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Flows and Levels of the Muskoka River System



“Living in Cottage Country”

Presenter: Steve Taylor, Ministry of Natural Resources and Forestry

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Muskoka River Watershed

- ❑ Originates on western slopes of Algonquin Park, descending 300 m over a distance of 210 km before flowing into Georgian Bay via the Musquash and Moon rivers
- ❑ 5,100 square km in size; approximately the size of PEI
- ❑ Comprised of 3 sub-watersheds; North Branch, South Branch, Lower Muskoka (Moon and Musquash rivers)
- ❑ Includes more than 2,000 lakes with a total surface area of approx. 78,000 ha.
- ❑ Receives more than 1,000 mm of annual precipitation - one of the wettest locations in Ontario;
- ❑ Annual precipitation includes more than 300cm of snowfall, typically representing about 25% of the annual wet precipitation amount

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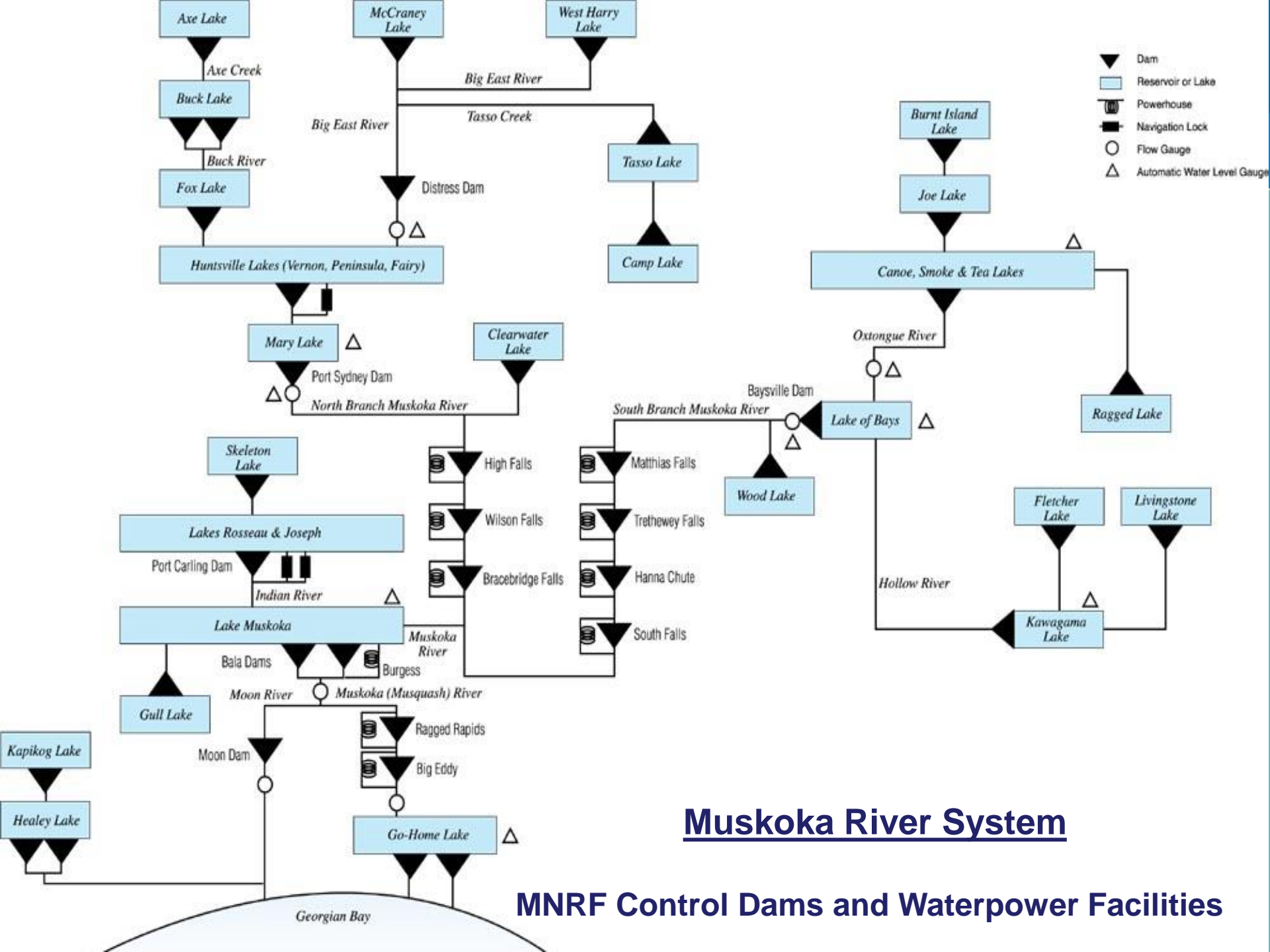
Water Control Structures

- ❑ 41 water control structures on the Muskoka River system: including 10 waterpower facilities and 29 MNRF dams
- ❑ Currently 4 waterpower companies operate waterpower facilities within north and south branches of the Muskoka River and lower Muskoka River system; Musquash River
- ❑ Dams originally built for timber driving and then improved to maintain water levels for navigation and recreation

OPG Ragged Rapids Station

Musquash River





Muskoka River System

MNRF Control Dams and Waterpower Facilities

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Muskoka River Water Management Plan

- ❑ MRWMP came into affect June, 2006: available on *Muskoka WaterWeb*: www.muskokawaterweb.ca
- ❑ *Goal*: contribute to the environmental, social and economic well being of people through the sustainable development of waterpower resources and to manage these resources in an ecologically sustainable way for present and future generations;
- ❑ Achieved through management of water levels and flows as they are affected or controlled by the operation of both waterpower facilities and MNR dams
- ❑ Waterpower facilities and dams each have an annual operating plan for flow and level requirements “*None of the dams regulating the 23 major lakes were built for flood control purposes*”

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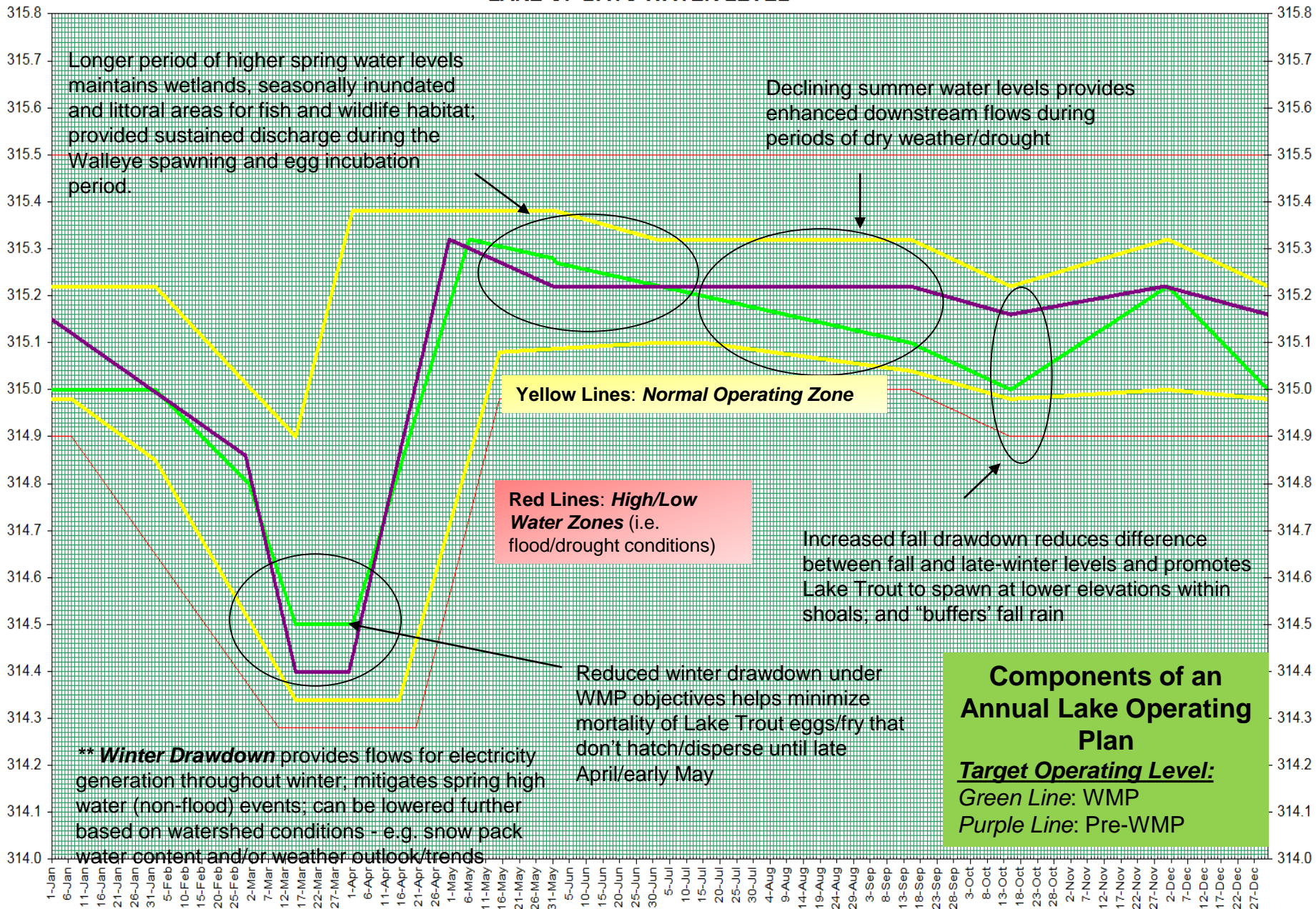
MRWMP Planning: Issues/Considerations

- ❑ Recreational lake levels
- ❑ Lake levels and river flow fluctuations
- ❑ River base (minimum) flows
- ❑ Lake trout spawning habitat - winter lake drawdown
- ❑ Walleye spawning habitat - spring flows
- ❑ Seasonal inundation of wetland areas- fish and wildlife habitat
- ❑ Flood mitigation - protection of property



(Photo: Walleye spawning area: below OPG South Falls)

LAKE OF BAYS WATER LEVEL



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Daily Planning Cycle: Monitoring and Dam Operations

The composite image displays three technical documents related to dam operations:

- Top Left:** A graph titled "LANE ROSEAU WATER LEVEL - m" showing water level trends from 224.0 to 227.0 meters against "LAKF MUSKOKA WATER LEVEL - m". It includes curves for various flow rates (0 CMS to 60 CMS) and data points for specific dates.
- Top Right:** A spreadsheet snippet for "BALA SOUTH" with columns A through L. It contains operational data such as "ENTER Bala Bay water level in 'm'" (225.14), "Water level in 'feet'" (738.85), "Sluice #", "Logs Out", "Logs In", "Sill Elevation", "Head Feet", and "Flow cfs". A yellow box highlights "KEY NOTE".
- Bottom Left:** A graph titled "FIG. 7 BALA REACH DISCHARGE RATING CURVE" showing "BALA REACH WATER LEVEL - Downstream of Bala Dams" (m OSG) versus "TOTAL BALA DAMS DISCHARGE - cms". It includes seasonal operating bands and specific event markers.

On the right side, a large circular diagram illustrates the planning cycle layers:

- Outermost Layer:** Watershed Conditions – Trends - Weather
- Second Layer:** WMP Objectives
- Third Layer:** Upstream Dam Operations
- Innermost Layer:** Individual Dam Operations

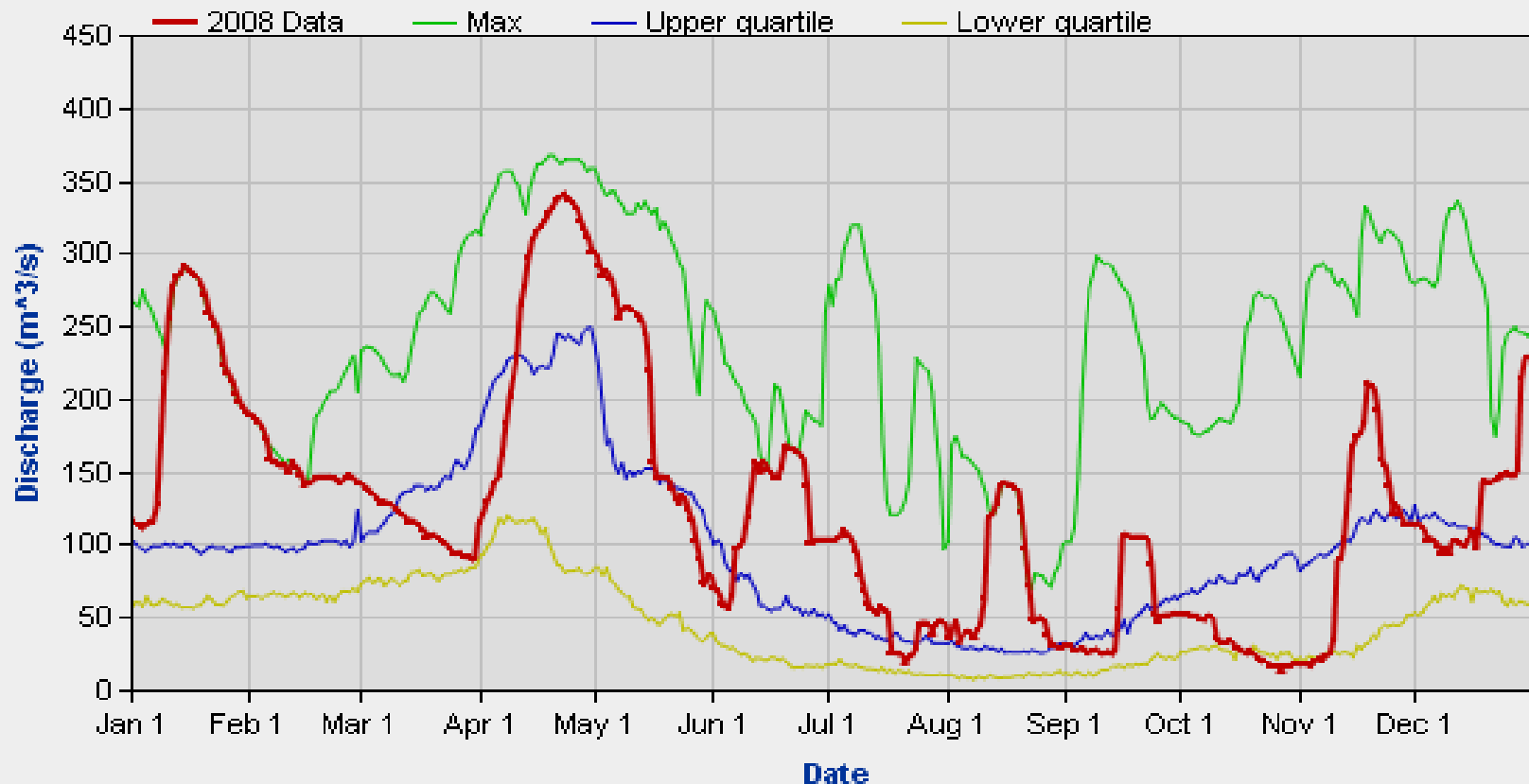
A red arrow points from the "Individual Dam Operations" layer towards the discharge rating curve graph.

Constraints

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Water Level and Flow Gauge Network

Daily Discharge for MUSKOKA RIVER BELOW BALA (02EB006)



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High Water vs Flood Events

- ❑ The operation of MNR dams mitigate impacts of high water that occur at any time of the year but cannot prevent a *flood event*
- ❑ MNRF dams are not designed as flood control structures and have a finite discharge capacity within a lake's Normal Operating Zone;
- ❑ During spring freshet following winter drawdown, total inflow to a lake is greater than dam outflow. Lake level and dam outflow will continue to increase until such time dam outflow matches inflow; *then* lake levels crest
- ❑ Natural and manmade (e.g. bridge/infilling) constrictions to flows within rivers and lake outlets can compound high water conditions
- ❑ A flood is a natural event that occurs periodically and will continue to occur
- ❑ Frequency or severity of floods (and drought) will increase into the future due to climate change; *adaptation and mitigation important...*

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Living by Water: Adaptation/Mitigation

- ❑ MRWMP: *provides an adaptive management approach to operating dams which lessens impacts during periods of high water and drought; e.g. winter drawdowns, minimum flows within river sections downstream of regulated lakes*
- ❑ Avoid infilling or building within floodplains along rivers
- ❑ Build boathouses/docks at an appropriate elevation above normal summer lake levels
- ❑ “Flood-proof” boathouses; consider portable or cantilevered docks
- ❑ Operate boats in a manner to reduce wake; boat wake significantly more damaging to shorelines/infrastructure than wind-driven waves
- ❑ Follow good shoreline use practices to minimize erosion and safeguard other values associated with our lakes and rivers!



Questions?

...Thank-you!