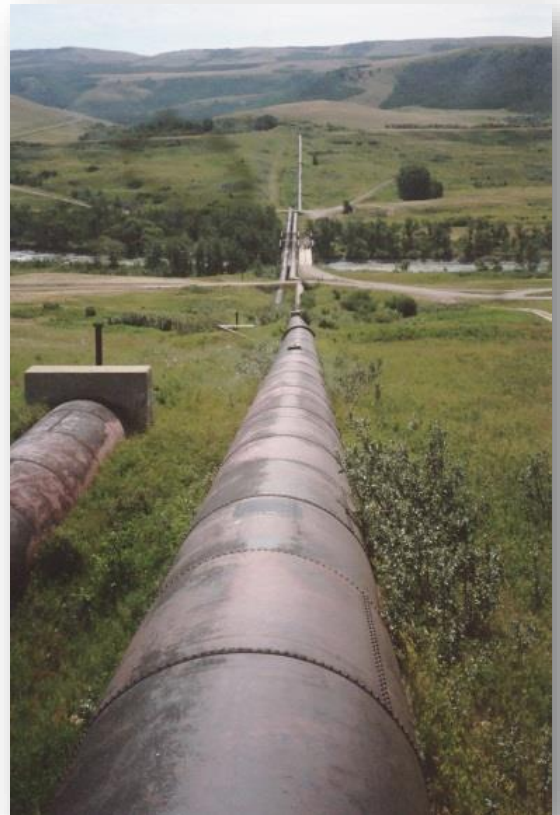
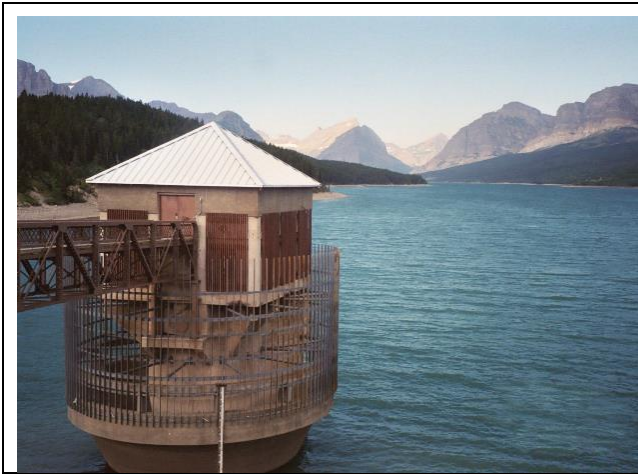




WORK PLAN FOR THE INTERNATIONAL ST. MARY AND MILK RIVERS STUDY



Work Plan

Submitted by the International St. Mary and Milk Rivers Study Board

to the International Joint Commission

February 10, 2022 / Updated June 29, 2022

1 Preamble

The St. Mary and Milk Rivers are international transboundary waters shared by the United States and Canada. These rivers and water sharing arrangements are managed under **1909 Boundary Waters Treaty (BWT)** between the two countries. The Treaty established the **International Joint Commission (IJC)** to have jurisdiction over the use, obstruction, diversion, measurement and apportionment of water that crosses the international boundary in the St. Mary and Milk Rivers basins that traverse both countries. The water sharing arrangement is managed in accordance with the 1909 BWT and the IJC Order of 1921 which established **Accredited Officers (AOs)** from each country and who are responsible for the measurement and apportionment of waters of both rivers.

Various stressors exist in the basin, including increased water demands by agricultural irrigators in the United States and Canada, interests for other water uses by Indigenous Nations, Tribes and others, historic and current water scarcity, and, anticipated risks that may be caused by climate change. Considering these stressors, the United States, Canada and the IJC recognize a need to review the apportionment and water use challenges with a comprehensive study. To this end, the United States and Canada issued a letter on June 28, 2021 in support of the IJC's plans to undertake a new study. Subsequently, the IJC issued a Directive on November 10, 2021 to create the **International St. Mary-Milk Rivers Study Board (ISMMRSB, or Study Board)**. The ISMMRSB will conduct a comprehensive study to investigate the hydrologic and socio-economic understanding of the boundary rivers, their water management options including new infrastructure, and will consider options that will improve water sharing apportionment arrangements.

The ISMMRSB initial study framework dated February 10, 2022 (updated June 29, 2022) is now respectfully submitted by the ISMMRSB to the International Joint Commission as the ISMMRSB Work Plan that describes the detailed scope of the study's work in accordance with the November 10, 2021 Directive to the Study Board. The Study Board will provide detailed findings, conclusions, and recommendations for the IJC's consideration upon study completion (anticipated by Autumn 2025). In carrying out this Work Plan, the Study Board will integrate as many considerations and perspectives as possible to explore options and combinations of options to improve access to apportioned waters by each country, in recognition of the challenges to apportionment, and in consideration of the risks posed by climate change. This Work Plan includes an analysis of lessons learned from the past 100 years since the 1921 Order was issued. The Study structure and outcomes are designed to work towards solutions that are mutually beneficial to both countries. Individual members of the Study Board will be guided by their knowledge and shall serve the IJC in their personal and professional capacities – they will not serve as representatives of their countries, communities, agencies, organizations, or any other special interests or affiliations.

The ISMMRSB will keep the IJC informed of its progress and direction and will maintain widespread

public awareness of basin-wide study activities through its governance efforts as noted in this Work Plan. The Co-Chairs or Alternate Co-Chairs of the Study Board shall convene and preside at all meetings of the Study Board and will jointly take a leadership role in planning and implementing the Study Board's mandate. The ISMMRSB will produce updated reports in a format suitable for public release and make annual reports available to the public. The Study Board will submit its final report to the IJC on or before June 13, 2025, with the Study Board's findings, conclusions, and recommendations using **SMART**¹ principles to develop the study's specific recommendations as outlined in the Directive's attachments.

2 Acknowledgements

This Work Plan is possible because of the assistance of the current members of the ISMMRSB and the work of the Accredited Officers, Field Representatives, and technical working groups. It is recognized that some of the working groups have conducted numerous analyses of the water challenges over recent years and have been exploring options for improving water use and apportionment over many years, including infrastructure changes – this existing body of knowledge will contribute to the study. The members of the Study Board were appointed by the IJC to provide expertise needed to develop and guide the scientific activities and tasks required to complete this Work Plan. Although Study Board members are currently or may have been formerly employed by government agencies in both Canada and the United States, all members have agreed to serve in their personal and professional capacities and not as representatives of their agencies, countries, organizations, or special interest groups.

3 Introduction and Organization

As early as 1891, irrigation was established in the Milk River basin in Montana and shortly thereafter in the St. Mary basin in Alberta (Figure 1) to increase agricultural security in these water-scarce regions. Montana irrigators quickly noted the Milk River was dry in the summer in about 2 of 3 years and began making plans to divert water from the St. Mary River into the Milk River to access a more reliable water supply and achieve greater agricultural water security. Canadian irrigators noted these plans with alarm and in 1903 hired a U.S. contractor and began construction of a canal just north of the border to move water back from the Milk to the St. Mary River. This Canadian intervention occurred one year before the U.S. began construction of the canal in 1904 to move water from the St. Mary to the Milk River. In 1908, the U.S. approached Canada about negotiating a treaty to better manage these transboundary rivers. The Boundary Waters Treaty of 1909 (BWT) between the United States (U.S.) and Great Britain was signed on January 11, 1909 to address water-related issues along the international border between the U.S. and Canada. The BWT also established the International Joint Commission to investigate and resolve water issues along the entire Canada – United States border, where rivers or lakes are shared.

¹ **SMART** principles or goals are **Specific, Measurable, Achievable, Relevant** and **Time-Bound**. See University of California's SMART Goals: A How to Guide; <https://www.ucop.edu/local-human-resources/files/performance-appraisal/How%20to%20write%20SMART%20Goals%20v2.pdf>

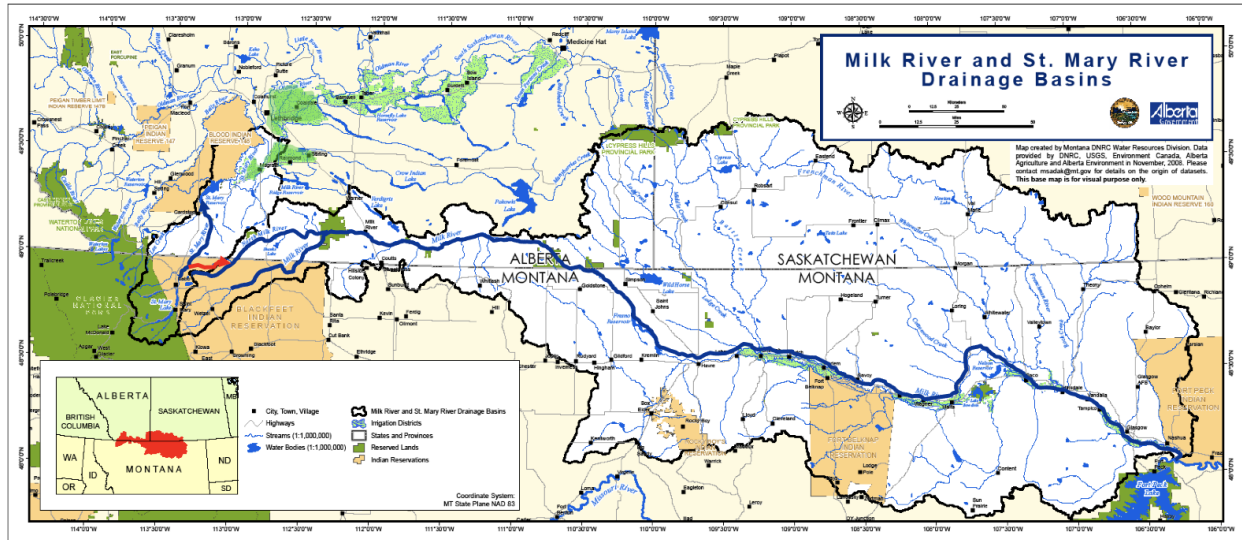


Figure 1 – The St. Mary and Milk River Systems

Article VI of the BWT, provides a framework for measuring and apportioning flows from the St. Mary and Milk Rivers, as well as three named Eastern Tributaries of the Milk River (Lodge Creek, Battle Creek, and the Frenchman River). The Article states that the two rivers “are to be treated as one stream for the purposes of irrigation and power, and the waters thereof shall be apportioned equally between the two countries, but in making such equal apportionment more than half may be taken from one river and less than half from the other by either country so as to afford a more beneficial use to each.” Questions soon arose on exactly how to interpret Article VI after the BWT was signed and led to a series of legal and public hearings between 1915 and 1921. Some of the disagreements included:

- the location where flow apportionment should be determined,
- the interpretation of prior appropriation language, and
- Indigenous water rights (Administrative Measures Task Force, 2006).

Therefore, following the completion of the U.S. St. Mary Canal in 1917, the IJC found it necessary between 1918 and 1921 to issue annual orders to what are now referred to as the “**Accredited Officers**” (AOs) specifying each country’s water entitlements. When Lake Sherburne became operational in 1919, a low flow year, the IJC directed the AOs who administer the apportionment, to seek some compromise, but the AOs were unable to do so (Administrative Measures Task Force, 2006). Consequently, in March 1921 the IJC issued a new order (henceforth known as the “**1921 Order**”) with specific instructions on how waters were to be measured and apportioned into the future. For the last 100 years the 1921 Order has been the primary guiding document for apportioning flows in these watersheds.

The 1921 Order clearly described each country’s entitlement, including prior appropriations as well as the location where flow apportionment should be determined, but it did not address Indigenous water rights. Despite its clarity on broad issues, the 1921 Order lacked the detailed information required by the AOs to operationally apportion water. The AOs are designated managers, one from the United States Geological Survey (USGS) and one from Water Survey of Canada, now the National Hydrological Service of Environment and Climate Change Canada (ECCC). The general duties of the AOs according to the 1921 Order are to:

- Determine daily natural flows at the border for the St. Mary, Milk, and Frenchman Rivers and Lodge and Battle Creeks.
- Determine the amount of water in these streams to which each country is entitled and communicate

this information to interested parties.

- Operate the irrigation works of either country to facilitate use by the other country of its share of the waters.
- Report measurements at international gages and any disagreement between the AOs to the IJC.

Over the past 100 years since the 1921 Order was issued, the AOs developed “administrative procedures” which were eventually codified beginning in 1979 into an “Administrative Procedures Manual.” The Manual has been periodically reviewed and updated as needed over the years. The manual includes such details as:

- a set of equations used to calculate the natural flow for each stream, which is a critical step in determining each country’s entitlement,
- a procedure for reporting daily natural flows on a twice per month basis, which came to be known as the “balancing period,” and
- a set of rules for refunding deficits when one country was determined after the fact to have diverted more than its entitlement, to be restored in the next balancing period or as mutually agreed by both countries. (Administrative Measures Task Force, 2006)

By the late 1980s, the Milk River natural flow equation had developed into a fairly sophisticated natural flow model. Continuous improvement of the Milk River natural flow model resulted in many updates to the Administrative Procedures Manual in subsequent years.

Over time, the AOs each designated **Field Representatives (FRs)** to handle the frequent interactions needed between the agencies measuring streamflow and estimating natural flows with the operators of irrigation infrastructure in the field. As water apportionment issues arose related to the details of natural flow models, streamflow measurement, communication of apportionment, etc., the AOs and FRs have relied on technical working groups with members from their agencies (USGS and ECCC) as well as State and Provincial agencies to investigate issues and suggest needed improvements to the models or administrative procedures.

Recognizing that the 1921 Order might not always allow the most beneficial use of the water in these watersheds, the AOs under their authority from the 1921 Order, in 1991 and again in 2001, signed Letters of Intent (LOIs) allowing the U.S. to use more than its entitlement of St. Mary River water in the spring and allowing Canada to use more than its entitlement of Milk River water in the summer, provided that the generated deficits were balanced or offset at the end of irrigation season. These LOIs were incorporated in the Administrative Procedures Manual after their adoption.

An LOI signed in 2007 allowed similar, if less proscriptive, flexibility in water apportionment in the Eastern Tributaries of the Milk River. Specifically, this Letter of Intent allowed Saskatchewan and Montana to manage deficit deliveries in these streams, with the approval of the Accredited Officers, to increase or maximize beneficial use for water users in both countries.

The AOs developed and codified procedures to implement the 1921 Order. However, over time, various U.S. interests, including the U.S. Federal Government and the State of Montana continued to note the inequity of the 1921 Order, based on their interpretation of Article VI of the BWT, and sought to revisit or reopen the 1921 Order. In each case, the IJC did not agree to reopen the Order. In response to a 2003 letter from Montana to the IJC requesting a review of the 1921 Order, the IJC held a series of public meetings and formed the **St. Mary / Milk Rivers Administrative Measures Task Force**. The Task Force issued a final report in 2006 without identifying a mutually acceptable means for the U.S. and Canada to increase their water entitlement share. The IJC suggested Montana and Alberta work with the AOs to explore the

issues further. In response, Montana and Alberta established the “**Montana – Alberta Joint Initiative on the Sharing of Waters of the St. Mary and Milk Rivers**” to “*review the current situation and make recommendations to the two governments on options to increase the ability of each jurisdiction to better access the shared waters of the St. Mary and Milk River systems.*” (MT-AB Joint Initiative, 2009). Notably, this effort did not include the AOs, which to some extent limited the options the Joint Initiative could consider for resolving the longstanding issues in these basins. The Joint Initiative produced some excellent background reports and modelled the effect of many changes in procedures and infrastructure on water apportionment. Like the earlier Administrative Measures Task Force, Montana and Alberta were unable to mutually agree on options that significantly improved each country’s ability to use its water entitlement. The Joint Initiative was formally ended in June of 2022 and because this study is now underway.

The Administrative Measures Task Force final report (2006) identified many technical improvements that the AOs could undertake to improve the accuracy of flow measurement, natural flow calculation, and therefore the accuracy of water apportionment. Over the following decade, the AOs made all those suggested changes. During a final review of the Administrative Measures Task Force Report in 2017, the AOs noted that according to the Task Force final report, the AO’s own administrative procedures limited the ability of the downstream country’s ability to utilize its full water entitlement. Notably, “*The U.S. entitlement of the combined flows of the St. Mary and Milk River (including Eastern Tributaries) is 45%, but it historically has received (or diverted) 41%.*” (Administrative Measures Task Force, 2006). Lack of infrastructure and administrative procedures of the AOs were identified as the likely causes of this difference.

Consequently, in 2017, the AOs began a review of their administrative procedures to identify potential changes that might improve each country’s ability to access its water entitlements. As part of this review, the AOs reviewed the modelling of the Joint Initiative which included both administrative, procedural, and water infrastructure changes. This work was summarized by the AOs in a white paper discussing the possible procedural and infrastructure changes and the potential benefits and drawbacks for each. The white paper was provided to Alberta, Montana, Saskatchewan, and the United States Bureau of Reclamation for comment. The final white paper was provided to the IJC in June 2019 along with a letter noting that the best opportunity to improve water access in these basins was likely a yet unidentified combination of changes in infrastructure and administrative procedures. The AOs noted the need for further investigation, the need for meaningful engagement with the public, rights holders and basin stakeholders (all with basin water interests), and their own lack of resources, and subsequently requested the IJC provide funds to undertake a comprehensive study to accomplish the tasks discussed in the white paper. The IJC endorsed this request and asked the AOs to provide a study plan and cost estimate. The IJC also asked that the study plan include an assessment of the socio-economic effects of any proposed changes and requested that extensive Indigenous engagement be undertaken as part of the study. The AOs provided a preliminary study plan and cost estimate to the IJC in November 2019 and this plan was endorsed by the IJC and both governments. On November 10, 2021 the IJC issued a Directive to the International St. Mary -Milk Rivers Study Board to conduct the study described by the AOs.

The Study Board is comprised of the following six members:

- Dr. Alain Pietroniro**, University of Calgary, ECCC (retired), Canadian Accredited Officer (Canadian Study Co-Chair)
- Dr. Dena McMartin**, Vice-President (Research), University of Lethbridge (Canadian Member)
- Mr. Laurie Tollefson**, PAg, VPH ICID (Canadian Member)
- Mr. John Kilpatrick**, U.S. Geological Survey, U.S. Accredited Officer (U.S. Co-Chair)
- Mr. Mark T. Anderson**, South Dakota School of Mines, U.S. Geological Survey (retired) (U.S. Member)
- Ms. Sue Lowry**; Owner, Avocet Consult, LLC; Chair, Red River Compact Commission (U.S.)

Member)

The first requirement of the Study Board was the development of a study framework by February 2022 (included in the following sections).

4 Study Objectives

The IJC Directive for the ISMMRSB will be addressed by the plan described in this document, which contains several tasks that are grouped under two broad activities:

- a. Historical and Socio-economic Analysis
- b. Modelling Changes in Administrative Procedures and Infrastructure

As with past efforts by the Administrative Measures Task Force, the Montana-Alberta Joint Initiative, and the AOs in their review of the water management administrative procedures, this study will focus on the St. Mary and Milk Rivers. Some of the study findings may have consequences for the Eastern tributaries of the Milk River so the entire system will always need to be considered. However, the analysis and option formulations will focus on the St. Mary and Milk diversions.

The schematic in Figure 2 shows the diversion from the St. Mary River to the Milk River basin.

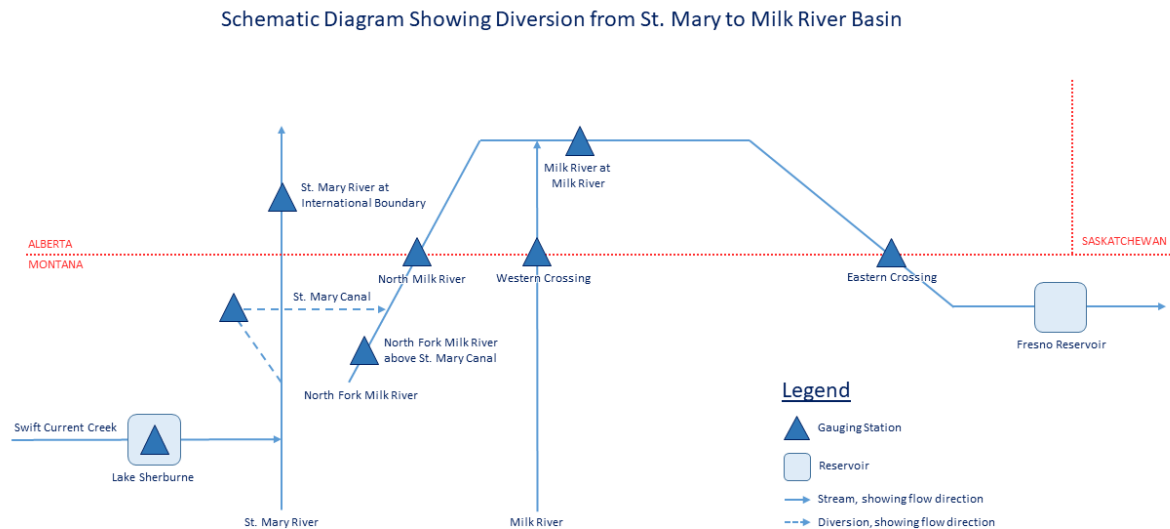


Figure 2 - Diversion from St. Mary River to Milk River Basin

The schematic in Figure 3 shows the eastern tributaries contributing flow into the Milk River basin.

Eastern Tributaries– Schematic Diagram Showing Diversions and Storage in Battle Creek and Frenchman River Basins

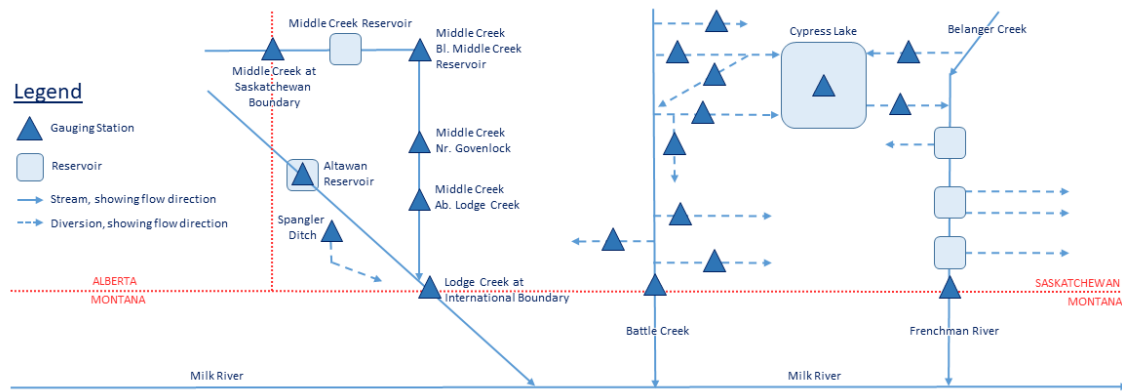


Figure 3 - Eastern Tributaries contributing into the Milk River basin

4.1 Historical and Socio-economic Analyses

Considering approaches adopted by other IJC study boards (e.g., Lake Champlain–Richelieu River and the Souris River), the ISMMR Study Board recommends undertaking an historical analysis of water availability, apportionment, and irrigation within the watershed. This would be done in the context of the Boundary Waters Treaty and the 1921 Order related to the St. Mary and Milk Rivers with particular emphasis on how water availability and apportionment under the 1921 Order have shaped irrigation development, water rights legislation, and water allocation within the jurisdictions. The historical analysis would include examination of the responses and mitigation measures adopted by water users during periods of drought or limited water availability. Coupled with this could be a review of how communities and water users have adapted or reacted to these situations.

Over the years, there have been a number of studies undertaken and reports commissioned related to flow apportionment and water supply and storage within the St. Mary and Milk Rivers watersheds. Some of these reports were initiated by the IJC, some by the jurisdictions, and others by third-party interests (e.g., local irrigators and municipalities). While many of these studies may have been technically focused on water and hydrology at their core, many have also included socio-economic perspectives. It would be instructive to review these previous studies within the current socio-economic context. This analysis could potentially inform some of the various options considered for hydrological modeling. An historical review of water user responses to previous droughts, along with input from interested jurisdictions, would allow for an analysis of current coping capacities, vulnerabilities and resiliency to water scarcity and the potential effects of climate change in the basins. A socio-economic resiliency analysis would also provide a context for model evaluations of various climate scenarios, and the administrative and structural options that could be considered to help mitigate the impacts. It would also be useful information in developing appropriate social and economic indicators that would have specific linkages to the diverse water interests of all basin stakeholders and in particular water interests of Indigenous Nations as rights holders in the basins. Conducting more current comprehensive socio-economic research would be used to develop an overall

benefits analysis as well as mitigation options to enable more substantive water apportionment and water management option comparisons. A significant part of the socio-economic analysis will be extensive engagement of stakeholders and rights holders within the basins. It is expected that engagement opportunities to gather input will leverage support for improving water governance by undertaking a Socio-Economic Systems (SES) analysis study component. Dedicated outreach/engagement sessions may be needed to engage with non-traditional stakeholders, who indirectly benefit from the agricultural industry that has evolved in the context of current water availability for the St. Mary and Milk Rivers (e.g., municipalities, processing plants, and other interests that may arise during the course of the study).

4.2 Modelling Changes in Water Management Administrative Procedures and Infrastructure

Modelling efforts will be initiated using models similar to those developed under the Montana-Alberta Joint Initiative. The data sets will need to be extended, however, and there will be a need to adapt or develop additional models to address the various combinations of options that are being considered. The analyses will include examining additional infrastructure options (storage and conveyance) and changes in water management administrative procedures. Effort will also be required to assemble climate data sets that can be used to evaluate various options under different climate conditions and/or scenarios. It will also be informative to undertake a retrospective analysis of current water management administrative options within the context of various climate scenarios. Throughout the process, there will be a need for the engagement of rights holders (Indigenous Nations) and stakeholder interests throughout the basins, likely via workshops, to ensure adequate basin interests are included as input for the models, and to better understand and compare options that result from the model output.

5 Engagement

Throughout the study, the interests and perspectives of the public, stakeholders, Indigenous Nations and basin communities (rural and urban) and appropriate local, State/Provincial, and Federal government agencies will be actively sought to gather socio-economic and hydrological information and data, and to foster dialogue, communication and participation at all levels, in both Canada and the U.S. The IJC is committed to providing all interested parties with convenient opportunities to be heard, as required in the Boundary Waters Treaty. The IJC emphasizes the importance of public outreach, consultation and participation, and promotes policies and programs that enable community input in the water management decision-making process to meet the needs of all stakeholders and rights holders. Such broad engagement includes the general public and must be driven by the concept that Study Board members, and members of associated committees and groups, participate and communicate objectively, and independently from their native countries and organizations. All public engagement is required to be reviewed by IJC Technical and Communications Advisors, and approved by the Study Board. A key goal with broad engagement of diverse people and sectors is to ensure the water in the basins will be managed to meet the interests of all stakeholders and rights holders in a manner that is as balanced and fair as possible, recognizing that appropriate tradeoffs are understood and acceptable.

A **Public Advisory Group (PAG)** has been established to help engage the public during and throughout the study. PAG members were selected by the IJC in collaboration with the Study Board to represent a variety of interests and geographic locations across the St. Mary - Milk Rivers basins, including an equal number of members from Canada and the US. PAG members will have the opportunity to provide advice and input to the Study Board throughout the study's duration. Membership of the PAG may be expanded in the future if the board identifies the need.

An **Indigenous Advisory Group (IAG)** will also be established to offer representatives from various Indigenous Nations (First Nations, Métis Nation, and Tribes) an opportunity to inform the study of Indigenous interests, **Indigenous Knowledge**² and **Indigenous Science**. The IAG will be invited to contribute information and data on Indigenous Nations' present and ancestral interests in the basin. In addition to informing the study, the IAG will be a forum for Indigenous Nations to learn about the Study Board's activities and to offer their input, knowledge, insights, and perspectives on possible water management options being considered. IAG Members will be selected by the IJC to represent a variety of Indigenous Nations and interests, with equal membership from those residing in Canada and the U.S. With respect to information-sharing, the Study Board is committed to implementing the best practices of the First Nations Information Governance Centre and the U.S. Indigenous Data Sovereignty Network.

5.1 Engagement Objectives

The Study Board will use several important means for participation and outreach. This includes public meetings through the Public Advisory Group (PAG), focused Indigenous engagement through an Indigenous Advisory Group (IAG), and the ISMMRSB web page (described in the "Communications" section). Participation in the study will be driven by key objectives.

The principal objectives for public and Indigenous engagement are to:

- Strive to ensure that the study process is open, inclusive and fair;
- Make the public aware of the study, its purpose, and process, including how decisions will be made;
- Provide opportunities to all interested parties to participate;
- Enhance public understanding of how water is apportioned in these basins;
- Inform the study by identifying and building on local expertise, knowledge and information;
- Invite and consider the views of all interests of the principal issues;
- Identify and consider the public's, rights holders' and diverse stakeholders' priorities and preferences in the plan formulation;
- Broadly disseminate study findings as they become available; and
- Encourage the public, rights holders, and stakeholders to share study findings with others.

The public refers to any person, association, organization or group that is affected, likely to be affected by, or has an interest in the study and any decisions that may ultimately be taken by the IJC in response to the findings or recommendations of the study. The public includes, but is not limited to, individuals and organizations representing the following interests: environment, aquatic recreation, local industry, agriculture, water supply and stormwater/sewage treatment; as well as riparian interests and municipalities. The term "stakeholders" refers to those with direct interests in water management within the basins, and will include decision-makers, public opinion influencers and elected officials. The term "rights holders" includes those with current or ancestral interests in water management and are broadly defined as Indigenous Nations, and include First Nations, Métis Nation and Tribes.

5.2 Public meetings

The Study Board will conduct public meetings, as appropriate, holding at least one in each country per year,

² **Indigenous Knowledge** relates to understandings, skills and philosophies of Indigenous societies with long histories of interaction with their natural surroundings (See: [What is Local and Indigenous Knowledge | United Nations Educational, Scientific and Cultural Organization \(unesco.org\)](#)); **Indigenous Science** is often linked with traditional ecological knowledge (See: [Discovering indigenous science: Implications for science education - Snively - 2001 - Science Education - Wiley Online Library](#))

either virtual, in person or both. During these meetings, the Study Board Co-Chairs will invite comments from the public on specific or general issues associated with the study as well as provide opportunities for the public to express its views and provide data of their interests in respect of the study. In order to inform and provide context for the technical investigations associated with the study, the public will be consulted at the beginning of the Study to identify the public's views on the principal issues, questions of interest, study objectives, acquire any available knowledge in the form of historical data, anecdotal information, Indigenous Knowledge, and identify existing or future plans, activities and initiatives that may relate to water management and apportionment interests with the transboundary rivers.

Other public participation activities or meetings will be conducted at strategic junctures throughout the study.

5.3 Public Advisory Group (PAG)

The IJC is committed to engaging with the public during the study on an ongoing basis through the Public Advisory Group (PAG). PAG members will represent multiple areas of interest and various geographic locations across the river basins, and include an equal number of people from Canada and the US. PAG members will have the opportunity to engage with the Study Board in the development of its Public Outreach Plan, which is proposed to be delivered to the IJC as described in the IJC's Directive to the ISMMRSB.

More specifically, the PAG will be asked to:

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

PAG members will be asked to draw upon their knowledge, contacts and experience to provide informed input to the study. The PAG members and the study team will seek to develop effective techniques to engage the public and stakeholders on a wide range of issues;

5.4 Indigenous Engagement

Indigenous engagement will be an important consideration in any options related to the sharing of the waters of the St. Mary and Milk Rivers. It is anticipated that there will be a need for dedicated meetings and facilitated workshops to ensure input from Indigenous Nations is appropriately captured. It will be equally important to have opportunities to discuss the outcomes of the Study with Indigenous Nations so there is an understanding of how options may affect Indigenous interests. While the engagement would necessarily occur throughout the Study, it is highly likely that there will be periods of more intensive engagement, such as at the beginning and end of the Study. Throughout this process it is understood that the IJC would provide support for the engagement (e.g., via Communication specialists, Advisors, etc.) as would the Study Managers (as identified for the Project Governance discussed in the next section) by contracting with dedicated Indigenous engagement experts.

6 Organization of the study and its governance structure

The study governance will be the key to successful efforts on behalf of the Board (Figure 4). Active

engagement from various basin stakeholders and rights holders, including government entities that have responsibilities for water management in the basin is necessary to ensure project success. The IJC Directive requires the establishment of several groups to support the Study Board. The Board has also chosen to establish several Technical Working Groups (TWG) and a Communications Committee to aid the study. This section describes the overall governance of the study, including a description of the roles of each of the groups and their individual members.

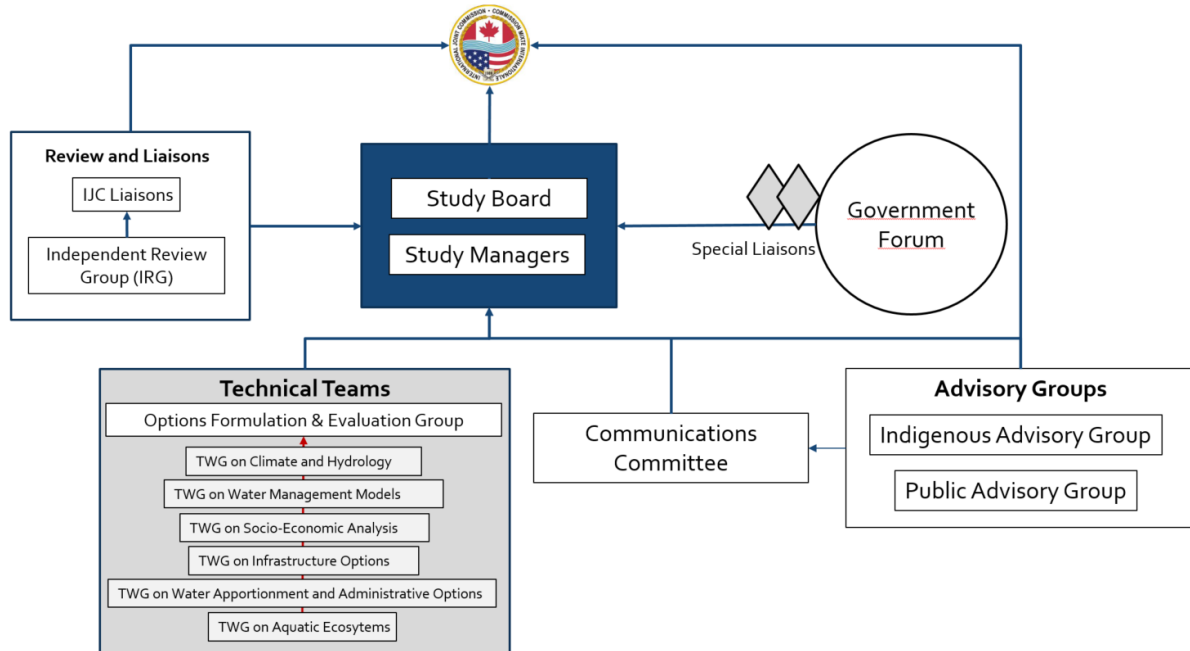


Figure 4 - The International St. Mary-Milk Rivers Study Board Recommended Governance Structure

Study Board: The International St. Mary-Milk Rivers Study Board is responsible for providing oversight to study activities and ensuring that study activities meet the goals of the study per the Directive. The Study Board is the decision-making body for all aspects of the study. The Study Board will conduct their work by consensus. The IJC has appointed an equal number of members from Canada and the United States to the Study Board and named a member from both Canada and the United States to be the Co-Chairs of the Study Board. The Co-Chairs are jointly taking a leadership role in planning and implementing the Study Board’s mandate. On behalf of the Board, the Co-Chairs have authority and responsibility for the study. The Study Board is to make recommendations to the IJC per the Directive by June 13, 2025. Study Board members shall synthesize and integrate technical findings to create Study Board findings, conclusions and recommendations in accordance with the IJC’s policy guidance to its boards on consensus decision-making for technical reports and its final report. A **Results-Based Management (RBM)**³ framework will guide the Study Board, its Technical Working Groups (TWGs), and the Study Board’s development of the study’s

³ The **Results Based Management (RBM)** framework approach is designed to ensure the Study Board, and all Technical Working Groups and study participants are aligned with how their **TWG activities or tasks** help produce desired **Study Outputs**, achieve specific **Study Outcomes** and ultimately create **Impact** whereby the Study Board’s Work may benefit Canada and United States for 5 to 10 years after the study is complete. See: **Global Affairs Canada: A How-to Guide, 2016, 2nd Ed., 104 pp.** https://www.international.gc.ca/world-monde/assets/pdfs/funding-financement/results_based_management-gestion_axee_resultats-guide-en.pdf and https://en.wikipedia.org/wiki/Results-based_management).

activities and outputs. The Study Board and the TWGs also recognize that a technical writing team will need to be established to work throughout the Study's duration in support of developing the Final Report and the study's findings.

Study Board Co-chairs: The International St. Mary-Milk Rivers Study Board Co-Chairs will lead the Study Board. They will meet with and provide updates to IJC Commissioners and their staff and seek guidance from the IJC, as needed per the Directive. They will facilitate and guide Study Board decisions and approvals of the task reports. The Co-Chairs will ensure that editorial and content revisions to most elements of study reports (technical or other reports) are carried out with the concurrence of the Study Board. It will also be their duty to recognize when issues or materials are brought before the Study Board that are outside of the Study's mandate and the Co-Chairs will refer these issues or materials to the IJC per the Directive.

Alternate Co-chairs: The IJC has appointed the **Field Representatives (FRs)** of the Accredited Officers as Alternate Co-Chairs to act on behalf of the Co-Chairs whenever their respective Co-Chair, for any reason, is not available to Co-Chair the Study Board meetings. The Alternate Co-Chairs may only participate in consensus decisions when respective Co-Chairs are not present (i.e., they do not act as additional Board members, but they are expected to attend all Board Meetings to ensure they are fully informed of all discussions throughout the duration of the Study).

Study Managers: Two study managers, one from Canada and one from the United States, are responsible for assisting the Study Board on delivering its mandate. The Study Managers will work under the joint direction of the co-chairs of the Study Board and shall not be members of the Study Board but will participate in every Study Board meeting. The Study Managers will keep fully abreast of the work of the different groups and function as liaisons between the Study Board and those groups. The Study Managers will be responsible for the effective management of the Study Board's Work Plan. Study Managers are responsible for communicating to the different groups the direction of the Study Board and assisting in general administrative support (e.g., meeting set-up; travel; administrative and contract matters; coordination of various teams and tasks; maintenance of digital files and repositories including SharePoint file systems; meeting minutes, documentation of study activities, distribution of study products; and providing briefings to the Study Board on tasks identified by the Co-Chairs). The IJC will provide technical and other support to the Study Managers in fulfilling their duties. It is expected that the Study Board will store all digital data and files, including models, working files, etc. on the IJC SharePoint websites to manage, protect and preserve all study data throughout the study period.

Communications Committee: The International St. Mary-Milk Rivers Study Board will establish a Communications Committee. Communications Committee members will include one board member from each country, the Study Managers, IJC communications staff from both Canada and United States Sections, contracted technical writers, and contracted facilitators and Co-Chairs of Public and Indigenous Advisory Groups. The Study Managers will co-chair the Communications Committee. The Committee will ensure IAG, PAG and IJC engagement and outreach are consistent. The Committee will rely on help from IJC communications staff for contributions focused on strategic design, planning, creating communications products, establishing targeted audiences, scheduling and delivery of communications products. Additionally, IJC communications staff can help with media outreach and media training. Communications Committee members will work on behalf of the Study Board, not their home organizations.

Public Advisory Group (PAG): The IJC, with advice from the Study Board, has established a binational PAG. Members of the PAG will be appointed by the United States and Canadian IJC secretaries in consultation with the IJC Liaisons and the Study Board. The PAG will act in accordance with its Terms of Reference issued by the IJC. The PAG will include an equal number of members from each country representing key interests and geographic regions within or consisting of the St. Mary-Milk Rivers Basins. Co-Chairs, one from Canada and one from the United States, will direct the PAG. The PAG will serve as a conduit to provide public and broad local knowledge and data input to the Study, and will help involve the public by sharing approved information from the Study Board to their various networks throughout the community, and continue the dialogue by bringing back views from the community for consideration by the Study Board. The PAG will assist the Study Board and the Communications Committee in the development of a Stakeholder Engagement Plan. The PAG is an advisory group and an important means of engaging the public in the study on an ongoing basis.

Indigenous Advisory Group (IAG): The IJC will establish an Indigenous Advisory Group (IAG) to support the Study Board. It will act in accordance with its Statement of Guiding Principles issued by the IJC. Members of the IAG, including its Co-Chairs will be appointed by the IJC's US and Canadian Secretaries in consultation with IJC staff and the Study Board, and will include Indigenous Nations representing Tribal, First Nation, and Métis Nation citizens from within the basins, and Indigenous Nations who may have ancestral interests within the basins (recognizing that Indigenous Nations were nomadic cultures prior to currently established country/state/provincial borders). As outlined in the directive, the IAG will consist of an equal number of members residing in each country. The Study Board and Communications Committee will work with the IAG in the development of an Indigenous Engagement Plan for the Study.

Options Formulation and Evaluation Group (OFEG): The OFEG will be established by the Study Board and consist of the Alternate Co-Chairs (FRs), who will provide a direct line of communication to the Study Board, and two additional Technical Leads, one from each country. The OFEG will provide technical guidance and support to the Study Board, coordinate the work of the TWGs to ensure the Study Board is provided with the information needed to formulate, and evaluate technical options and tools presented by the TWGs. The OFEG will be supported by Study Managers and will be responsible for scenario development and analysis of administrative and structural options being considered. The role of the OFEG is crucial to the Study, as the scenarios and possible options will inform the results for potential improvements to water apportionment strategies. Put simply, it will be the OFEG's role to analyze and clearly synthesize the options and their tradeoffs in accordance with the Study's RBM framework. The OFEG will be responsible for developing the full suite of options, and potential options for improving water apportionment and management. Through an iterative Results-Based Management (RBM) framework the OFEG will inform and participate with the Study Board in its efforts to formulate Final Report recommendations by consensus. As noted, recommendations will be designed to meet SMART principles.

Technical Working Groups (TWGs): The Study Board, Alternate Co-Chairs, Technical Leads, and Study Managers will establish Technical Working Groups (TWGs) to meet the requirements of the work for the St. Mary-Milk Rivers. Initially, the following TWGs will be established to accomplish the technical work needed to support the Study Board:

- Climate and Hydrology (CH TWG)
- Water Management models (WMM TWG)
- Socio-Economic Systems Analysis (SES TWG)
- Infrastructure Options (IO TWG)
- Water Apportionment and Administrative Options (WAAO TWG)
- Aquatic Ecosystems (AE TWG)

TWGs will be kept small and nimble and focus on tasks assigned by the OFEG. The OFEG will coordinate TWG activities and act as a liaison between TWGs and the Study Board. TWGs will operate based on information and assignments from the Study Board through the OFEG and will be independent of any country or agency affiliation. All TWGs will consist of an equal number of members from each country.

Government Forum: The Government Forum will include representatives from federal, state, provincial and Indigenous Nations governments having responsibilities for apportioning or permitting the use of water within their jurisdictions, and/or owning, operating, or accommodating infrastructure directly related to the conveyance or storage of St. Mary or Milk River water. Members of the Government Forum will be appointed by the IJC. The IJC may seek nominations from each of the relevant jurisdictions for consideration for membership. The Forum provides a venue for governments to:

- receive and disseminate study-related information in a timely manner;
- share information, ideas, and concerns; discuss and explore options; and
- provide feedback and advice to the Study Board on an active and ongoing basis, particularly during the formation of recommendations.

The Government Forum can request meetings with the Study Board on an as-needed basis. The Special Liaisons (see below) will ensure open lines of communication between the Study Board and the Government Forum members.

Special Liaisons to the Government Forum: There will be two Special Liaisons selected by the IJC, one from each country. The Canadian and U.S. Special Liaisons will act as the primary link between the Study Board and the IJC with the Government Forum to ensure that:

- Government Forum members are provided regular updates on the work of the Study Board and offered a collaborative and collegial forum to share information and discuss questions and concerns, and
- The IJC and the Study Board are kept aware of the views of Government Forum members that might affect the work and recommendations of the Study Board.

The Special Liaisons will regularly attend Study Board meetings to keep abreast of the work of the Study Board and provide updates from and to the Government Forum, ensuring effective two-way communication between the Government Forum and the Study Board.

Independent Review Group (IRG): The IRG will be established by the IJC to ensure that independent technical reviews are carried out as required during the Study. The selection of IRG and communications with the IRG will be handled by the IJC to ensure independence from the Study Board. The IRG will be made up of external experts capable of providing a critical, independent review of interim products of the Study Board and its various supporting Technical Working Groups, and will undertake a critical review of the Final Report and its recommendations to be produced by the Study Board. The IRG can also seek outside expert technical reviews as needed.

7 Potential Water Management Options for Consideration from Past Studies

The AOs previously considered a variety of potential options to improve each country's receipt of their water apportionment entitlement. The Study Board acknowledges that a significant amount of important work has previously occurred during the Montana-Alberta Joint Initiative and acknowledges that this past study provides a good starting point for the new study to be undertaken by the ISMMRSB. The options

resulting from the Joint Initiative were considered feasible to implement by the AOs, and will form the basis of initial options, under the new study. The ISMMRSB Work Plan, however, is not limited to the options considered or deemed feasible by the **Joint Initiative Team (JIT)**. A greater breadth and scope of possible options will be considered by the ISMMRSB. The options that will be considered, singly, or in combination, can be broken down into two categories: structural and non-structural options. Structural options require building infrastructure and the participation of federal/state/provincial governments to evaluate, fund, and implement. Non-structural options (i.e., changes in water management administrative procedures), are largely within the authority or control of the AOs. Some of the options studied by the JIT are presented below. The AOs conducted some analysis within their limited resources on non-structural changes (water management administrative procedures), structural changes, and options to improve upon the 1921 Order, resulting in the following recommendations to the IJC for further study.

7.1 Structural Options:

Structural options require the construction of water management infrastructure and participation of federal/state/provincial governments to evaluate and implement.

St. Mary Canal Improvement

Description: At the time of the JIT modelling activity (2008-2011) the maximum safe operating capacity of the St. Mary Canal was 18.41 m³/s (650 cfs), which is a 25% reduction in the original design capacity. However, in 2018 the maximum safe operating capacity of the canal was reassessed and determined to be closer to 16.99 m³/s (600 cfs). Improving the canal to the original design capacity of 24.07 m³/s (850 cfs), increases the ability to transfer U.S. St. Mary water through the Milk River system in Canada, for use in the U.S. portion of the Milk River basin. This was modelled as Option 2a by the JIT.

Lower St. Mary Lake Storage Improvement

Description: The addition of storage in the upper St. Mary River basin will increase the U.S. ability to manage flows to Canada and to the Milk River via the St. Mary Canal. The JIT Option 4c considered adding a control structure at the St. Mary Lake outlet to allow for the regulation of 10,855 dam³ (8,800 ac-ft) of storage on Lower St. Mary Lake, with 2010 infrastructure that provides conveyance for 18.41 m³/s (650 cfs) and a 0.71 m³/s (25 cfs) U.S. release flow, below Lower St. Mary Lake for maintaining Instream Flow Needs.

Canadian Milk River Storage

Description: Adding reservoir capacity to store water in the Canadian portion of the Milk River enables Canada to access more of its entitlement and reduces sending surplus water beyond the apportionment entitlement to U.S. on the Milk River.

Canadian Conveyance Alternative

Description: The option of a canal or pipeline in Alberta to move water from the St. Mary basin to the Milk River basin was considered to increase the water supply available for the Milk River irrigators.

7.2 Non-Structural Options

Non-structural options do not require the construction of water infrastructure and could be implemented by the AOs in consultation with the IJC.

Modified Balancing Periods

Description: Natural flows during the irrigation season are currently reported daily and balanced twice

monthly per current water management administrative procedures. Seasonal and annual balancing periods were considered to allow greater flexibility in managing apportionment.

Deficit Trading – Letter of Intent

Description: A Letter of Intent is a mechanism to allow offsetting deficits between the St. Mary River and the Milk River with the intent of maximizing benefits, providing greater flexibility in managing apportionment.

Capped Credit System

Description: The capped credit system allows credits to be accumulated and used over the water year (Nov. 1 to Oct. 31). Unused credits are zeroed as of October 31. This option would allow for more flexibility in calculating or accounting the water apportionment volumes and flows over longer periods of time.

1921 Order Re-visited

Description: Modifications to the 1921 Order considered changing prior appropriation amounts, shares of water at different flows, and the definition of irrigation season in the context of a changing climate.

Almost all of the options recommended for further consideration and study by the AOs are complex and interdependent, requiring additional study to identify a combination of options of greatest mutual benefit. The study plan may also consider additional options beyond those listed above. The identification and implementation of any combination of these options will require significant interaction with stakeholders and rights holders, and the development of new/revised procedures for administration by the Accredited Officers. The required modeling and time needed to conduct meaningful public, rights holders, and stakeholder engagement will be critical to establish the time needed, and the path for this study. The options that the study will examine initially, individually and in combination, are outlined in Table 1.

Table 1 - Potential Structural and non-structural option for study consideration

Selected Options	U.S. - Increased Access to St Mary Entitlement	Canada - Increased Access to Milk Entitlement	Level of Effort and/or Cost to Implement	Treaty or 1921 Order Implications	Considerations
Structural Options					
U.S. St Mary Canal Improvements	Modest improvement	Neutral	Significant cost	Neutral	24.07 m ³ /s (850 cfs) canal and reduced risk of unplanned shutdowns
U.S. Lower St Mary Lake Storage Improvements	Modest improvement	Neutral	Modest cost	Neutral	Blackfoot Tribe consent and participation
Canadian Milk River Storage	Neutral	Significant improvement	Significant cost	Neutral	Potential to store U.S. St Mary water
Canadian Conveyance Alternative	Neutral	Modest improvement for irrigation scheduling	Significant cost	Neutral	Potential alternate route to move U.S. St Mary water to the Milk
Administrative Options:					

1921 Order Revisited	Access to 50% of St Mary natural flow in drier years	Access to 50% of Milk natural flow in wet years	Limited cost	U.S.-Canada government level negotiations	Revisit of Article VI issues and arguments
Modified Balancing Periods	Minor improvement for seasonal Modest to significant improvement for annual in drier years	Significant improvement	Limited cost	Neutral	Modest to significant implications for the downstream country
Deficit Trading - Letter of Intent	Minor improvement	Minor improvement for irrigation scheduling	Limited cost	Neutral	Involvement of Alberta and Montana
Capped Credit System	Modest improvement	Significant improvement in drier years	Limited cost	Neutral	Involvement of Alberta and Montana

Data Management and Information Management and Dissemination

The Study Board recognizes that as these and other options are considered through the work of the OFEG and the various Technical Working Groups involved in the study, large quantities of purchased, acquired and leveraged data along with information, models and associated documentation will be generated. This data collection and development represents a significant investment and legacy of the study. As a result, the Study Board will require unrestricted access to data and ensure that data collected by the Study will be made available online, once it has been approved for distribution by the Study Board and the IJC. The Study Board, with the technical assistance of the IJC, will address the information management needs of the study, with options and recommendations for the archiving and dissemination of the study’s data assets. The Study Board will also develop an Information Management and Dissemination process to provide external parties with access to the study’s data and information. This will include using web-based tools such as Office 365 and a dynamic decision-mapping system to ensure the transparency of the Study Board’s decisions similar to other IJC studies.

8 The Study’s Technical Working Groups and the RBM Framework

The study will formulate and evaluate non-structural water management options and structural water infrastructure options that may improve water management and apportionment to achieve maximum benefits for both countries and their water needs, recognizing needs to balance benefits, impacts, and tradeoffs, and respecting environmental needs and benefits. As noted earlier there are two broad activities in the analysis:

- a. Historical and Socio-economic Analysis
- b. Modelling Changes in Water Management Administrative Procedures and Infrastructure

The overall goals of the study are to:

- Describe the historical water availability, apportionment, and irrigation in the watershed.
- Develop combinations of potential changes in apportionment procedures and infrastructure for simulation.
- Develop updated hydrologic and water management models to evaluate water availability under various climate and apportionment scenarios.
- Describe the socio-economic and ecological effects of the modelled scenarios.

- Recommend to the IJC preferred combination(s) of changes in administrative procedures and/or infrastructure that will improve each country’s ability to access its share of water from these basins.

The Study will be guided by a Results-Based Management (RBM) framework, which will help determine the desired Impact, Outcomes, Outputs and Activities or Tasks for each phase of the work.

Figure 5 shows how study inputs will contribute to the analysis and scenario evaluations by the Options Formulation and Evaluation Group. Numerous options will be considered in order to identify the most feasible options.

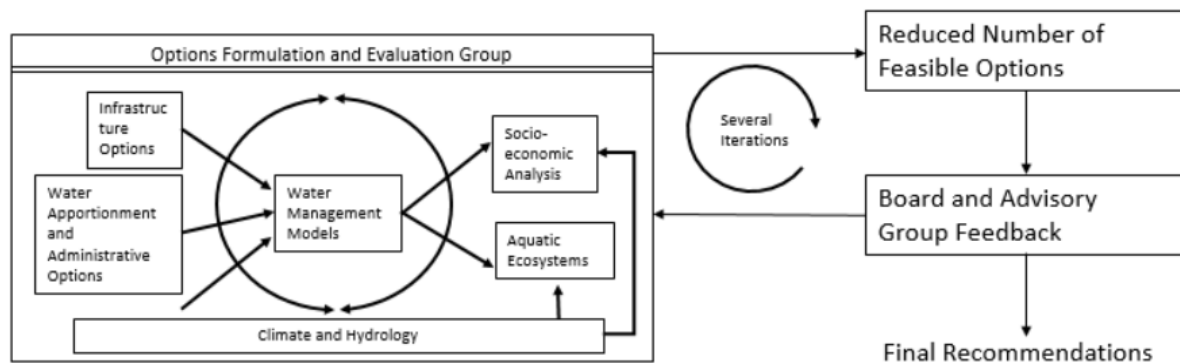


Figure 5 – OFEG Analysis and Development of Suite of Feasible Options

The Climate and Hydrology CH TWG is foundational and tasked to provide the Study Board, and all TWGs, with a better understanding of water availability, apportionment, and irrigation demands within the watershed. This CH TWG will provide much of the needed background and historical context for the water Management Models, Aquatic Ecosystems, and Socio-Economic Systems Analysis TWGs, which will include an understanding of the past, present, and possible future hydrologic conditions in the St. Mary and Milk watersheds. The Infrastructure Options and Water Apportionment and Administrative Options TWGs are focused on refining both structural and non-structural options for consideration by the OFEG and to outline the technical requirements for Water Management Models being developed. Several options were previously included in the Accredited Officers’ submission to the IJC on June 18, 2019. These two TWGs will evaluate feasible options and may also propose additional options not already articulated by the Accredited Officers or by other studies.

The outcome from the Water Management Modelling TWG will provide the Aquatic Ecosystems and Socio-Economic Systems Analysis TWGs with information that can be used to identify social, economic, and environmental consequences of the proposed options given past, present, and possible future hydrologic conditions. Finally, the outcome from both the SES Analysis and Aquatic Ecosystems TWGs will include an articulation of the social, economic, and environmental consequences resulting from the water management scenarios considered as a part of the Study. The SES Analysis and Aquatic Ecosystems TWGs may also provide suggestions for the two Options TWGs to consider.

The six technical working groups and their RBM framework are briefly described to demonstrate how each task is integrated and relates to other TWGs:

The Climate and Hydrology (CH) TWG creates the foundation for the hydrologic modeling and will primarily consist of three core components: 1) a comprehensive assessment of watershed characteristics

including past, current, and future climate and hydrology of the basin, as well as, water demand, water access, water use and water availability in the basin, 2) model development which includes an integrated river and watershed model, and 3) simulations of historical and future streamflow in the watershed. The CH TWG will coordinate with the other TWGs, especially the Water Management modelling TWG to assure that the hydrology model results can be incorporated into the Water Management model(s) and also available to other TWGs for impact assessments. Outcomes expected from the Climate and Hydrology Technical Working Group (CH TWG) include a detailed description of water availability, apportionment, and irrigation in the watershed, and a description of the past, present, and possible future hydrologic conditions in the watershed. Results of these modelling efforts will be communicated with other TWGs in order to facilitate analysis of potential effect on aquatic ecosystems and socio-economic metrics.

The Infrastructure Options (IO) TWG will develop recommendations on structural options to be considered, supported by fact-based analysis and public engagement. Significant work and history regarding structural alternatives within both Canada and the U.S. provide a well-defined starting point for reviewing and analyzing structural options. These options include:

- 1) St. Mary Canal Improvement
- 2) Lower St. Mary Lake Storage Improvement
- 3) Canadian Milk River Storage
- 4) Canadian Conveyance Alternative

The IO TWG will review the merits of each of the options above and provide a recommendation for inclusion into the Study's modeling efforts. In order to objectively review the merits of structural options, a framework for analysis must be developed. As other TWG's and Advisory Groups will be reviewing impacts to socioeconomic factors and aquatic ecosystems, the IO TWG will focus efforts on technical considerations for future engineering feasibility of development, based on initial construction and future operations and maintenance. The IO TWG will also deliberate on additional options for consideration because other options may also exist that AO's did not consider.

The Water Apportionment and Administrative Options (WAAO) TWG will produce a set of water apportionment and water management administrative options along with key considerations. The WAAO TWG may also suggest initial metrics for hydrologic and water management Performance Indicators (PIs) to assess the various options. The options will include those options provided in the AO's final work plan and any other options which the TWG agrees are promising.

The Water Management Modelling (WMM) TWG will identify, refine, and run water management models of the St. Mary and Milk Rivers system to evaluate the performance of various combinations of infrastructure options (storage and conveyance) and changes in administrative procedures. The model results will be used to:

- (1) Assess the apportionment and delivery of shares of the natural flow of the waters of the St. Mary River, Milk River, and the northern tributaries of the Milk River to the United States and Canada under the various combinations of options and future climate scenarios, and
- (2) Simulate the management and use of this apportioned water by entities and water users in Canada and the United States.

With information and input from the other TWGs, the overall performance of various combinations of infrastructure and water management options can be assessed. For instance, model results can be used by other technical teams, such as Socio-economic and Aquatic Ecosystems TWGs, to assess how different apportionment, management, and infrastructure options might affect these resources. The water

management modeling could be used to simulate the proposed options given past, present, and potential future hydrologic conditions

The Socio-Economic Systems Analysis (SES) TWG will conduct investigations into the social and economic systems in the watersheds and help to develop Performance Indicators (PIs) to analyze various structural and non-structural scenarios being considered by the Study. This SES TWG will also articulate the social and economic consequences resulting from the water management scenarios considered as a part of the Study. The TWG activities may include: economic assessments; historical analysis of water availability, apportionment and irrigation; press review of past droughts and impacts from water availability; a review of existing or past studies on the St. Mary/Milk Rivers; a resilience analysis on water availability; developing a Socio-Economic (SES) Indicator; and Cost-Benefit Analyses of various options. The SES TWG may include an analysis of land use, resource management and protection, agricultural water uses, industrial water uses, municipal water uses, Indigenous Nations (First Nations, Métis, Tribal) water interests and uses (including ancestral basins interests), and cultural values and expectations related to water uses, protection and management.

The Aquatic Ecosystems (AE) TWG will evaluate the current state of and potential effects of changes in water availability on aquatic ecosystems in the SMMRB. This analysis will largely focus, where feasible, on using existing biological information to assess the ecological effects of water apportionment and future climate change scenarios. It is expected that there are significant data and knowledge gaps on the status and trends of the aquatic ecosystems and species within the basins, and thus some field assessments may be necessary. The approach of this aquatic ecosystem assessment is to assess potential changes in relevant biotic populations and communities associated with water management scenarios in relation to reference conditions for entire aquatic food webs. Assessing aquatic ecosystem health involves designing an approach that can detect potential changes in relevant aquatic species and their communities at multiple spatial and temporal scales. The outcomes expected from the AE TWG are to articulate the potential ecological consequences resulting from the water management scenarios considered as a part of the Study and provide recommendations for the Options TWGs to consider.

As described in Figure 5, many options are expected to be analyzed. The iterations will be analyzed for impacts, benefits and feasibility. A sub-set of promising options will be identified. These will become the Targeted Suite of Options for consideration by the Study Board and Advisory Group feedback, to seek Board consensus for reporting the final recommendations. Table 2 identifies the study’s RBM Framework showing key activities, outputs and desired impacts from the study.

Table 2 – The Study’s RBM Framework and anticipated impacts

ID	Key activities	Outputs	Outcomes	Impact
WP - Work Planning				
WP.1	Identify the TWGs	TWGs are formed	Personnel on TWGs & Study Board are committed to undertake tasks for the Study’s entire duration.	US/CAN constructively commit to deliver the ISMMRS (the Study) following the concepts in the Work Plan.
WP.2	Create the RBM framework	RBM is finalized		
WP.3	Allocate financial and human resources	Budget & Schedule are finalized		
WP.4	Draft TWGs and OFEG workplans	All TWG workplans are finalized		
WP.5	Synthesize all TWG & OFEG workplans	Detailed OFEG workplan is finalized		
WP.6	Obtain Study Board Work Plan Feedback	Study Board has approved the Work Plan		
1 - Foundational Information				
1.1	Compile historic	ISMMR basins’ historic water	The Study Board,	Stakeholders, Rights

	water uses for ISMMR basins (Climate and Hydrology TWG)	availability, apportionment, irrigation uses & issues are documented	PAG, IAG, public, IJC and Canada and United States have a better, broader, and shared, common understanding of water uses and issues for the St. Mary and Milk Rivers Watersheds.	holders, Sectors, decision-makers and Canada and United States are better-equipped and motivated to seek mutually agreeable solutions to improve ISMMR water management options.
1.2	Describe present and future climate variability for ISMMR basins (Climate and Hydrology TWG)	ISMMR basins' climate and probable future climate conditions are documented		
1.3	Summarize present and future hydrologic variability for ISMMR basins (Climate and Hydrology TWG)	ISMMR basins' hydrology and probable future hydrologic conditions are documented		
1.4	Summarize ISMMR aquatic ecosystems (Aquatic Ecosystem TWG)	Current knowledge of ISMMR basins' aquatic ecosystems/needs is documented		
1.5	Summarize socio-economic systems and water issues, including cultural significance, (SES) in ISMMR basins (Socio-economic TWG)	SES analysis of ISMMR basins is documented for historic conditions and possible factors summarized for future scenarios		
1.6	Compile combinations of structural and non-structural water management options (Infrastructure and Administrative Options TWGs)	Possible feasible combinations of structural and non-structural water management options are recommended for further analysis		
2 - Water Management Modelling and Tools				
2.1	Develop & test a hydrologic and water management model framework (Climate and Hydrology and Water Management Modelling TWGs)	The hydrologic and water management model framework is produced and documented	A series of tools are available for the Study Board's analysis of improving present water management approaches. These tools will be available for future water management improvements and will aid in better overall water management and common watershed	United States and Canada have better tools to understand their respective abilities to use their water entitlements of the St. Mary and Milk Rivers, while increasing climate resilience and taking into account Indigenous Nations perspectives, ecological flow needs, and socio-economic effects of any changes.
2.2	Integrate SES and Aquatic Ecosystems analyses into the hydrologic and water management modelling system (Water Management, SES and Aquatic Ecosystems TWGs)	Performance Indicators (PIs) including SES and Aquatic Ecosystems components are factored into the hydrologic and water management modelling system		
2.3	Generate possible hydrologic scenarios	Historic and stochastically generated hydrologic		

	for evaluating socio-economic and ecological impacts (Climate and Hydrology TWG)	timeseries of inputs are factored into the water management modelling system	management knowledge by all stakeholders, sectors, rights holders and orders of Governments in Canada and United States.	
2.4	Create future hydro-climatic scenarios for evaluating socio-economic and ecological impacts (Climate and Hydrology TWG)	A range of possible future hydrologic timeseries of inputs are factored as scenarios for evaluation with the water management modelling system		
2.5	Create a tool for visualizing and analyzing the impact of scenarios on Performance Indicators (OFEG)	A hydro-visualization tool is developed to assist scenario analyses and hydrologic water management model comparisons		
Options Analysis				
3.1	Analyze feasible non-structural water management options (OFEG lead with TWGs as required)	Feasible non-structural water management options are verified in the new modelling framework, including stochastically generated and potential climate change hydrologic inputs in the water management models	Canada and United States, stakeholders, rights holders and sectors agree that there are desirable options or combination(s) of structural and non-structural options that should be considered for implementation in the watersheds.	United States and Canada have improved their respective abilities to use their water entitlements of the St. Mary and Milk Rivers for the benefits of stakeholders, rights holders, sectors and other groups with water management interests within the ISMMR basins. The water management improvements have strengthened climate resilience, and have factored the Indigenous Nations perspectives, ecological flow needs, and socio-economic effects of any changes. People and governments are satisfied that water management has been improved and is effective in the ISMMR watersheds.
3.2	Analyze feasible structural water management options (OFEG lead with TWGs as required)	Feasible structural water management options are verified in the new modelling framework, including stochastically generated and potential climate change hydrologic inputs in the water management models		
3.3	Analyze potential options and combination(s) of water management options (OFEG lead with TWGs as required)	Potential combinations of water management options are integrated and evaluated. Final recommendations are made based on the outcomes of the analysis.		
Engagement and Awareness				
4.1	Collaborative work with study teams and advisory groups to produce engagement materials. (Communications Committee lead)	Fact sheets, periodic study updates, and other communication products.	Publicly accessible material is developed to inform stakeholders and rights holders of multiple aspects of the watershed and the study's	Stakeholders and rights holders are advocates of the study's findings.
4.2	Workshops with Advisory Groups and Options Formulation	"What we heard" documents.		

	and Evaluation Group (OFEG). (OFEG lead)		work, while stakeholder and rights holder input is infused into the work of the study.	
Legacy Products				
5.1	Complete and archive all study reports. (IJC lead)	Technical reports	Study methodology, results and tools are clearly documented and reproducible.	Study results and tools continue to be used after the study is complete.
5.2	Archive modelling tools developed within the study. (OFEG lead)	Modelling tools		

9 Project Review

Three general levels of study review will be used to assure technical quality of the activities:

- internal review by the ISMMRSB,
- agency technical review of models and reports produced by federal or state/provincial agencies and provided to Technical Working Groups, and
- independent external reviews conducted by an Independent Review Group (IRG).

Reviews will be scalable to the content of each component of the study, deliberately included as part of the study process throughout the life cycle of the study (scoping, interim products, and final products), and concurrent with recommendations to include previous work in the study and completion of new study phases/ products from each contributing agency/contractor and the Study Board.

9.1 Internal Review

The ISMMRSB will conduct a preliminary review of existing/completed products and their associated documented peer and independent reviews. This review can be done by the Study Board or Technical Working Groups of the Board. These reviews will ensure consistency and coordination across all study components. A list of all reviews will be provided to the IRG with background documentation. The IRG can subsequently request a review or other additional reviews of these products at their discretion.

9.2 Agency Technical Review

Some of the products needed or produced by members of Technical Working Groups may require the review and approval of their agencies before release to the Study Board. Agency technical and approval reviews are internal quality control processes performed within agencies by supervisors, senior staff, peers and others within agencies or in some cases (USGS) by outside peers. The Board recognizes the value of these processes and the independent reviews that characterize these processes in many agencies. Technical Working Groups should anticipate these reviews and account for them when establishing deadlines for delivery of products by agencies.

9.3 Independent Review Group (IRG)

The Independent Review Group (IRG), appointed by the IJC, will provide independent technical review

and documentation of appropriate Study components and documents produced jointly during the Study process. The IRG, while appointed by the IJC, will operate independently outside the control of the IJC and the ISMMRSB. Independent peer review is key to improving the quality of work in studies and therefore, interim reviews as well as the final reviews will be undertaken in order to facilitate early checks on methods and assumptions early, thus reducing the risk of late-stage issues for the study.

An IRG review will be completed on all recommendation and implementation documents and specific study products identified as fundamental to making those recommendations. For other products, the Study Board will provide documentation of existing reviews and recommendations to the IRG for targeted reviews as may be needed. The IRG will provide their decisions on whether to perform additional review.

10 Communications

Indigenous and Public Outreach Plans will be an important part of this Study. The Communications Committee will ensure these plans meet the communications needs of the study. The Indigenous and Public Outreach Plans for the ISMMRSB will identify:

- Public perceptions, rights holder and stakeholder interests;
- Historical IJC activities in the basin;
- Communications objectives over the course of the study;
- Target audiences, including partner organizations (municipalities, elected officials, First Nations/Métis Nation/Tribes, local media, and interest groups including irrigators in each country);
- Strategic considerations, including communications needs, opportunities, challenges; and
- Key communications deliverables from the Study Board, along with timelines and identification of leads and collaborators – this will include products to educate or inform, public engagement events, i.e., open houses/webinars/public meetings; and activities to promote the work of the study, i.e., social media, news articles, etc.

The Indigenous and Public Engagement Plans will be living documents so that the principles of adaptive management can be incorporated, and will evolve as the communication needs of the study become more clearly defined. As such, the effectiveness of the communications approach will be continually evaluated.

10.1 ISMMRSB Web Pages

The web is an important communication tool, serving as a primary means of providing information to a diverse public. As such, the Communications Committee will work with IJC staff to maintain the Study's microsite with information on the progress and achievements of the Study, and other information relevant to the study. Promotional resources, such as brochures, articles, and social media posts, will contain a consistent call to action directing target audiences to the Study's microsite.

The Study Board will also encourage public discussion by inviting comments from the public on specific or general issues associated with the study, and providing opportunities for the public to express its views by, among other means: publicizing a mailing address in each country for correspondence and submissions; establishing and promoting the use of a dedicated e-mail address; and hosting webinars, when warranted. In addition, the IJC will promote opportunities for public input on this web page and social media accounts.

11 Cost and Timeline

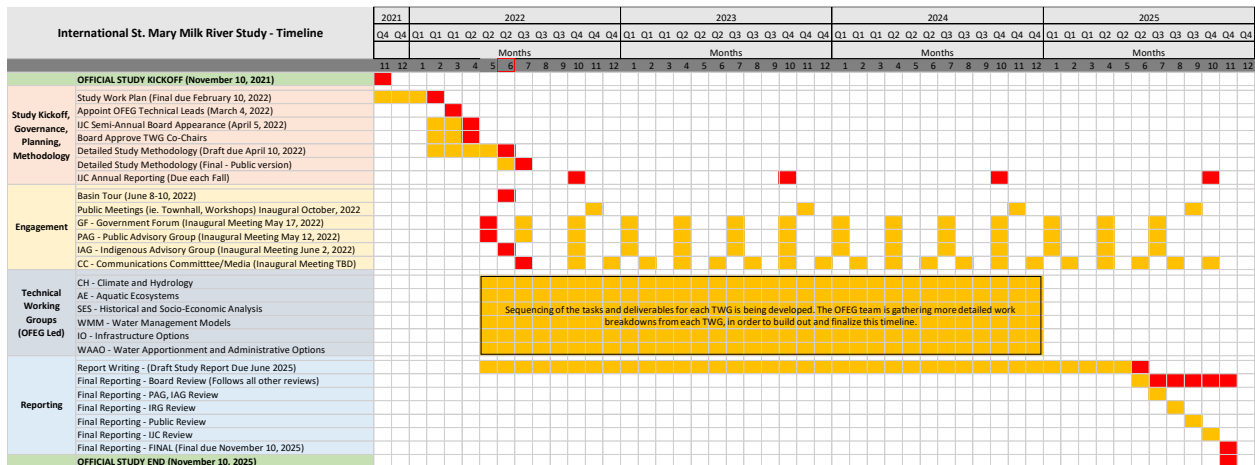
The total cost for each group of tasks planned by the ISMMRSB is shown in Table 3. The Work Plan

may be revised as the Study progresses, scope of work is modified, funding levels change, results become available, and stakeholders and public inputs are provided. The Study timeline is shown in Table 4. The TWG efforts must be sequenced according to priority since some tasks have dependencies on others. However, the Study Board anticipates several feedback loops between the various TWG efforts as the questions, engagement-led discussion and results are refined, and questions by both the TWG and the advisory boards. The Gantt chart below shows the overall timeline for the TWG efforts including the required time to revisit or refine individual TWG outcomes as they are developed.

Table 3 - Costs, activities required to meet the IJC Directive to the International St. Mary-Milk Rivers Study Board

TWG or category	Proposed funding including addition of funds for administrating the TWG effort
Climate and Hydrology	\$450,000
Water management models	\$450,000
Socio-economic analysis	\$350,000
Infrastructure Options	\$80,000
Water Apportionment and Administrative Options	\$80,000
Aquatic Ecosystems	\$200,000
OFEG funds for technical work	\$75,000
Technical Engagement and Review	\$100,000
Total of TWG and funding	\$1,785,000
Engagement	\$580,000
Study management	\$488,000
Total ISMMRB Study funding	\$2,853,000

Table 4 - Study Timeline



Acronyms

- AOs** – Accredited Officers
- BWT** – 1909 Boundary Waters Treaty between United States and Canada
- FRs** – Field Representatives
- IAG** – Indigenous Advisory Group
- IJC** – International Joint Commission
- IRG** – Independent Review Group
- ISMMRSB** – International St. Mary and Milk Rivers Study Board
- JIT** – Joint Initiative Team

LOIs – Letters of Intent

OFEG – Options Formulation and Evaluation Group

PAG – Public Advisory Group

PIs – Performance Indicators

RBM – Results-Based Management

SMART – Specific, Measurable, Achievable, Relevant, Timebound (i.e., for study recommendations)

SES – Socio-Economic Systems

TWG – Technical Working Groups

AE TWG Aquatic Ecosystems TWG

CH TWG Climate and Hydrology TWG

IN TWG Infrastructure Options TWG

SES TWG Socio-Economic Systems TWG

WAAO TWG Water Apportionment and Administration Options TWG

WMM TWG Water Management Modelling TWG

Measurement Units

Flow rate

1 cubic meter per second or $1 \text{ m}^3/\text{s} = 35.315$ cubic feet per second (cfs or ft^3/s)

$1 \text{ ft}^3/\text{s} = 0.02832 \text{ m}^3/\text{s}$

Volume

1 acre-foot = 1.2335 dam^3 (decameter³)

$1 \text{ dam}^3 = 0.8107$ acre-feet

$1 \text{ dam}^3 = 1,000 \text{ m}^3$ (meter³)