

International
Souris River
Study Board
Progress
Report

April 14

2021

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Executive Summary

The International Joint Commission (IJC) created the International Souris River Study Board (Study Board) in 2017 in response to the US and Canadian governments' reference to evaluate and make recommendations regarding the operating plan contained in Annex A and B of the 1989 International Agreement for Water Supply and Flood Control in the Souris River Basin. The Study Board submitted a Work Plan to the IJC in 2017 that addresses each element of the governments' reference. The Study Board has the technical staff in place to apply hydrologic and hydraulic models and has investigated a wide range of alternatives. The technical staff has developed an excellent suite of models that will lead to a summation of the best alternative(s) for the IJC to consider; and will remain a legacy of this project for many years to come.

The Study Board, along with IJC staff, have assembled a strong group of managerial, technical, public and logistical specialists to conduct the 19 tasks outlined in the work plan and main body of this report. The purpose of the Work Plan was to describe all studies needed to assist the Study Board in fulfilling the terms of the July 5, 2017 reference. Each element of the governments' joint reference is addressed in the Work Plan through a number of tasks that are grouped under four broad activities: Operating Rules Review, Data Collection and Management, Hydrology and Hydraulics and Plan Formulation.

In addition to the technical efforts, the Study Board has established a governance structure through the **Resource and Agency Advisory Group (RAAG)** and is connecting with **Indigenous Communities** to build relationships and obtain input from those living and working in the Souris River Basin. The IJC also established a **Public Advisory Group (PAG)** as a means of engaging the public during the course of the study. The PAG and the RAAG have been used extensively throughout the Study. These groups have had a series of successful meetings through the pandemic period and with much assistance for the IJC communication staff and the IJC liaison staff. A final virtual PAG meeting was held on March 15, 2021 to provide an update on study status, discuss draft recommendations coming from the study, and provide information on how the PAG can continue to engage with the study process as it continues. Similarly, a final virtual RAAG meeting was held on March 15, 2021 to provide an update on study status, discuss draft recommendations coming from the study, and provide information on how the RAAG can continue to engage with the study process as it continues. The Indigenous participants expressed continued interest to collaborate with the IJC. The ISRB Co-chairs submitted the Board's recommendation on Indigenous Engagement to the IJC on March 26, 2021 along with the IJC-Indigenous Nations Virtual Workshop, September 17-18, 2020 report. The workshop report provides additional context related to the recommendation.

We are bringing a number of elements to the study to a close including our plan formulation recommendations, which have recently been approved by the Study Board. All elements of the workplan are completed or nearly complete. The study team members are working diligently to deliver the final report by August 31, 2021.

Background

The Souris River originates in Saskatchewan, crosses the International Boundary into the United States and passes through the state of North Dakota, and then again crosses the International Boundary into Manitoba before joining the Assiniboine River. Major reservoirs have been constructed in both Canada and the United States. These include Boundary, Rafferty and Grant Devine Reservoirs in Saskatchewan, and Lake Darling in North Dakota (figure 1). The basin also includes a number of wildlife refuges and small impoundments along the North Dakota portion of the river.

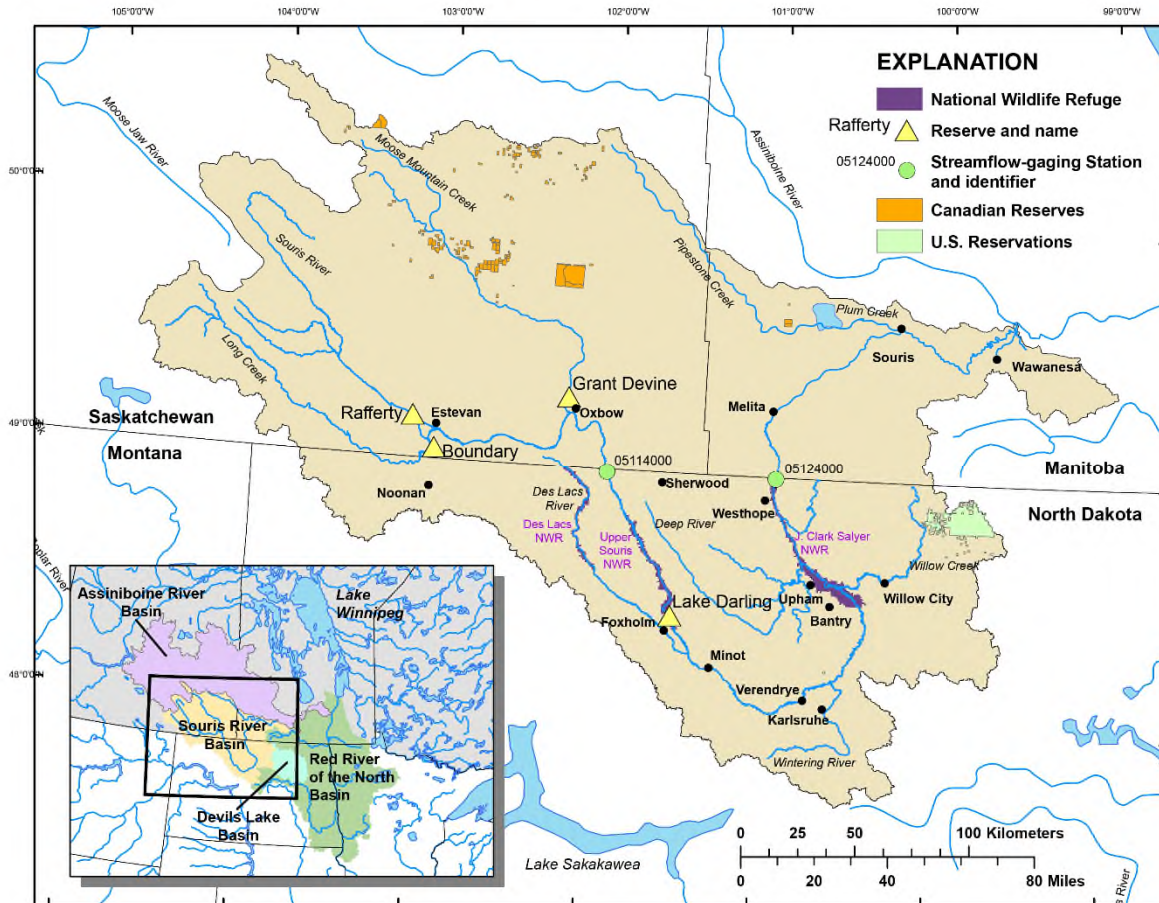


Figure 1. Souris River Basin showing locations of major reservoirs, and National Wildlife Refuges

(Modified from Kolars and others, 2016).

The International Souris River Board (ISRB) operates under the 2002 Directive and was formed through the integration of 2 existing boards – the Souris River Board of Control and the Souris River aspects of the International Souris-Red Rivers Engineering Board. The ISRB is responsible for ensuring compliance with flow apportionment and low-flow measures. In addition, the ISRB

ensures the terms of the 1989 International Agreement for Water Supply and Flood Control in the Souris River Basin are met.

Unprecedented flooding in the Souris River Basin in 2011 focused attention on review of the Operating Plan contained in Annex A to the 1989 International Agreement. Public, as well as government, agencies involved in flood protection, particularly in North Dakota, requested that additional flood protection measures be evaluated, above and beyond what is currently provided under the International Agreement, and that the Operating Plan contained in Annex A of the Agreement also be reviewed. In light of these factors, the ISRB established the Souris River Basin Task Force in February 2012 to conduct a review of the Annex A Operating Plan for presentation to the governments of Canada and the United States. The Task Force completed a Plan of Study in 2013 that describes the detailed studies that would be needed to review the existing Annex A Operating Plan for the reservoirs described in the 1989 Agreement in Saskatchewan and North Dakota and to evaluate alternatives to maximize flood control and water supply benefits. In June 2013, the IJC submitted the Plan of Study to governments.

On July 5, 2017, the governments of Canada and the United States issued a reference for the IJC to undertake the Plan of Study. In this reference, the governments of Canada and the United States requested that the IJC examine and report on flooding and water supply in the Souris River Basin and coordinate the completion of the full scope of the 2013 Plan of Study.

On September 5, 2017, the IJC issued a Directive to establish and direct the Study Board to examine and report to the IJC on matters raised by the governments of Canada and the United States in the 2017 reference.

As outlined in the Directive, the IJC directed the Study Board to develop a Work Plan; this was submitted to the IJC in February 2017. The purpose of the Work Plan is to describe all studies needed to assist the IJC in fulfilling the terms of the July 5, 2017 reference. Each element of the governments' joint reference is addressed in the Work Plan through a number of tasks that are grouped under four broad activities:

- a. Operating Rules Review
- b. Data Collection and Management
- c. Hydrology and Hydraulics
- d. Plan Formulation

On April 18, 2019 the Study Board submitted an extension request. The Study Board requested an extension based several factors including, 1) the partial U.S. Government shutdown (12/22 through 1/25/20), 2) costs of collaboration and engagement, and 3) aspects of vetting the final report. This request was granted in June 2019 and had extended the Study by one year. The Study Board's technical teams made significant progress from April 2019 through March 2020. However, the onset of the COVID-19 pandemic in early 2020 caused complications and delays in a number of study aspects. On June 17, 2020, the Study Board submitted a letter to the IJC outlining three options for completion of the study.

- a) Option 1: new money and additional time of 8 months
- b) Option 2: new money and additional time of 10 months
- c) Option 3: no new money and no additional time.

On January 12, 2021 the IJC granted the ISRSB a 6-month extension with no additional funds. The Study Board is pleased the study date has been extended by 6 months and, in anticipation of the IJC response, the Study Board developed contingency plans to ensure we meet our delivery deadlines. The Study Board will deliver a final report by August 31, 2021. The Study Board notes that the IJC has made it clear that specific analysis around dam safety specifications, as interpreted by both countries, is not in the scope of this study. However, the sophisticated tools developed within this study will lend themselves completely to any further analysis.

In 2020-21, several data and task reports have been completed and submitted to the IJC Engineering Advisors. A final report summarizing possible alternatives developed using information gathered on past flood events and dry period operation, input gained from the public, Indigenous representatives, and agencies will be submitted to the IJC, in August 2021.

Study Progress

Study progress can be broken into engagement and technical parts. The IJC and Study Board, as outlined in the Study Governance section below, have established the Resource and Agency Advisory Group, the Public Advisory Group, and is engaging with Indigenous communities to obtain input from those with a direct interest in the Souris River Basin. Also, a Climate Advisory Group has been established to help guide the climate change work of the Study Board. Technical progress can be evaluated by reviewing the accomplishments of the nineteen tasks outlined in the Workplan and listed in table 1. Each task has been assigned a technical lead and a technical team to complete the task and provide oversight.

1. Study Governance

The planning of the study and the governance structure is complete. A Study Board comprised of four members from Canada and four members from the United States has been established and is responsible for providing oversight to the study. The Study Board members come from Federal, Provincial, and State Agencies in addition to two members representing the public. Two study managers, one from Canada and one from the United States, were selected, and are responsible for assisting the Study Board on delivering on its mandate. An Independent Review Group (IRG) was also established to provide an independent evaluation of Study products.

2. Workplan

One of the main tasks of the Study Board during 2018 was to modify and produce the final Work Plan which was delivered to the IJC in October 2018. The Study Board modified the Work Plan based on comments received online, from the IRG, and from Study Board public meetings in Minot, ND in February 2018 and in Estevan, SK in June 2018. The high-level feedback coming from these meetings was that the public has a variety of concerns specific to their homes, ranch operations, and that they have been affected differently by Souris River streamflow depending on their situation. There was also feedback on the impacts to local transportation infrastructure.

The modified Work Plan has 19 projects grouped into the four broad categories listed in Table 1 (below) to enable the IJC to address the issues identified in the terms of the Reference. One of the major improvements in the modified Work Plan has been to clearly identify the technical lead for each task, outline the sub-tasks to be completed, provide a timeline, and estimated cost for each task.

Significant modifications to the tasks include separating the original HH4 task between forecasting development and forecasting assessment and adding task PF4 to look at water quality and ecosystem health. The addition of task PF4 will help the IJC address comments made in the Reference related to water quality and ecosystem health. In addition, several tasks have been reorganized. These have mainly been moved to task PF1 – “workshops and engagement”; engagement with various groups remains an important tenet of the Work Plan (see Table 1 for more detail on these tasks).

3. Technical Tasks

Nineteen tasks placed in four broad groups are shown Table 1 below. Each task has been assigned a technical lead, in addition to a technical team. The technical teams are comprised of scientists and engineers from several Provincial, State, and Federal Agencies as well as Consultants. Currently, the technical teams are in the final stages of completing work on sub-task assignments as outlined in the Work Plan. It is worth noting that Table 1 is from the updated work planning process and the costs were estimates at that time.

Old No.	New No.	Name	Group	Canada Costs (CND)	USA Costs (USD)
1a, 1b, 2	OR1	1989 Agreement Language Review	Operating Rules Review	6	0
				6	0
3	DW1	Summarize POS Projects and Report Progress since 2013	Data Collection and Management	3	0
4	DW2	Lidar and Bathymetry for Reservoirs		75	0
5	DW3	Review of Hydrometeorological Network Report		15	0
6	DW4	Data Collection for PRM		0	85
				93	85
7	HH1	Regional Hydrology	Hydrology & Hydraulics	44	25
8	HH2	Stochastic Water Supplies		6	185
9	HH3	Artificial Drainage Impacts Review		43	0
10	HH4	Flow Simulation Tools Development (MESH)		76	0
11, A4	HH5	ECCC Climate Change Supplies		47	5
12	HH6	Reservoir Flow Release Planning (RES-SIM)		64	65
13	HH7	Reservoir Flow Release Planning (HEC-RAS)		3	16
new	HH8	Develop PRM Model		4	72
new	HH9	Model System Integration		28	0
new	HH10	Forecasting Assessment		175	0
				490	368
14, A1, A3, A5, A	PF1	Workshops and Engagment	Plan Forumlation	209	175
15, 16, 17	PF2	Run and Evaluate Alternatives		173	238
new	PF3	Dam Safety		3	75
new	PF4	Roadmap for apport., water quality, and aquatic eco. health		0	0
				385	488
	A1	Administration - Independent Review Group		47	33
	A2	Administration - Study Manager (Canada)		165	0
	A3	Administration - Study Manager (U.S.)		0	106
				212	139
Total				1186	1080

Table 1. Canadian and U.S. costs, and activities required to meet the IJC September 5, 2017 Directive to the International Souris River Study Board

Study Board members have made significant progress completing task reports in 2020-21 as outlined in table 2. Task report HH3 “Artificial Drainage Impacts” was delivered to the IJC in January 2020 and a fact sheet summarizing the report findings was delivered in July 2020. The fact sheet “Review of Artificial Drainage Impacts” summarizes the basic information about the management and impacts of drainage in the Souris River Basin.

Task report HH6 “Reservoir Release Planning (HEC-ResSim)” was delivered to the IJC for IRG review in July 2020. The HEC-ResSim model described in the HH6 task report simulates current operation of Rafferty Reservoir, Boundary Reservoirs, Grant Devine Lake (formerly Alameda Reservoir), and Lake Darling. The model is the key analytical tool used to compare baseline conditions to various reservoir operations in an effort to improve the management of water supply and flood operations in the Souris River Basin. The IRG reviewed the report and the Study Board approved the technical team responses to the IRG comments in March 2021.

Task report DW3 “A Hydrometeorological Network Review” was delivered in August 2019. US Study Co-chair Michael Bart presented the results of the study to the North Dakota State Water Commission in July 2020. The Commission is chaired by North Dakota Governor Doug Burgum.

Table 2 Souris River Study Board task numbers, names, and status

Task Number	Task Name	Status-Delivery Date
OR1	1989 Agreement Language Review	Complete
DW1	Summarize POS Projects	Complete
DW2	Lidar and Bathymetry Data	Complete
DW3	Review of Hydrometeorological Network Report	Complete
DW4	Data Collection for PRM	Complete, Board approval pending
HH1	Regional Hydrology	Complete
HH2	Stochastic Hydrology	Report with USGS Publications group
HH3	Artificial Drainage report	Completed Also, a fact sheet was completed
HH4	Flow Simulation Tools Development	MESH report being written
HH5	Climate Change Supplies	Report being written
HH6	Reservoir Flow Release Planning HEC-RES-SIM	Complete
HH7	Reservoir Flow Release Planning HEC RAS	Complete
HH8	Develop PRM Model	Complete
HH9	Model System Integration	Report being written
HH10	Forecasting Assessment	Complete
PF1	Workshops and Engagement	Ongoing
PF2	Run and Evaluate Alternatives	Modelling complete – report being written
PF3	Dam Safety	Pending Board approval
PF4	Apportionment, WQ, Aquatic Eco Health	Pending Board approval

The Plan Formulation Task for running and evaluating alternatives (PF2) has been broken down into 5 Phases to ensure that proper feedback is collected along the way. Phase 1 focused on mock RES-SIM runs to show what the model was capable of doing, and how the performance indicators (PIs) will be utilized. Phase 2 focused on developing alternative building blocks from the ideas generated from the RAAG, PAG, and technical team at the workshops that were held in March and April. Phase 3 focused on further refinement of the alternative building blocks and the addition of runs based on feedback provided at the Plan Formulation team face to face meeting on May 21-24, 2019. Phase 3.5 was created, as it was determined that several of the building blocks from Phase 3 required further analysis before being combined into full alternatives in Phase 4. The technical team has completed Phase 4 simulations that focused on the combination of the alternative building blocks into full alternative operating plan based on feedback from the PAG and RAAG. Phase 5 focused on a more in depth look into the alternative

operating plans, and the recommendation of an operating plan based on PAG and RAAG feedback.

4. Advisory Groups

Throughout the Study, public opinions, Government agencies and stakeholder perspectives have been sought to foster communication and participation at all levels on both sides of the border. The IJC and Study Board have emphasized the importance of public outreach, consultation and participation by establishing various Advisory Groups as described below.

A **Resource and Agency Advisory Group (RAAG)** has been established to act as a conduit for Federal, Provincial, State and municipal agency input and industry input on interests to study processes and for dissemination of study outputs. The first meeting was held on June 25, 2018 in Estevan, Saskatchewan. At this meeting, the Study Board outlined the Work Plan, the role and expectations of the RAAG were discussed, and a draft Terms of Reference was discussed and modified. During October and November 2018, the RAAG solicited feedback from agencies through a request for information (RFI); this information is being used in models to evaluate alternatives for the study. A Webinar was held on January 29, 2019 to introduce hypothetical alternatives and the plotting routines used to analyze alternatives based on seven study themes:

- 1) Flood control
- 2) Water Supply
- 3) Environmental
- 4) Agriculture
- 5) Erosion
- 6) Recreation
- 7) Cultural

Performance Indicators that relate a river condition (flow or water level) to a benefit or impact have been developed for the seven study themes.

The RAAG workshop held on March 19-20, 2019 in in Minot, ND resulted in the advancement of several aspects of the study, including:

- 1) Discussion of how the seven Performance Indicators capture the interest within the Souris River Basin,
- 2) Holding a Plenary Session to review example graphics and data to display for Performance Indicators analyzed for each alternative,
- 3) Holding a brainstorming session to develop and evaluate alternatives; and,
- 4) Ranking the alternatives.

The RAAG is working hard to ensure that information is obtained from all necessary agencies to develop accurate Performance Indicators to provide for the best possible modelling results.

A RAAG webinar on July 22, 2019 displayed the Phase 2 results and outlined Phase 3 scenarios. Another RAAG webinar was held on August 15, 2019 to present the Phase 3 results. Both of these webinars were held to solicit feedback from the RAAG on the scenarios as the Study was

moving into phase 4. On November 20 and 21, 2019, an additional webinar was held to present Phase 4 results to the RAAG and solicit feedback for Phase 5.

A virtual RAAG meeting was held on July 22, 2020 to update members on the Phase 5 alternatives and the Hydrologic Visualization tool. U.S. and Canadian Study Co-chairs briefed the RAAG on three Options presented to the IJC for completion of the Study. Good discussion took place regarding RAAG preferences for minor modifications to a few of the Phase 5 alternations. Also, the Study Board and RAAG members discussed how future RAAG comments will be incorporated into final alternative recommendations. In follow up to the meeting, the RAAG co-chairs asked RAAG members to review Phase 5 results using the Phase 5 summary sheets and the Hydrologic Visualization tool to answer a set of questions to provide structure for a call that took place on September 2, 2020. On the call and by providing written input, RAAG provided their feedback on Phase 5, which the RAAG-cochairs submitted to the ISRSB.

A final virtual RAAG meeting was held on March 15, 2021 to provide an update on study status, discuss draft recommendations coming from the study, and provide information on how the RAAG can continue to engage with the study process as it continues.

The IJC, working with the Study Board, established a **Public Advisory Group (PAG)** in December 2017. The PAG includes an equal number of members from each country (seven) representing key interests and geographic regions within the Souris River Basin. The PAG co-chairs requested that alternate PAG co-chairs be established, and the IJC approved the PAG request. The PAG is an advisory group that provides an important means of engaging the public in the study on an ongoing basis. PAG activities are described below in Section 5.0 Public Engagement.

The **Climate Advisory Group (CAG)** was established in early March 2019 and a Kick-off webinar was held on March 25, 2019. The CAG is assisting the board and technical teams with the climate change analysis in the Souris River Basin. The CAG has six members (three each from Canada and the United States) from Government and Academia; members represent the disciplines of water resources, hydrology, climatology and atmospheric science.

A CAG virtual workshop was held on April 30 and May 1, 2020, followed by an update on October 14, 2020. A climate change literature review for the Souris River Basin has been completed and is in the final stages of review. A first order statistical analysis has been carried out on a number of locations in the basin for temperature, precipitation and streamflow, with only a small amount of remaining analysis left to complete. An analysis of Global Circulation Models (GCMs) and downscaled and bias corrected Regional Climate Models (RCMs) has also been completed and is being written-up for CAG review. Once the hydrological model has been fully calibrated and validated, the models will be run to determine potential impacts on reservoir operations in a changing climate.

5. Public Engagement

The first PAG Workshop was held in February 2018 in coordination with the ISRB winter meeting in Minot, ND. At the meeting the PAG was briefed on the establishment of the Study

Board and the Work Plan. Several PAG members shared their own experiences related to the water resources of the Souris Basin. The PAG prepared and released a questionnaire to the public (available online until November 12th, 2018) in order to solicit feedback on how various interests were affected by the 2011 flooding and how changing flows might potentially affect their lives and communities. The results of the questionnaire were utilized to develop inputs to various models that will contribute to selecting an operating plan or plan(s).

A Webinar was held with the PAG on January 28, 2019 to provide an update on development of Performance Indicators, introduce hypothetical alternatives, and display graphics used to analyze alternatives.

A PAG workshop was held on March 18-19, 2019 in Minot, ND to discuss how the seven Performance Indicators capture the interests within the Souris River Basin. Of the seven Performance Indicator themes (flood control, water supply, environmental, erosion, agriculture, cultural, and recreation) the overwhelming responses to the question “what do you care about most in the Souris Basin?” were flood control, environment, and recreation. Public participation from Saskatchewan and Manitoba was limited at the PAG workshop in Minot. Thus, in an effort to gain a more complete understanding of stakeholder concerns in all parts of the Souris River Basin, the Study Board hosted a follow-on one-day workshop on April 29, 2019 in Estevan, Saskatchewan.

An interactive PAG workshop was held on July 30-31, 2019 in Estevan, SK to help the PAG members understand how to interpret the results from the model runs. The interactive PAG-Study Team workshop helped all participants to better understand flow alternatives, their benefits, impacts and trade-offs in the analysis of different flow scenarios.

In addition, the Study has hosted four public meetings in Minot, North Dakota on February 20, 2018; Brandon, Manitoba on February 19, 2019; Bottineau, North Dakota on June 25, 2019; and Minot, North Dakota on February 20, 2020. These meetings were well attended and received positive media coverage.

A Virtual PAG meeting was held on August 27-28, 2020 to provide PAG members a recap of the study and to bring members up to date on the Phase 5 alternatives and the Hydrologic Visualization tool. U.S. and Canadian Study co-chairs provided a brief presentation on the 3 options submitted to governments and mentioned that the Study is waiting for guidance from governments on how to proceed with Dam Safety concerns. PAG members indicated a desire to meet in person when health and safety issues allow.

The PAG and those working on the study are working hard to ensure that the public is able to provide their input for this important step in the study. In fact, PAG co-chairs submitted a letter to the IJC on August 19, 2020 outlining how the PAG has worked with Study Board members to foster “buy-in” from Souris Basin residents, and the PAG requested that the IJC consider all the effort invested by the PAG when considering how to proceed with the work needed to complete the study.

A final virtual PAG meeting was held on March 15, 2021 to provide an update on study status, discuss draft recommendations coming from the study, and provide information on how the PAG can continue to engage with the study process as it continues.

The ISRSB will hold a general public consultation period in July 2021.

6. Indigenous Engagement

The Study Board worked with the PAG and IJC to contact First Nations, Métis and Tribes who may be interested in various aspects of the Work Plan or who may have been affected by the 2011 event. A workshop presentation focused on Indigenous engagement with First Nations in Canada was held in June 2018 in order to provide further background to the Study Board on the process as well as recommendations for engagement. Engagement with these groups is ongoing; engagement has taken place through different channels in each country due to different existing relationships and structuring of the various Indigenous communities and Tribes. In both countries, the goal is to establish engagement meetings to have meaningful dialogue with the First Nations, the Métis Nation and Tribes regarding the impact of flooding and water supply.

In Canada, a consultant was contracted to assist the Study Board to set up meetings with the Indigenous groups in the basin to discuss the study with them, gauge their interest in the study and its outcomes, obtain their feedback on how they may have been affected by the 2011 flood, and establish potential long-term relationships. Through 2018 and 2019, seven meetings took place, one with each of the following; Cowessess First Nation, Swan Lake First Nation, Carry the Kettle Nakoda Nation, Ochapawace Nation, Canupawakpa Dakota Nation, Métis Eastern Region III, and the Manitoba Metis Federation.

In the United States, Study Board committee members met with the Executive Director of the North Dakota Indian Affairs Commission on January 4, 2019 to seek guidance on Tribal interest and the consultation process. On February 27, 2019 Study Board member Tim Fay and Study Board committee members met with representatives from 4 out of 5 North Dakota Tribes to discuss the study and how the Tribes might participate. The Study Board learned that cultural sites are important to the Tribes, and most of sites are not in the files of the North Dakota State Historic Preservation Office. The Tribes indicated that cultural site surveys would be needed to identify many of the sites. The Study Board reached out to tribes outside of North Dakota seeking interest in the Study, as they may have ancestral interest within the basin.

The Study Board hosted an “Indigenous Nations Peace Garden Workshop” on November 6-7, 2019 at the International Peace Garden near Bottineau, ND and Boissevain MB. The workshop was targeted to obtain the insights of Tribes in the United States, and First Nations and the Métis Nation in Canada to better understand their interactions and concerns with Souris River streamflow. The Study Board had two key goals for the workshop:

- 1) Gather Indigenous knowledge of how the Souris River flow impacts Indigenous Nations; and,

- 2) Explore the interests of Tribes, First Nations, and the Métis Nation to engage with the IJC and ISRB in a long-term relationship.

Important Workshop follow-up actions included:

- 1) The ISRSB study team planned to continue to gather and develop Performance Indications of interest to Indigenous Nations; and,
- 2) Continue to explore options to form an Indigenous Advisory Group to provide input to the short-term ISRSB and provide longer-term collaboration to the IJC by working with the ISRB.

The Study Board hosted an “Indigenous Nations Virtual Workshop” September 17-18, 2020 as a follow-up to the workshop held in 2019. The workshop was attended by 49 individuals (although active 2-day participation was around 35). Indigenous participants numbered around 15, representing about 10 Indigenous Nations. The other participants represented the ISRSB, ISRB, IJC, and IJC Commissioners. The workshop provided a brief overview of the study by the ISRSB and was primarily focused on models of engagement utilized by the IJC, its boards, and by Indigenous Nations. The Indigenous participants expressed continued interest to collaborate with the IJC. They offered their input and recommendations to on forming an Indigenous Advisory Group that would advise the ISRB (permanent river board), with suggestions on Indigenous representation on the ISRB.

The ISRB Co-chairs submitted the Board’s recommendation on Indigenous Engagement to the IJC on March 26, 2021 along with the IJC-Indigenous Nations Virtual Workshop, September 17-18, 2020 report. The workshop report provides additional context related to the recommendation.

Budget

The original budget for this study shown in table 1. In 2019, the IJC approved the Study Board's request for an additional one-year extension for the study and a funding increase of \$761,000 between the two countries. The funding increase is being used for:

- 1) additional review and development of modelling tools for alternative scenarios
- 2) to ensure adequate incorporation of climate change scenario development
- 3) additional alternative scenarios completed in Phase 5
- 4) additional workshops, thorough engagement with the public and resource agencies, and special effort in planning and logistics for Tribal, First Nations, and Métis workshop held at the International Peace Gardens on November 6-7, 2019.
- 5) additional time to review work, develop recommendations, and write final report.

Although the Study Board made great strides completing many of the tasks outlined in the one-year extension request, COVID-19 realities lead to complications for the agencies involved in the study and resulted in delays for a number of reasons. Thus, the Study Board outlined three options in a letter sent to the IJC on June 17, 2020, requesting an extension. A six-month, no-cost extension was granted. Each agency reprioritized their activities to best meet the study deliverables.

Notable Accomplishments

1. Task Progress

Given the challenges that 2020-21 has brought to the Study team, the technical staff have made significant progress as evidenced by the completion of many task products (Table 2).

2. Capacity Building

Several agencies assisted with model development, and the team approach has led to an increase in forecasting and hydrologic modeling capabilities. Thus, staff from various Federal, State, and Provincial agencies can apply the models to address various alternatives. This approach to model development used by the Study Board, with buy in from agencies, required large in-kind contributions (close to one million dollars through 2019, which has increased through to today) of staff time, continuing to pay dividends to the ISRB in addressing future water-management questions in the Souris River Basin.

3. PAG and RAAG Engagement

The PAG workshops held in Minot and Estevan in 2019 provided the first opportunities for the public to view and discuss how different reservoir operations will impact the magnitude and duration of streamflow in the Souris River Basin. A preliminary alternatives PAG workshop was held on July 30-3, 2019 in Estevan to show how flow scenarios impacted performance indicators. The virtual workshop held on August 27-28, 2020 allowed the Study Board to describe the Phase 5 alternatives and receive feedback for PAG members. The dividends of continued engagement with the PAG was noted in a letter PAG co-chairs submitted to the IJC on August 19, 2020

outlining how the PAG has worked with Study Board members to foster “buy-in” from Souris Basin residents.

As stated in the 2019 Progress Report “the Study Board believes the PAG engagement is paying dividends, and continued meetings and engagement with the PAG will lead to PAG understanding of recommended alternatives.” In 2020, engagement with the RAAG has continued through meetings, webinars, and teleconferences, but the next steps will be dependent on the government’s response to the extension request.

4. Indigenous Engagement-Continuing the Dialogue

As noted in earlier Progress Reports, the tribal and First Nations engagement has been slower to develop, but significant progress is being made. The Study Board learned through tribal engagement meetings in Bismarck that the Tribes are interested in the role of the IJC and the IRSB’s mandate. Discussion focused on the role water plays in the Tribal culture and how that should be considered in any recommended alternative. The Study Board engagement is the first time a dialogue has been attempted between the Tribes and the IJC’s IRSB. Canadian and U.S. Study Board members and staff held a joint workshop for First Nations, the Métis Nation, and Tribes on November 6-7, 2019 at the International Peace Garden.

The Study Board hosted an “Indigenous Nations Virtual Workshop” September 17-18, 2020 as a follow-up to the workshop held in 2019. The workshop was primarily focused on models of engagement utilized by the IJC, its boards, and by Indigenous Nations. The Indigenous participants expressed continued interest to collaborate with the IJC. They offered their input and recommendations to on forming an Indigenous Advisory Group that would advise the IRSB (permanent river board), with suggestions on Indigenous representation on the IRSB.

The two workshops have established the groundwork that may lead to long-lasting First Nations, Métis, and Tribal engagement through the course of the IRSB study and with the IRSB. We look forward to seeing how the IJC acts upon the IRSB recommendation provided in March 2021.

Summary of Emerging Issues/Challenges

1. The Second Extension Request

In July 2019 the Study Board requested, and was granted, an extension as described in the background section of this report. The Study Board and the technical team made great progress on the tasks from the summer of 2019 until March 2020 when COVID-19 started to impact Study Board members and the technical team’s ability to focus on the tasks. Unfortunately, the transition to virtual work and meetings, and the associated increase in general workload as a result of COVID-19, has taken time away from the Study. Throughout this transition, the technical team members have needed time to get back up to speed on Study tasks, which was unanticipated when the Study began. As a result of the challenges associated with COVID-19, and the dam safety concerns described in the next section below, the Study co-chairs requested a second extension in June 2020 that was granted in January 2021. Since the second extension request, the Study team has been working very hard to catch-up and complete the remaining

study tasks. The Study teams are unfortunately behind schedule on some of the tasks however Study team members are working diligently to deliver the final report by August 31, 2021.

2. Dam Safety

The concerns that have arisen under the title of “dam safety” since the start of the study go far beyond what was anticipated at the beginning. The term “dam safety” itself is misleading as there is no known imminent threats to the dams in the coming weeks, but rather a longer-term potential risk to the dams under exceptionally wet conditions. Notwithstanding this potential misunderstanding around dam safety risks, the study technical teams have completed work under the dam safety task as follows.

Dam safety operations were proposed by the Saskatchewan Water Security Agency (SWSA) and studied in Phase 4 by adding the proposed rules to each basic alternative. The proposed dam safety operations consisted of drawing down Rafferty and Grant Devine reservoirs to a predetermined Inflow Design Flood Supply Level (IDFSL) during the month of May and ensuring the reservoirs do not rise above the IDFSL throughout the summer months. Under this proposal, maximum allowable flow restrictions could potentially be exceeded to accomplish the objectives.

About the time the Study Board was wrapping up Phase 4, the Study Board co-chairs determined that, based on guidance from governments, the Board was to suspend activities related to dam safety alternatives. Thus, the costs and benefits of SWSA’s proposed dam safety operations or any other variants were not evaluated in Phase 5. However, the HEC-ResSim modeling methodology was improved such that the model more realistically simulated dam safety operations during flood events smaller than the 2011 flood.

It is worth noting that there are numerous alternatives that could be considered for dam safety but have not been formulated or evaluated as the effort required to do this goes beyond the Study’s available resources for the task. On December 21 2021, the governments determined that dam safety was out of scope for the study by official correspondence to the IJC.

Next Steps

The Study Board will continue to hold virtual meetings on at least a bimonthly basis to complete:

1. Board Approvals

- The Board will continue to approve completed work tasks.

2. Technical meetings

- The Study team will continue to develop list of recommendations and list of significant findings to be included in the final report.
- The report writing team will hold frequent conference calls to continue writing the working final draft report.

3. Engagement

- The Study will provide opportunities to provide feedback on the working draft of the final report and host virtual meetings as required to facilitate this engagement process.

4. Transition from ISRSB to ISRB

- The Study will work with the IJC and ISRB to ensure an orderly and efficient transition of the various Study products.

5. Delivery of Final Report to IJC

- The ISRSB will submit its final report to the IJC by August 31, 2021.

Recent Issues of Potential Significant Interest to the IJC

On April 12, 2021 the ISRSB approved the motion as follows:

“The International Souris River Study Board accepts the Phase 5 Options as the completion of the Plan Formulation Phase for the basis of the final report preparation.

Key Considerations in support of the motion:

1. *The 1989 Agreement (with Annex A and B) has performed well for balancing water supply and flood protection for the Souris River Basin.*
2. *The ISRSB research completed extensive analyses and developed numerous new analytical techniques and tools to better understand the existing Souris River flow operations and possible alternatives for improvement of operations. These analyses and tools have tremendous value and importance in guiding application for any future operational changes, and for better understanding of the value and importance of the existing 1989 Agreement.*
3. *After modeling over 60 scenarios, this document presents the most promising suite of alternative options. They are the “Phase 5 Options on Flow Operations for the Souris River,” and are largely based on research analyzing Performance Indicators in the Souris River Basin.*
4. *Before an actual detailed operating plan is developed, these options must be further analyzed beyond Performance Indicators to determine feasibility with appropriate risk and sensitivity analyses. An array of stochastic and climate change data research should also be applied to test the resilience of operational changes and to refine options for a detailed operational plan.*

5. The IJC and Governments of Canada and the United States will need to determine an appropriate path forward to implement changes. Key factors will also require resolving issues related to current hydrology and dam safety approaches and addressing any issues prior to changing the 1989 operational plan (these were beyond the scope of the ISRSB).

The Phase 5 Options will be outlined and described in Study Reports.