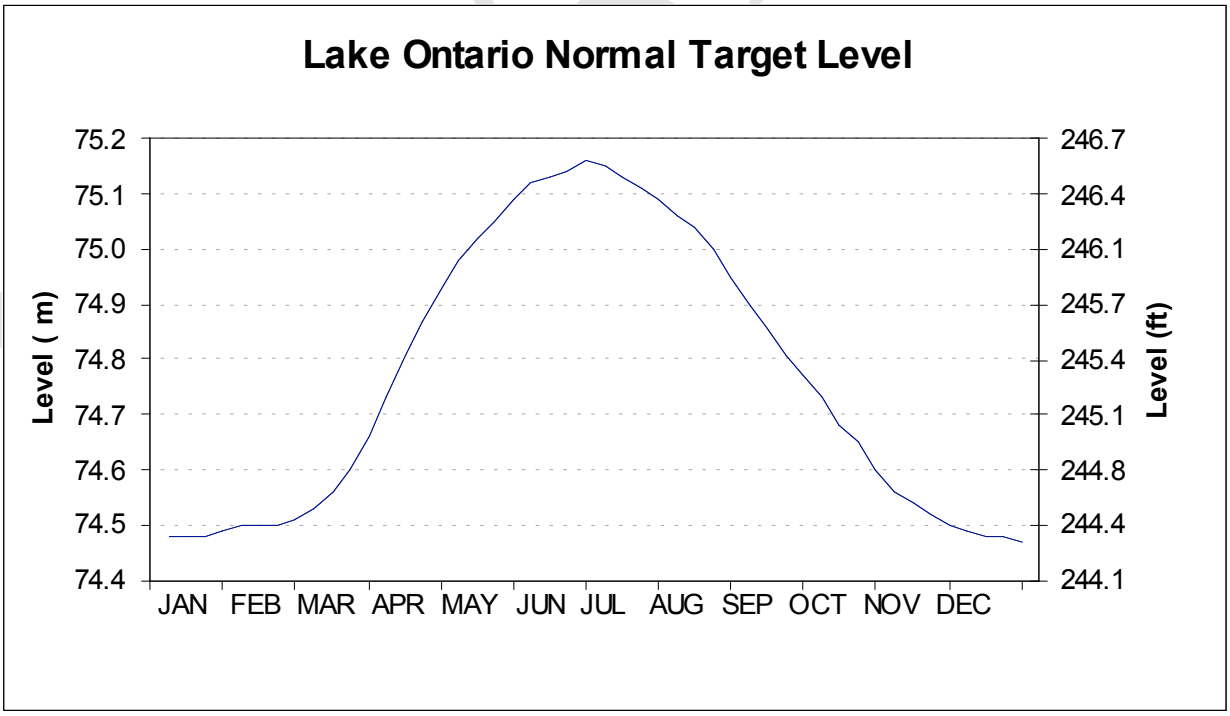
[1] All water levels in this document are listed according to the International Great Lakes Datum of (IGLD) 1985

7. From the set of trial flows and their corresponding individual benefits scores, pick the flow having the highest overall benefit score.

Benefit Score Curves

The following are the benefit score relationships, or curves, used within Plan 2007 to determine the release for the coming period. These curves were initially developed to reflect the relationships between levels or flows and benefits of several of the uses of the system, but some were later modified by trial and error to produce better overall results with respect to the more rigorous performance indicators used in the study evaluation process. Since beneficial water levels for one use often overlap those for another, there is not a separate curve for each and every use or interest or location. For the same reason, the number of points assigned one purpose on an individual graph is not an accurate measure of the importance the plan assigns to that purpose. The true measure of how Plan 2007 balances interests can only be found in the evaluations of the plan that provide economic and environmental performance and statistics on the resultant water levels and flows.

Figure 1A. Lake Ontario Normal Target Level.



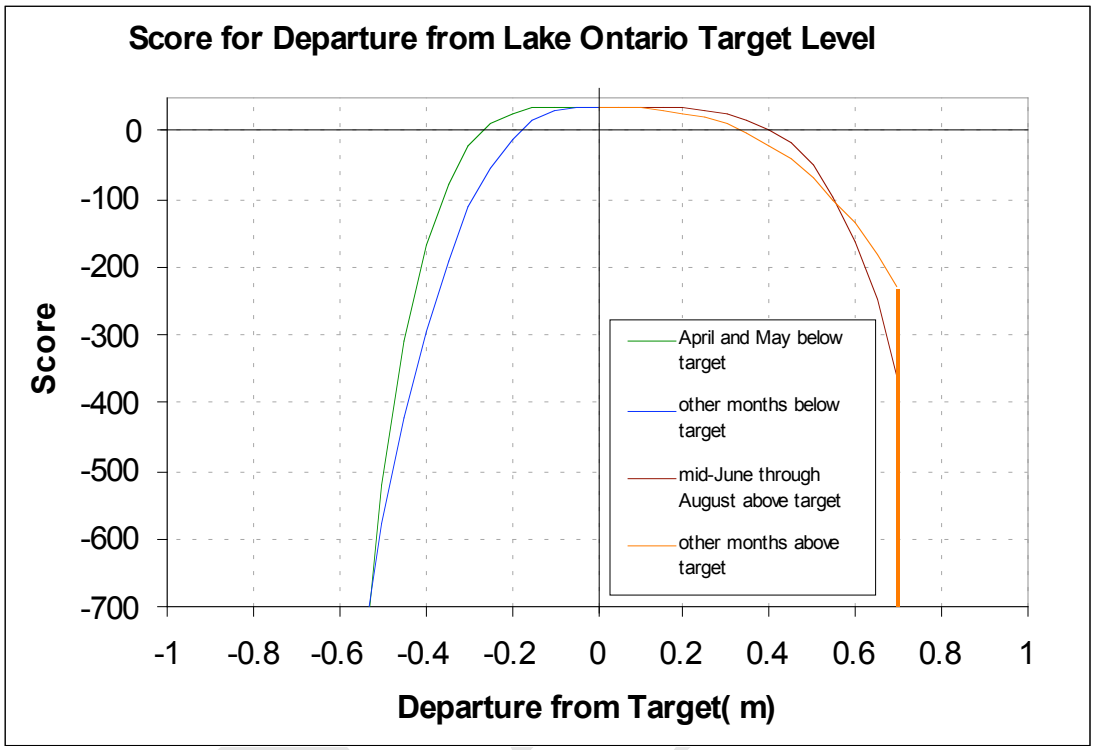
The expected level of Lake Ontario in the coming week is estimated by a water balance (i.e. present level + (forecast supply – trial outflow)). This expected level varies

depending on the trial outflow. Referring to Figures 1A and 1B, if the expected Lake Ontario level in the coming period equals the target level of Figure 1A (or if it is a year that the environmental shift applies, then this target level of Figure 1A minus the amount of shift), then the Lake Ontario level score is 35. As the expected Lake Ontario level in the coming period departs from the target level, then the score diminishes according to appropriate curve for the time of year as shown in Figure 1B.

The rate at which the score diminishes varies with the time of year and whether the level is above or below the target level. The further away from the target level the worse the score, with the score for levels below target getting worse faster than for levels above the target unless the level is more than 0.71 m above the target. As can be seen from Figure 1B, the score gets exponentially worse as the expected level differs further from the target level. The scores for levels greater than 0.71 m above the target worsen at a much higher rate in order to try to prevent such extreme levels.

For example, if the expected level is 0.20 m below the target level in November, then the Lake Ontario level score is about -12.0. If the expected level is 0.20 m above the target level, then the Lake Ontario level score is about 27.0. If the level is right on the target level the score is 35.

Figure 1B. Lake Ontario Score for Departure from Target Level



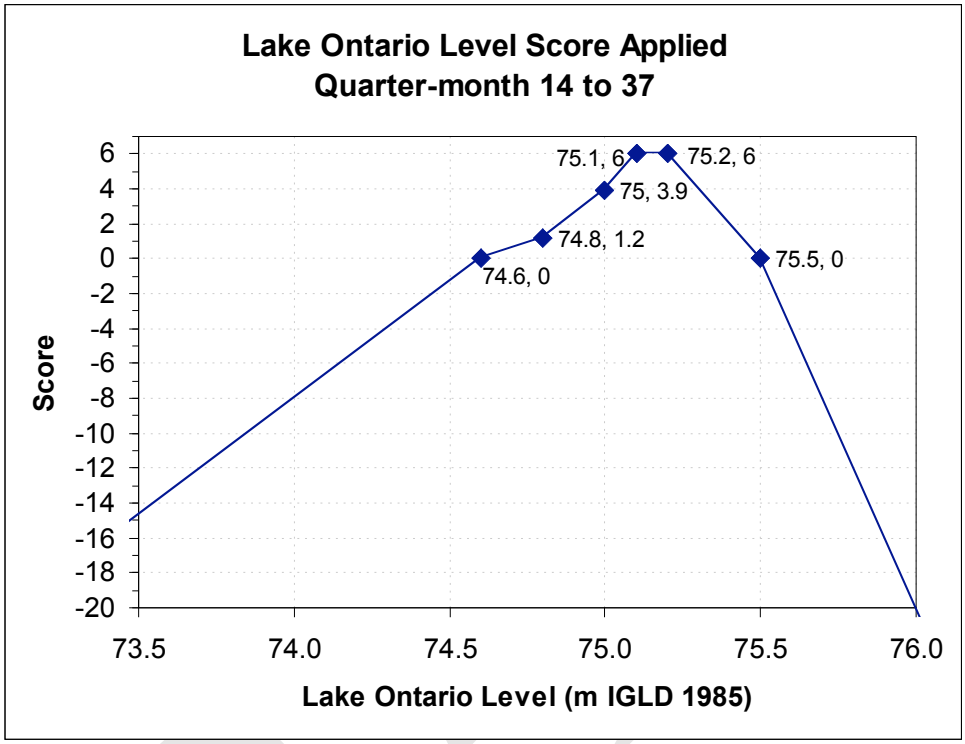
In the development of Plan 2007, both the normal target level and the departure scoring curves were adjusted many times in consideration of several different interests both on the lake and river, including the ecosystem, until this final set of curves was achieved.

In order to periodically provide lower Lake Ontario water levels in the growing season, Plan 2007 keeps track of the number of years since the peak annual Lake Ontario level was less than 74.70 m. Research during the Lake Ontario-St. Lawrence River Study (2000-2005) suggested that keeping Lake Ontario below this level every 20 to 25 years would help control the dominance of cattails in coastal wetlands and would lead to an improved diversity of plants in wetlands. If it has been more than 20 years since the last peak annual Lake Ontario level was lower than 74.70 m for two years in a row, then the plan at the end of February checks if the Lake Erie outflow (averaged over the previous 2 months to smooth out weekly fluctuations due to wind and ice) is in the "right zone" such that there is a good chance that the supplies are right to obtain a peak Lake Ontario level less than 74.70 m in the coming spring-summer period. If the Lake Erie flows are too high (outside the right zone) then it is unlikely that the Lake Ontario level can be maintained below 74.70 m in the growing season and it makes no sense to try to reduce the level due to the impact on the other objectives. If the Lake Erie flow is too low, then it is likely that the peak Lake Ontario level will be less than 74.70 m anyway, and it

would be counter-productive to try to drive the level even lower. If it has been more than 20 years since the last two consecutive years with annual Lake Ontario peak below 74.70 m and the Lake Erie outflow is in the right zone at the end of February, then the plan shifts the Lake Ontario target levels down by 0.2 m from March through the end of July and then the target level is gradually returned to its usual value over the next four months. A gradual, rather than a rapid, return to the normal target Lake Ontario level is made so as not to cause a large reduction in the release that would result in a sudden drop of levels downstream and rise in Lake St. Lawrence. The shift is not applied throughout the year since this would exacerbate low levels on the lake and the lower river late in the year, with no benefit to the environment. At the end of the year the plan checks if the peak Ontario level in the growing season was indeed below 74.70 m and, if so, it again checks if the Lake Erie flows are in the right zone at the end of the following February. If both of these conditions are met, then the second year shift is applied with the Lake Ontario target levels shifted down, by 0.20 m again for the same March - July period and then gradually returned to their usual values over the next four months. This second year of lower peak growing season level is again provided to better meet the stated wetland habitat diversity needs. Whether or not the shift was applied, once the peak annual Ontario level has been lower than 74.70 m level for two years in a row, the year counter is reset and the low shift will not occur again until both the 20 year and the right Lake Erie outflow conditions occur.

To provide better levels for Lake Ontario recreational boating, the scores shown in Figure 2 are applied from the 2nd release decision in April to the 2nd release decision in October, inclusive. Outside this period a score equal to 6/35 of the Lake Ontario departure from target level score produced using Figures 1A and 1B is added.

Figure 2. Lake Ontario Score added in Recreational Boating Season (2nd release April to 2nd release in October, inclusive.)



Benefit functions for the Seaway reflect the need for adequate depths and ship safety. The benefit score for the Seaway is the least score obtained from a number of relationships for different locations along the Seaway route from Lake Ontario to Lake St. Louis. These scores reflect the levels preferred along the route by ships using the Seaway. This score also attempts to maintain a balance in low level during low level periods at the various locations in the system for all uses. Also included in this set are scoring relationships that are based on the gradient between key points on the upper river. The gradients are a measure of the current in the river, and the score is reduced as the gradients become too high and currents too fast for safe navigation. Because the worst conditions throughout the Seaway will determine the requirements for ships passing through the Seaway, only the lowest score from the relationships in Figures 3A to 3K is included in the optimization. Note that as the plan iterates through the different trial flows, the curve with the lowest scoring relationship may switch from one location to another. The score from these relationships are used during the period when the Seaway operates, so these functions will be used in the first release decision after the Seaway opens each spring and will continue to be used until the Seaway closes for the season. Outside this period a score equal to 3/35 of the Lake Ontario departure from target level score produced using Figures 1A and 1B is added since this was found to result in better conditions for the Seaway when it opens again in the spring.

Figure 3A. Lake Ontario Level Seaway Navigation Score

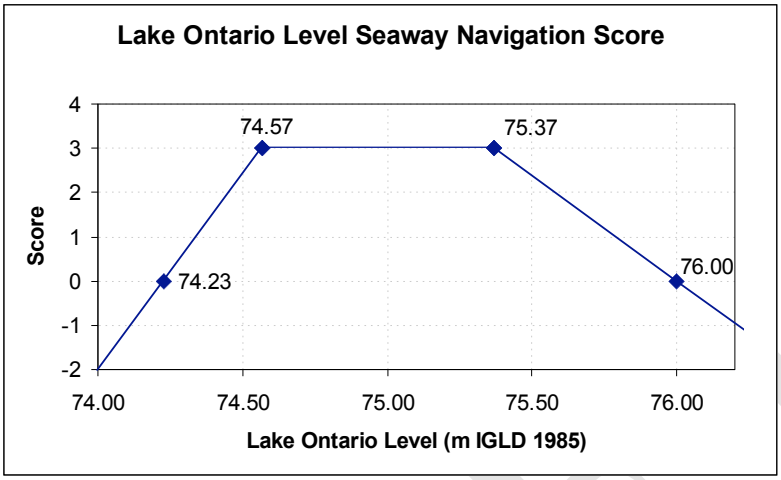


Figure 3B. Ogdensburg Level Seaway Navigation Score

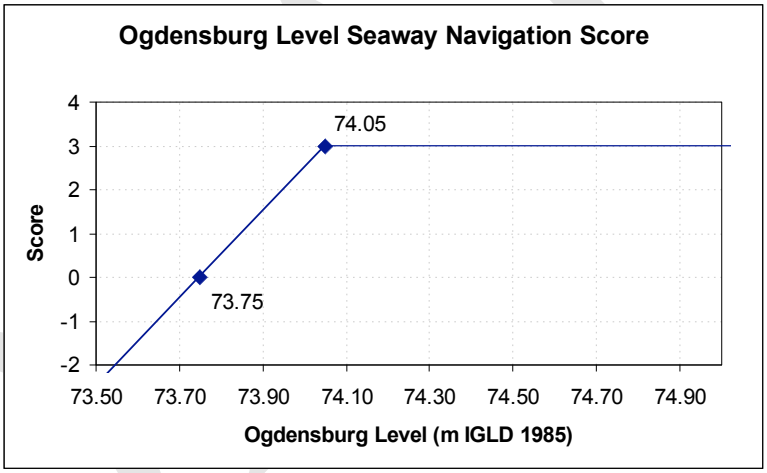


Figure 3C. Cardinal Headwater Level Seaway Navigation Score

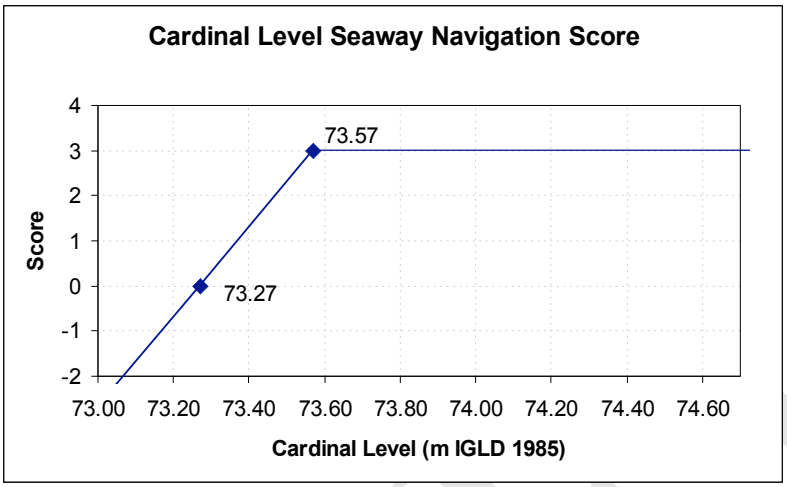


Figure 3D. Iroquois Headwater Level Seaway Navigation Score

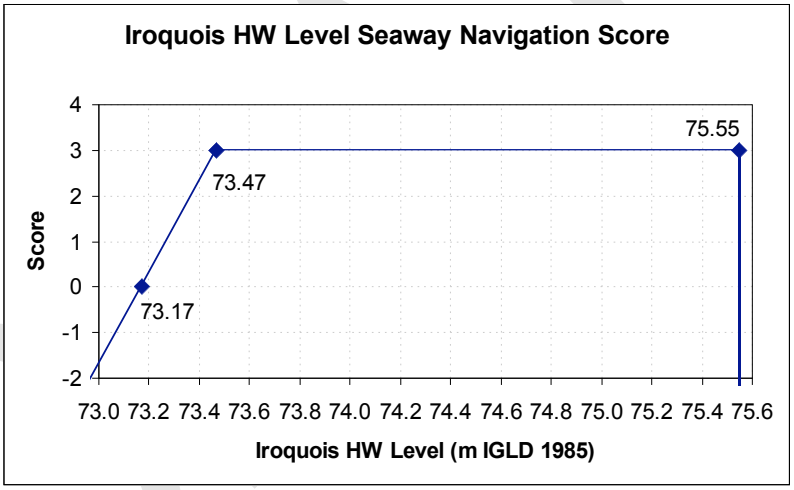


Figure 3E. Morrisburg Level Seaway Navigation Score

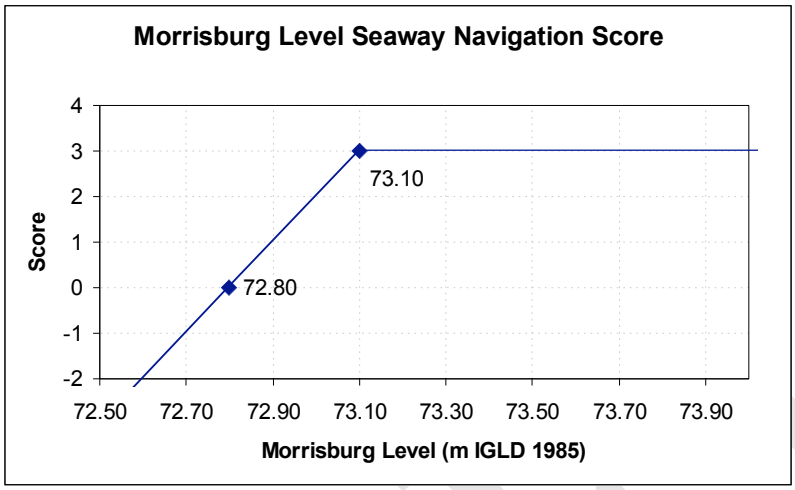


Figure 3F. Long Sault Dam Level Seaway Navigation Score

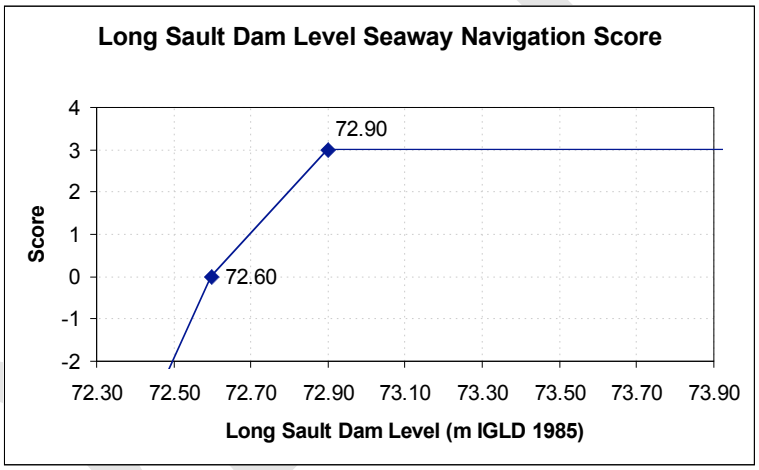


Figure 3G. Summerstown Level Seaway Navigation Score

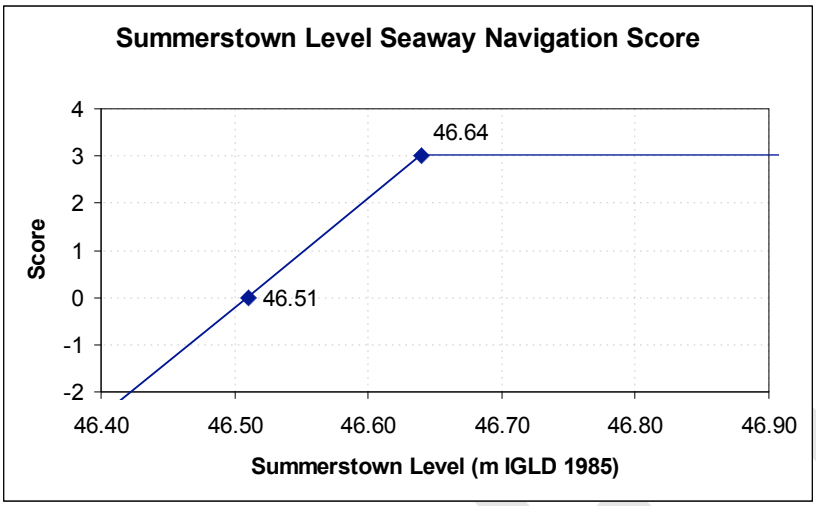


Figure 3H. Pointe Claire Level Seaway Navigation Score

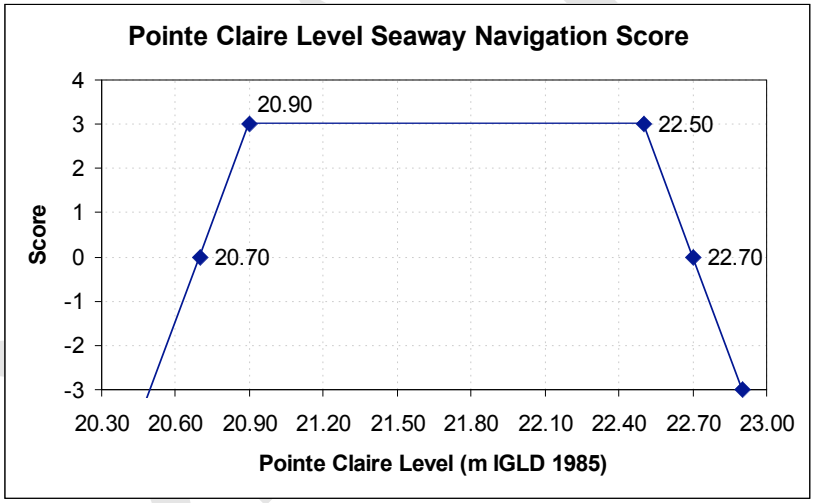


Figure 3I. Ogdensburg – Cardinal Gradient Seaway Navigation Score

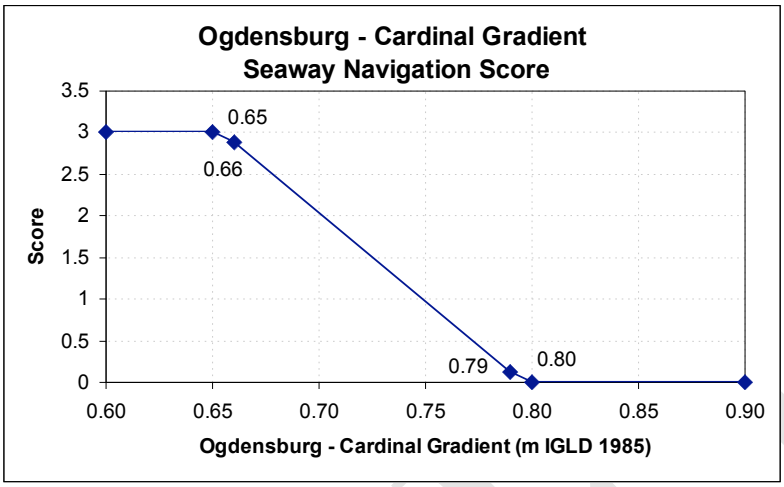


Figure 3J. Cardinal – Iroquois Headwater Gradient Seaway Navigation Score

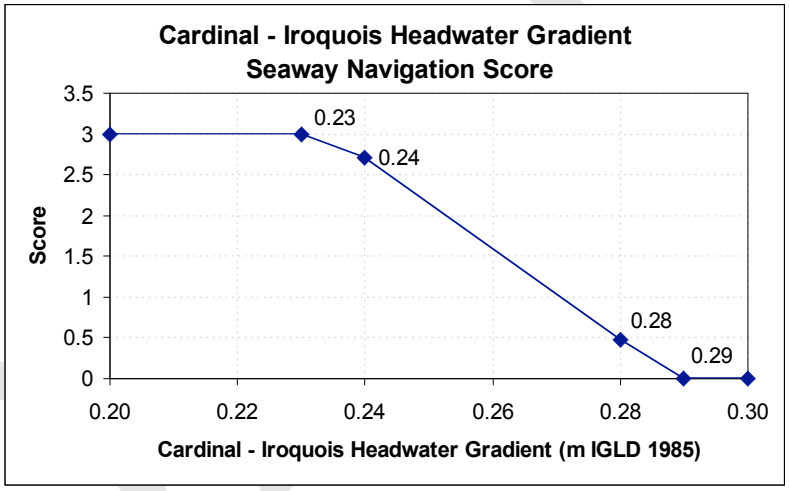


Figure 3K. Morrisburg – Long Sault Dam Gradient Seaway Navigation Score

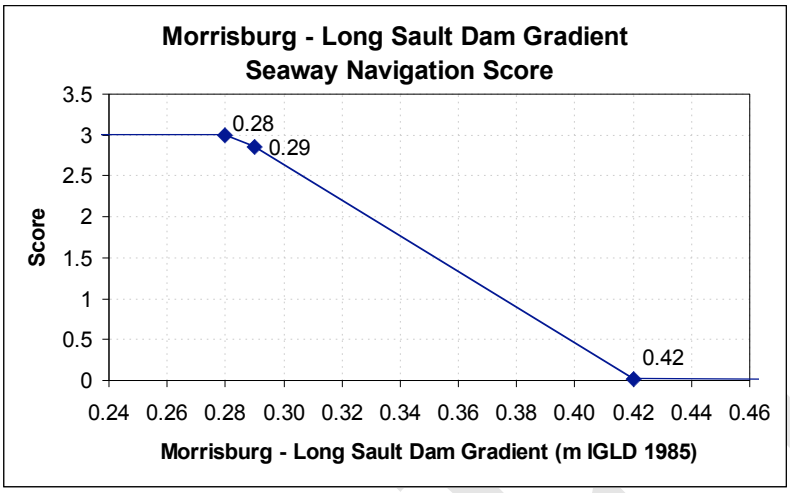


Figure 4 shows the benefit score curve used to limit the severity and frequency of very low levels of Lake St. Lawrence. It uses the expected level at Long Sault Dam to represent the Lake St Lawrence level. This score has a large range due to the sensitivity of Lake St. Lawrence levels to Lake Ontario outflows and river ice restrictions, and the impact on municipal water intakes of low Lake St. Lawrence levels. The score from this curve is included throughout the year.

Figure 4. Score for Level at Long Sault Dam

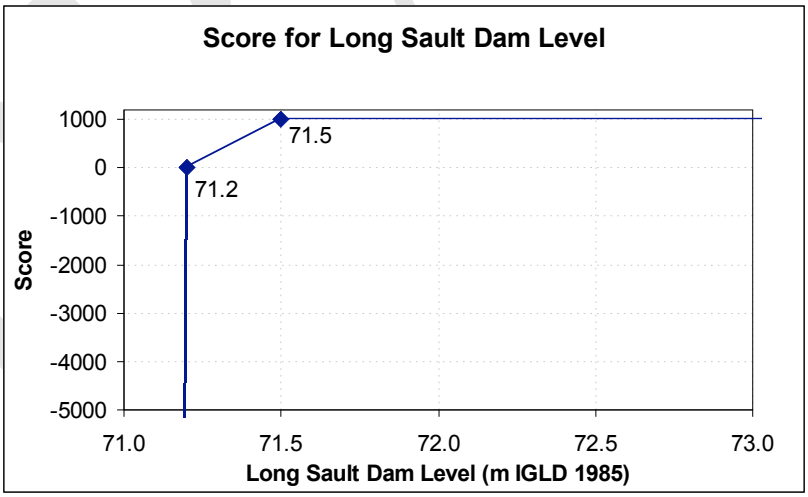


Figure 5 shows the three possible benefit score curves for flow; the status of channel ice upstream of the Moses-Saunders Dam determines which curve applies. If there is no ice cover on the river (i.e. open water condition) upstream of the Moses-Saunders Dam, then the score given by the green curve applies. If the ice cover is forming in the international

section of the river upstream of the dam, then the score shown in the lighter blue curve applies, which essentially limits the flow to less than 6230 m^3/s in order to form a smooth, stable ice cover and prevent ice jams on the river. Once the ice cover has formed on the upper river, flows are limited according to the dark blue curve.

Figure 5. Lake Ontario Flow Score for Different Conditions on the St. Lawrence River Upstream of Moses-Saunders Dam

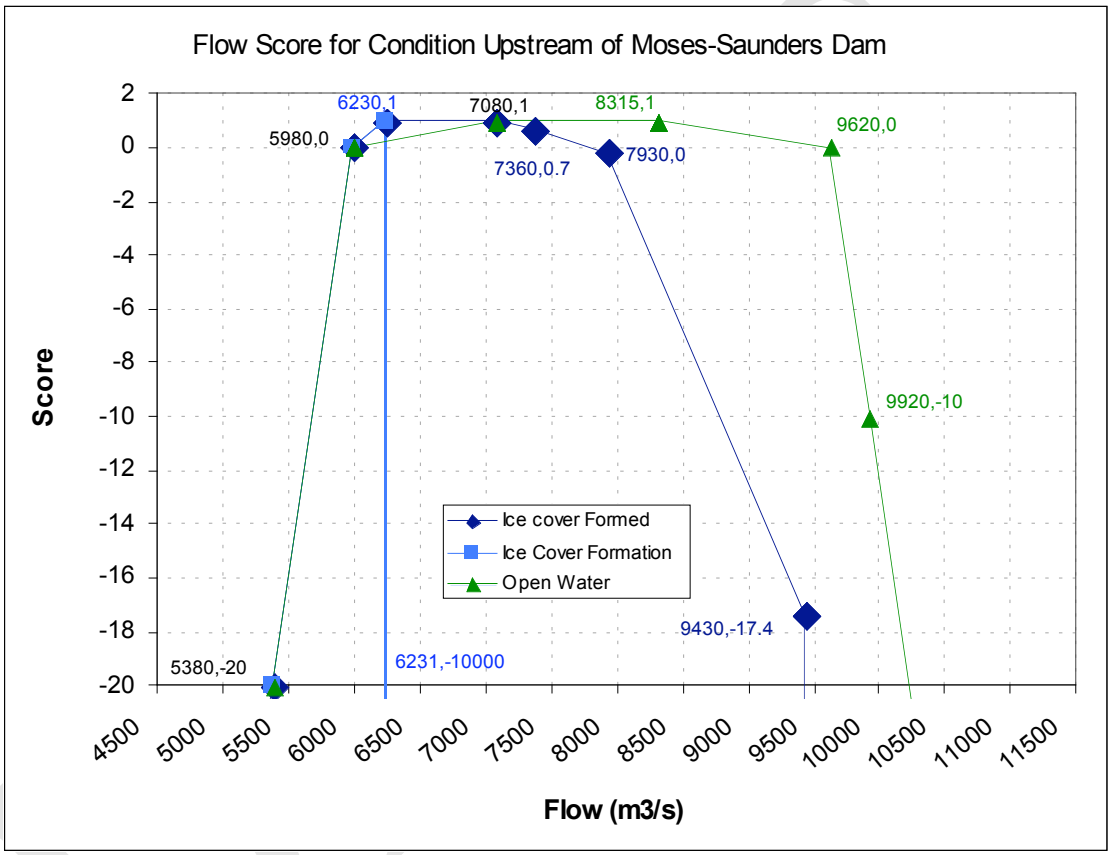


Figure 6A. Lake Ontario Flow Score during Ice Formation on the Beauharnois Canal

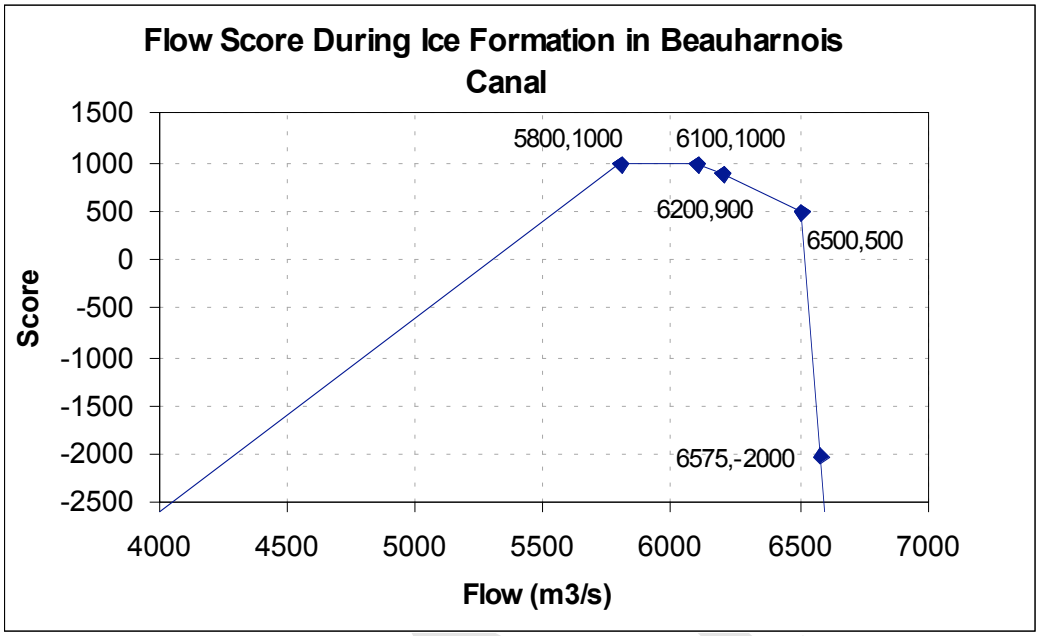


Figure 6B. Lake Ontario Flow Score for Conditions Other Than Ice Formation on the Beauharnois Canal

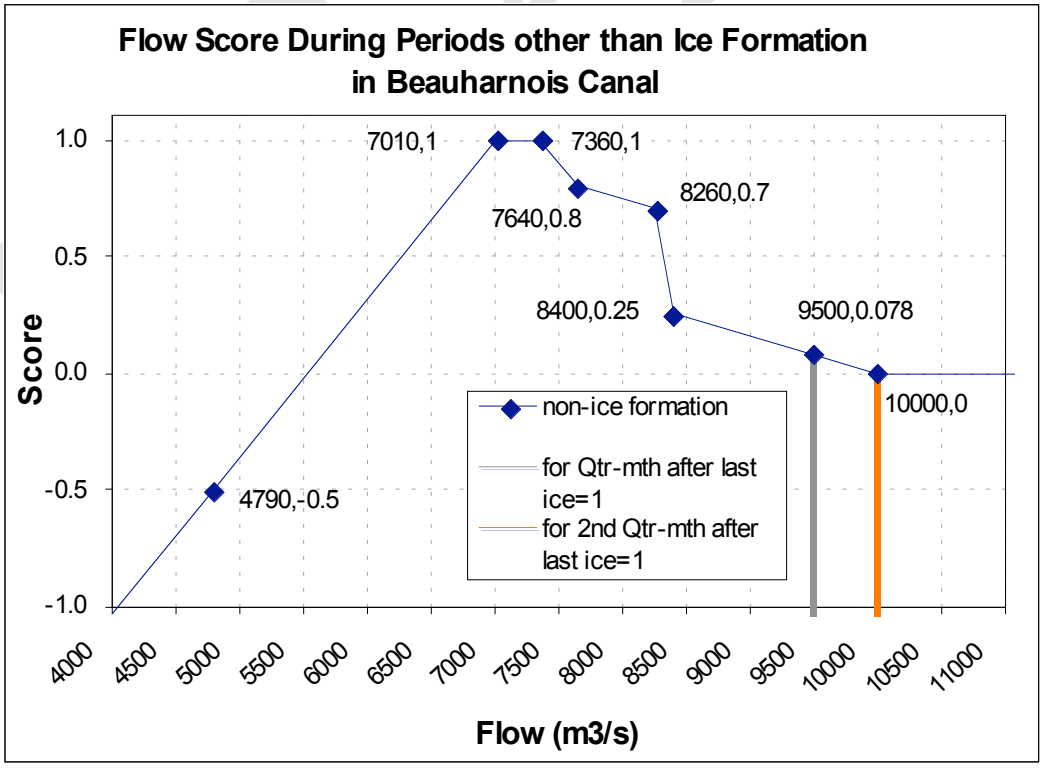
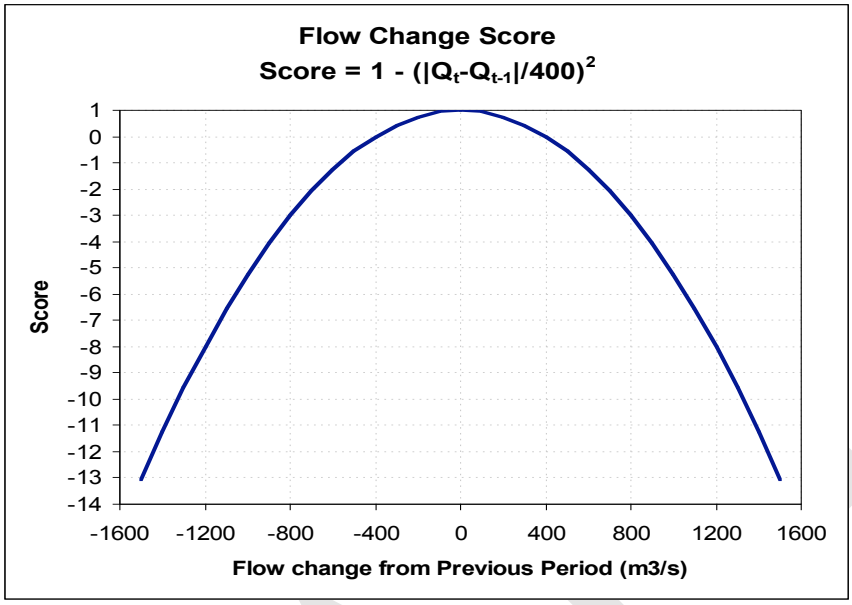


Figure 6A and 6B shows the benefit score curves that are used depending on the ice status in the Beauharnois Canal. The flow referred to is the Lake Ontario outflow that is being determined by the plan. If the ice cover is forming on the canal, then 1000 x the score shown in Figure 6A applies, which tends to limit Lake Ontario outflows above 6100 m^3/s in order to form a smooth, stable ice cover and prevent ice jams on both the Beauharnois Canal and the Coteau channel. Once the ice cover in the Beauharnois Canal has formed, or if there is no ice (i.e. open water condition), then the curve shown in Figure 6B applies. During the ice break up period on the lower river, which typically occurs within the two quarter-months (weeks) after the last ice on the river upstream of Moses-Saunders, then the maximum Lake Ontario flows are limited to 9500 m^3/s and 10000 m^3/s in the first and second release after upper river ice disappears.

Figure 7 shows the score applied to the change in flow from one period to the next. A large week to week change in the release can surprise human and animal users on the river, flooding or stranding activities that continue from week to week. Large flow changes tend to have negative consequences to power production to the extent that it reduces the predictability of flows and could lead to the scheduling of turbine maintenance under the expectation that the remaining turbines would have enough capacity for the expected releases.
If the trial flow is the same as the previous week's flow, then the score is 1. As the absolute difference from the previous week's flow increases, this score is reduced according to the relationship shown in the figure. This tends to reduce the flow change from week to week. This score is included throughout the year except: if ice formation is occuring, if the level of Lake St Louis at Pointe Claire is above 21.9 m, or if the projected Lake Ontario level is more than 0.25 m above the target Lake Ontario level.

Figure 7. Score Based on the Change in Flow from One Week to the Next



Four benefit score curves are included that are based on the expected level of Lake St. Louis at Pointe Claire in the coming period with the trial flow. The score from one of the three curves, as shown in Figure 8, is applied depending on the time of year. These curves reflect different seasonal benefits from the Lake St. Louis levels. In addition, during the mid-April to mid-October boating season, the score shown in Figure 9 is also included.

Figure 8. Lake St. Louis at Pointe Claire Level Score

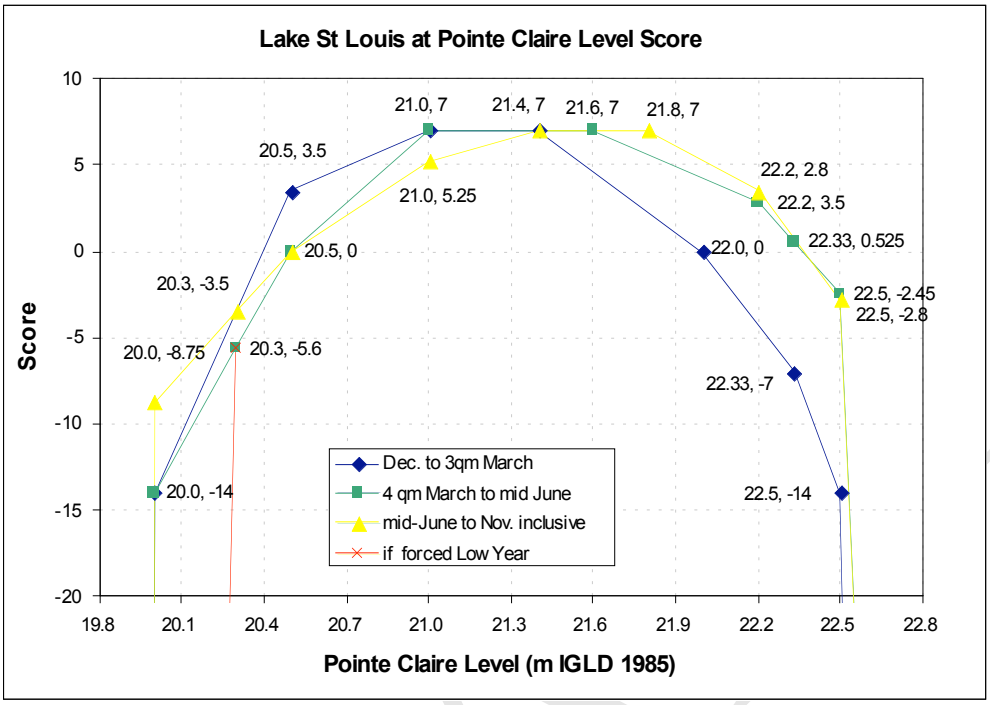
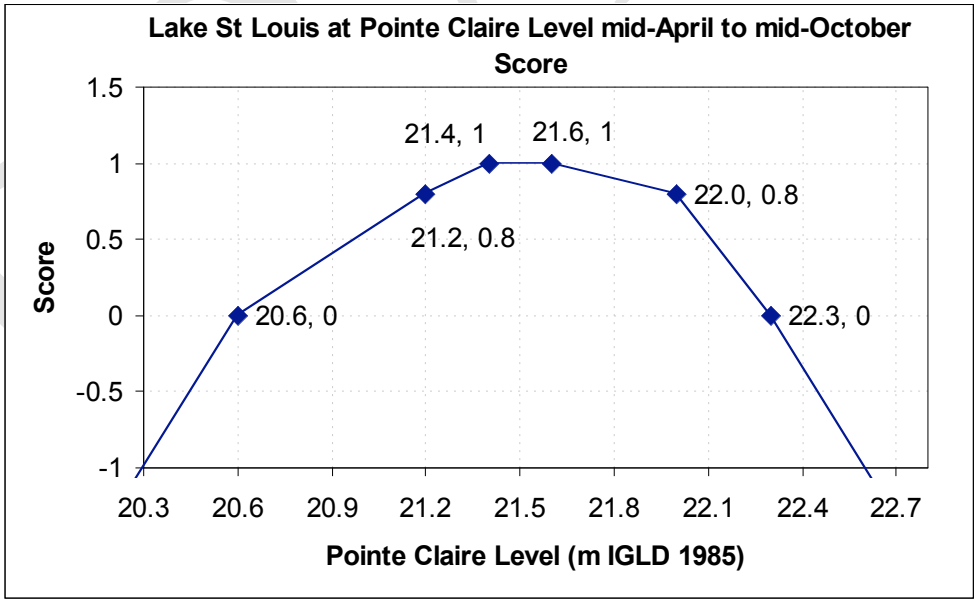
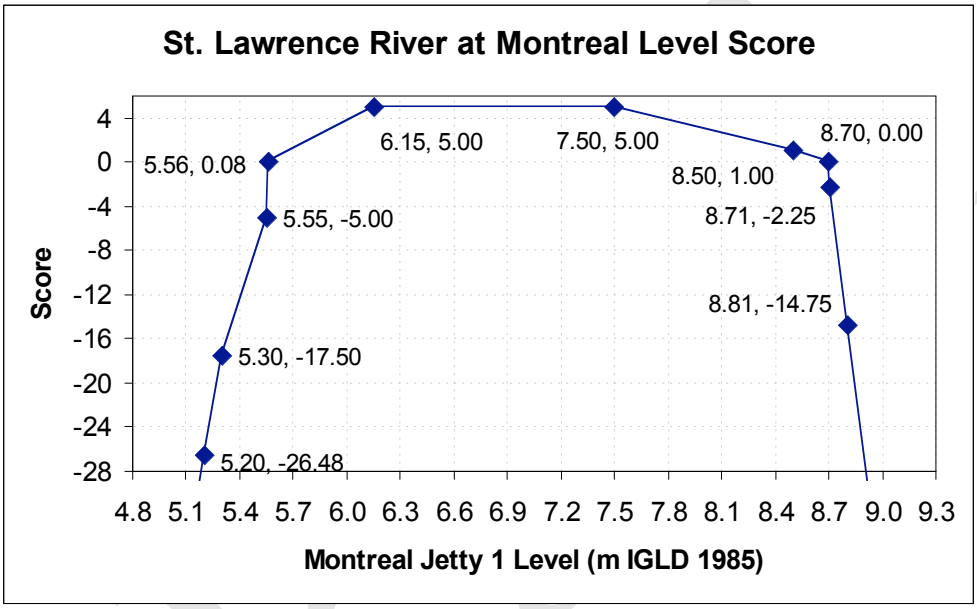


Figure 9. Lake St. Louis at Pointe Claire Level Score



A score based on the expected level of the St. Lawrence River at Montreal, as shown in Figure 10, is also included. This curve applies throughout the year and tends to limit levels above 8.7 m or below 5.55 m at Montreal (Jetty 1 gauge). The score from this curve is doubled in spring months (March through June inclusive) when the net total supplies to Lake Ontario are expected to be moderate as indicated by the average Lake Erie outflow during the winter.

Figure 10. St. Lawrence River at Montreal Score



Flow Constraints

In addition to the tendency of the above described curves (especially those in figures 5 to 7) to limit the Lake Ontario outflows, there are some additional constraints imposed on the flows.

The absolute maximum outflow is limited to be no more than 9910 m^3/s if the Lake Ontario level is less than 0.78 m above the target level. If the Lake Ontario level is more than 0.78 m above the target, then the maximum outflow averaged over the week is allowed to be as high as 10700 m^3/s for periods from the first release in April to the last release of that year inclusive, and 11500 m^3/s for periods outside this range. These flow limits were based on experience in the 1990s with high flows and Seaway navigation operation. The maximum Lake Ontario outflow at which the Seaway has maintained operation has been 9910 m^3/s. Under very high Lake Ontario levels in the past, the Seaway has operated on alternate days when the flow was reduced to 9910 m^3/s, with the other day having higher flows. The 10700 m^3/s amount approximates half the weekly period at 9910 m^3/s and the other half at 11500 m^3/s outflow. A flow of 11500 m^3/s is

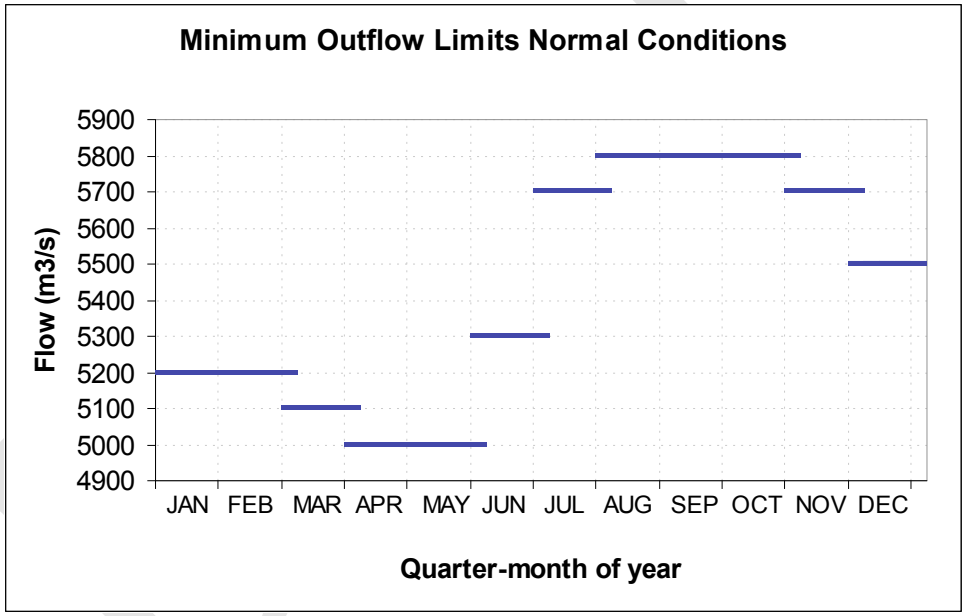
considered the maximum practical outflow from Lake Ontario with the downstream Lake St Francis outlet control structures operating at capacity. Flows this high would be extremely rare under Plan 2007, but could be necessary to balance high water impacts above and below the dam.

The minimum outflow limits in Plan 2007 are as shown in Figure 11. These limits apply if the Lake Ontario level is not more than 0.48 m below the target level. However, if the Lake Ontario level is more than 0.48 m below the target level, then the minimum flow limit is reduced by the following amount in m^3/s:

1300 x (Departure - 0.48)/0.18

The term "Departure" is the amount in metres below the target level of the Lake Ontario level. For example, if the Lake Ontario level is 0.57 m below the target level for the particular period, then the minimum flow for that period will be 650 m^3/s less than the value given for that period in Figure 11.

Figure 11. Minimum Lake Ontario Outflow Limits for Normal Conditions



Example calculations showing how Plan 2007 would be applied

Example 1: Calculating the flow for the week ending June 8, 2001[2]

Conditions

Previous week's release: 6730 m^3/s
Lake Ontario level on the day of the decision: 74.85 m
Forecast Net Total Supply (NTS) for the coming week: 7210 m^3/s
Forecast local flow into Lake St Louis: 930 m^3/s
Ice status: Open water.

Plan Operation

The Lake Ontario target level for the week coming up is 75.12 m.

The first trial flow is 6330 m^3/s, the greater of last week's flow (6730 m^3/s) minus 400 m^3/s (=6330 m^3/s) or the minimum flow (5200 m^3/s). Based on this flow, the beginning of week Lake Ontario level of 74.85 m, and forecast NTS of 7210 m^3/s, the Plan 2007 program would calculate:

- the first trial Lake Ontario end of week level for the following week (74.85 + (7210-6330)/32289.4 = 74.88 m);
- the downstream water levels using forecasts of tributary flows and stage-discharge relationships, and
- each benefit score.

For the first trial flow of 6330 m^3/s, the individual benefit scores are:

Lake Ontario Score for Departure from Target Level (Figure 1):	13.271
Lake Ontario Score added in Recreational Boating Season (Figure 2):	2.243
Seaway Navigation Score (Figure 3):	1.279
Lake St Lawrence Level Score (Figure 4):	1000.000
Flow Score for River Upstream of Moses-Saunders Dam (Figure 5):	0.334
Lake Ontario Flow Score for Conditions on the Beauharnois Canal (Figure 6):	0.541
Flow Change Score (Figure 7):	0.000
Lake St. Louis at Pointe Claire Level Score (Figure 8):	3.994
Lake St. Louis at Pointe Claire Level Score Add Boating Season(Figure 9):	0.247
St. Lawrence River at Montreal Score (Figure 10):	0.133

[2] Examples are from a simulation of the regulation plan using recorded hydrological data for the stated regulation week. The regulation week begins at 0:00h Saturday and continues to the following Friday

The total score for this trial flow of 6330 m^3/s is the sum of individual scores, which is 1022.041.

Plan 2007 then calculates benefit scores for 80 more trial flows, increasing from 400 m^3/s below to 400 m^3/s above last week's flow in 10 m^3/s increments. The next trial flow in this case is 6340 (6330+10) m^3/s. The plan repeats the benefit score calculations, for this trial flow of 6340:

Lake Ontario Score for Departure from Target Level (Figure 1):	13.146
Lake Ontario Score added in Recreational Boating Season (Figure 2):	2.239
Seaway Navigation Score (Figure 3):	1.330
Lake St Lawrence Level Score (Figure 4):	1000.000
Flow Score for River Upstream of Moses-Saunders Dam (Figure 5):	0.344
Lake Ontario Flow Score for Conditions on the Beauharnois Canal (Figure 6):	0.547
Flow Change Score (Figure 7):	0.049
Lake St. Louis at Pointe Claire Level Score (Figure 8):	4.041
Lake St. Louis at Pointe Claire Level Score Add Boating Season(Figure 9):	0.252
St. Lawrence River at Montreal Score (Figure 10):	0.172

The total score for this trial flow of 6340 m^3/s is 1022.120.

This procedure is repeated until the trial flow equals 7130 (6730+400) m^3/s. The plan then finds which trial flow (from 6330 to 7130 m^3/s) results in the highest total score. In this example, the trial flow with the highest score is 6670 m^3/s with a total score of 1023.632. The forecast Lake Ontario level with a 6670 m^3/s release is 74.87 m. The individual scores for a flow of 6670 m^3/s in this case are:

Lake Ontario Score for Departure from Target Level (Figure 1):	8.718
Lake Ontario Score added in Recreational Boating Season (Figure 2):	2.101
Seaway Navigation Score (Figure 3):	2.980
Lake St Lawrence Level Score (Figure 4):	1000.000
Flow Score for River Upstream of Moses-Saunders Dam (Figure 5):	0.652
Lake Ontario Flow Score for Conditions on the Beauharnois Canal (Figure 6):	0.770
Flow Change Score (Figure 7):	0.978
Lake St. Louis at Pointe Claire Level Score (Figure 8):	7.581
Lake St. Louis at Pointe Claire Level Score Add Boating Season(Figure 9):	0.398
St. Lawrence River at Montreal Score (Figure 10):	1.454

Had the example been for the winter with ice conditions in transition from open water to ice formation conditions, the lowest trial flow would be permitted to be as much as 6000 m^3/s lower than the previous quarter-month flow (rather than only 400 m^3/s lower) to allow the flow to be reduced sufficiently for ice formation. Alternately, if the levels in the lower river are high (above 22.0 m at Pointe Claire), the highest trial flow can be as much

as 1500 m^3/s higher than the previous quarter-month flow (rather than only 400 m^3/s higher) to allow the flow to rebound after being reduced for the Ottawa River freshet. The following examples illustrate these cases.

Example 2: Calculating the flow for the regulation week ending January 23, 2004

Conditions

Previous week's release: 7340 m^3/s
Lake Ontario level on the day of the decision: 74.66 m
Forecast Net Total Supply for the coming week: 7260 m^3/s
Forecast local flow into Lake St Louis: 1540 m^3/s
Ice status: Ice was forming in the Beauharnois Canal
Lake St. Louis level on the day of the decision is 21.66 m.

Plan Operation

The Lake Ontario target level for the coming week is 74.48 m.

Plan 2007 stipulates a greater range of trial flows when ice is forming at Beauharnois. Trial flows can range between a lowest flow equal to the greater of last week's flow minus 6000 m^3/s (7340-6000 = 1340 m^3/s) or the minimum flow constraint for this week of the year, which is 5200 m^3/s, as shown in Figure 11. The high end of the trial flows is 7740 (= 7340 + 400) m^3/s in this case. Plan 2007 will generate 255 trial flows (from 5200 m^3/s to 7740 m^3/s) under these conditions. In this case, the highest total score occurs at a trial flow of 6100 m^3/s. The total score for this flow is 2043.772 with the individual scores shown below.

Lake Ontario Score for Departure from Target Level (Figure 1):	25.183
Lake Ontario Score added outside Recreational Boating Season (6/35 x Figure 1):	4.317
Seaway Navigation Score (3/35 x Figure 1):	2.159
Lake St Lawrence Level Score (Figure 4):	1000.000
Flow Score for River Upstream of Moses-Saunders Dam (Figure 5):	0.113
Lake Ontario Flow Score for Conditions on the Beauharnois Canal (Figure 6):	1000.000
Flow Change Score (Figure 7) not applicable since ice is forming:	0.000
Lake St. Louis at Pointe Claire Level Score (Figure 8):	7.000
Lake St. Louis at Pointe Claire Level Score Add Boating Season (Figure 9):	0.000
St. Lawrence River at Montreal Score (Figure 10):	5.000

Example 3: Calculating the flow for the regulation week ending January 19, 2007

Conditions

Previous week's release: 8700 m^3/s
Lake Ontario level on the day of the decision: 74.75 m
Forecast Net Total Supply for the coming week: 8010 m^3/s
Forecast local flow into Lake St Louis: 2010 m^3/s
Ice status: No ice in the Beauharnois Canal or upstream of the Moses-Saunders Dam.
Lake St. Louis level on the day of the decision is 22.02 m.

Plan Operation

The Lake Ontario target level for the coming week is 74.48 m.

Plan 2007 stipulates a greater range of trial flows when the current Lake St. Louis level is over 22 meters. Trial flows can range between a lowest flow equal to the greater of last week's flow minus 3500 m^3/s (8700 - 3500 = 5200 m^3/s) or the minimum flow constraint for this week of the year, which is also 5200 m^3/s, as shown in Figure 11. The high end of the trial flow range is the lower of: last week's flow plus 1500 m^3/s, in this case 10200 (= 8700 + 1500) m^3/s, or 9910 m^3/s which is the maximum flow limit for this week. In this case, the high end of the trial flow is 9910 m^3/s. Plan 2007 will test 472 trial flows (from 5200 m^3/s to 9910 m^3/s) under these conditions. In this case, the highest total score occurs at a trial flow of 8940 m^3/s. The total score for this flow is 1032.816 with the individual scores shown below.

Lake Ontario Score for Departure from Target Level (Figure 1):	21.616
Lake Ontario Score added outside Recreational Boating Season (6/35 x Figure 1):	3.706
Seaway Navigation Score (3/35 x Figure 1):	1.853
Lake St Lawrence Level Score (Figure 4):	1000.000
Flow Score for River Upstream of Moses-Saunders Dam (Figure 5):	0.488
Lake Ontario Flow Score for Conditions on the Beauharnois Canal (Figure 6):	0.166
Flow Change Score (Figure 7) not applicable since L St Louis >21.9 m:	0.000
Lake St. Louis at Pointe Claire Level Score (Figure 8):	-0.012
Lake St. Louis at Pointe Claire Level Score Add Boating Season (Figure 9):	0.000
St. Lawrence River at Montreal Score (Figure 10):	5.000

Operationalizing Plan 2007

Within-week Flow Adjustments

As with all the candidate plans, this plan is dependent upon forecasts and minimum and maximum flow limitations. Adjustments will need to be made within the week in some circumstances due to the difficulties of accurately forecasting changing ice conditions on the St. Lawrence River and flows from the Ottawa River and downstream tributaries. These adjustments are to be made consistent with the intent of the plan. For Plan 2007, explicit relationships will be developed from the results of the 50 000 year stochastic simulation to guide these within week adjustments.