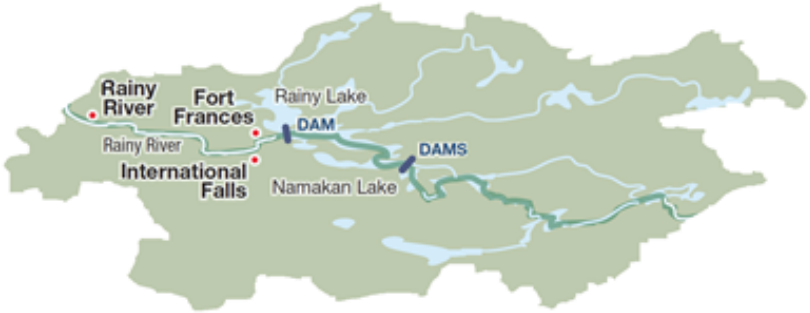
International Rainy and Namakan Lakes Rule Curves Study Board



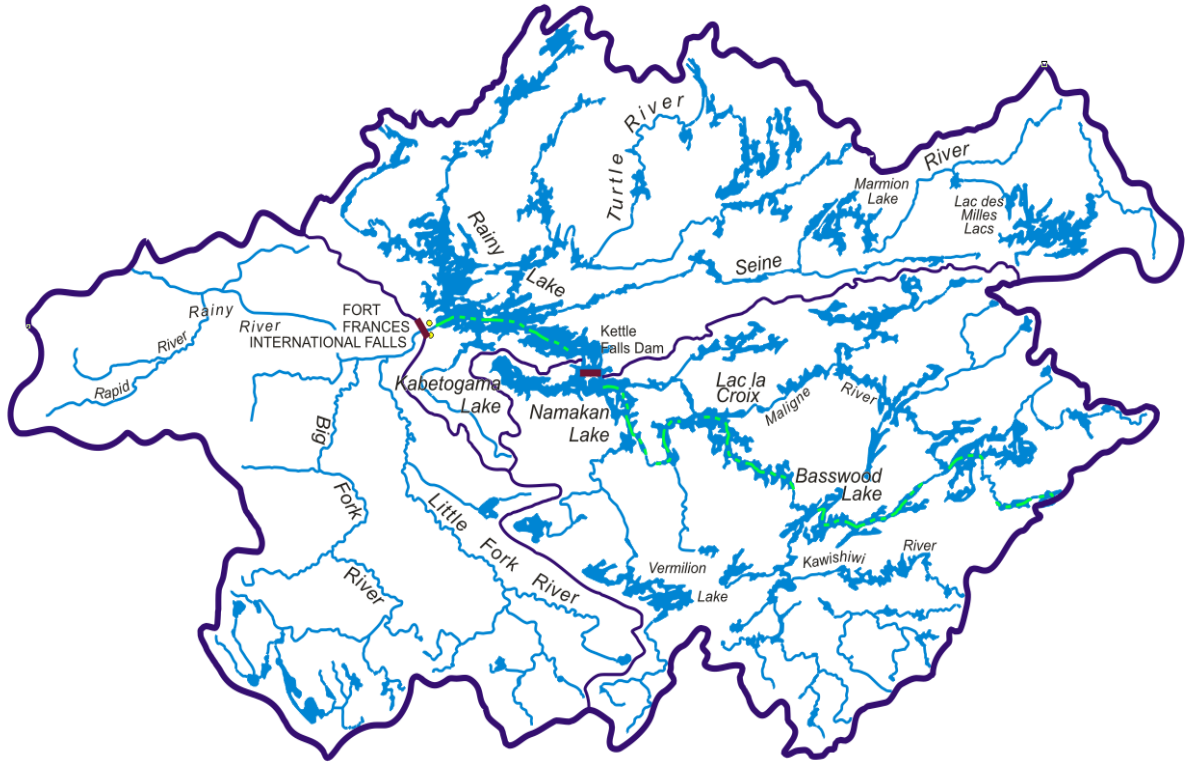
Initial Public Engagement September 2015

Webinar and Public Briefings

September 25-30, 2015

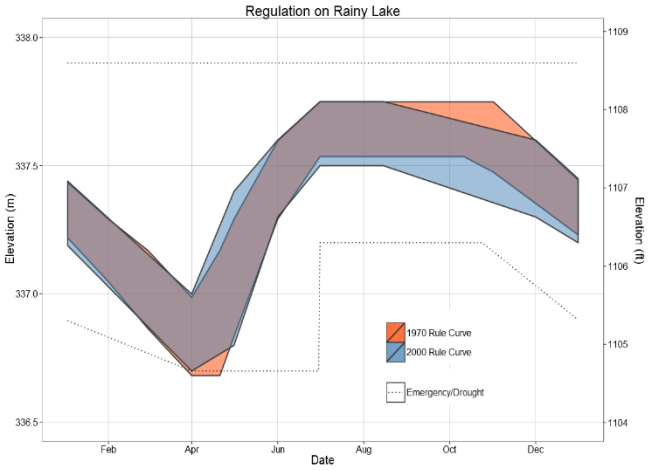
Outline

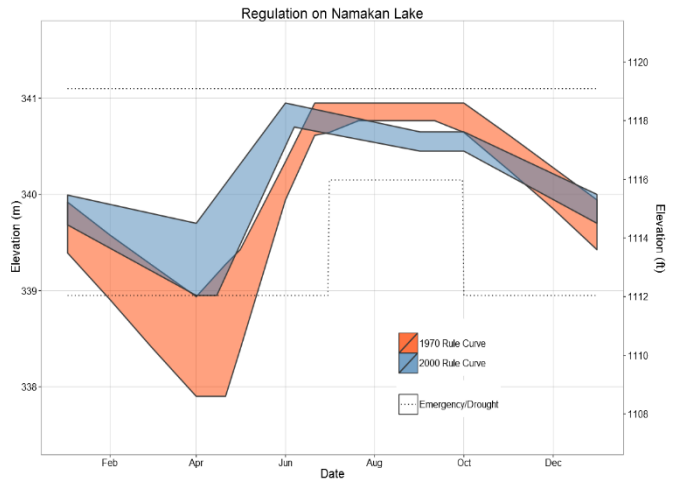
- IJC Review of 2000 Rule Curves and Timeline
- Rule Curve Review and Governance
- Approach for Review and Studies to Date
- Key Components of the Rule Curve Review
- Weight of Evidence and Shared Vision Model Approaches
- Key Analyses, Scenarios and Alternatives
- Public Engagement and Feedback – what we need from you

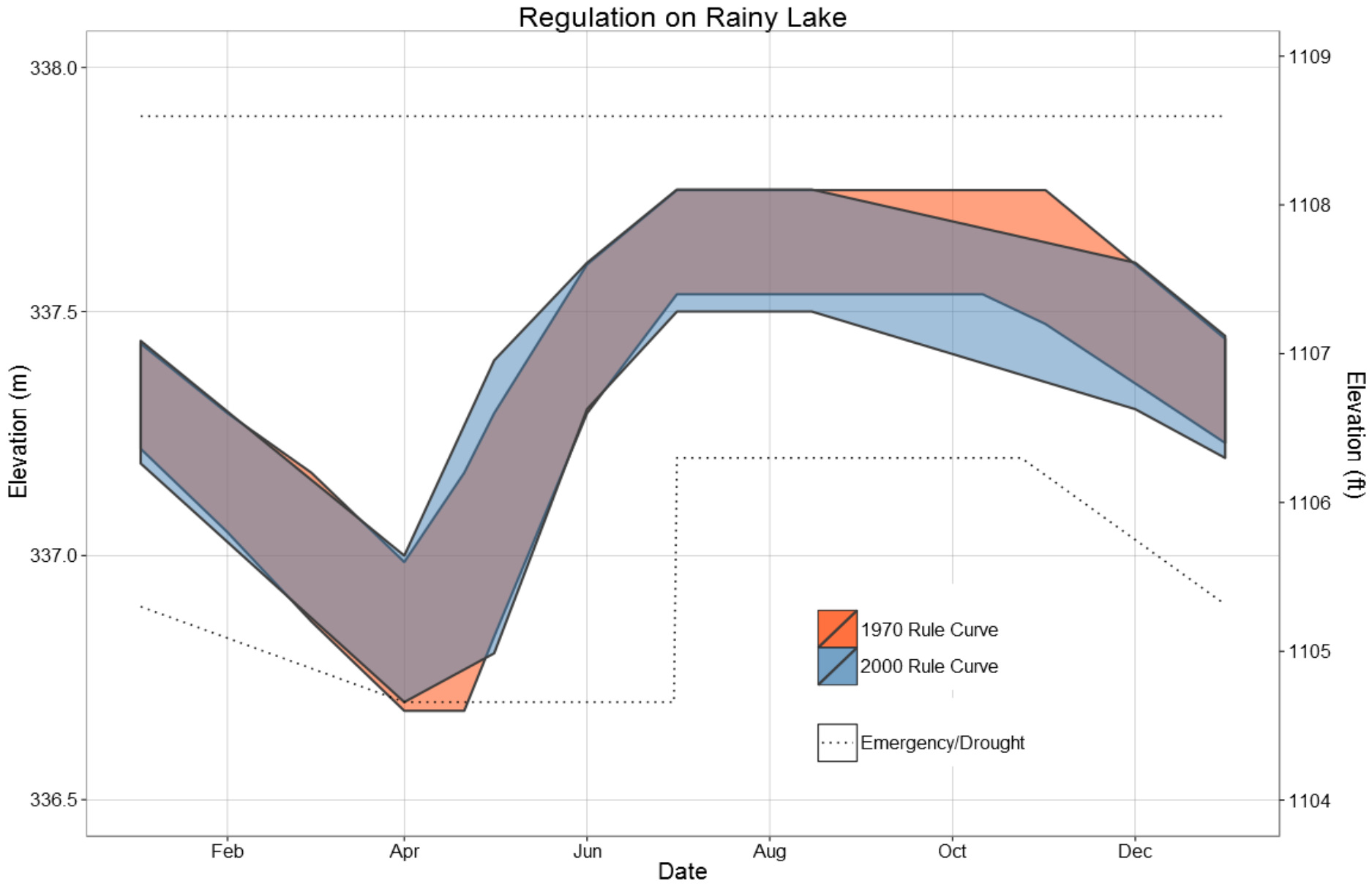


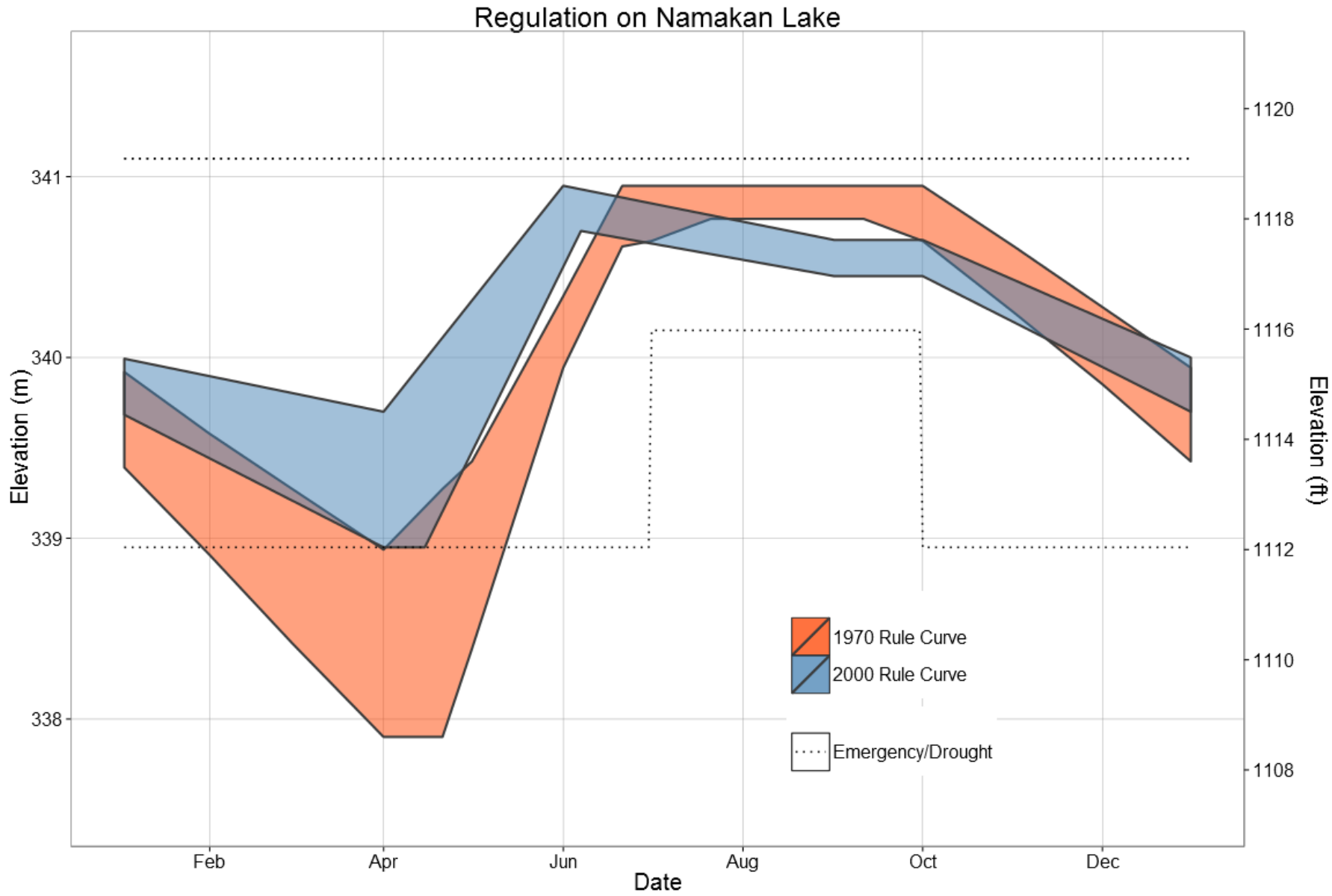
1970 and 2000 Rainy and Namakan Lake Rule Curves

- **A Rule Curve:** limits or guidelines (rules) on how water levels should be maintained in a lake or reservoir throughout a year.
- **1949 Order** directed the Companies, insofar as possible, to keep the level of Rainy and Namakan lakes precisely on a single rule curve (which varied seasonally) defined for each lake.
- **1957 Supplementary Order** made no change in Rainy Lake rule curve but defined both an upper and lower rule curve for most of the year on Namakan Lake with the level to be maintained between these limits at the discretion of the Companies and a single rule curve remaining only for the summer months.
- **1970 Supplementary Order** defined an upper and lower rule curve for both lakes, with operation between these curves at the discretion of the Companies, and prescribed minimum outflows from the lakes.
- **2000 Supplementary Order** revised the 1970 upper and lower rule curves for both lakes, required that the Companies target the middle portion of the rule curve band subject to other direction from the International Rainy Lake Board of Control, and revised the prescribed minimum outflows. The Order also stipulated a review in 15 years (2015).






Regulation on Rainy Lake
338.0
337.5
337.0
336.5
Elevation (m)
1109
1108
1107
1106
1105
1104
Elevation (ft)
Feb
Apr
Jun
Aug
Oct
Dec
Date
1970 Rule Curve
2000 Rule Curve
Emergency/Drought


Regulation on Namakan Lake
Elevation (m)
341
340
339
338
1120
1118
1116
1114
1112
1110
1108
Elevation (ft)
Feb
Apr
Jun
Aug
Oct
Dec
Date
1970 Rule Curve
2000 Rule Curve
Emergency/Drought

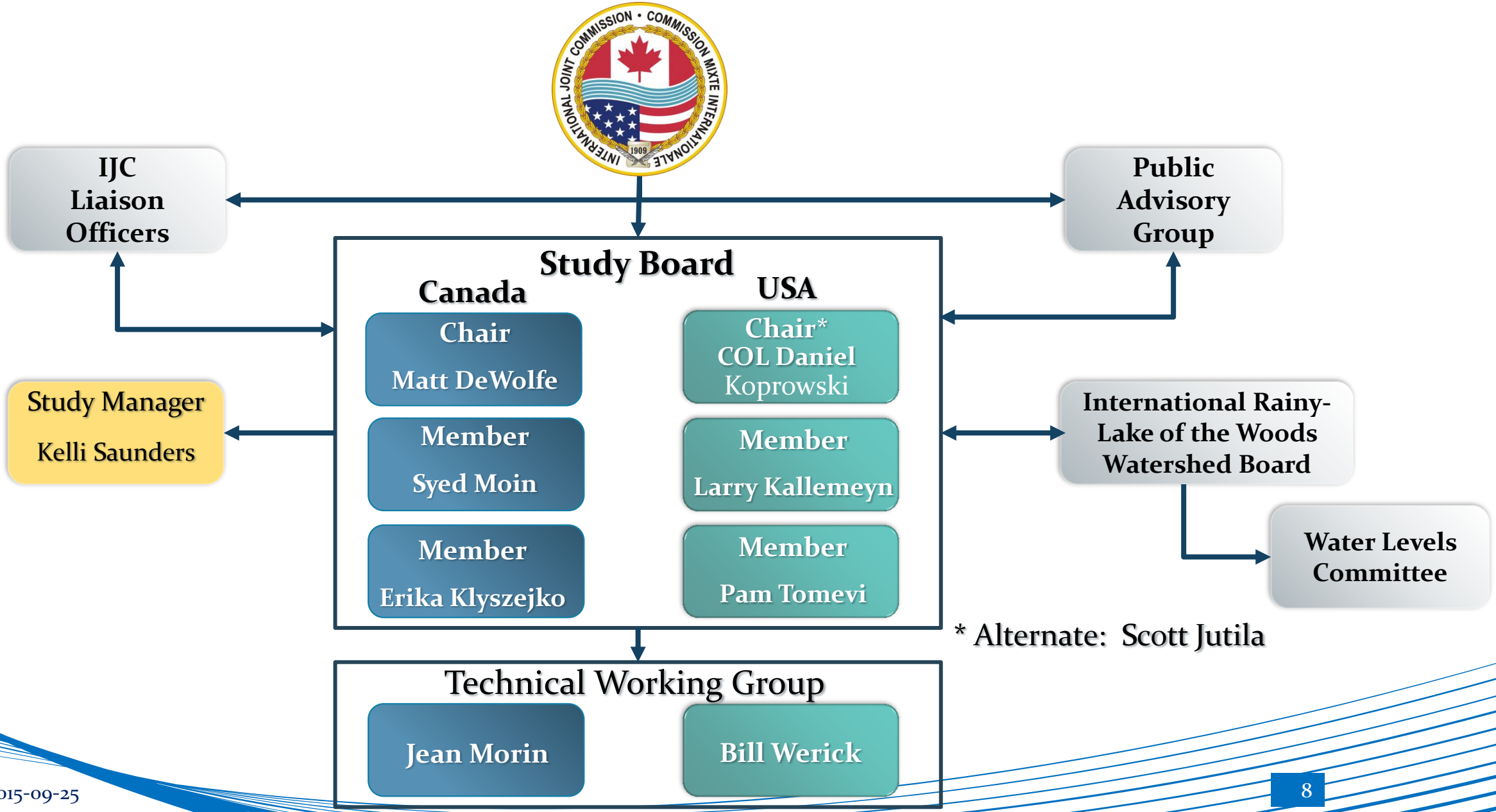
IJC Review of 2000 Rule Curves

- Studies supporting the scheduled rule curve review began in 2010 (based on government funding procured in 2009 for this purpose)
- Studies looked at a wide range of potential impacts to the watershed due to the rule curve (flooding damage, wildlife habitat, cultural resources, fish spawning, etc.)
- Review of effects of 2000 Rule Curves begins now – your input is key throughout the process
- Will consider the information collected through the previous studies
- Study Board to deliver a comprehensive set of study results to the IJC so that they may make an informed decision
- Ultimately, the IJC will decide whether to maintain the 2000 Rule Curves or alter the rules governing dam operation once again

Timeline

- **August 7, 2015** – IJC announces the structure, role, and membership of the Study Board and Technical Working Group (TWG)
- **August 10, 2015** - Study Board convenes an initial meeting separately and in conjunction with the International Rainy-Lake of the Woods Watershed Board (IRLWWB) annual meetings
- **October 2015** – Appoint Rule Curve Public Advisory Group (RCPAG)
- **November 1, 2015** – Evaluation Methodology Report to be sent to IJC
- **March 2016** – International Rainy-Lake of the Woods Watershed Forum – Study Board public information meetings
- **Summer 2016** – Public Meetings
- **March 21, 2017** – Draft report submitted to the IJC
- **May 31, 2017** – Final draft report submitted to the IJC; Public hearings to be held as required

Rule Curve Review Governance



Overview of Study Approach

Overview of Study Approach as outlined by IJC

- Two complementary approaches:
  - Weight of Evidence
  - Shared Vision Model
- Incorporation of 21 studies over past several years
- Science-based evaluation of at least 18 different scenarios

Overview of Studies to Date

List of topics covered by studies that will be considered:

- Ecological
  - Northern Pike, Walleye, Lake Sturgeon, Perch, Beaver, Loon, Muskrat, Macroinvertebrates, Invertebrates, Wild Rice, Cattail, Submerged plants, and Wetlands
- Power production
- Tourism industry
- Flood impacts
- Cultural resources

Study results to be incorporated into Shared Vision Model and/or Weight of Evidence Evaluation

Weight of Evidence Approach

- Simple matrix evaluating benefits/disbenefits of 1970 and 2000 Rule Curves for various indicators
- Seen in 2001 as primary way to evaluate 2000 Rule Curves after 15 years
- Strength is that the evidence is actual data
- Weakness
  - the comparison is not on a level playing field
  - the data also reflect the particular flow conditions
  - This approach can't be used for alternative plans or flow conditions

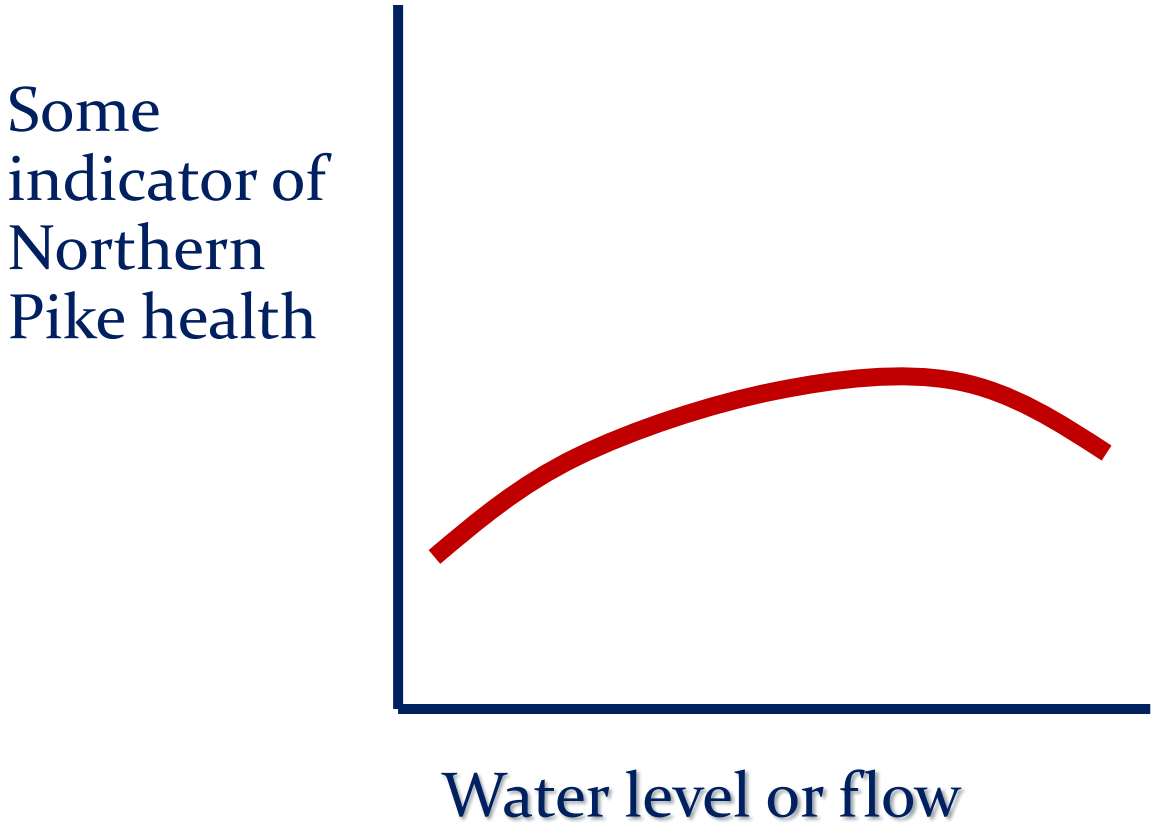
Sample Matrix to compare 2000 Rule Curves vs. 1970 Rule Curves[1]

Indicator	Namakan Reservoir			Rainy Lake			Rainy River		
	better	neutral	worse	better	neutral	worse	better	neutral	worse
1. **Fish**									
Northern Pike population									
Walleye population									
Lake Sturgeon population									
Whitefish population									
Northern Pike spawning habitat									
Walleye spawning habitat									
Lake Sturgeon spawning habitat									
Log perch spawning habitat									
Fish community health (Index of Biotic Integrity)									
Mercury concentration modeling									
2. **Wildlife**									
Beaver population health									
Common Loon reproductive success	X				X				
Common loon reproductive success modeling	X				X				
Muskrat population model									
Marsh Nesting Birds and Herptile habitat		X			X				
3. **Economic Impacts**									
Power Production									
Flooding and ice damage									
Resort industry									
4. **Cultural Resources**									
Condition of resources									
5. **Vegetation**									
Wetland modeling									
Wild Rice									
Wetland monitoring	X				X				
6. **Invertebrates**									
Invertebrate community									
Benthic macroinvertebrate habitat									
Mussels									
7. **Water Quality**									
Trophic State	X			X					
Municipal and fish hatchery water use									

Indicate with an "X" whether the impact has been qualitatively better, neutral or worse for the indicator at each location.

Shared Vision Model Approach

- Will complement, not replace, weight of evidence
- Can only be used when we have functions that relate the indicators quantitatively to water levels and flows
- For example, can we predict how Northern Pike population or reproductive success would change under different water levels or releases?



Shared Vision Planning

- Before making an important decision in the real world
- Make it in a virtual copy of that world, and do it together
- For SVP to work, everyone has to trust the model outcomes from the decisions

What Should a Shared Vision Model Do?

- Provide “Yes” or “No” answers such as:
- Have the 2000 Rule Curves avoided high and low water impacts more effectively than the 1970 Rule Curves?
- Have the 2000 Rule Curves balanced interests as well as the 1970 Rule Curves?
  - Upstream and downstream concerns
  - Hydropower needs
  - Flood risk
  - Boating
  - Needs of the biological and aquatic communities

Shared Vision Planning

- Modern **planning**, **public involvement** and **decision making** methods
- A collaboratively built **model** of the system in question
- Two model design questions:
  - Who will use the model?
  - How will it be used?
- There are some general "whos"
- Because this is a decision model, the "who" must involve **decision makers**
- Because important decisions must be transparent, the "who" involves those affected by the decision
- Because the model has to be trusted, the "who" will include **experts**.

Key Analyses as per IJC Terms of Reference - 1

Part 1 - Shared Vision Model details:

- Whether the 2000 Rule Curves worked as expected
- Whether they are better than the 1970 Rule Curves and why
- What benefits and/or negative impacts may have resulted from the 2000 Rule Curves relative to likely impacts of the 1970 Rule Curves
- What benefits and negative impacts would result from a “state of nature” operating plan
- What benefits and negative impacts would result from a few alternative operating policies or plans
- What benefits and negative impacts would result from changed climate

Key Analyses as per IJC Terms of Reference - 2

Part 2 – Climate Scenarios and Regulation Alternatives:

- Testing various climatic scenarios (drought, earlier snow melt, etc.)
- Regulation Alternatives Considered (at least three):
  - 2000 Rule Curves operating according to State of Nature releases
  - Modified 2000 Rule Curves based on evaluation
  - 2000 Rule Curves with target elevation shifted by current data (soil moisture, temperature, snow pack ,etc.)
- The SVM model will be used to run approximately 18 scenarios composed of:
  - Six operating plans (1970, 2000, State of Nature, three regulation alternatives)
  - Three water supply sets (historical, extreme, climate change)

Public Engagement

- IJC outlines clear commitment to an open, inclusive and fair process in the Directive
- Study Board expects multiple opportunities for general public input and feedback during the review process
- IJC will appoint Rule Curve Public Advisory Group (**RCPAG**)

Rule Curve Public Advisory Group

Membership consisting of public, industry and stakeholder groups as well as First Nations, Métis and Tribes with the following roles:

- Review and provide comment on Study Board reports and products as requested;
- Advise the Study Board on the responsiveness of the study process to public concerns;
- Advise the Study Board on public consultation, involvement and information exchange; and
- Serve as a conduit for public input to the study process, and for public dissemination of study outcomes.

Interested individuals or organizations should contact the IJC to get involved.

Commission@ottawa.ijc.org **or** Commission@Washington.ijc.org

Your Input Needed Now

The Study Board asks for your input on the study approach outlined by the IJC in the Directive and Terms of Reference

- Suggested changes to regulation alternatives being considered
- Additional approaches or factors to consider
- Impact of factors most important to you
- Additional studies, historical data, future plans and activities that could be affected by water levels
- Other considerations not included in the Directive from IJC

•Deadline for feedback: **Wednesday, October 14, 2015**

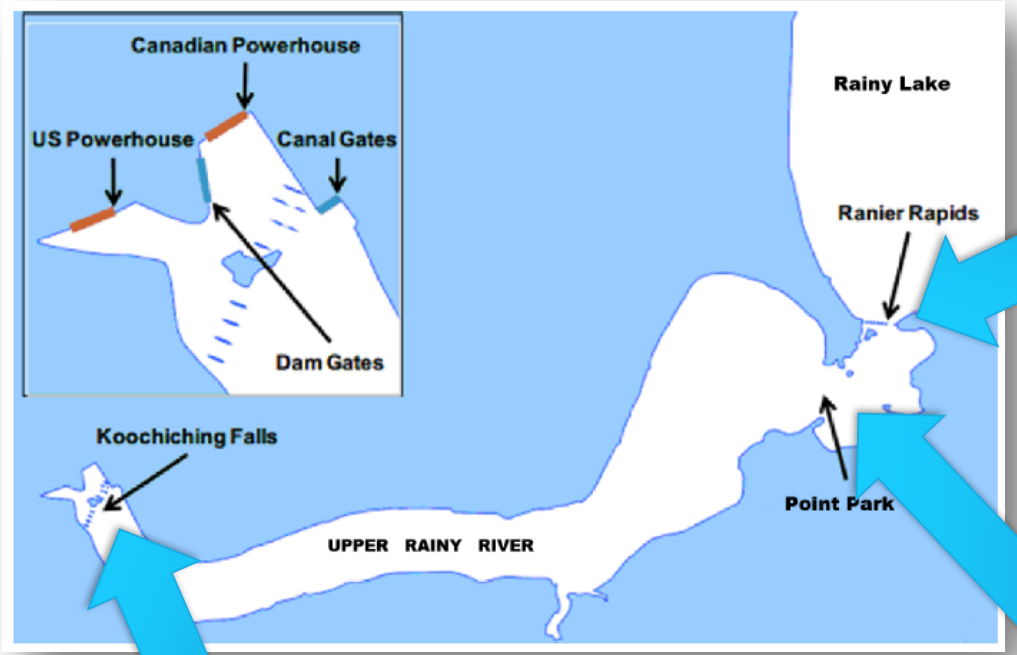
Please submit feedback to saundersk@ottawa.ijc.org

Further Information

http://ijc.org/en_/RNLRCSB

Questions ….

Hydraulic Features at Rainy Lake Outlet



Key Characteristics of Rainy River Watershed