



# Muskoka River

## Water Management Plan



### Final Plan Report

January 2006

Amended February 2018



# Water Management Plan

VS

# Integrated Watershed Management

# Introductions

- Bryan Ingram

Operations Manager, Bracebridge Generation



- Justin Bremner

Engineer – Water Management, Ontario Power Generation



# Muskoka River Water Management Plan

## Agenda

- Introductions
- Background
- Watershed Overview
- Muskoka River Water Management Plan (MRWMP)
  - Why do we have it?
  - How does it work?
  - Limitations
- Water Management Plans vs. Integrated Watershed Management

# Background

- Many of the original dams were constructed in the late 1880's to early 1900's to facilitate the transport of logs to sawmills or the diversion of water to power the mills, and to aid in commercial river navigation. The first ship steamed Lake Muskoka in 1866.
- Hydroelectric power generation has taken place on the Muskoka River since 1894 with most constructed before 1950. There are currently 11 hydroelectric facilities. In 1940, the Ontario Government and the Hydroelectric Power Commission of Ontario (now Ontario Power Generation - OPG) signed the Hackner-Holden agreement, which formalized the control of lake levels and river flows within the Muskoka River drainage area. The agreement, amended in 1969, continues to form the basis of the operational management plans for many of the Muskoka lakes and their control structures. The capacity and reliability of the local electricity system relied on river flows to keep the lights on. As the electricity system developed, local electricity was still produced but connection to the provincial transmission and distribution system relaxed the need to manage local water resources for electricity.

# Background

- Over time, the operational emphasis of some of the dams has evolved from one of commerce and transportation, to recreation, fisheries enhancement and flood control. As the demand for recreational opportunities increased, so has the demand for shoreline cottage/holiday homes with the expansion of the tourism industry. The Muskoka River, and its connecting lakes and tributaries, now supports a range of economic, recreational and tourism activities that are enjoyed by residents and visitors year-round.

# What is the MRWMP?

- Issued under authority of Section 23.1 of the Lakes and Rivers Improvement Act (LRIA)
- Operational strategy for managing flows and levels in a river system through the operation of waterpower facilities
- Maintain water levels and flows within an approved operating range
- Includes an Operating Plan for each water control and generating facility on the river system
- Primary tool for ensuring that operations of waterpower facilities and their associated water control structures balance social, recreational, environmental and economic objectives on a system-wide basis.
- Aims to improve ecological sustainability (through seasonal distribution and maintenance of target water levels and flows)

## Why do we have a MRWMP

# Legislative and Regulatory Context

- Water management planning was first introduced to support the commercialization of Ontario's electricity market.
- ***Energy Competition Act***
  - Act passed by the province in 1998
  - Provided the opportunity to establish a deregulated competitive open market for generation and sale of electricity which opened May 1, 2002
  - Provides market-based mechanisms that favour environmentally preferred types of generation such as waterpower
    - *Recognized that a formal planning framework was needed for managing existing and future waterpower and dam facilities jointly with other interests and values within river systems*

## Why do we have a MRWMP

# Legislative and Regulatory Context

- ***Lakes and Rivers Improvement Act***
  - Act amended in 2002 to create a regulatory framework for existing dam operations.
  - The amendment established the statutory authority for the Minister of Natural Resources to order an owner of an existing dam to prepare or amend a management plan for the operation and maintenance of the dam, consistent with Minister approved guidelines.
- Water management planning process was established to implement this legislative amendment.

# Why do we have a MRWMP

## Legislative and Regulatory Context

- ***Water Management Planning Guidelines for Waterpower (2002)***
  - Approved by MNR in 2002 to implement the LIRA amendment.
  - The goal was to contribute to the environmental, social and economic well-being of the people of Ontario through the sustainable development of waterpower resources, by managing these resources in an ecologically sustainable way.
  - The WMPGs established a planning process for defining goals, objectives, scope and criteria for the preparation of WMPs.
  - Existing waterpower facilities on rivers in provincial jurisdiction were ordered to prepare plans for the management of flows and levels at their generating stations.
    - In some instances, owners of non-power producing water control structures within the same river were required to participate in water management planning for rivers in which their dams were situated, if their dams were integral to the regulation of flows and levels.\*\*

# Current State of the MRWMP

## *Maintaining Water Management Plans Technical Bulletin 2016*

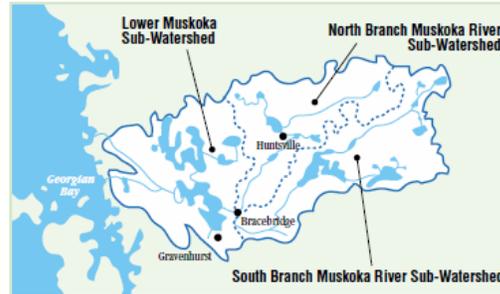
- Replaces the 2002 Water Management Planning Guidelines for Waterpower and its Appendices.
- Annual or 10-year plan reviews no longer required – WMPs amended to reflect this change.
- Amendments to WMPs to follow process outlined in 2016 Maintaining Water Management Plans Technical Bulletin.
- Implementation Reports now required every 5-years. The IR provide plan proponents, the Ministry and interested parties with a status update of the IR and shall include summary of amendment requests; status of Standing Advisory Committee; effectiveness monitoring program results if any; data collection program results.
- The MRWMP Implementation Report is currently being reviewed and will be available once completed.

# MRWMP

- MRWMP came into affect June, 2006: available on *Muskoka WaterWeb*: [www.muskokawaterweb.ca](http://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”*



# Watershed Overview



The watershed is composed of three sub-watersheds as shown above. River profiles for the 3 sub-watersheds are shown in the adjacent figures.

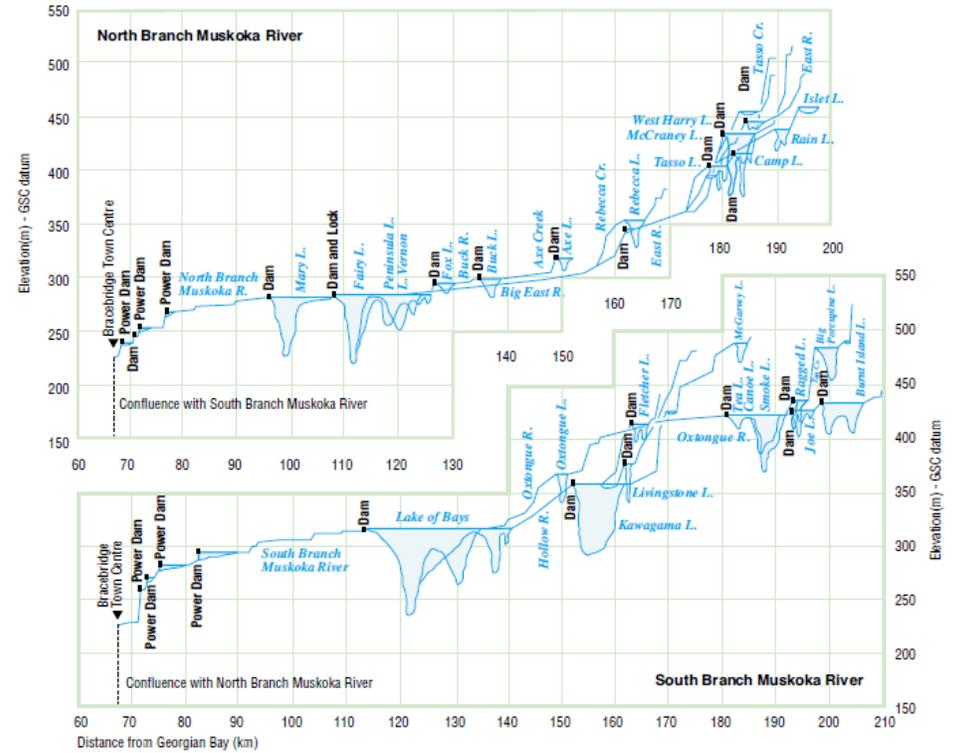
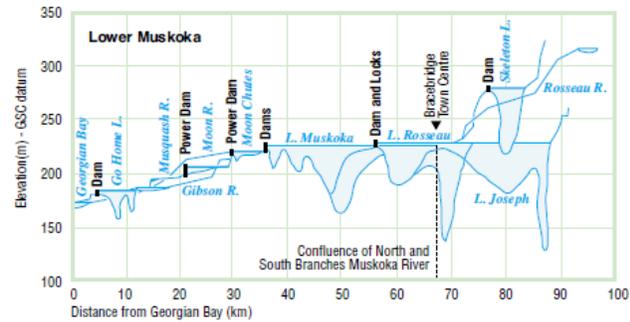
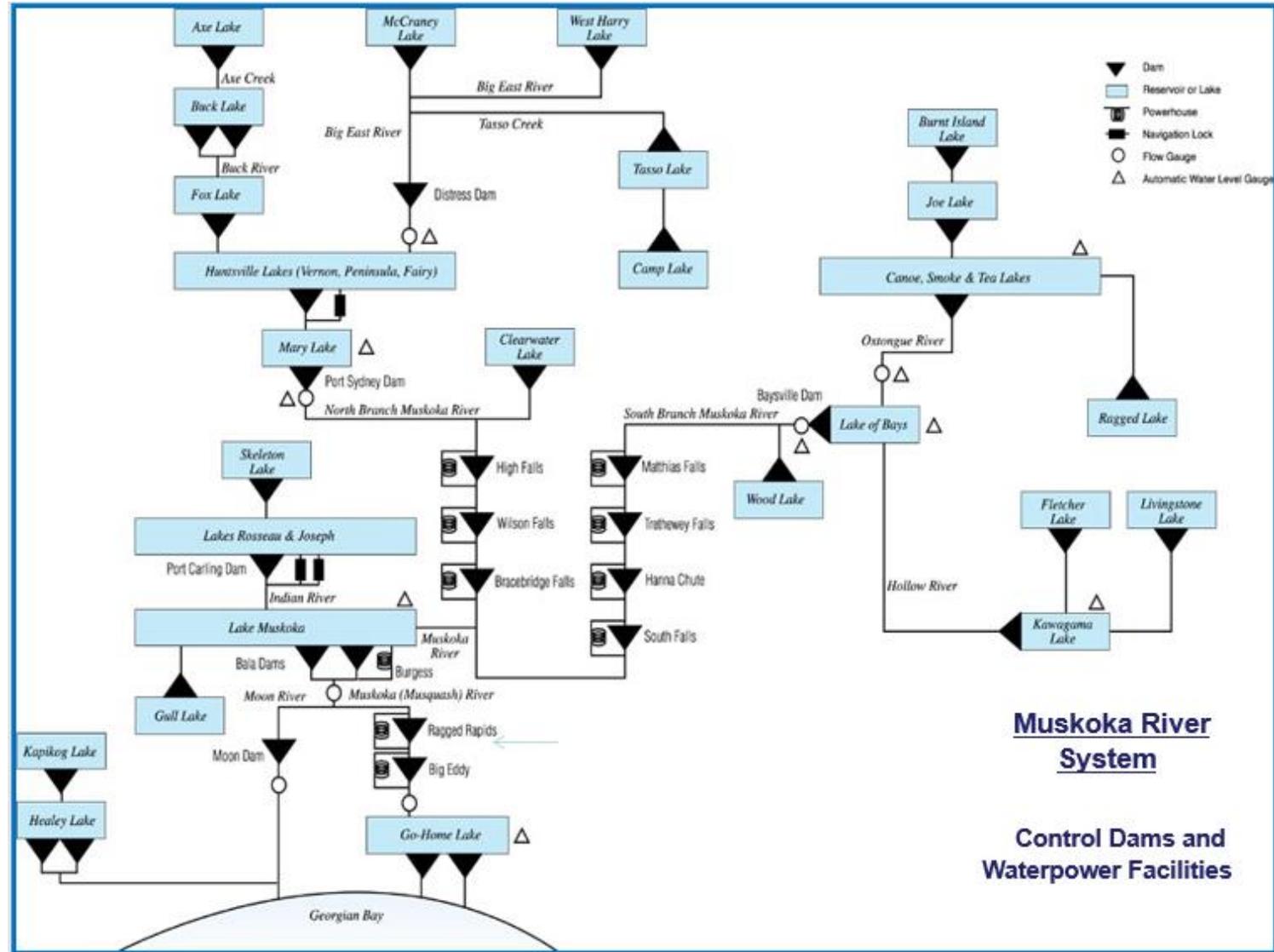


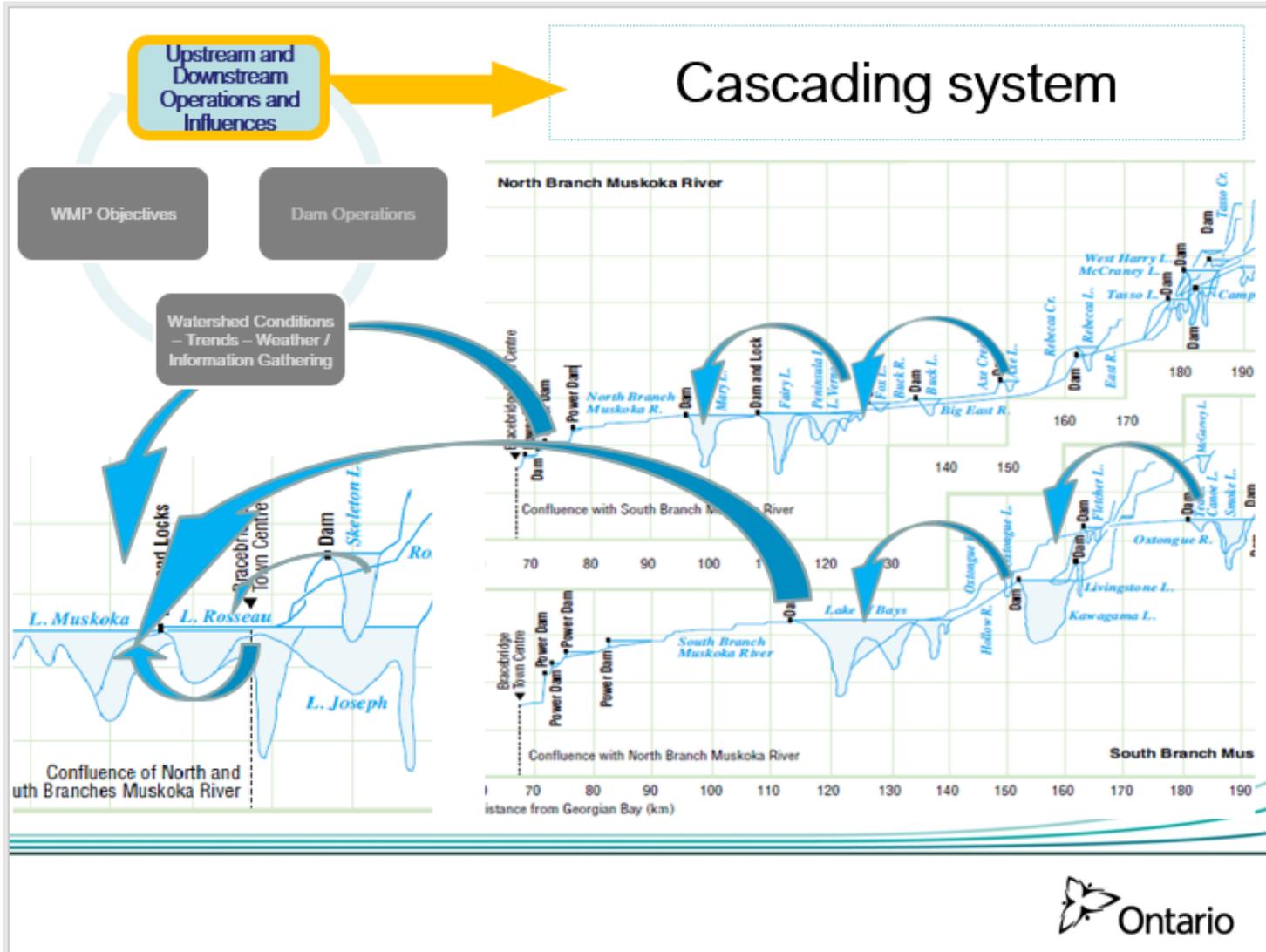
Figure 2.3  
Muskoka River Water Management Plan  
Water Surface Profiles



# Dam and Generating Stations Overview



# Cascading System



# Dams

## Purpose of Dams on the Watershed

Many of the original dams were constructed in the late 1800's to early 1900's:

- Facilitate the transport of logs to sawmills
  - Hydroelectric generation
  - Aid commercial navigation
- Dams range from large structures with multiple openings requiring frequent visits to small structures that may not appear to be a water control structure.
  - Many of the dams maintain the same configuration and discharge capacity of the original structures .

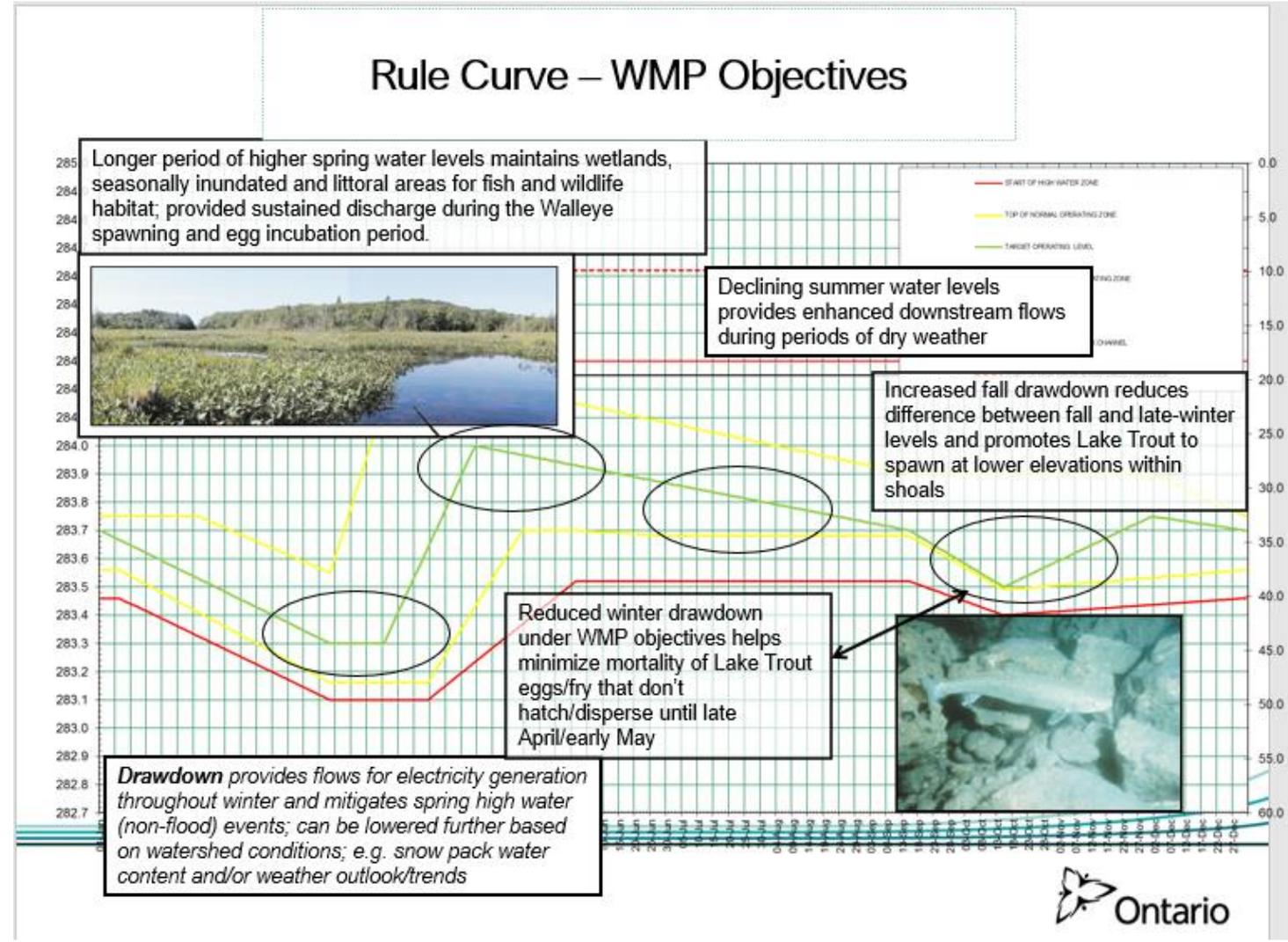


# Hydro Generating Stations

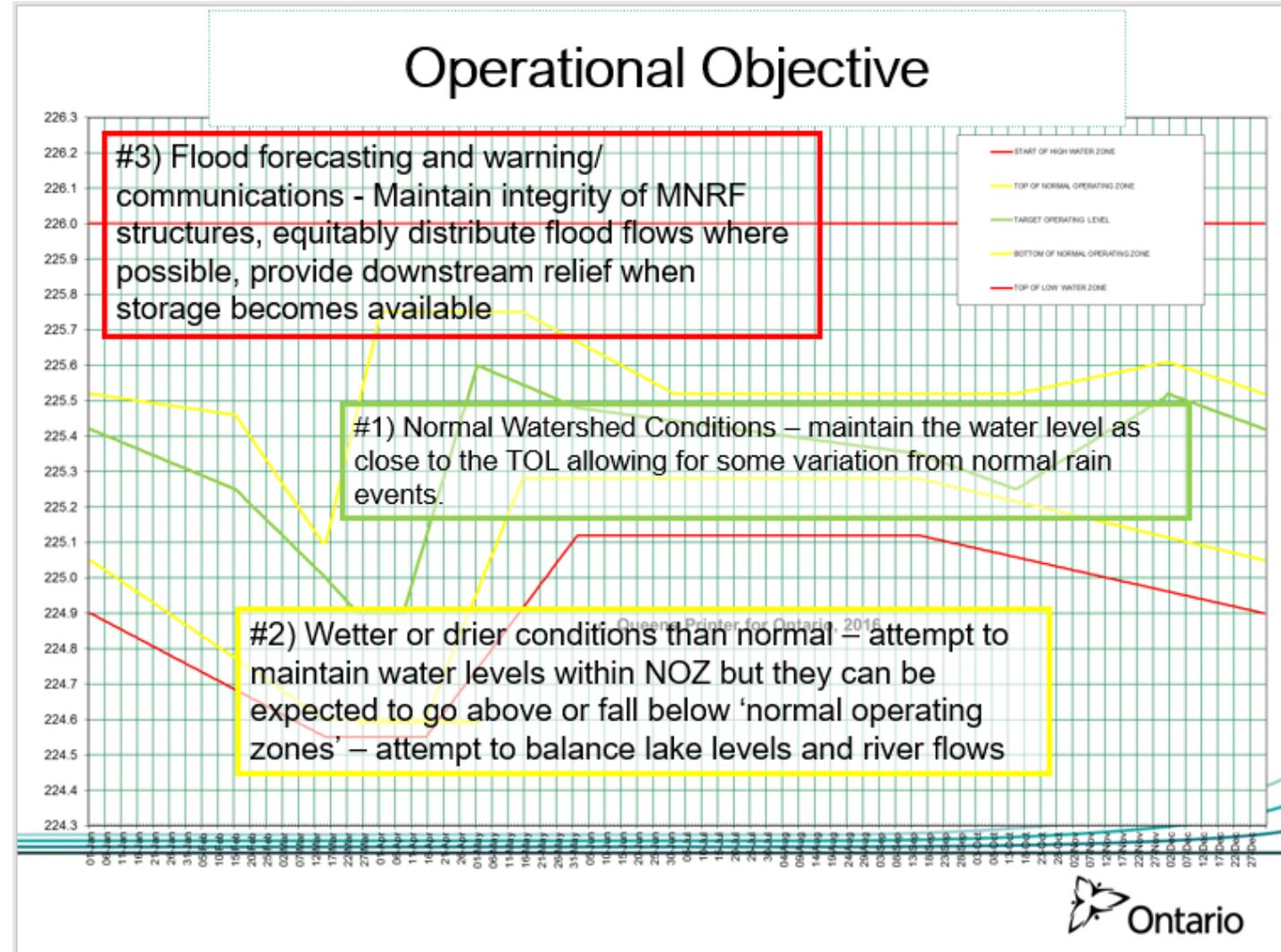
- Maximum and Minimum Normal Operating Ranges
- Dam Safety Levels
- Run of the River Stations
- Limited Storage



# How the MRWMP works

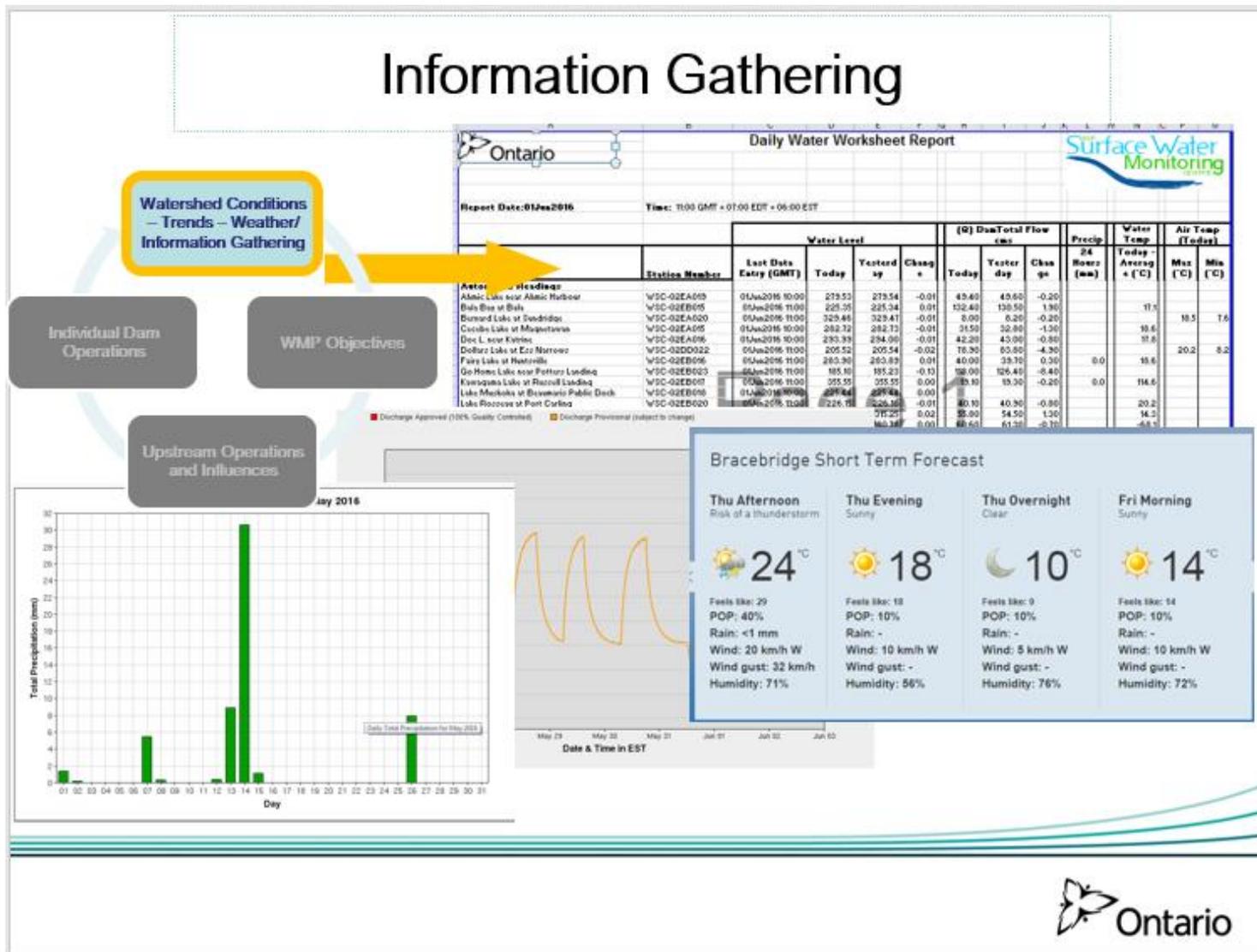


# How the MRWMP works

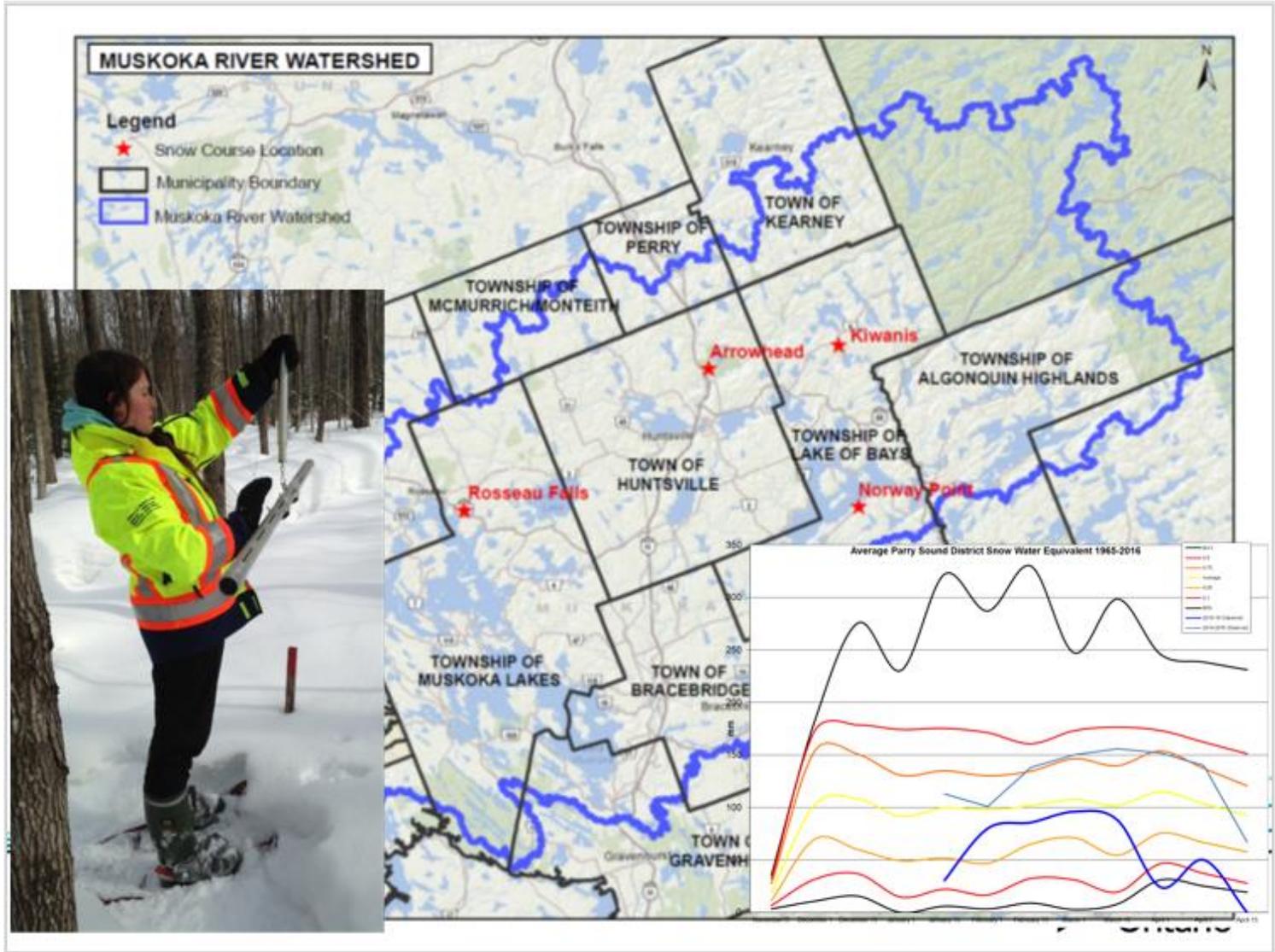




# How the MRWMP works



# How the MRWMP works



What the limitations of the MRWMP are (i.e., not meant for flood control or watershed management).

## High Water *and* Flood Events – what dams can and cannot do!

The operation of dams mitigate impacts of high water that occur at any time of the year but cannot prevent a *flood event*

Muskoka River 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...*

What the limitations of the MRWMP are (i.e., not meant for flood control or watershed management).

## MNRF Flood Messages

Special Provincial Flood Watch for Lake Ontario Issued by the Surface Water Monitoring Centre of the Ministry of Natural Resources and Forestry Friday July 7, 2017 at 10:00 AM

**To: MNRF Districts:**

Guelph, Aurora, Peterborough, Kemptville

**To: Conservation Authorities:**

Niagara Region, Conservation Hamilton, Conservation Halton, Credit Valley, Toronto Region, Central Lake Ontario, Ganaraska, Lower Trent, Quinte, Cataraqui, South Nation, Raisin Region

**Local Messages Issued By:**

Note: See [Ontario.ca/flooding](http://Ontario.ca/flooding) for current locally issued messages.

**MNRF Districts:**



**BULLETIN**  
Ministry of Natural Resources and Forestry

Parry Sound District

Flood Warning – North Branch Muskoka River Sub-Watershed, Moon River/ Bala Reach and the South Branch of the Muskoka River.

Flood Watch - District Municipality of Muskoka, the Territorial District of Parry Sound and a portion of the County of Haliburton.

NEWS Saturday, April 15, 2017  
9:30 AM

The Ministry of Natural Resources and Forestry – Parry Sound District is advising area residents that a **Flood Watch** is in effect for the District, which includes the District Municipality of Muskoka, the Territorial District of Parry Sound and a north-west portion in the County of Haliburton.

Provincial messages are issued by SWMC to MNRF Districts and Conservation Authorities

MNRF Districts and Conservation Authorities issues local messages according to local watershed conditions

Municipalities  
First Nations  
Local Roads Boards  
OPP  
Health Unit  
Media



What the limitations of the MRWMP are (i.e., not meant for flood control or watershed management).

## MNRF Flood Messages

### Watershed Conditions Statement – Water Safety



### Flood Watch



### Watershed Conditions Statement – Flood Outlook



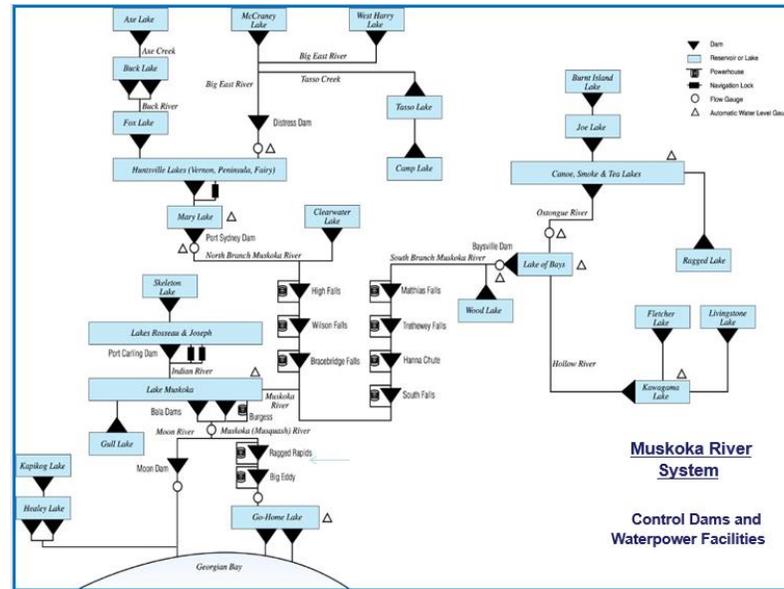
### Flood Warning



# MRWMP

VS

# Integrated Watershed Management



## Equability

Recreational lake levels

Water levels and river flow fluctuations

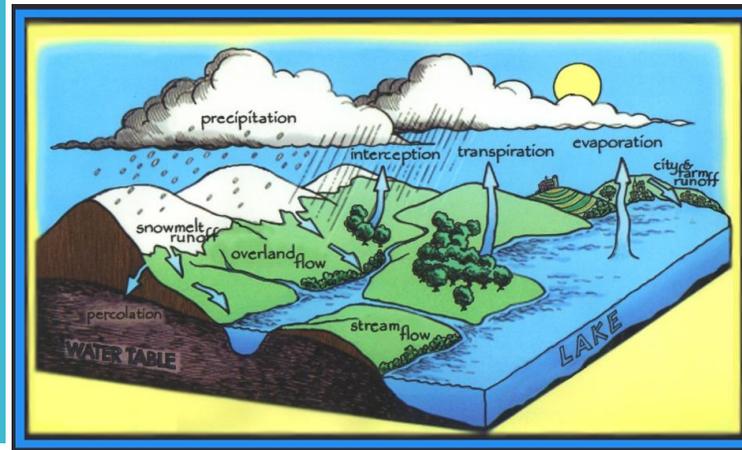
River base (minimum) flows

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.



Human Health A healthy watershed provides safe drinking water, provides food, enables us to adapt to the impacts of climate change more easily by cooling the air and absorbing greenhouse gas emissions, and provides natural areas for people to keep active and recharge our batteries.

Ecological Health A healthy watershed conserves water, promotes streamflow, supports sustainable streams, rivers, lakes, and groundwater sources, enables healthy soil for crops and livestock, and also provides habitat for wildlife and plants.

Economic Health A healthy watershed produces energy and supplies water for agriculture, industry and households. Forests and wetlands help to prevent or reduce costly climate change and flooding impacts, manages drought, contributes to tourism, fisheries, forestry, agriculture and mining industries.

# WMP vs IWM

## IWM – Value Added



*Watershed-based plans can be integrated into a broader integrated watershed management*

- The whole is greater than the sum of its parts
- Integration is within and among plans
- The parts address cross boundary issues & opportunities that are specific to the watershed
- Implementation is shared among partner agencies & stakeholders within individual mandates
- People working together towards a common goal produces:
  - focused efforts,
  - builds on existing strengths,
  - reduces duplication, pools human & financial resources, and
  - effects change on-the-ground

## Summary: MRWMP

- ***Lakes and Rivers Improvement Act***
  - Act amended in 2002 to create a regulatory framework for existing dam operations.
- ***Water Management Planning Guidelines for Waterpower (2002)***
  - The goal was to contribute to the environmental, social and economic well-being of the people of Ontario through the sustainable development of waterpower resources, by managing these resources in an ecologically sustainable way.
- MRWMP came into affect June, 2006: available on *Muskoka WaterWeb*: [www.muskokawaterweb.ca](http://www.muskokawaterweb.ca)
- *Maintaining Water Management Plans Technical Bulletin 2016*

## Summary: Dams

- There are many dams within the watershed, that were built the late 1800's or early 1900's to support logging industry, hydro generation and aid commercial navigation.
- Muskoka Watershed does not have reservoirs that can mitigate large flooding events. Dams have a finite discharge capacity that at times can be exceeded due to large flooding events.

Any  
Questions?

- Thank you for your time.

Presenters

Bryan Ingram, Operations Manager, Bracebridge Generation

Justin Bremner, Engineer- Water Management, Ontario Power  
Generation