LAKE MANITOBA LAKE ST. MARTIN

OUTLET CHANNELS PROJECT

Lake Manitoba and Lake St. Martin Water Control Structures Operating Guidelines

Draft as of June 16, 2022

Fairford River Water Control Structure Operating Guidelines

The Lake Manitoba and Lake St. Martin regulation guidelines for the Fairford River Water Control Structure (FRWCS) that were recommended by the 2003 Lake Manitoba Regulation Review Advisory Committee[1] and later amended by the 2013 Lake Manitoba, Lake St. Martin Regulation Review Committee[2] are as follows:

1. The desired regulation range on Lake Manitoba is 247.04 metres (m) to 247.65 m (810.5 feet [ft] to 812.5 ft). The desired regulation range on Lake St. Martin is 242.93 m to 243.84 m (797.0 ft to 800.0 ft). It is expected that Lake Manitoba Levels may rise to 247.80 m (813.0 ft) or higher in some years, and drop to 246.89 m (810.0 ft) or lower in other years.
2. The FRWCS is operated under the Minimal Log Change Model as follows:
   a) **Normal Operating Conditions** - When the water level on Lake Manitoba is between 247.04 m to 247.65 m (810.5 ft and 812.5 ft), the water level on Lake St. Martin is between 242.93 m to 243.84 m (797.0 ft and 800.0 ft), and that neither lake is in a flood recovery or drought recovery condition, no changes to the stop-log configuration are made provided discharge remains within 50 – 60% of full capacity.
   b) **High Water Operation** - The FRWCS increase discharge at its maximum capacity when the Lake Manitoba water level exceeds 247.65 m (812.5 ft). During recovery from high water conditions on Lake Manitoba, the FRWCS operates at its maximum capacity until the Lake Manitoba water level recedes to 247.35 m (811.5 ft), after which discharge is reduced to 50% of full capacity.
   c) **Low Water Operation** - The FRWCS will discharge at its minimum discharge rate when the Lake Manitoba water level falls below 247.04 m (810.5 ft). During recovery from drought, the FRWCS is kept at 800 cubic feet per second (cfs) until the Lake Manitoba water level reaches 247.35 m (811.5 ft) after which discharge is increased to 50% of full capacity.
3. Any variances in the lake levels outside of the desired regulation range shall be shared between Lake Manitoba and Lake St. Martin insofar as this may be reasonably possible. This is achieved by adjusting the discharge at the FRWCS.
4. The minimum discharge at the FRWCS is 800 cfs when this can reasonably be achieved. It is desirable to maintain a minimum discharge of 1,000 cfs as often as possible.
5. Notwithstanding the guidelines above, discharge may be adjusted to accommodate maintenance, inspection, or survey work as required.

Lake Manitoba and Lake St. Martin Outlet Channels Operating Guidelines

It is assumed that Lake Manitoba and Lake St. Martin water control structure (WCS) gate settings will be adjusted when required on a weekly or biweekly basis rather than on a daily basis. All references to Lake St. Martin water levels are for the south basin of Lake St. Martin. Notwithstanding the guidelines outlined below, temporary adjustments to channel flows are permitted to facilitate maintenance and inspection activities.

Lake Manitoba Outlet Channel

1. The desirable regulation range on Lake Manitoba is 247.04 m to 247.65 m (810.5 ft to 812.5 ft).
2. Except as outlined in the following conditions, opening of the Lake Manitoba Outlet Channel (LMOC) may begin when Lake Manitoba is above the top of the regulation range 247.65 m (812.5 ft). Discretion may be used to keep the LMOC gates closed or only partially open if Lake Manitoba is forecast to exceed its desired range by less than 0.5 ft and less than 4 weeks, but the outlet shall otherwise be used to its full capacity when Lake Manitoba is above 247.80 m (813ft).
3. The LMOC may be opened pro-actively when the lake level is below 247.65 m (812.5 ft), if the water level on Lake Manitoba is forecasted to be above 247.80 m (813 ft) in the same season.

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Lake Manitoba Outlet Channel *(continued)*

4. Initial operation of the LMOC will increase flow incrementally over multiple days to minimize the mobilization of sediment.
5. During recovery from flood, the outflow from the LMOC will be reduced when the water level on Lake Manitoba recedes to the middle of the regulation range (247.35 m (811.5 ft)). The outflows from the channel will be gradually reduced to ensure Lake Manitoba water levels stay within the middle of the regulation range and will be reduced to zero once the outflow through Fairford River matches or exceeds the total inflow to the lake.
6. If the LMOC must be operated continuously from the open water season into winter freeze-up, the control structure will be operated in a manner to minimize water level fluctuations over the winter and to maintain stable ice conditions, insofar as practicable.
7. Operation of the outlet control structure should not be initiated during the period in which there is solid ice cover in the channel (typically from Dec 1 – April 30th). However, operation may be considered if Lake Manitoba is forecast to exceed 248.1 m (814.0 ft) for the following spring.
8. A riparian flow shall be maintained when required to support dissolved oxygen levels through the channel when the outlet channel gates are closed. Consideration will be given to eliminating riparian flows should Fairford River flows decline below 14.1 m3/s (500 cfs).
9. Flow through the channels will not be restricted through operation of the outlet channel WCS gates when Lake Manitoba is above 247.80 m (813.0 ft

Lake St. Martin Outlet Channel

1. The desirable regulation range for Lake St. Martin is 242.93 m to 243.84 m (797 ft to 800 ft).
2. Opening of the Lake St. Martin Outlet Channel may begin when the Lake St. Martin water level rises above 243.84 m (800 ft). Discretion may be used to keep the Outlet Channel gates closed or only partially open if Lake St. Martin is forecast to exceed its desired range by less than 0.5 ft and less than 4 weeks, but the outlet shall otherwise be used to its full capacity when Lake St. Martin is above 244 m (800.5 ft).
3. Notwithstanding Rule 2, the Lake St. Martin Outlet shall be operated to full capacity when:
   a) the Lake Manitoba Outlet is operated to full capacity,

      and

   b) Lake St. Martin is above 242.93 m (797 ft),

      and

   c) Lake St. Martin is forecasted to go above 243.84 m (800 ft) without operation of the Lake St. Martin Outlet Channel.
4. The LMOC may be opened pro-actively when the lake level is below 243.84 m (800 ft), if the water level on Lake St. Martin is forecasted to be above 244 m (800.5 ft) in the same season.
5. Initial operation of the Lake St. Martin Outlet Channel will increase flow incrementally over multiple days to minimize the mobilization of sediment and to reduce the level differential across the Lake St. Martin Narrows.
6. The outflow from the Lake St. Martin Outlet Channel will be reduced when the lake level decreases below 243.84 m (800 ft) and the lake level will gradually be drawn down to 243.23 m (798 ft). Outflows from the channel will then be further reduced to ensure that the Lake St. Martin water level stays within the middle of the regulation range and will be reduced to zero once the outflow through Dauphin River matches or exceeds the total inflow to Lake St. Martin.
7. If the LMOC must be operated continuously from the open water season into winter freeze-up, the Lake St. Martin Outlet Chanel will be operated in a manner to minimize water level fluctuations over the winter and to maintain stable ice conditions, insofar as practicable.
8. Operation of the outlet control structure should not be initiated during the period in which there is solid ice cover in the channel (typically from Dec 1 – April 30th). However, operation may be considered if the LMOC is operated under clause 7 of its guidelines, or if Lake St. Martin is forecast to exceed 244.75 m (803.0 ft) for the following spring.
9. A riparian flow shall be maintained when required to support dissolved oxygen levels through the channel when the outlet channel gates are closed. Consideration will be given to eliminating riparian flows should conditions on the Dauphin River warrant.
10. Flow through the channels will not be restricted through operation of the outlet channel WCS gates when Lake St. Martin exceeds 244 m (800.5 ft).

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References:

1. Farlinger, D., et al. (2003). Regulation of Water Levels on Lake Mantioba and along the Fairford River, Pineimuta Lake, Lake St. Martin, and Dauphin River and Related Issues: A Report to the Manitoba Minister of Conservation (Volume 2: Main Report). Manitoba Conservation.

   http://content.gov.mb.ca/mit/wm/water_levels_main2003_07.pdf.

2. Westdal, H., et al. (2013). Lake Manitoba/Lake St. Martin Regulation Review Finding the Right Balance: A Report to the Minister of Infrastructure and Transportation (Volume 1: Main Report). Manitoba Infrastructure and Transportation.

   https://www.gov.mb.ca/asset_library/en/2011flood/regulation_review_report.pdf.

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