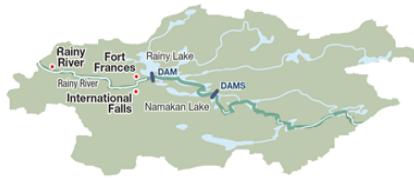




# International Rainy and Namakan Lakes Rule Curves Study Board

## Fact Sheet Series



### Factsheet #8

#### Title: Peaking and Ponding

#### Background

Peaking and ponding are practices used by dam operators that aim to make the most effective use of water for hydropower production. In general, larger volumes of water are released from the reservoir and passed through the turbines during the daytime, when demand for electricity is greatest. When electricity demand is lowest, such as during the night and on weekends, outflows are reduced in order to increase storage for future power production.

Peaking refers to the hour-to-hour flow changes made by a dam operator over the course of a single day. Ponding refers to day-to-day changes made over the course of a week.

#### Effects of Peaking and Ponding on Water Levels

When flow passing through the dam at International Falls is reduced, the water level of Rainy River falls. The water level of Rainy Lake may begin to increase providing that inflows to the lake are greater than the flow being released (see Fact Sheet #3 for more details).

The opposite is true when flow passing through the dam at International Falls is increased. The water level of Rainy River increases and the water level on Rainy Lake decreases, providing inflows to the lake are less than the flow being released.

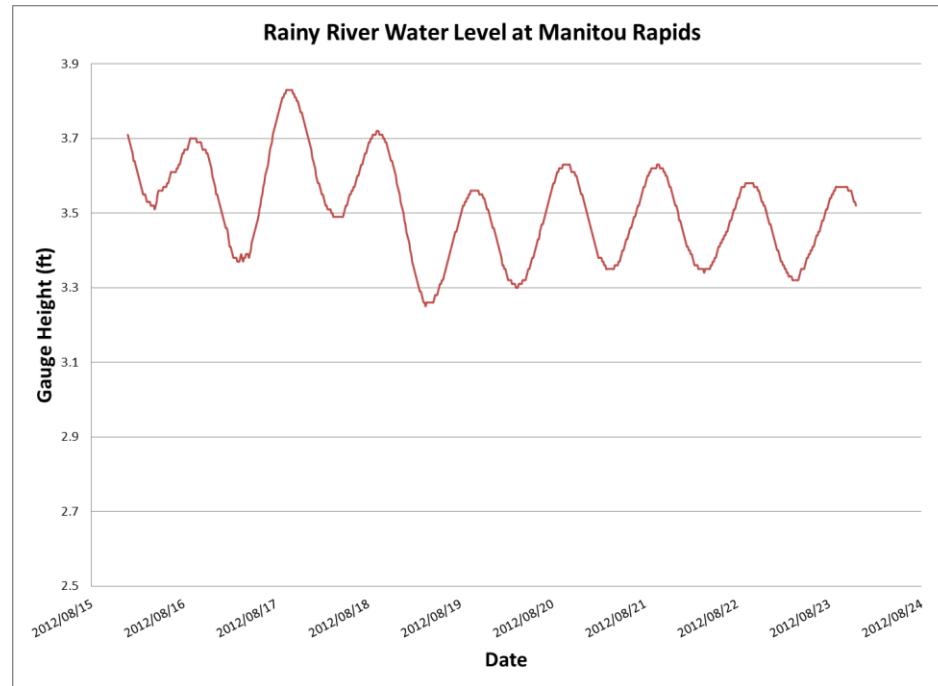
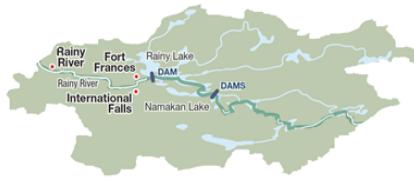
As Rainy Lake is a very large lake, it responds slowly to changes in outflow at the dam. The water level of Rainy River, however, will increase or decrease immediately as a result of a flow change at the dam. The effects of the flow changes on the river are damped as you travel downstream. Water level fluctuations below the dam may vary from 0.5 to 1 m (approximately 1.5 to 3.0 ft) as a result of peaking; whereas, the water level at Manitou Rapids, 53 kilometers (33 miles) downstream, will fluctuate 0 to 15 cm (0 to 0.5 ft). Figure 1 shows the effects of peaking at the International Falls dam on the water level at Manitou Rapids from August 15<sup>th</sup> to 23<sup>rd</sup> 2012. During this period, the water level on Rainy Lake fluctuated less than 3 cm (1 in), largely due to the effects of wind, and the inflows from the Little Fork and Big Fork Rivers remained relatively constant. The observed fluctuations of up to 15 cm (0.5 ft) over the course of a single day at Manitou Rapids can be attributed to changes in flow through turbines at the International Falls dam.

It is important to note, however, that rivers naturally experience great variation in water levels due to intense precipitation events or tributary inflow. The Little Fork and Big Fork Rivers flow in to Rainy River downstream of the International Falls dam. These rivers are not controlled by dams and can deliver large amounts of water to the Rainy River in a short amount of time.



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**Figure 1. Peaking effects on Rainy River water levels at Manitou Rapids**

### Ecosystem Effects of Peaking and Ponding

Sudden changes in water level can have severe impacts on the Rainy River ecosystem. During the spawning period, fish eggs may become exposed under rapidly decreasing flow conditions, or become dislodge under rapidly increasing flow conditions. Aquatic plants, invertebrates such as mollusks, and fish larvae can also be affected.

### Current Peaking and Ponding Practices on Rainy and Namakan Lakes

The current Consolidated Order requires the Companies (H2O Power LP and Packaging Corporation of America or PCA) to target the middle portion of the rule curve band (see Factsheet #1), thereby limiting the amount of water the Companies are able to hold back for release at a later time.

Peaking does not occur on Namakan Reservoir. Kettle Falls and Squirrel Falls dams are unmanned facilities and crews must be sent on location to make flow changes. Furthermore, there are no hydropower facilities at the outlet of Namakan Lake to benefit from this practice.

Peaking does occur on Rainy Lake where H2O Power LP attempts to optimize its power production and revenue from electricity sales. However H2O Power LP voluntarily restricts peaking practices each spring from April 15 to June 30 in an effort to protect spawning beds of Lake Sturgeon. In Northwestern Ontario, Lake Sturgeon are identified as "Threatened" on the Species at Risk in Ontario list.

Peaking practices are not currently used by PCA as its hydroelectric facilities provide power for operation of its paper mill.