COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD OF MAY 1-JUNE 1, 2017 AND STUDY BOARD RESPONSE

June 29, 2017

Date and Author	Comment	Study Board Response
Tom Worth, RCPAG, May 16	The consideration of the Rule C was done with each interested group and individual given the ability to attend and contribute. I also like to see the flexibility in the Rule Curve C proposal, especially in the spring. While I am not happy to see Walleye Pike lose slightly compared to the 2000 Rule Curve, it is my opinion that the flexibility in Rule Curve C will be able to make up the difference.	Comment acknowledged.
Dave and Jan Imes, RCPAG, May 30	This is a nice excellent presentation.	Thank you; Comment acknowledged.
H2OPower and PCA, May 26	We agree with the Board that the Rule Curves generally performed in line with expectations. As Dam owner/Operators, the Long Term Average Generation experienced at our facilities did decrease with the application of the 2000 Rule Curves, compared to the benchmark for operation under the prior curves. We anticipate the implementation of the Alternative C curve will further erode electrical generation. We caution that the statement regarding the expansion of Hybrid Cattail in Rainy Lake be viewed with a strong degree of skepticism. While the regulation resulting from the 2000 Curves may be a contributing factor to the cattail expansion, there is (a) no foundation provided to prove or disprove that this phenomena would not have occurred in an unregulated setting, and, (b) insufficient data on which to base a path modifying the regulation regime will in of its own provide an effective control to curb further expansion of the cattail distribution.	The Study Board has not stated that "this phenomenon [hybrid cattail invasion] would not have occurred in an unregulated setting." The report details results of IERM simulations, based on available science, indicating that stable water levels provided by regulation reduce stress on hybrid cattails. Alternative 'C', in the Study Board's view, has the potential to significantly increase muskrat populations on the lakes which would provide a natural control mechanism for hybrid cattail since larger water level variations, such as under Alternative F, are not feasible. The Study Board also does not claim that this approach will, "of its own, provide an effective control to curb further expansion of cattail distribution". The Study Board states in the report that long-term monitoring of hybrid cattail extent, muskrat populations, and wild rice extent in the context of adaptive management is essential should **Alternative C** be adopted. Only through monitoring can the benefits of this approach be validated. Other methods to combat the spread of invasive hybrid cattail, such as those currently being planned by the National Park Service at Voyageurs National Park, may work in concert with water level regulation. These methods are efficient on a small scale (~1 hectare) but cannot be applied on a large scale such as the entire Rainy-Namakan system (~1000s hectares).
	We concur and strongly support that additional flexibility is required to provide effective water management, especially into the lead-up to the spring freshet season. In the strict application of the 2000 Curves, we have found ourselves being forced to implement some counter-Intuitive operations by being guided by a strict calendar based set of rules rather than an analysis and assessment of real time conditions. We strongly caution however against a general approach towards decreasing water	Comment acknowledged.

	levels on longer term windows, particularly on Rainy Lake. With these facilities categorized as low head plants, even small changes in headwater levels have an appreciable effect on the performance of the hydroelectric units. A reduction of elevation has an immediate impact on generating unit capacity, where a change of 0.1 meter impacts capacity by approximately 1.7%.	
	The Study Board confirmed that 2000 Curves did meet their projected outcomes, one of which was a forecasted reduction in energy production at the Fort Frances and International Falls Generating Stations. A review of the impact of the 2000 Curves showed a reduction of 2.1% in aggregate energy production compared to the previous curves. The estimated impact of the proposed Alternative C curve is a further 0.8% reduction of energy production. The combined Impact of the successive curve changes is a reduction of 3.0% of average annual energy production, this in an era where climate change is becoming an increasingly larger concern. While the volume from these facilities may be relatively small from a global perspective, any move to further decrease the production of renewable carbon free hydroelectric energy is contrary to publicly stated goals of both governments of reducing greenhouse gas emissions and encouraging renewable energy production	Comment acknowledged. The Study Board notes that the conclusions regarding the reduction in energy production under the 2000 Rule Curves are based on the results of a redacted study done by a consulting engineering firm for H2O Power, and have not been independently verified because data has not been provided by the dam operators.
	Re: Recommendation 1: H20 Power and PCA/Boise do not support this recommendation. It is our view that Rule Curve Alternative B provides improved flexibility and best meets our objectives. In reviewing the operability aspects of the proposed C curve, we advise that implementation of this curve will be challenging, and we question whether during low natural inflow conditions and minimum flow requirements at the International Dam that is feasible to maintain within the rule curve during the winter months. During these conditions, the curve will have to be maintained at the top of the rule curve during the early part of the winter, ending at the bottom of the rule curve during the spring. From an energy production perspective, the accelerated drawdown in late fall results in inefficient operation of the generating units and substantially increases the possibility of late fall/early winter spill operations at Fort Frances. Following the higher flow period In late fall/early winter, flows would be significantly reduced through the winter period. The net impact from a production/cost perspective is lower energy production on a MWHr/flow basis and increased costs associated with gate and spillway operations. The largest concern with Alternative C curve is a lack of consideration for human safety at the Namakan dams. Presently, log operations are implemented ahead of the anticipated freeze-up to set the Namakan dams for a protracted and smooth drawdown and minimize the number of operations required over the winter months. Operations during the freeze up window are avoided if at all possible due to the significantly increased safety risks associated with travel prior to solid ice conditions being established. Implementation of the C Curve would result In log operations being required during the freeze up period, and, by extension, requiring access to the dams during a period that is known to be increasingly hazardous.	Shared Vision Modelling results indicate that, in low flow winters, the outflow profile from Rainy Lake is nearly the same under 2000 Rule Curves and **Alternative C** for the 65-year period modelled. This is due to the use of the same minimum flow criteria. The Study Board acknowledges that flows will be higher in early fall and lower in late fall and winter under Alternative C and that this will result in a net reduction in energy generation in most years. The dam operators did not provide data or analysis demonstrating an increased frequency of gate operations would be necessary under **Alternative C** compared to the 2000 Rule Curves. Shared Vision Model results for **Alternative C** do not indicate this would be the case. The Study Board acknowledges the safety concerns. The change in slope of **Alternative C** Rule Curve for Namakan in the fall occurs in early November, generally before freeze-up. Flexible operations by the Water Levels Committee, in communication with the Dam Operators, could anticipate when ice formation is likely and ensure that flow changes are scheduled accordingly. The gradual winter drawdown can actually be initiated in the first week of November for a constant slope through the late fall and winter if the level is within the lower half of the Rule Curve band. The Study Board also notes that log operations have occurred at all times of the year in the past, including during the freeze-up and freshet periods.
	Re: Recommendation 2: H20 Power certainly welcomes flexibility in its operation of the dams. We would caution however that flexibility comes with a price, invariably absorbed by the Dam Operators.	Comment acknowledged.

	Ourexperiencewith the2000Rule was anetlossofenergy production. Ourconcernis that "flexibility" willcomeattheexpense ofgenerating capacity, energyproduction and increased operatingcostsandwillfurthererodethe value ofthese facilities.	
	Re: Recommendation 3: WewouldwelcomehavingtheCommitteeempowered inorderto improvethetimeline toreacttorealtimeevents. In particular, theTerms of Reference shouldspecifythecompositionoftheWater LevelCommittee membership to include the Dam Operators. We believe our contribution goesbeyondsimply acceptingtheCommittee'sdirectivesandwouldprovidethe Committee withapractical view of the realtime operations of the watershed.	The Study Board has not recommended changes to the WLC makeup, believing that its small size, without representatives of interest groups, is best able to be nimble in operations and remain impartial. Involvement of other groups, including the Dam Operators, in advising the WLC is included in recommendations for the lead up to spring. This perhaps could be a starting point for more regular meetings eventually, but there are a variety of things that would need to be addressed to have this done effectively.
	Re: Recommendation 4: We welcome andsupportthisrecommendation. We do caution however that timely discussion is required with the Dam Operators in order to efficiently and safely Implement such directives. H20Poweroperatesmultiplesfacilitiesin theFortFrances area, all of whicheffectively impact Rainy Lake operations.	Comment acknowledged.
	Re: Recommendation 5: Thisrecommendation wouldseemto be introducing the conceptofreducedramp rates forflowchangesonthe International Dam, together with communicationsprotocols. We have some specific concerns with the implementation of such a commitment. From an operational perspective, thiswillImply multipleoperations to achieveagiven flowchange. Repeating anearlierpoint, thiswill result in inefficient use ofourstaff resources and increased cost. From an equipment perspective, the equipment limitationsneedtobefactoredIndiscretely - theFortFrances spillway gates operatein abinaryfashion– each gate is eitherfully openorfullyclosed, with no provisionfor Intermediateopening.Operationof thegates is amanualeffort. While muchworkhas goneintoimprovingthereliabilityofthegates, theystill remain locally operatedand controlled devices. In ordertosatisfy thepotentially conflicting objectivesofdownstream Rainy River interests and meetingCurverequirements, thiswillmakeRainy Lakemoreproneto curveexcursionsduringboth ramp upanddown scenarios. Therealsoremains theneedtokeepoperational flexibility - therewillbe occasions (albeitnotoften) wherelarge flowchangesmaybeneeded. From acommunications perspective, weseethisrolelying withsomeone otherthanthe Dam Operators.	The recommendation calls for the identification of best practices for limiting large flow changes. Those practices would have to consider the trade-offs for reduced flow changes, including, for example, the impact to hydropower generation, the position within the Rule Curve, flood and drought risk.
	Re: Recommendation 6: The Dam Operators support this recommendation. Strategically placed monitoring equipment will improve the collective understanding of the watershed's behavior	Comment acknowledged.
	Re: Recommendation 7: TheDamOperatorsadvancestherecommendationthattheWater Levels Committee shouldinitially meet on amonthlybasisand adapt, as theCommittee works into role, to a schedule of meetings no less frequently than quarterly. The view of the Dam Operatorsisthat theRainy River/Namakan systemisaverydynamicbasinwithsome challengingseasonalaspectsthat requiremorethananannualengagementbythe Committee	The Water Levels Committee is engaged year-round and is in regular communication with the Dam Operators. The recommended pre-spring engagement recognizes the special circumstances of spring regulation and its particular interest to many stakeholder groups (e.g. flood protection, fish and wildlife protection, hydropower, tourism). For this period, the Study Board views the face to face discussions to

		be worth the commitment of resources by the IJC and stakeholder groups.
	Re: Recommendation 9: We were rather surprised to see this recommendation find its way into the report when there was not any consultation or discussion with the dam owners on the technical implications of this recommendation. While we appreciate that this "may" offer a solution to easing flooding on Rainy Lake, this would come at considerable cost, *If it is Indeed even technically feasible*. Raising this recommendation even as a draft idea without fully developing the thesis only serves to raise false expectations. Eliminating or reducing the present flow impediments on Rainy Lake (Rainier Rapids, the approach to the International Bridge and the bridge piers being the dominant features) then makes the International Dam the next point of congestion. Removing these upstream impediments may have the undesired outcome of creating dam safety issues due to the resulting higher probable flows Into the dam under severe conditions. Prior to this recommendation getting any significant traction, an in-depth discussion between Study Board members, their technical advisors and the Dam Owners on the technical aspects is required before any additional effort is expended.	Emergency conditions due to high water on Rainy Lake occur periodically due to inflow conditions that exceed the natural outflow capacity of the lake. The Study Board heard calls for a modification of the natural outlet constrictions, between Ranier, MN and Fort Frances, ON to reduce the severity of high water events. The Study Board recognizes that evaluating outlet modification would be a complex undertaking, with many environmental, economic, and political considerations. However, it also notes that significant reductions in flood peaks on Rainy Lake are not possible through operational changes or modification of the Rule Curves. The Study Board notes that this is not a matter that the IJC can investigate on its own initiative, but would require direction from Canada and the United States. Based on feedback received from a variety of interests on this question, it is recommending that the IJC advise the two governments that this is a subject of interest and discussion in the watershed; it is not intended to be an endorsement for modification. The Study Board has modified the language in Draft Recommendation #9 to reflect this.
LWCB, May 31	The LWCB supports the recommendation to allow the Water Levels Committee to exercise increased flexibility in targeting water levels at different times of year based on the best available inflow forecasting information.	Comment acknowledged.
	Analysis of the different time series of modeled Rainy Lake outflows under the proposed Rule Curve Alternative C indicates that the inflow to Lake of the Woods will be largely unaltered during drought periods. Additionally, the proposed changes could potentially provide some flood protection during periods of very high inflow, although the actual effect on Lake of the Woods operations during flood conditions could prove different than what has been modeled.	Comment acknowledged. The Study Board has not extended analysis downstream to Lake of the Woods, but the outflow profile for modelled time series 1950-2015 under **Alternative C** is consistent with these observations.
	During years when the flood protection curves are triggered there is the potential for increased spring flow into Lake of the Woods. The LWCB would have to balance the rising Lake of the Woods level with an increased flow on the Winnipeg River. Should this occur when an ice cover remains on either the lake or the river, there would be an increased risk of damages to shoreline structures that are designed to remain frozen into ice.	The Study Board has not extended analysis downstream to Lake of the Woods, but the outflow profile for modelled time series 1950-2015 under **Alternative C** is consistent with observations that outflow would be higher at the end of winter when a flood reduction target is used. The amount of this difference, however, would depend upon where in the **Alternative C** band the level is in early March. If on the lower end of the range, as might be expected if winter conditions have been harsh, the increased flows would differ little from the 2000 Rule Curves. If at mid-band, the difference in Rainy Lake outflow compared to the 2000 Rule Curves, and taking into account additional flow out of Namakan Lake, would be on the order of 100 m^3/s, the equivalent of less than 2 cm of Lake of the Woods refill in a week.

	The steeper autumn drawdown of Rainy Lake is expected to increase inflow to Lake of the Woods during the freeze-up period. The LWCB would likely need to increase the flow into the Winnipeg River during this period to help compensate. The expected net result would be higher freeze-up levels on both the lake and the river, which in turn increases the risk of ice-induced damages to shoreline structures on both water bodies. Managing this balance would be all the more challenging during wetter than normal periods	The Study Board has not extended analysis downstream to Lake of the Woods, but the outflow profile for modelled time series 1950-2015 under **Alternative C** is consistent with the observations that outflow from Namakan and Rainy Lakes would have to be higher during the earlier fall period. The additional Rainy Lake outflow under normal mid-band targeting from end of September to mid-November is on the order of 50 m^3/s, which would fill Lake of the Woods by less than 5 cm over this 6-week period if the additional flow was not transmitted further downstream.
	The reduced winter drawdown of Rainy Lake is expected to have the greatest effect on the regulation of Lake of the Woods and the Winnipeg River. The outflow from Lake of the Woods into the Winnipeg River is relied upon for hydropower by three different power companies. To maintain the same potential for power production during the core winter period, the LWCB would have to make up the lost inflow from Rainy Lake by increasing Lake of the Woods over-winter drawdown. This in turn would affect both Lake of the Woods fisheries (risk of dewatering the eggs of fall-spawning fish) and recreational users on the lake and the river (risk of ice-induced damage to shoreline structures). Alternatively, the LWCB could retain current drawdown practices on Lake of the Woods, thereby passing the reduced flow on to downstream users, which would reduce energy production during a critical time of year. The LWCB has a mission to balance conflicting interests for the benefit of all users and as such would need to initiate discussions with all affected parties to strike a balance that shares the effect of the reduced winter inflow as reasonably as possible. As such, the reduced winter flow from Rainy Lake is expected to have a negative effect on Lake of the Woods fisheries, on hydropower production along the Winnipeg River, and on recreational users of both the lake and the river.	The Study Board has not extended analysis downstream to Lake of the Woods, but the outflow profile for modelled time series Alternative C is consistent with observations that outflow from Rainy Lake during the core winter period in most years would be lower than under the 2000 Rule Curves. Based on SVM modelling, **Alternative C** requires a reduction of Rainy Lake by approximately 50 m^3/s throughout the core winter period. Based on statistics published by the Lake of the Woods Control Board, this represents roughly 15% of the normal inflow to Lake of the Woods in this period, and up to 19% in a year with low (25^{th} percentile) inflow. Relative to Lake of the Woods outflow, a major component of Winnipeg River flows, 50 m^3/s represents less than 10% of normal winter flow, and roughly 14% of outflow in low-normal flow winters (i.e. 25^{th} percentile).
	The above comments are based on an analysis comparing historical data against the Study Board's modeled data and do not specifically include a consideration for future conditions under a changing climate. Future conditions could be uniformly wetter or drier than the recent past, or could have a greater tendency towards opposite extremes from one year to the next, and may see shifts in seasonal precipitation patterns. What seems certain from the review of the Study Board's report is that downstream agencies will need to incorporate additional adaptive management strategies into their operations should the proposed rule curves be implemented. In closing, the LWCB supports some of the findings in the Study Board's report. However, the LWCB will undoubtedly need to revise its regulation strategies for Lake of the Woods and the Winnipeg River should the proposed Rainy Lake Rule Curve Alternative C become operational	The Study Board acknowledges that the effects of a changing climate on water regulation in this watershed are not well-defined, but notes that control of water levels, regardless of future climate conditions, is constrained at both the low end (minimum outflow requirements) and the high end (maximum natural outflow capacity). Flows within these bounds permit effective level management within the Rule Curves. The percentage of time effective control is possible may change with shifting climate conditions, but not the control itself, nor the absolute difference in flows transmitted downstream relative to the current Rule Curves.
Manitoba Hydro, May 29	We support the objective of providing flexibility to target levels and timing of those levels supported by informed decision making and enhanced knowledge of basin conditions which includes a review of monitoring data used in inflow forecasting. (Draft Recommendation 4 and 6)	Comment acknowledged.

	The rule curve modifications will effectively increase outflows during the fall with the potential for impacts to stakeholders on the Winnipeg River in Manitoba, especially during wet years. This could increase the likelihood of spillage at MH generating stations in the fall months unless regulation of Lake of the Woods is modified. (Draft Recommendation 1)	The Study Board has not done detailed analyses of the downstream impacts of Alternative C, but the observations by Manitoba Hydro are consistent with the modelled outflow results from Rainy Lake.
	Reduced winter drawdown of Rainy and Namakan Lakes will result in reduced generation on the Winnipeg River when electrical demand is highest unless regulation of Lake of the Woods is modified. This is expected to result in economic impacts to Manitoba Hydro. (Draft Recommendation 1)	
	As indicated in our comments 2 and 3, unless regulation of Lake of the Woods is modified, the benefits achieved from modifying the rule curves as recommended will be achieved at some expense to those downstream on the Winnipeg River in Ontario and in Manitoba and on Lake Winnipeg. We note the report is silent in recognizing this issue especially when it comes to flood events. The IJC represents the interests of all of Canada, not just those Canadian interests around Rainy and Namakan Lakes. We would welcome recognition in the report that regulation of the Rainy River basin has impacts on others and how those impacts have been considered or not.	The Study Board has revised the language in the report to acknowledge potential effects on downstream interests, but is not intending to expand analysis to evaluate them. While downstream interests at Lake of the Woods and the Winnipeg River are affected by the timing and magnitude of flows released into the Rainy River that could have the potential to affect operations for downstream dams as well as stakeholders in these areas, this study focused solely on potential effects of Rule Curve and operational changes on interests within the study area.
	The supporting text for Draft Recommendation 9, to investigate the feasibility of modifying the outlet of Rainy Lake to increase its outflow capacity, noted the investigation would have to consider impacts to stakeholders downstream on the Rainy River and on Lake of the Woods. We would recommend that this list be expanded to stakeholders further downstream on the Winnipeg River. All else being equal, increasing the outflow capacity of Rainy Lake will intensify the magnitude of flood peaks at all the way downstream to Lake Winnipeg	Emergency conditions due to high water on Rainy Lake occur periodically due to inflow conditions that exceed the natural outflow capacity of the lake. The Study Board heard calls for a modification of the natural outlet constrictions, between Ranier, MN and Fort Frances, ON to reduce the severity of high water events. The Study Board recognizes that evaluating outlet modification would be a complex undertaking, with many environmental, economic, and political considerations. However, it also notes that significant reductions in flood peaks on Rainy Lake are not possible through operational changes or modification of the Rule Curves.The Study Board notes that this is not a matter that the IJC can investigate on its own initiative, but would require direction from Canada and the United States. Based on feedback received from a variety of interests on this question, it is recommending that the IJC advise the two governments that this is a subject of interest and discussion in the watershed; it is not intended to be an endorsement for modification. The Study Board has modified the language in Draft Recommendation #9 to reflect this.
Voyageurs National Park, June 1	Of the three alternatives being considered, we support choosing the Plan C alternative. We believe that the benefits of that plan to the aquatic ecosystems of Rainy Lake and Namakan Reservoir and to preservation of archeological resources make it the best of the three options. The predicted ecosystem benefits to muskrat survival, lake whitefish and cisco spawning habitat, and benthic invertebrate communities are important and may well provide secondary benefits to the aquatic ecosystems that will further restore these aquatic ecosystems from past harm.	Comment acknowledged.
	We support Draft Recommendation 2, *Promote flexible operation to improve outcomes*, including the development of Operational Guidelines to allow the Water Levels Committee of	Comment acknowledged.

	the International Rainy – Lake of the Woods Watershed Board provide further benefits to affected parties and to the ecosystem as described on pages xii and xiii of the Executive Summary.	
	We support Draft Recommendation 3, *Provide the Water Levels Committee with Terms of Reference*. We feel that the Terms of Reference should set the membership of the committee and that committee membership should be balanced among interests in the basin, including resource agencies.	Comment acknowledged
	We support Draft Recommendation 4, *Empower the Water Levels Committee to direct targets outside of the Rule Curve range*, but feel it is important that the IJC defines the specific scenarios in which the Water Levels Committee is empowered to direct targets outside of the Rule Curve range	Comment acknowledged.
	We support Draft Recommendation 5, *Examine practical operational approaches to benefitting Rainy River interests while meeting Rule Curve requirements*	Comment acknowledged.
	We support Draft Recommendation 6, *Review data monitoring sources to support inflow forecasting by the Water Levels Committee*	Comment acknowledged.
	We support Draft Recommendation 7, *Formalize pre-spring engagement by the Water Levels Committee*, and we feel that it is important that the IJC ensures balanced representation of interests, including resource agencies, at these meetings. We also feel a formal spring consultation with resource agencies should be included so that effects of this decision regarding which curves to follow in spring for Rainy Lake can be discussed	Comment acknowledged.
	We support Draft Recommendation 8, *Investigate adaptive management*. We strongly agree that consistent monitoring of the indicators listed on page xvi of the Executive Summary needs to be maintained to inform future decisions on lake level management and that adaptive management should be used to improve lake level management on this system. This continued data collection combined with adaptive management will allow managers to more effectively adjust for changing conditions, including those related to climate change. We would like the IJC to clarify that the adaptive management cycle refers to the entire period of data collection (monitoring) and research that occurs between prescribing rule curves and the full review of those rule curves a set period of time later (15 years in this case) and that this differs from the operational guidelines which may be used on shorter time frames to provide benefits.	The Study Board is recommending a full suite of adaptive management elements as presented in Figure 9-1 and the 11 elements contained in Section 9-3 of the report. When an adaptive management process is implemented as proposed, it entails monitoring, review and evaluation cycles on a continual basis (captured in Figure 9-2). The report was modified to include a formal review after a 15-year period as part of an adaptive management process.
	We would appreciate the inclusion of a statement similar to the following statement from page 5 of the January 5, 2000, IJC Supplementary Order prescribing rule curves for Rainy and Namakan Lakes: "The review shall, at minimum, consider monitoring information collected by natural resource management agencies and others during the interim that may indicate the effect of the changes contained in this Supplementary Order	The Study Board has recommended **Alternative C** with the implementation of an adaptive management process where monitoring of the performance indicators is a requirement. In this scenario, the Study Board feels specifying monitoring requirements on top of this will be superfluous.
	We do not agree that Draft Recommendation 9, *Recommend that the Governments investigate the feasibility of modifying the outlet of Rainy Lake*, should be included. The National Park Service mission dictates that natural and cultural resources should be maintained in an unimpaired condition. Modifying the outlet of Rainy Lake would move water level fluctuations further from natural conditions and would hinder the efforts of Voyageurs National Park to meet the National Park Service mission of protecting resources.	Emergency conditions due to high water on Rainy Lake occur periodically due to inflow conditions that exceed the natural outflow capacity of the lake. The Study Board heard calls for a modification of the natural outlet constrictions, between Ranier, MN and Fort Frances, ON to reduce the severity of high water events. The Study Board recognizes that evaluating outlet modification would be a complex undertaking, with many environmental, economic, and political considerations. However, it also notes that significant reductions in flood peaks on Rainy Lake are not possible through operational changes or modification of the Rule Curves.

		The Study Board notes that this is not a matter that the IJC can investigate on its own initiative, but would require direction from Canada and the United States. Based on feedback received from a variety of interests on this question, it is recommending that the IJC advise the two governments that this is a subject of interest and discussion in the watershed; it is not intended to be an endorsement for modification. The Study Board has modified the language in Draft Recommendation #9 to reflect this.
	We support Draft Recommendation 10, *Examine approaches for developing and sustaining improved relationships and communications with First Nations, Métis, and Tribes on water issues*	Comment acknowledged.
	We support Draft Recommendation 11, *Consider sponsoring research projects to improve understanding of relationship between water levels and areas of Aboriginal Traditional Knowledge*. The perspective of those with traditional ecological knowledge would be of great value to water level managers.	Comment acknowledged.
	Section 1.2 (Page 5), Page 12 and Page 18: Voyageurs National Park, a US National Park, part of which is located along the shorelines of lakes and rivers in the study area. – Please edit this text to indicate that the park includes portions of Rainy Lake and Namakan Reservoir as well, in addition to the land along the shorelines currently included in the text.	Revised as suggested.
	Page 47: Data from a US Geological Survey-US National Park Service water quality partnership study were used within the IERM to comp are the effects of the 1970 and 2000 Rule Curves on YoY Yellow Perch mercury concentration. – Please edit this text to reflect that multiple studies produced this dataset rather than singling out the current study. Perhaps the simplest effective edit would be to write that US Geological Survey and US National Park Service data were used to support this modeling.	Revised as suggested: "Data from several studies (the US Geological Survey, the US National Park Service and the University of Minnesota-Duluth) were used..."
	Page 47: The IERM showed an increase in mercury concentrations in Yellow Perch coincident with the change in Rule Curve in the Namakan Chain of Lakes. – Please acknowledge that there are unresolved discrepancies between this result and draft USGS modeling results.	Comment acknowledged. Text revised to clarify research results.
	Page 57. According to page 56 of the Annex, Study 13 on Rainy River cultural resources is still in peer review. Therefore, we are concerned about the adequacy and accuracy of the results presented on page 57 which indicate that cultural resources are not impacted by any of the rule curve scenarios or state of nature.	An error on the report status is noted and acknowledged. The Cultural Study Report prepared by Golders Associates was peer reviewed and accepted by the IJC for the Rule Curve Review purposes. The report was not redactable for presentation and hence was not posted on the Study Board website. The final report has been edited to reflect the correct status.
	Page 76: What change in the dataset occurred in 1986 to make the State of Nature Wet Meadow predicted coverage rise so drastically compared to the two rule curve scenarios?	The increase of wet meadow between 1985-1986 for the SON series is linked to the concomitant decrease of the shrubby swamp for the exact same period. For a large number of nodes (grid point) the last two years were at inundation levels over 50% of the vegetative season and when this happens, the system changes for the most adapted wetland class.
	Page 76: What change in the dataset occurred in 1978 to make the State of Nature Shrubby Swamp predicted coverage rise so drastically compared to the two rule curve scenarios?	The increase of the shrubby swamp in the SON series is due to the technique used for modelling the wetlands. It is related to the initial conditions that we were using for the modelling. All regulation series (SOM, 1970RC, 2000RC, etc.) used for modelling the response of the wetlands are using the same method. We start the wetlands with the

		same initial condition representing the measured series that were run for 30 years and were used as initial conditions. It is not surprising to see that the 2000RC is "quite stable" for the shrubby swamp. However, for the SON, major differences appear that destabilize the emergent marsh (not presented herein) and increase the shrubby swamp class. After 3 years, this wetland class "evolved" in term of increased number of hectares to reach a plateau after a few years.
	Page 83: Summary Section: Since the water quality improvements referenced were in Rainy Lake (Black Bay) and Lake Kabetogama (whereas water quality in Namakan and Sand Point lakes did not change from 1970 Rule Curve conditions to 2000 Rule Curve conditions), please revise the text so that it does not indicate improved water quality in Namakan Lake	Revised as suggested (in both Ex Summary and 5.4).
	Page 117: Section 7.3.2 – Please make it clear that the benefits described for "Namakan Lake" are actually for all of Namakan Reservoir which includes Kabetogama, Namakan, Sand Point, Crane, and Little Vermilion lakes	Text added in Chapter 7 (7.1 Study approach) to note that effects discussed in the chapter for "Namakan Lake" generally will be applicable to the "Namakan Chain of Lakes".
RLPOA, June 1 (also submitted Barr's report)	The RLPOA endorses, in whole or in part, all eleven major recommendations of the draft report. The major considerations in this broad endorsement are:	Comment acknowledged.
	Recommendation 1, coupled with operational procedures outlined later in the draft report, provide an explicit protocol for the identification and mitigation of seasonal flow conditions leading to flooding on Rainy Lake. In-basin meetings with stakeholders would take place each year in the March/April timeframe (Recommendation 7) for the purpose of assessing the probability of Spring or Summer flooding. The assessment would be based on the best available data using regional and global weather patterns, sensor information from the watershed, and expert advice (Recommendation 6). Should there be a determination that a flooding event is likely, then the Water Level Committee would have authority to implement the flood mitigation features of Rule Curve C (Recommendations 2, 3, and 4.)	All items mentioned here are captured in Study Board's recommendations.
	As a group, the recommendations would appear to have minimal negative impacts on predominant game fish reproduction and food chain, and improved outcomes for traditional species including Wild Rice.	Comments are consistent with Study Board findings.
	Acceptable navigation and channel depths for safe operation during the recreational year extending from mid-May through mid-October	Comments are consistent with Study Board findings.
	Addressing hybrid cattail infestation on Rainy Lake through reduced winter mortality of muskrats.	Comments are consistent with Study Board findings.
	While the RLPOA generally favors the recommendations included in the draft report, it is the opinion of the RLPOA that recommendations could be significantly strengthened to provide a more robust set of protocols, additional protections against future high water and flooding events, and provide for the long-term adaptive management. 1. Rule Curve Alternative C will impose new obligations and responsibilities on all of the key stakeholders. The Water Levels committee will have additional responsibilities, need to process information and respond in near real-time to the state of the watershed. It is therefore imperative that sufficient funding will be allocated from the IJC to conduct annual in-basin meetings in the March/April time frame for the purpose of reviewing rule curve performance, to assess the probability of Spring and Summer floods, and to determine whether to implement the flood mitigation feature of the rule curve.	For Rule Curve **Alternative C** to be effective, other endorsed elements in Study Board's recommendations need to be in place, in particular, Adaptive Management.
	Draft Recommendation 3 reads "Provide the Water Levels Committee with Terms of Reference". The explanatory text makes clear that the purpose of the recommendation is to develop the roles and responsibilities of Water Levels Committee and the actual decision-	Comment acknowledged.

	making processes, data collection and record keeping, and areas of competent authority. Execution of the recommendation is a prerequisite and essential to the success of Rule Curve C, and therefore an explicit timeline should be attached to the execution of the recommendation. This point is further elaborated in the report of Barr Engineering.	
	Draft Recommendation 6 “Review data monitoring sources to support inflow forecasting by the Water Levels Committee” needs to be interpreted in the context of long-term adaptive management of the watershed and the operational considerations. In particular, the responsibility for funding new monitoring stations, and new remote sensing capabilities needs to be clearly stated. Without a clear statement of funding responsibilities, recommendations like these have little import and would ultimately undermine the new regime for management of the watershed.	These comments would fall within the mandate of any adaptive management group that is found to follow up on this recommendation.
	The principle of adaptive management will be used for intra-annual adjustments to accommodate wild rice maturation and harvest, flood mitigation, and other changes deemed within the scope of Rule Curve C as determined by the Water Level Committee. Appropriate studies will be conducted to determine if the desired ecological changes, including improved survival of muskrats and reduction in hybrid cattail invasion, have been achieved. These studies should begin at the earliest possible date with annual updates.	The recommendations for **Alternative C** and adaptive management are in tandem. The resource agencies supporting the adaptive management aspects would be key to these follow-ups.
	As the report shows, improving the conveyance of upper Rainy River is the most direct means of mitigating flooding and high water events. Additional studies should be initiated to consider revisions to upper Rainy River. Previous engineering observations have identified a substantial quantity of submerged logs and other impediments which interrupt the conveyance on Rainy River upstream of the Dam at International Falls that could be mitigated at reasonable expense.	The scenario analysis that was carried out by the IJC considered only removing shallow zones by deepening and increasing upper Rainy River capacity especially during high water levels.
Mitaanjigamiing First Nation, June 7	I am concerned with the wording in your draft report under section #2 - Opportunities for Improving Water Level Mgt through New Rule Curves which states "Study Board concluded that construction of the dams did not introduce this constraint and modelling results indicated that similar flooding would have occurred if dams had never been constructed". I disagree with this statement. My First Nation is currently involved in a Flood Claim with Canada and the Province that resulted from damages to our land, our resources and our people from a dam being constructed on Rainy Lake. The construction of this dam resulted in loss of our lands through erosion, swampification (formation of swamps) and the creation of islands. We lost a lot due to the construction of this dam with NO consultation or warning to our people. We lost rice fields (and continue to lose these traditional gathering areas due to continual flooding of the lakes for hydroelectricity purposes), we lost traditional ceremonial and burial sites, we lost access to our traditional hunting and fishing grounds, we lost pictographs that are now under the water - these are just a few of our losses due to the construction of that dam. So please don't say or imply that the construction of the dam did not introduce constraints or that similar flooding would have occurred without the dam because we lost our traditional lands and resources from it and continue to see losses and damages to our traditional resources.	Text in the report has been revised: “…. construction of the dams did not introduce this constraint and SVM modelling results indicate that similar flooding would have occurred if the dams had not been constructed. That is, under the State of Nature conditions, extremely high peaks water levels would still occur in flood years. However, modern ‘normal’ water levels experienced in the post-dam period are higher than would have occurred in a State of Nature, as the dams raised the water levels in both Rainy Lake and the Namakan Chain of Lakes.”
MNDNR, June 8	**Page x,** regarding the statement: "Modifications to over-winter drawdown could result in multiple ecological benefits....." While the statement above references multiple benefits, the paragraph that follows only discusses hybrid cattails. We suggest additional a reference in this section to capture the other benefits discussed in the document.	Further ecological benefits of a reduced over-winter drawdown are discussed in the main body of the document. Section 6.3.1 describes impacts to muskrat survival, success of fall spawning fish and the survival of benthic

		invertebrates.
	Page xii, *Draft Recommendation 1, "Adopt Rule Curve Alternative C":* We support this recommendation; of those examined, it best captures the environmental benefits achieved under the 2000 Rule Curves and provides additional improvements (e.g. moves towards a more natural hydrograph). However, we ask the committee consider our concerns regarding potential impacts including increased analysis for downstream impacts. (Please reference special topics).	In the Terms of Reference for the Study Board, the IJC stipulated that: "The geographic scope of this study comprises the Rainy and Namakan Lakes, the connecting channels and the Rainy River downstream of Rainy Lake to the Lake of the Woods, and the riparian areas adjacent to these water bodies."
	Page xiii, *Draft Recommendation 2, " Promote flexible operation...." :* Please also reference above comments and consider downstream impacts. We recommend the development of operational guidelines to consider additional variables such as: minimum outflows from the dams during dry periods, rates (ramping) for making changes, and seasonal differences. Also, we suggest the operational guidelines include discussion of peaking and ponding to increase power production and the potential impacts resulting to the river.	The Study Board has compiled a list of sample Operational Guidelines, based on information collected as part of the Rule Curves review. These Sample Operational Guidelines are provided in Annex 8 and discuss all considerations mentioned in this comment.
	Page xiii, *Draft Recommendation 3, "Provide the Water Levels Committee with Terms of Reference":* We support this recommendation. We suggest the 'Terms of Reference' consider the make-up of the Committee. We recommend a balanced informed committee to represent the interests in the basin addressing both up and downstream needs; including resource agencies and others entities that rely on healthy ecosystems. Research has shown that economic sustainability is tied to ecological sustainability; therefore, we ask to provide direction and balance of ecological and economic benefits/impacts.	The IJC's Directive to the International Rainy-Lake of the Woods Watershed (IRLWWB) describes the make-up of the Water Levels Committee: "The Commission shall appoint as Chairs of the Water Levels Committee, the Chairs of the International Lake of the Woods Control Board (ILWCB). The ILWCB was established by the Lake of the Woods Convention and Protocol of 1925, and its members are appointed by their respective governments. The Commission shall appoint two additional members from the U.S. and Canada residing near the affected boundary waters. Committee chairs may appoint Engineering Advisors to assist them in their duties."
	Page xiv, *Draft Recommendations 4 and 5:* We generally support these recommendations, with respect to comments above. We agree (and appreciate the Board's acknowledgement) that current operations generally do not consider impacts to the Rainy River. The statement " ....Study Board also recognizes that fluctuations of the water levels in the Rainy River are affected only in part by the releases from the dam...." While true, this understates the magnitude of the impacts from dam operations in the upper end of the Rainy River.	Comment acknowledged.
	Page xv, *Draft Recommendation 7, "Formalize pre-spring engagement by the Water Levels Committee":* We support this recommendation and encourage the UC to ensure this group is balanced among the various interests in the basin, including the resource agencies and respective disciplines. This will ensure the states natural resources and those dependent on them are fully addressed. We also suggest the 'Terms of Reference' also anticipate potential conflicts of interests and provide guidelines (protocols) for how decisions are made	Comment acknowledged.
	Page xvi, *Adaptive Management:* We support the concept of adaptive management.	Walleye, Sturgeon and Northern Pike

	Please note that the resource agencies have ongoing monitoring efforts in place that provide information to inform/support this process. We recommend the bulleted list provided include monitoring efforts on the Rainy River such as: sturgeon and walleye assessments, fall whitefish spawning assessments below the dams, and invertebrate sampling in the upper Rainy River (in the reach affected most by dam operations).	(gamefish) monitoring efforts are recognized in the bulleted list provided in the report and acknowledgement has been made that other ecological monitoring, as suggested by resource agencies, should be considered as part of the adaptive management process.
	Page xvii, *Draft Recommendation 9, " Investigate the feasibility of modifying the outlet of Rainy Lake":* We do not support this recommendation, which is focused solely on flood prevention. In general, we support managing this system (to the extent possible while considering the various interests upstream and downstream) for a more natural flow regime, which includes periodic floods and droughts. As stated on **pages x and xi,** a wider range of water levels than currently experienced on the lakes would provide benefits to plant, amphibian, and fish communities. Modifying the outlet of Rainy Lake to reduce flooding would further reduce benefits to the aquatic ecosystem	Emergency conditions due to high water on Rainy Lake occur periodically due to inflow conditions that exceed the natural outflow capacity of the lake. The Study Board heard calls for a modification of the natural outlet constrictions, between Ranier, MN and Fort Frances, ON to reduce the severity of high water events. The Study Board recognizes that evaluating outlet modification would be a complex undertaking, with many environmental, economic, and political considerations. However, it also notes that significant reductions in flood peaks on Rainy Lake are not possible through operational changes or modification of the Rule Curves. The Study Board notes that this is not a matter that the IJC can investigate on its own initiative, but would require direction from Canada and the United States. Based on feedback received from a variety of interests on this question, it is recommending that the IJC advise the two governments that this is a subject of interest and discussion in the watershed; it is not intended to be an endorsement for modification. The Study Board has modified the language in Draft Recommendation #9 to reflect this.
	Graph on Page 93. What are the difference between the 2000 rule curve vs. Alternative C? Are the changes in water levels significant enough to have measureable ecological benefits for all species identified especially for Rainy Lake? How where significant benefits determined? Changes in areal coverage are noted; maps may be helpful to illustrate this.	In Figure 6-4 (Section 6.3.1), the 2000 rule curves are indicated by a dashed black line. Chapter 7 describes the ecological impacts of **Alternative C** assessed using the IERM. Although the IERM is able to produce 2D maps of areal coverage for some PIs, the Study Board feels that it is the overall relative comparison of PI performance under different alternatives that is most important. Due to model limitations, the spatial inaccuracies within IERM output may lead readers to false conclusions. Spatial maps for the comparison of the 1970 and 2000 rule curves, and the state of nature can be found in Study 21- Modeling the Rainy Lake and Namakan Reservoir Ecosystem Response to Water Level Regulation (Morin, Bachand, Richard and Martin, 2016). This study is available on the Study Board website.
	Muskrats: "Probability of winter lodge viability" is included; how was that determined? And how was this addressed for fisheries and other topics? Was this conducted by the advisory group? The answers to these questions may be in the document however they were not located	Annex 5 describes how each individual PI is calculated. Many of these PIs were developed based on information collected from the 52 studies reviewed for the WOE assessment (Annex 7). More information on PI development can be found in Section 3.4.4.
	Recommend that the Governments investigate the feasibility of modifying the outlet of Rainy Lake: This would pose serious threats to flooding within the cities of International	Comment acknowledged.

	Falls and Fort Frances. It is also likely that infrastructure modifications to the dam and the waterway itself would be difficult to permit and financially restrictive. The potential impacts to the resources and increased ability to leave areas dry is a serious concern. This recommendation, even in draft form, may foster conversation about an unattainable control of the watershed. We encourage removing this recommendation	
	Because alterations in water levels can impact upstream (Lakes) and downstream (Rainy River) including connected waters (associated wetlands, streams, groundwater interfaces); impacting ecosystems, communities, and species; we support the move to a more natural hydrograph on Namakan Reservoir and Rainy Lake. In particular our concern is that this document does not adequately address downstream impacts; including ecological integrity, diversity, health, and sust ai nability . Inaccurate flood forecasts, the consequences that happen after drawing the reservoir down, and the continued need for power generation, are a concern . The increased flexibility recommended (e.g. ...*".allowing lower targets in spr ing" ....)* could create a situation problematic to downstream species and ecosystems. Changes in outflows from Rainy Lake have the potential to disrupt sensitive flo ra and fauna such as; spawning fish (dewater eggs and fry, lake sturgeon), nesting migratory birds (shorebirds, or birds using the riparian habitat), emergent vegetation , and ot hers. Therefore, we ask that special consideration be given to examining and establishing critical flow criteria to ensure that downstream habitat is not degraded and that adequate and more natural flows are maintained; and recommend establishing operational guidelines and outflow criteria that consider how quickly changes in outflows are made from the dam in International Falls/Fort Frances (e.g. ramping rates) to prevent/minimize negative downstream impacts and maintain ecological integrity. *1.} <u>Example:</u> Lake levels are lowered in anticipation of high runoff to reduce flood potential {which would increase flows to the River). However, if the precipitation is lower than expected; outflows might then be reduced to increase lake levels. Resulting in a sudden decrease in downstream flow. This type of approach could disrupt the behavior of flora and fauna causing negative impacts to populations downstream and upstream. To avoid and minimize these potential negative impacts to downstream especially during the spring flowering, nesting, and spawning seasons; we would like to see more discussion about potential impacts to the River (stage and flow) and ways to mitigate those impacts.*	Annex 8 contains Sample Operational Guidelines. Ramping rates are discussed under the Year-Round Considerations for the Water Levels Committee, as other means of protecting the Rainy River from negative impacts due to releases from the International Falls Dam. However, it should be noted that returning the river to a more natural regime would actually see much higher peaks during most high runoff events. Study #3- An Investigation of the Effects of the 2000 Rule Curve Change on the Rainy River Hydrologic and Hydraulic Regime (Luce and Metcalf, 2014) suggests that extreme high flows at the International Falls Dam are lower under regulation. This is because lake levels are lowered in anticipation of high runoff events, thereby decreasing the outflow capacity at the dam. Please refer to the informational videos provided on the Study Board website to better understanding Rainy River and Rainy Lake outflows.

	NIHS/Habitat/ Ecological Integrity- Assessment and Monitoring Alterations in water levels can impact upstream (Lakes) and downstream (Rainy River) including connected waters (associated wet lands, streams, groundwater interfaces). Consequently, these changes can directly and indirectly impact the aquatic (surface and ground waters) and terrestrial/aquatic interfacing habitats. Nesting migratory birds (water, shore, and riparian habitat), mussels, fishes, invertebrates, reptiles and amphibians and other species can be greatly impact ed. Therefore, we ask that both Federal and State Threatened and Endangered species be considered in the management of these waters and shore lands. We encourage the Study Board to either enter into a license agreement with the DNR for Rare Features Data so that potential impacts to known occurrences of state-listed species can be more thoroughly addressed, or to query the DNR Rare Species Guide to get a list of state-listed species found in the area and address issues more generally.	The Study Board appreciates this information and will ensure it is forwarded to the IRLWWB. As the Rule Curves Study Board will come to an end as an entity upon submission of its final report to the IJC, the Board will be unable to examine the dataset for potential information on additional species sensitive to water level regulation in the Namakan Chain of Lakes, Rainy Lake and Rainy River. However, if an adaptive management strategy is implemented by the IJC based on the recommendation of this Study, this dataset will be an important source of information.
	Special Note: The downstream piping plover population of Lake of the Woods has been studied by the US Fish and Wildlife Service along with the MN DNR. http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNNB03070# If the changes in water levels occur as a result of this projects activities then nesting piping plovers this will need to be addressed. Changes in water levels during the nesting season have the potential to disrupt behavior and/or destroy nests and young. The next step would typically be to provide an avoidance plan that can be reviewed by DNR staff. Piping plovers are also a federally-listed species so the USFWS should be consulted on this project or any changes. The follow pertains directly to this project: **"Why is the piping plover endangered? Habitat Loss or Degradation** - Many of the coastal beaches traditionally used by piping plovers for nesting have been lost to commercial, residential, and recreational developments. Through the use of dams or other water control structures, humans are able to raise and lower the water levels of many lakes and rivers of plover inland nest sites. Too much water in the spring floods the plovers' nests. Too little water over a long period of time allows grasses and other vegetation to grow on the prime nesting beaches, making these sites unsuitable for successful nesting." https://www.fws.gov/midwest/endangered/pipingplover/pipingpl.html. We suggest further studies to investigate the historical and current status of populations, identify potential impacts	In the Terms of Reference for the Study Board, the IJC stipulated that: "The geographic scope of this study comprises the Rainy and Namakan Lakes, the connecting channels and the Rainy River downstream of Rainy Lake to the Lake of the Woods, and the riparian areas adjacent to these water bodies." The Lake of the Woods Control Board oversees the management of lake levels on Lake of the Woods by directing the outflows of the lake.

	from water levels changes over time, and consider the possible infl uences from the hydroelectric activities from this project. For more detailed information regarding this species and it protection : https:/ / www.fws.gov/ midwest / endangered/ pipingplover/ index .ht ml https: // www .fws.gov/ nort heast / ny fo / es/ GLplove r03.pdf Also we recommend working with Audubon , USGS, and other universities and organizations involved in research: http:// www.audubon.org/ import ant-bird-areas/ lake-woods-iba Research:ht t ps:/ / w ww. jst or.org/ st able/ 1522185?seq =1#page_scan_tab_contents	
	We also recommend considering the impacts to rare species, species of special concern, rare communities, and other natural resources in your management plan. Not only is wildlife viewing providing important revenue and increase economic potential for our state. Many of these species/communities may serve well as indicators of ecological health/integrity and long term sustainability; and recommend they be considered for future analysis/ assessments and be incorporated into your 'Investigate Adaptive Management. While the list of ongoing monitoring recognizes sampling within the reservoirs, there is no consideration to downstream impacts. We ask you work with our fisheries, wildlife, and ecological staff Rainy River to consider additional targets for monitoring and assessment both up and in particular downstrea m. Additionally, we would like this project to consider the impacts to enhancing the introduction, transport, and enhancement of all potential terrestrial and aquatic invasive species.	If an adaptive management strategy is implemented by the IJC based on the recommendation of this Study, information on impacts of water level regulation to rare species, species of special concern, rare communities, and other natural resources will be essential for effective management of interests within the basin. Outlining the specifics of this adaptive management strategy are outside the scope of this Study as they will be largely dependent on resources allocated by the governments.
	We suggest acknowledging and addressing cumulative effects of these concerns	The Study Board has made great efforts to recognize and balance the interests of all areas affected by the water level regulation of Rainy and Namakan Lakes and has provided opportunities during all stages of the Study for advisory groups, members of the public and all interested parties to provide input. Nevertheless, the Study Board recognizes that not all impacts can be foreseen and there exists many areas where the relationship between water levels and performance are poorly understood. The Study Board has therefore recommended the implementation of adaptive management strategy to ensure a continual evaluation of regulation strategy performance and its observed impacts within the basin.

	General Comments Document provided	Thank you for this information.
MNRF, June 8	We are pleased to concur with the Study Board's conclusion that the 2000 Rule Curves for Rainy and Namakan Lakes performed as expected, and recognize that the proposed curves build on the ecological benefits already achieved.	Comment acknowledged.
	Draft Recommendation 1 We support the recommendation to adopt Rule Curve Alternative C, which provides conditional spring flood reduction targets for Rainy Lake in years with high spring flood risk and reducing over-winter drawdown for broad ecological benefits in both lakes. We agree this alternative offers a number of additional benefits over the 2000 Rule Curves, specifically improvements to the aquatic ecosystem, and is a step towards more natural hydrology on the system while accommodating a number of interests. While we support in principle the recommendation for an early spring drawdown and delayed refill on Rainy Lake based on a flood forecast, we would like to see more precise language regarding under what conditions the flood risk for Rainy Lake is deemed to be high and when this Rule Curve would be implemented. This could be included in the new Terms of Reference for the Water Levels Committee.	Comment acknowledged. Although the Study Board has suggested operational guidelines in Annex 8, it feels it is the responsibility of the Water Levels Committee to definitively identify a comprehensive set of guidelines after consultation with key groups in the watershed affected by water level regulation ahead of the spring freshet (see recommendation #7)
	We support the changes to over-winter drawdown on both Rainy and Namakan Lakes that will increase muskrat survival. We understand muskrat should act as a natural control of invasive hybrid cattail, resulting in increased habitat availability for wild rice, among other predicted ecological benefits. We would like to acknowledge the Study Board's finding that the steady water levels resulting from the 2000 Rule Curves provided conditions for the expansion of invasive hybrid cattail, at the expense of wild rice.	Muskrat comment acknowledged.
	We are of the opinion that adoption of Alternative C must also include immediate implementation of a fully funded monitoring program to assess whether the changes to winter water level targets under this alternative are resulting in the intended ecological effects, specifically on the spread of hybrid cattail and muskrat population growth. We also believe that adoption of the conditional spring flood reduction target of Alternative C must also include immediate implementation of a fully funded monitoring program to assess whether the frequency of applying early spring drawdowns on Rainy Lake under this alternative are resulting in overall adverse impacts to fisheries, specifically spring spawning fish. *As* an agency we do have concerns over a lack of consideration about downstream impacts to the Rainy River given the limited Performance Indicators (PI's) that were included in the IERM and SVM analysis that was conducted. After the review of the 1970 IJC Order, it was apparent that further work was needed to assess downstream ecological, economic, and social impacts of the 2000 Rule Curves. We understood that the Rainy River would be examined in greater detail during this review; however, in our	The Study Board has recognized that there are ongoing gaps in information pertaining to the Rainy River. It is also recommending the implementation of an adaptive management program in support of **Alternative C**. An adaptive management program implies funding either sourced or leveraged through collaboration, but the Study Board has specifically noted funding as an important consideration. How this will proceed depends on IJC's review, hearings and recommendations to the governments.

	view the consideration for downstream impacts was not as expected. Moving forward, we hope the water levels committee will continue to work with our agency in addressing Rainy River hydrologic issues as they unfold. The proposed curve for Rainy Lake raises a new suite of questions for the Rainy River, particularly uncertainly associated with the flood curve and the considerably lower winter flows generally. For these reasons we re-emphasize the importance of the Rainy River in Rule Curves decisions and would like to see the Study Board recommend additional study of the Rainy River during the term of the next Order and provide clear recognition outlining this need for the next Rule Curves review. It is understood that the current minimum outflows for Rainy and Namakan Lakes remains in effect.	
	Draft Recommendation 2 We support, with some clarification, the recommendation to promote flexible operations to improve outcomes. While we generally support more flexible operations using the 25th and 75th percentile range rather than simply targeting the middle of the band, we advocate that these decisions be carefully considered so that they do not inadvertently result in unintended consequences. It is a concern that one perceived improvement in an outcome could compromise another. While it is difficult to predict all the various outcomes, we suggest that a set of principles be developed to help inform the decision process and significant, frequent, or prolonged deviations be discussed with resource agencies and others to advise on any adverse effects. Factors to be considered in the development of the Operational Guidelines include, but are not limited to; spring spawning flows for both Rainy and Namakan Lakes, ramping rates when outflow changes are made, peaking and ponding operations and downstream effects, wild rice maturation and harvest, and balanced flows between Squirrel and Kettle Fallsdams.	Comment acknowledged. The Study Board has provided sample guidelines in Annex 8 for consideration by the Water Levels Committee and an advisory group comprised of representatives from key groups in the watershed affected by water level regulation, including the resource agencies.
	Draft Recommendation 3 We support the recommendation to provide the Water Levels Committee with a Terms of Reference. As well, we believe that the Terms of Reference should include provision for a balance of interests, including federal, provincial, and state agency representation on the Committee. The Terms of Reference should also include direction on managing upstream and downstream interests and needs, as well as balancing ecological, social, and economic benefits.	Comment acknowledged. The Study Board thinks the current composition of the Water Levels Committee should be maintained but is recommending (#7) a formal process be developed to engage the Water Levels Committee with key groups in the watershed affected by water level regulation ahead of the spring freshet.
	Draft Recommendation 4	Comment acknowledged.

	We support the recommendation to empower the Water Levels Committee to direct targets outside of the Rule Curves range, under clear limits i.e. to respond to emergency conditions, or to allow for more flexible spring refill of the lakes in timing with the freshet. These limits should be clearly articulated in the Water Levels Committee Terms of Reference. We would like to acknowledge that, in our experience, the IJC's reaction and issuance of Temporary Orders in response to environmental issues has been timely.	
	Draft Recommendation 5 We support the recommendation to examine operational approaches to benefitting Rainy River interests while meeting Rule Curve requirements. We see this recommendation inherently tied to the additional flexibility proposed in Draft Recommendation 2, recognizing that river flows are directly dependent on upstream decisions, and as such must be considered upfront in the development of the Operational Guidelines being proposed. We see this recommendation, in concert with #2, as contributing to a more balanced and comprehensive water level management strategy. We suggest factors to be considered in the development of the Operational Guidelines include, but are not limited to; spring flow regimes for the Rainy River, ramping rates, and peaking. We acknowledge the Study Board's assertion that fluctuations of water levels in the Rainy River are only partially affected by dam releases, however we wish to point out that conditions in the upper river below the dam are most affected by dam operations, and is where effects are most pronounced. As a result, downstream effects in this area should be given consideration in the OperationalGuidelines.	Comment acknowledged. The Study Board has revised the language in the report to acknowledge potential effects on downstream interests, but is not intending to expand analysis to evaluate them. While downstream interests at Lake of the Woods and the Winnipeg River are affected by the timing and magnitude of flows released into the Rainy River that could have the potential to affect operations for downstream dams as well as stakeholders in these areas, this study focused solely on potential effects of Rule Curve and operational changes on interests within the study area. In addition, the Study Board has compiled a list of sample Operational Guidelines, based on information collected as part of the Rule Curves review. These Sample Operational Guidelines are provided in Annex 8 and discuss all considerations mentioned in this comment.
	Draft Recommendation 6 We support the review of data monitoring sources to support inflow forecasting by the Water Levels Committee.	Comment acknowledged.
	Draft Recommendation 7 We support the recommendation to formalize pre-spring engagement by the Water Levels Committee. We believe this should include a commitment to formally consult with resource agencies at this time, to discuss any adverse biological or environmental impacts seen as a result of previous application of conditional spring flood reduction targets. As well, the recommendation should include language that clearly states the purpose of these engagement sessions is to convey	Comment acknowledged. See Recommendations #2 and #3.

	whether or not the alternate spring water level targets have been applied, and that the responsibility for triggering the conditional spring flood reduction water level targets on Rainy Lake is a science-based decision made by the Board. The content of this recommendation should also be included in the Water Level Committee's Terms of Reference.	
	Draft Recommendation 8 We support the recommendation to investigate adaptive management. We fully support the implementation of this process to evaluate whether the changes to water level targets under Alternative C are resulting in the intended ecological effects. It will be important to implement monitoring programs to evaluate these effects immediately following implementation of Alternative C, should the IJC endorse this alternative. We request the Study Board clarify that the adaptive management cycle will encompass the entire monitoring and review period after the new Rule Curves Order. Also, the Operational Guidelines and any additional flexibility the Water Levels Committee is proposing should not be seen as an opportunity to conduct ad-hoc or annual changes to the curves based on interest group pressure that will confound future interpretation of impacts.	The Study is proposing an 11 element adaptive management program that encompasses and addresses various points raised in these comments, including the need to monitor key environmental resources. There is, usually, continuous learning and adaptation steps where changes are made gradually towards an optimum and not on an ad-hoc basis. The Study Board trusts this will be the norm this time as well. The proposed operational guidelines stem from numerous simulations of the Shared Vision Model and the Integrated Ecological Response Model.
	We also request that the Study Board include a formal deadline for the next Rule Curves review. We are concerned about the apparent lack of firm commitment to fund and undertake monitoring impacts of the changes proposed with Alternative C by the Study Board. It is imperative that a monitoring program be funded and developed to assess the anticipated impacts on muskrat, cattails, and wild rice, among others, and this monitoring program should include representation of the entire system. Our ministry remains committed to providing any information that we routinely collect within the basin that may serve to inform the IJC in future reviews. We would also appreciate inclusion of a statement from the Study Board recommending that the IJC consider monitoring information collected by resource agencies during the interim that may indicate impacts of the new Rule Curve, including the conditional spring flood reduction targets. As we previously articulated in our July 7, 1999 submission to the IJC regarding the Review of the 1970 IJC Order for Rainy and Namakan Lakes, we support monitoring programs in the basin. We reiterate our position that resource agencies have a limited capacity to undertake additional monitoring programs, especially in the absence of external funding.	The very reason for Adaptive Management is to avoid costly, infrequent reviews. With the formal implementation of an adaptive management program, Alternative C would be incrementally adjusted based on the response of performance indicators and hydrological metrics. This is captured in Figure 9-2 of the report; however, the Study Board has recommended a formal review of the results of **Alternative C** along with the associated adaptive management elements after a 15-year adaptive management cycle. The report has been modified to recognize the need for funding and resources for monitoring and for adaptive management implementation.

	We encourage the Study Board to include a firm recommendation to the IJC in their final report to fund and co-ordinate with agencies and other partners these essential monitoring studies. We also recommend striking a new Rule Curves Monitoring Committee to guide the planning and delivery of this monitoring.	
	Draft Recommendation 9 We were surprised to see Recommendation 9 included at this stage of the review given no previous consultation or discussions. While it is unclear what the investigation might encompass or conclude, our ministry has serious reservations in the concept and are particularly concerned that this was not raised previously. We, and other agencies, were of the understanding that exploring modifications to the outflow was out of scope for the review. To propose such a recommendation at this stage is problematic and it is for this reason that we caution against its inclusion as a final recommendation. This is a complex issue and presumably the cost to undertake such a study would be significant. It is our opinion that the critical research and monitoring needs outlined previously take priority in terms of support and funding. Managing for more natural hydrology on the system has numerous benefits, especially to the aquatic ecosystem from which we all derive benefit. We have serious concerns that physical alteration of the natural outlet of Rainy Lake at Ranier Rapids and Seven Oaks (Point Park) would have significant social, economic, and environmental impacts at the site and downstream.	Emergency conditions due to high water on Rainy Lake occur periodically due to inflow conditions that exceed the natural outflow capacity of the lake. The Study Board heard calls for a modification of the natural outlet constrictions, between Ranier, MN and Fort Frances, ON to reduce the severity of high water events. The Study Board recognizes that evaluating outlet modification would be a complex undertaking, with many environmental, economic, and political considerations. However, it also notes that significant reductions in flood peaks on Rainy Lake are not possible through operational changes or modification of the Rule Curves. The Study Board notes that this is not a matter that the IJC can investigate on its own initiative, but would require direction from Canada and the United States. Based on feedback received from a variety of interests on this question, it is recommending that the IJC advise the two governments that this is a subject of interest and discussion in the watershed; it is not intended to be an endorsement for modification. The Study Board has modified the language in Draft Recommendation #9 to reflect this.
	Recommendation 10: We support the recommendation to examine approaches for developing and sustaining improved relationships and communications with First Nations, Metis, and tribes on water issues	Comment acknowledged.
	Draft Recommendation 11 We support the recommendation to consider sponsoring research projects to improve understanding of relationships between water levels and areas of Aboriginal Traditional Knowledge	Comment acknowledged.
	We would also like to take this opportunity to comment on the review process. The continually changing nature of the alternatives presented by the Study Board challenged our ability to effectively assess impacts of the alternatives. Having alternatives presented in a public forum through use of the Decision Workshops without advance notification to the Resources	Comment acknowledged.

	Advisory Group posed barriers to full participation as agency staff were unprepared to formally take positions on new information in this forum. We thank the Study Board and its staff for their tireless work in reviewing the 2000 Rule Curves, and developing and evaluating a number of alternatives that reflected the perspectives of the many stakeholders involved. We appreciate the effort the Study Board has taken in involving the public and agencies in the process, and appreciate the opportunity to comment on the draft report.	
	Sec 1.2.3- Suggest replacing 'shoreline property ownership' with cottaging	Retained existing language as Study Board felt it was more appropriate.
	2.1.1- *Namakan Lake*- Squirrel and Kettle Falls are solely owned and operated by H2O Power LP	Text edited to only refer to who operates the dams.
	Rainy Lake- Seven Oaks is located at the Point Park in Fort Frances, not Ranier. Sentence could better read " ...the natural outlet of Rainy Lake at Ranier Rapids, between Ranier MN and Seven Oaks/Point Park in Fort Frances, ON'.	Revised as suggested.
	2.2.1- Riparian Interests- Overview- First Nations and Metis have Aboriginal and Treaty rights enshrined in Canadian law with regards to resources, including fishing and trapping rights. Indigenous communities are concerned about how fluctuating water levels may affect their ability to exercise their rights, in particular the cultivation and harvest of wild rice. This section should be revised to acknowledge these rights.	Comment acknowledged. Indigenous interests in the study area are recognized and addressed throughout the report. Indigenous communities were also able to organize and participate in information exchange meetings with the Study Board at various stages of the Study.
	Implications of changing water levels and flows- Mention of municipal and First Nations communities' infrastructure is missing from this section. The Town of Fort Frances water treatment plant (above the dam), and the sewage treatment plant below the dam can be/are impacted by flood events due to their low elevation and close proximity to the water (Upper Rainy River above and below the dam). As well, several First Nations communities have similar water treatment/wastewater infrastructure that are affected by extreme low and high water events, as demonstrated during the 2014 flood. As a result, water supplies for the Town of Fort Frances and other communities can be affected. Other infrastructure, including roads and watercrossings on both sides of the border, are also impacted by high water levels on Rainy Lake and the upper Rainy River above the International Dam. The text of this section should be revised to reflect this information.	Comment acknowledged. The Study Board contacted the Town of Fort Francis regarding this issue. The Town confirmed that extremely high water events can threaten the wastewater treatment plant, but the Town notes that such high levels are beyond the capacity of the dam to control. The Town's water treatment plant is well above the water level and surrounding land and not at risk of flooding.
	2.2.4- Overview- Term Aboriginal should be replaced with Indigenous for consistency.	Revised as suggested.
	2.2.5- Recreational Boating and Tourism- This section is heavily weighted towards VNP. Inclusion of some Canadian statistics would be appreciated. See the 2010 Survey of Recreational Fishing in Canada: Ontario Fisheries Management Zone 5, Ontario Ministry of Natural Resources and Forestry, 2013. Over 16 000 anglers visit the Canadian side of Rainy Lake each year (OMNRF 2013). See also the 2017 Boundary Waters Atlas (MN DNR, in prep- see Kevin Petersen for it). This also contains a wealth of information on anglers in the area.	Revised as suggested: "As well, an estimated 16,000 anglers visit the Canadian side of Rainy Lake each year, according to the Ontario Ministry of Natural Resources and Forestry (OMNRF)."
	4.3-Table 4-2- The meeting with Lac La Croix First Nations is missing from the table.	Revised.
	5.2- It would be helpful to the reader under each subsection/PI if the reference or study number was included after each mention of the study's findings to be able to find the research.	Comment acknowledged. However, this change has not been made.
	9.2.4- Draft Recommendation 8- There is no mention of a new Adaptive Management Committee recommended by the Study Board (option 3), as described in s. 8.3.2. The text of	Text in Finding 18 under 10.2.4 has been revised to reflect this comment.

	9.2.4 and the draft recommendation should be clarified to reflect this.	
Grand Council Treaty #3, June 14	After reviewing the report on Managing Water Levels and Flows in the Rainy River Basin, it was concluded from the perspective of the Territorial Planning Unit (TPU) of Grand Council Treaty #3 that, while we acknowledge the engagement efforts by the Rule Curve Review Board, the Board has not conducted meaningful engagement with Treaty #3 communities. In the report, the Study Board lists their engagement with Treaty #3 membership consisting of two individual community engagement sessions and one regional Learning Forum for the seven Treaty #3 communities. The IJC should have conducted individual engagement sessions with each of the communities in the region and hosted additional regional Learning Forums throughout the duration of the two-year review. The Territorial Planning Unit recommends the IJC develop an engagement strategy with Grand Council and Treaty #3 communities. While the Study Board has built a strong relationship with Grand Council, the TPU does not speak on behalf of individual communities. The role of the TPU is to provide technical support to communities and act as a bridge between the communities and organizations/government. By acknowledging Aboriginal and treaty rights, each individual community should be engaged. The IJC needs to acknowledge Aboriginal and treaty rights of the Anishinaabe Nation of Treaty #3 and understand past grievances as it relates building relationships and managing water levels in the Rainy and Namakan chain of lakes.	Comment acknowledged. The Study Board connected with each of the communities within the Study Area by email and by follow up phone calls at the onset of this project and throughout the process; we were pleased to respond to those communities who invited us to meet and would have been pleased to meet with any community who was interested in discussing concerns and issues with the us. The Study Board feels it built relationships with individual communities during and as follow up to the Learning Forum, as well as through the joint planning and hosting of two public meetings (in Nigigoonsiminikaaning First Nation and at Kay-Nah-Chi-Wah-Nung Historical Centre) during the July 2016 public meeting series. In addition, discussions with elders and other community members (in person and by telephone) regarding water level impacts on medicinal plants, infrastructure and pictographs on Rainy Lake were invaluable to enhancing our knowledge of specific concerns and were one of the drivers for Recommendation #11. As well, the ongoing participation and input of a number of First Nation community representatives on our Public Advisory Group was extremely helpful in ensuring concerns around the impacts of regulation on wild rice health and lake sturgeon spawning were addressed adequately. Recommendation #10 acknowledges the need for better and more sustained communication with communities. The Study Board will pass on Grand Council Treaty 3's observations on IJC activities to the Commission.
	Engagement and outreach in the Study (vi) Objectives	The Study Board has amended the text in Chapter 4 to read: "The communications directive also instructed the Study Board to "directly

	The objective does not include engagement with First Nations. Please include a statement in the objectives demonstrating: The process sought to engage Treaty #3 members, provide an opportunity to participate and provide their input in the rule curve review.	engage early with Aboriginal peoples including but not limited to, First Nations, Metis and Native American Tribes in the basin to seek their input in the Rule Curve evaluation and their involvement in the Rule Curve Public Advisory Group."
	4.3 Perspectives of Tribes, First Nations and Metis (pg. 38) Paragraph 2- should say the Anishinaabe Nation of Treaty #3 Clarification: The purpose of the Learning Forum was to introduce Treaty #3 members to the IJC and the rule curve review. Further Learning Forums were needed to build a stronger relationship between Treaty #3 members and the Rule Curve Study Board.	Comment acknowledged. The text has been revised to reflect the purpose of the Learning Forum.