June 18, 2019

Dr. Pierre Béland
Canadian Section Chair
International Joint Commission
234 Laurier Ave. West, 22nd Floor
Ottawa, Ontario K1P 6K6

Ms. Jane Corwin
U.S. Section Chair
International Joint Commission
1717 H St. NW, Suite 801
Washington, DC 20006

Dear Dr. Béland and Ms. Corwin:

In the spring of 2017, the Accredited Officers for the St. Mary and Milk Rivers (AOs) indicated to the International Joint Commission (Commission) it would begin a review of their administrative procedures with the goal of recommending changes that would improve access to each country's apportioned share of the water. In a letter from the Commission dated February 2, 2018, the Commission officially directed the AOs to conduct a review of the apportionment procedures, and to work with the Montana-Alberta Water Management Initiative to facilitate the completion of their work, and report back to the Commission with recommendations in the Spring of 2019. As you may be aware, the administrative procedures are used by the AOs to measure and apportion natural flow and are evaluated from time to time.

The Commission has previously directed the AOs to review administrative procedures in the St. Mary – Milk River Basins. Article VI of the Boundary Waters Treaty notes water measurement and apportionment is conducted within the basin by the appointees of the governments and at the direction of the Commission. As stated in the Commission's 1921 Order, the Accredited Officers (AOs) shall, until the 1921 Order is varied, modified, or withdrawn by the Commission, make jointly the measurement and apportionment of the waters of the St Mary and Milk Rivers to be used by the United States and Canada according to the rules defined by the Order. Some specific duties for the AOs are outlined in Paragraph VIII of the Order including "*…to take such further and other steps as may be necessary or advisable in order to insure the apportionment of the said waters.…*" as well as to reporting to the Commission on the measurements made.

As per the Commission's direction, the AOs have conducted a thorough review of previous studies and options for amending the administrative procedures. As part of the review process, the AOs reviewed past efforts of the International St. Mary – Milk Rivers Administrative Measures Task Force (2004-2006) and more recent efforts by the Joint Initiative Team (JIT) of the Montana–Alberta St. Mary and Milk Rivers Water Management Initiative (2008 – present). The AOs found the Modeling and Process Reports, prepared by the JIT, to be particularly informative. During the course of this review, it became apparent that factors that were not considered by the JIT, such as changes to infrastructure and shifts in the timing of natural flows, also needed to be considered in the AOs review. The AOs reviewed the results of the JIT identifying those options with the greatest potential for increasing the ability of each upstream jurisdiction to utilize its apportioned share of water. Most of the options modelled by the JIT for improving the administrative procedures also evaluated many structural options that would result in improvements. In this analysis, the AOs limited their review to the options that had been previously modelled.

As part of the review process, the AOs produced a preliminary review document, outlining options considered by the AOs. This options summary document was provided for review to the various agencies, in Canada and the United States, involved in water management in these basins, seeking their perspectives on what options their agencies and the constituencies they represent believe show promise with respect to optimizing the sharing of waters between the two countries. The responses received from the agencies contributed to the AOs recommendations and form the basis of the attached report. The recommendations considered included administrative and structural options. In addition, the AOs recognized vulnerabilities and the need for resiliency with any of the options considered, given the climate is changing and has changed since the 1921 Order was issued.

Given the complexities and interdependence of these options, coupled with climate vulnerabilities and the desire to achieve long-term resiliency in these shared waters, further detailed investigations are necessary. The required modelling, and the time needed to conduct meaningful public and stakeholder engagement will exceed the resources of the AOs. Therefore, we would like to explore, with the Commission, approaches that would secure the required resources to support the recommended studies and associated stakeholder engagement.

In an effort to facilitate discussions and improve understanding of the complexities and challenges within the St. Mary and Milk Rivers, the AOs would be pleased to organize a meeting and tour of the basin this summer for the Commissioners. This would provide an opportunity to see the benefit these shared waters have for both countries as well as some of the challenges faced in accommodating the apportionment of flows.

Enclosed for your consideration is a document that summarizes the AO's recommendations for further study of non-structural administrative procedural changes and structural options that could potentially improve the access to apportioned waters by each country. We appreciate your consideration of these recommendations and look forward to the opportunity of hosting the Commissioners on a meeting and tour of the basins.

Sincerely,

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Canadian Accredited Officer for the
St. Mary and Milk Rivers

John Kilpatrick
U.S. Accredited Officer for the
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c.c.: Camille Mageau, Secretary, Canadian Section/IJC
Charles Lawson, Secretary, U.S. Section/IJC
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Mark Colosimo, Senior Engineering Advisor, U.S. Section/IJC
Malcolm Conly, Canadian Field Representative
Jill Frankforter, U.S. Field Representative

Accredited Officers Options and Recommendations

Submitted to the International Joint Commission

Background:

The Province of Alberta, Saskatchewan and the State of Montana have shared the waters of the St. Mary and Milk rivers for more than 100 years. These rivers are, and continue to be important for irrigation as well as other beneficial uses for all three jurisdictions. The United States (U.S.) St. Mary Canal in northern Montana physically connects these two systems, allowing water to be transferred from the St. Mary river system to the Milk River. Accredited Officers (AOs), appointed by each country, administer the apportionment of these waters, as directed under Article VI of the Boundary Waters Treaty (1909) and the 1921 Order of the International Joint Commission (IJC).

Over the years, there have been multiple discussions and investigations regarding the sharing of these waters between Canada and the United States. A relatively recent investigation originated from a 2007 recommendation by the IJC that Montana and Alberta begin cross-border discussions to: *"…explore the fundamental and interrelated issues of collaboration on the use and management of transboundary waters, cooperation on the rehabilitation of the United States St. Mary Canal, and future arrangements for increasing the ability of each country to better access the full amount of water available to it under the current apportionment".*

Montana and Alberta followed up on this recommendation forming a Joint Initiative Team (JIT) in 2008 to assess current water sharing arrangements, and make recommendations on options that could increase the ability of Montana and Alberta to better access their respective share of the waters of the St. Mary and Milk Rivers. The aim of the JIT was to develop a better understanding of how Montana and Alberta manage water, and identify options that could improve access to the shared water with consideration of the needs of water users in both Montana and Alberta.

The JIT undertook a modeling approach to assess various options utilizing a 45-year modelling period (1959 – 2003). Almost one hundred (100) various options were modeled by the JIT to see how each could potentially effect the ability of each jurisdiction to access its share of the waters. Based on the modeling undertaken by the JIT, the AOs of the St. Mary and Milk Rivers prepared a summary document providing their interpretations of the JIT's results. The purpose of the summary was to provide a common understanding of the results, promote dialogue, and identify options for further consideration.

To this end, the AOs provided their summary review (see Appendix) to the various agencies in Canada and the United States, and met with them, seeking their perspectives on what options their agencies and the constituents they represent, believe show promise with respect to optimizing the sharing of waters between the two countries. The Province of Alberta, the State of Montana and the U.S. Bureau of Reclamation provided formal responses. The responses, which are included in an appendix to this report, contributed to the recommendations herein provided in this document respectfully submitted to the IJC by the AOs.

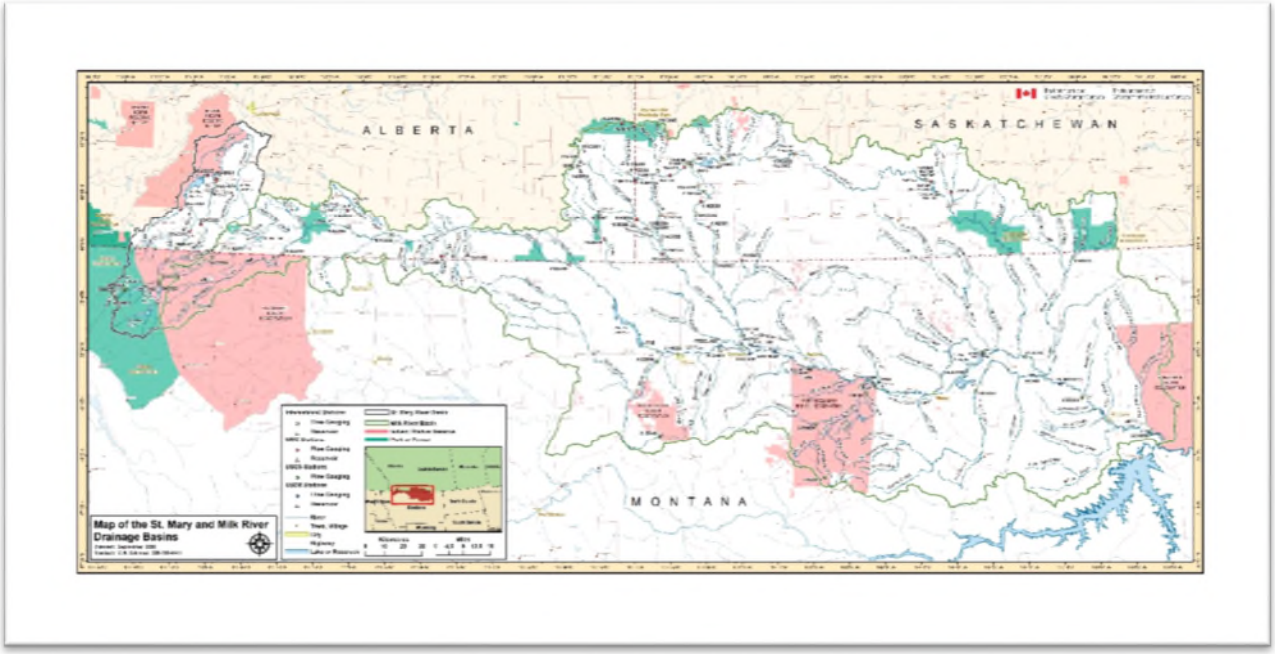

Figure 1: Map of St. Mary and Milk River Basins

Recommendations:

The AOs considered a variety of potential options to improve each country's receipt of their entitlement. Non-structural options (i.e., Administrative Options) are largely within the authority or control of the AOs and structural options require participation of federal/state/provincial governments to evaluate and implement. One non-structural option considered the performance of the 1921 Order in view of changing climate. While changes to the order are beyond the authority of the AOs, the performance of the order should be reviewed in the context of changing climate.

Study and initial implementation of these options exceeds the resource capacity of the AOs to accomplish in a timely manner. The AOs recommend that the IJC seek additional resources to investigate these options in detail. It is important to understand that none of these options can be considered in isolation, as some combination may hold the most promise of mutual benefit to stakeholders. The recommended and proposed bi-national study would align well with the IJC's recent Climate Change Guidance Framework in that it would test the vulnerability of the existing Order to a changing climate. While more detailed investigation is needed, the AOs have conducted some analysis within their limited resources on non-structural changes (administrative procedures), structural changes, and the Order resulting in the following recommendations to the Commission for further study.

Structural Options:

Structural options require the construction of 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 650 cfs, which is a 25% reduction in the original design capacity. However, in 2018 the maximum safe operating capacity of the canal was closer to 600 cfs. Improving the canal to the original design capacity of 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 (see Appendix).

AOs Recommendations for Further Study:

> Montana, Alberta, Reclamation, and Saskatchewan all agreed that canal restoration was important. The AOs support further bi-national investigation of rehabilitation of the U.S. St. Mary Canal to at least the original capacity of 850 cfs. The study may want to consider, after discussion with stakeholders and the U.S. Bureau of Reclamation (Reclamation), modeling the benefits and risks of increased canal size beyond its original capacity.

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 8,800 ac-ft of storage on Lower St. Mary Lake with 2010 infrastructure that provides conveyance for 650 cfs and a 25 cfs U.S. release flow below Lower St. Mary Lake for Instream Flow Needs (IFN).

AOs Recommendations for Further Study:

> All parties recognize the complexity of implementing this option due to the location of the lake on the Blackfeet Indian Reservation and Blackfeet water rights. Alberta was not interested in pursuing it because of this complexity, but both Montana and Reclamation were at least interested in studying it further. The AOs recommend further investigation or study of this option in conjunction with many of the administrative options.

Canadian Milk River Storage

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

AOs Recommendations for Further Study:

Alberta supported both shared and unshared storage but thought this option needed further study. Both Montana and Reclamation did not support additional storage on the Milk River, if not shared by both countries. Shared storage on Milk River in Canada could benefit irrigators in both countries faced with changing climatic conditions by providing additional resiliency in the system. Shared storage could benefit U.S. users by adding additional live storage especially as Fresno storage capacity is declining due to sedimentation. Despite weak support from Montana and Reclamation, the AOs recommend further investigation or study of this option in conjunction with administrative options.

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.

AOs Recommendations for Further Study:

The parties only tacitly supported this option, and noted that it needed additional study to properly evaluate. The AOs believe that this option merits further study because a secondary means of conveying St. Mary water into the Milk River could add resiliency in case of U.S. St. Mary Canal issues and/or changes in runoff patterns due to climate change. A secondary conveyance could increase the volume of St. Mary water moved into the Milk River for either Canadian or U.S. users.

Non-Structural Options

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

Modified Balancing Periods

Description: Natural flows during the irrigation season are currently reported daily and balanced twice monthly per current administrative procedures. Seasonal and annual balancing periods were considered.

AOs Recommendations for Further Study:

Montana, Alberta, Reclamation, and Saskatchewan all agreed that longer balancing periods were worth consideration, but noted the associated complexities and risks. The AOs recommend further study of modified balancing periods in conjunction with other structural and administrative options.

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.

AOs Recommendations for Further Study:

> Montana, Alberta, Reclamation, and Saskatchewan all agreed that deficit trading – letters of intent - were worth consideration but noted the associated complexities and risks. The AOs recommend further study of deficit trading – letters of intent - in conjunction with other structural and administrative options.

Capped Credit System

Description: The capped credit options allows credits to be accumulated and used over the water year (Nov. 1 to Oct. 31). Unused credits are zeroed as of October 31.

AOs Recommendations for Further Study:

> Montana, Alberta, Reclamation, and Saskatchewan all agreed that a capped credit system was worth consideration but noted the associated complexities and risks. The AOs recommend further study of a capped credit system in conjunction with other structural and administrative options.

1921 Order Re-visited

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

AOs Recommendations for Further Study:

> Both Montana and Reclamation supported re-visiting the order. Alberta noted that their infrastructure investment is based on the current Order and opposed reopening the Order. Given the age of the Order and changing climatic conditions/runoff patterns, the AOs recommend, as a first step, a study of the historical performance of Article VI of the Treaty and the 1921 Order coupled with modelling of future performance under various climatic scenarios. With changing climate, it may be that some of the specific details of Article VI of the Treaty or Order could be adjusted in consultation with stakeholders and governments to the benefit of both countries and to the detriment of neither.

Path Forward

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. Beyond identification, operationalizing the identified combination will require significant interaction with stakeholders and development of new/revised procedures for administration. The required modeling and time needed to conduct meaningful public and stakeholder engagement will exceed the resources of the AOs. Therefore, we would like to explore, with the IJC, approaches that would secure the required resources to support the recommended studies and associated stakeholder engagement. A very preliminary estimate for the proposed four-year study is as follows:

Work Description	Cost Estimate
Validate/develop models to evaulate models, review current procedures	
Validation/development of existing hydrology model	$140,000
Validation/development of streamflow/reservoir routing	$112,000
Simulation of climate change scenarios	$140,000
Modification of code to simulate infrastructures changes	$168,000
Evaluation of different options and combinations of options	$560,000
Engagement with stakeholders - workshops	$350,000
Report review and response	$105,000
Administration - study managers (1/3 to 1/2 time)	$420,000
TOTAL	$1,995,000

If the IJC intends to seek funding for all or part of this proposed study, the AOs would like the opportunity to provide a more detailed and up-to-date cost estimate based on feedback from the IJC.

If funding is made available, the AOs recommend the study be led by a bi-national, unbiased study board consisting of the AOs as Co-chairs, technical leads and independent experts from each country as appointed by the IJC. The bi-national Study Board would be responsible for overseeing all study components and allocating funding for each component on a bi-national basis, and strive to make consensus-based recommendations to the Commission. It is recommended each AO have an Alternate Co-Chair to assist with workload and fill the duties at meetings for which the Co-Chair could not attend. Further, the AOs recommend the Board be aided by Study Co-Managers who will support engaging with agency and public stakeholder groups, lead the execution of contracts as directed by the Study Board, develop meeting agenda and logistics, and manage the administrative record transparently in addition to other duties. The AOs propose the IJC Communications Specialists lead public engagement with stakeholder groups in collaboration with the Study Board and with the support of the Study Co-Managers. Should funding be made available, the AOs recommend the first task of the Study Board be to develop a more detailed work plan to utilize the provided funds.

Appendix

To include:

- AO Review of the Joint Initiative Results
- Copy of Letter sent to Jurisdictions requesting feedback
- Copy of Response Letters (and documents)
- Anything else?

Options Summary

Accredited Officers Review of the Joint Initiative Results

The Accredited Officers (AOs) of the St. Mary and Milk Rivers were tasked with identifying options to improve access to entitlements by Canada and the United States. To this end, the AOs have reviewed the results as of August 2018 of the Joint Initiative (JI) between Alberta and Montana.

The Field Representatives (FRs) submit this summary of their interpretation of the results presented in the April 8 version of the Results Viewer spreadsheet, prepared under the Joint Initiative. The purpose of the summary is to provide a common understanding of the JI results, to promote dialogue, and to identify options for further consideration.

For the purposes of this document the term "*apportionment*" is defined as "*the process of determining the amount of water to which each country is entitled*", which is clearly the meaning of this term in Section V in the IJC's 1921 Order to the Accredited Officers. The term "*entitlement*", is defined as "*the volume of water apportioned to each country by the Accredited Officers under the direction of the IJC.*".

The FRs have considered the Entitlement Access Summaries found in the Results Viewer provided by the Joint Initiative Team, particularly the "Annual Percentage of Entitlement Accessed". These results are presented as percentages of entitlement accessed by each country.

To demonstrate the sensitivity of the options with respect to the availability of water, the results are presented as the change in percentages for the average of the driest 11 years, the driest 22 years, and all 45 years (1959-2003) modelled for each option identified. These three water availability scenarios are referenced as D11, D22, and Avg45.

The base conditions used for the comparison of the identified options are Option 1a, which models 2010 infrastructure with a 650 cfs U.S. St. Mary Canal; Option 2a, which models 2010 infrastructure with a 850 cfs U.S. St. Mary Canal; or Option 10a, which is Option 1a with deficit trading as per the 2001 Letter of Intent.

Option 1a: Annual Percentage of Entitlement Accessed

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	93%	137%	105%	27%
D22	88%	142%	108%	17%
Avg45	75%	147%	117%	13%

Option 2a: Annual Percentage of Entitlement Accessed

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	94%	137%	104%	27%
D22	91%	142%	106%	17%
Avg45	80%	147%	114%	13%

Option 10a: Annual Percentage of Entitlement Accessed

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	95%	138%	103%	26%
D22	90%	143%	107%	17%
Avg45	76%	147%	116%	12%

The results summarised in the tables show the change in the percentage of entitlement accessed by each country in comparison to Option 1a. For the upstream country, 'the percentage of entitlement accessed' is water that is stored, diverted or used by the upstream country. If the upstream country does not access its full entitlement, then the downstream country receives more than 100% of their entitlement, which is considered a surplus.

The FRs have grouped the results according to structural options and administrative options, which follows the classification of options used by the JI. The details of this classification are as follows:

- Structural Options consider infrastructure improvements or new structures that store and convey water
- Administrative Options consider changes to the existing administrative procedures that could be implemented to improve access to entitlements

The FRs have identified the following options that influence access to entitlement, some of which extend beyond the analysis completed by the JI.

Selected Structural Options:

St. Mary Canal Improvement

Description: At the time of the JI modelling activity the maximum safe operating capacity of the St. Mary Canal was 650 cfs, which is a 25% reduction in the original design capacity. However, in 2018 the maximum safe operating capacity of the canal was closer to 600 cfs. Improving the canal to the original design capacity of 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 JI.

Result: Option 2a, the increase in the St Mary Canal capacity to 850 cfs, will improve the U.S. access to their entitlement when compared to the base condition Option 1a. The results are summarised in the following table.

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	94-93 = 1%	137-137 = 0%	104-105 = -1%	27-27 = 0%
D22	91-88 = 3%	142-142 = 0%	106-108 = -2%	17-17 = 0%
Avg45	80-75 = 5%	147–147 = 0%	114-117 = -3%	13-13 = 0%

Discussion: Restoring the St. Mary Canal to the original design capacity will increase the ability for the U.S. to access more of its entitlement and reduce the surplus water to Canada on the St. Mary River. It will have no effect on U.S. access to their entitlement to Milk River water. As well, there is no effect on Canada's ability to access their entitlement on the Milk River, which remains at 27%, 17% and 13% for D11, D22, and Avg45, respectively.

Increasing the size of the St. Mary Canal to 1,200 cfs, Option 3, increases the percentage of entitlement that the U.S. may access for the D22 and Avg45 water availability scenarios. However, for the D11 scenario, the canal capacity is not the limiting factor.

Restoring the capacity of the St Mary Canal to 850 cfs vs 1,200 cfs is more likely than other structural options, given that the U.S. Congress has authorized some funding for the engineering design of the St. Mary Canal head-gate to accommodate 850 cfs.

Increasing the capacity of the St. Mary Canal to 1,200 cfs has constraints with respect to how much water can be accessed in the U.S. by the Bureau of Reclamation (BOR). Other stakeholders, such as the Blackfeet Tribe and the Province of Alberta, would need to be engaged, e.g., to increase flows beyond 850 cfs. The higher flows would have the potential to increase erosion along the Milk River in Alberta, and may be further limited by requirement for U.S. instream flow needs (IFN) in the St. Mary River with respect to endangered species, such as bull trout. A 1,200 cfs canal would reduce surpluses on the St. Mary River entering Alberta and may have some benefit to Alberta Milk River water users under an updated Letter of Intent that increases the amount of the deficits that can be traded.

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 JI Option 4c considered adding a control structure at the St Mary Lake outlet to allow for the regulation of 8,800 ac-ft of storage on Lower St. Mary Lake with 2010 infrastructure that provides conveyance for 650 cfs and a 25 cfs U.S. IFN release flow below Lower St. Mary Lake.

Result: Option 4c considers adding a control structure on Lower St. Mary Lake outlet that allows for the regulation of an additional 8,800 ac-ft of storage to Lower St. Mary Lake along with a U.S. IFN release improves the U.S. access to their entitlement when compared to the base condition Option 1a. The results are summarised in the following table.

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	96-93 = 3%	137-137 = 0%	102-105 = -3%	27-27 = 0%
D22	92-88 = 4%	142-142 = 0%	105-108 = -3%	17-17 = 0%
Avg45	77-75 = 2%	147-147 = 0%	116-117 = -1%	13-13 = 0%

Discussion: Option 4c improves the ability for the U.S. to access more of its entitlement and reduces the percentage of surplus water to Canada on the St. Mary River. Additional benefits are realised if the

additional Lower St Mary Lake storage is used in conjunction with improvements to restore the St. Mary Canal canal's conveyance to 850 cfs.

As modelled, addition of a control structure would impound water within the Lower St. Mary Lake natural 4-foot range in water levels. Water would be stored during the winter months in addition to some of the spring freshet water. The JI determined that adding storage to the Lower St. Mary Lake had more benefit then increasing Lake Sherburne storage, as Lake Sherburne was appropriately designed for the hydrology of Swift Current Creek.

The development of a control structure on Lower St. Mary Lake requires engagement with the Blackfeet Tribe, as the improvements are on Tribal lands, and the Province of Alberta, if there was a demonstration of shared benefits to Alberta.

The relative costs are considered moderate as compared to alternative structural improvements.

Canadian Milk River Storage

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

Option 7a modelled the addition of 122,000 ac-ft of storage on the Milk River in Canada to store Milk River natural flow with a 850 cfs St Mary Canal and a 15 cfs winter IFN release below the proposed Milk River reservoir. Under this option, none of the 850 cfs U.S. St Mary water would be stored in Canada.

Result: Option 7a has the following result when compared to Option 2a. Option 2a was used for comparison as it considers the effects of an 850 cfs canal whereas Option 1a only considers a 650 cfs canal.

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	94-94 = 0%	111-137 = -26%	104-104 = -0%	78-27 = 51%
D22	92-91 = 1%	107-142 = -35%	105-106 = -1%	87-17 = 70%
Avg	82-80 = 2%	109-147 = -38%	113-114 = -1%	83-13 = 70%

Option 7a has the following result when compared to Option 11a. Option 11a considers a 850 cfs canal with deficit trading as per the 2001 Letter of Intent.

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	94-96 = -2%	111-138 = -27%	104-101 = 3%	78-26 = 52%
D22	92-93 = -1%	107-143 = -36%	105-103 = 2%	87-17 = 70%
Avg	82-83 = -1%	109-147 = -38%	113-110 = 3%	83-12 = 71%

Discussion: Option 7a provides the ability for Canada to store Milk River natural flow that results in a significant increase in access for Canada to its Milk River entitlement. The storage on the Milk River in Canada, if designed only for Milk River natural flows, would have no benefit to the U.S. with respect to their access to Milk River or St Mary River entitlements.

Increasing the size of a Milk River reservoir in Canada was considered under Options 7b and 7c. The percentage improvements for Canada to access its entitlement over Option 7a are minor, suggesting that the limiting factor is water availability. However, a larger Milk River reservoir with a 850 cfs St Mary Canal would have the potential to store some U.S. St. Mary River and Milk River water, resulting in an overall potential benefit for both countries.

Option 7a is considered a high cost option, however there are potential mutual benefits for Canada and U.S., which should be further investigated.

Canadian Conveyance Alternative

Description: The option of additional infrastructure to move water from the St. Mary basin to the Milk River basin via Verdigris Coulee, for example, was not considered in the scenarios examined by the JI.

It is suggested that the Verdigris Coulee provides a general concept of conveying water from the St. Mary to the Milk basin in Canada. Other design options may also be considered particularly given the potential for water quality concerns associated with moving water via Verdigris Coulee. The FRs believe that there may be merit to the option of water transfer from the St. Mary to the Milk River in Canada.

Discussion: In general, transferring water from the St. Mary to the Milk basin in Canada would:

- Allow Canada to transfer St. Mary water to the Milk River basin to meet the needs of Canadian Milk River water users
- Have the potential to improve the U.S. access to their entitlement to the St. Mary River water by providing an additional path to move water similar to the St. Mary Canal to the lower Milk River

This option would improve the security of water supply in the Milk River basin in Alberta and could improve U.S. access to their St Mary River entitlement under a shared benefit approach. The shared benefit consideration is based on the principle that Canada could move a portion of the U.S. St. Mary entitlement via the infrastructure built in Canada, complementing the St. Mary Canal.

Additional information and modelling are required to evaluate this concept.

Further Considerations: There has been some discussion on the change in the seasonal distribution of flow from the eastern slopes of the Rockies. For example, the freshet runoff is beginning earlier and is resulting in higher volumes of runoff, while the June mountain runoff is becoming more rainfall dominated.

These changes, coupled with hotter and drier growing seasons, have implications for water management as the existing infrastructure and operations were not explicitly designed to accommodate this change in the seasonal distribution of water supply. Any future investigations related to conveyance and/or storage should take into consideration variations in seasonal water supplies.

Administrative Options

1921 Order Re-visited

Description: Modifications to the 1921 Order considered by the JI included the following:

1. Changing the prior appropriation allowing the downstream country 75% access to the first 666 cfs, 25% access to the next 666 (1,332 cfs) and 50% access to anything above 1,332 cfs.
2. Same as 1, but using a 65/35 ratio instead of 75/25.
3. Same as 2, however, during the irrigation season from April 1st to October 31st Alberta and Montana will not receive less than their entitlement as per the 1921 Order in any calendar year.

Result: A review of the modelled results for the noted modifications to the 1921 Order suggest that apportionment can approach a 50:50 sharing of the natural flow on the St. Mary River, particularly in the drier years. It is worth noting that during wetter periods additional infrastructure within the system is required to achieve a 50:50 sharing of the natural flow.

Discussion: These modifications increase U.S. entitlement on the St. Mary and irrigators in Canada would be negatively affected in drier years. Changes to the 1921 Order would be procedural and therefore have limited direct cost implications. However, modification of the 1921 Order is beyond the purview of the AOs.

The JI attempted to rebalance the flows between Canada and the US within the irrigation season. It would be informative to investigate other options for rebalancing flows that could include:

i. balancing outside of the irrigation season,
ii. adjusting prior appropriation numbers, and/or
iii. allowing for flexibility in defining an irrigation period for a particular year.

Given the shift in recent years to an earlier spring for both runoff and irrigation, these options may warrant further consideration.

Modified Balancing Periods

Description: Natural flows during the irrigation season are reported daily and balanced twice monthly. The JI looked at a number of options using seasonal and annual balancing periods. They are shown as Options 16a to 16f.

Option 16a considers a seasonal (April 1-October 31) independent balancing of entitlements on the St Mary River and Milk River with 2010 Infrastructure but with a 850 cfs U.S. St Mary Diversion Canal, IFN on St Mary River in Canada of 35% of the natural flow. The option has Canadian Milk River irrigators accessing the entire Milk River natural flow and a modified drawdown for Lake Sherburne Reservoir.

Option 16b considers an annual water year (November 01 to October 31) independent balancing of entitlements on the St Mary River and Milk River assuming the same infrastructure and operations as Option 16a.

To understand the effect of changing the length of the balancing period, the difference in results from Options 16a to and 16b to Option 2a were compared. Option 2a was used for comparison as it includes the effects of an 850 cfs St Mary Canal with no Letter of Intent.

Result: Option 16a with a seasonal balancing period some improvement for the U.S. to access its entitlement on the St. Mary River and for Canada to access its entitlement on the Milk River when compared to Option 2a.

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	93-94 = -1%	130-137 = -7%	104-104 = 0%	41-27 = 14%
D22	92-91 = 1%	137-142 = -5%	105-106 = -1%	28-17 = 11%
Avg45	87-80 = 7%	143-147 = -4%	109-114 = -5%	19-13 = 6%

Result: Option 16b with an annual balancing period, further improves the U.S. and Canada's access to their entitlement when compared to Option 2a.

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	101-94 = 7%	128-137 = -11%	100-104 = -4%	45-27 = 18%
D22	99-91 = 8%	137-142 = -5%	101-106 = -6%	29-17 = 12%
Avg45	94-80 = 14%	143-147 = -4%	104-110 = -10%	20-13 = 7%

Discussion: Lengthening the balancing period will lessen the implication of deficits to the upstream country and enable the upstream country to take advantage of surpluses, which are forfeited by using a shorter balancing period.

With seasonal balancing the access to entitlement for the U.S. on the St. Mary River shows little change (-1% to 1%) in dry periods but up to a 7% increase on average. The access to entitlement for Canada on the Milk River increases between 11% to 14% in dry years and 6% on average.

With annual balancing the increase is 14% Avg45 for the U.S. on the St. Mary River and 7% Avg45 for Canada on the Milk River. When annual balancing is combined with the full range of structural options the increase can be as high as 22% for the U.S. on the St Mary and 81% for Canada on the Milk River as shown by Option 16g.

In summary, lengthening the balancing periods enables the U.S. to access more of its entitlement on the St. Mary and for Canada to access more of its entitlement on the on the Milk. The implications for downstream water managers with the longer balancing periods are that water is not necessarily available according to the historical apportion pattern that was used to design and operate the existing infrastructure and is insensitive to the timing of water demands in the downstream country. To satisfy the timing of downstream water demands under a longer balancing period scenario could require increased multi-year downstream storage.

Changes to the balancing period are within the jurisdiction of the AOs and would have a low direct cost. There could be costs incurred by downstream operators because of the need to increase storage

capacity to ensure entitlement is available when needed. Active collaboration and cooperation could lessen the need for each downstream country or operator to incur storage costs. For example, on the Eastern Tributaries SK and MT work closely to make the best use of scarce water where only SK owns significant water storage infrastructure.

Deficit Trading – Letter of Intent

Description: A Letter of Intent is a mechanism to allow offsetting of deficits between the St. Mary River and the Milk River with the intent of maximizing benefits. Option 10a considers the 2001 Letter of Intent and Option 10b investigates the implications of having a larger offsetting deficit under a revised Letter of Intent.

Result: Option 10a, 2001 Letter of Intent, improves the U.S. access to their entitlement on the St. Mary when compared to the base condition Option 1a.

The results are:

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	95-93 = 2%	138-137 = 1%	103-105 = -2%	26-27 = -1%
D22	90-88 = 2%	143-142 = 1%	107-108 = -1%	17-17 = 0%
Avg45	76-75 = 1%	147-147 = 0%	116-117 = -1%	12-13 = -1%

Although not shown by the table above, Canada realises an improvement in the Milk as the Letter of Intent allows Canada to access either a greater percentage of the Milk natural flow later in the irrigation season, if available, or some of the U.S. St. Mary water that is transferred by the U.S. St. Mary Canal. As well, the analysis considering only percentages, however considering only percentages does not demonstrate the benefit of the Letter of Intent with respect to the volume of water available later in the season, which is important to Alberta Milk River irrigators.

Option 10b, increasing the deficit volumes considered by the Letter of Intent, further improves the U.S. access to their entitlement on the St. Mary River when compared to the base condition Option 1a. The results are:

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	97-93 = 4%	138-137 = 1%	102-105 = -3%	26-27 = -1%
D22	92-88 = 4%	143-142 = 1%	105-108 = -3%	17-17 = 0%
Avg45	78-75 = 3%	147-147 = 0%	115-117 = -2%	13-13 = 0%

As with Option 10a Canada realises further improvement in the volume of water available for Milk River irrigators as the Letter of Intent allows Canada to access either a greater volume of the Milk natural flow later in the irrigation season or some of the U.S. St. Mary water that is transferred by the U.S. St. Mary Canal.

Discussion: Many of the modelled deficit trading options also included infrastructure improvements. As a consequence, when deficit trading is modelled in combination with other options, access to entitlements improves, however this is not related to the Letter of Intent.

The modelled results indicate that the 2001 Letter of Intent has been successful in allowing the U.S. to access more of its St. Mary entitlement when compared to Option 1a. The 2001 Letter of Intent allows Canada to indirectly access more of its entitlement in the Milk River basin, by having access to a greater volume of the Milk natural flow later in the irrigation season or to some of U.S. St. Mary water being diverted to the Milk River.

These results indicate that increasing the deficit volumes under the Letter of Intent increases the ability of the U.S. to access more of its entitlement on the St. Mary, but has limited implications for Canada to access its entitlement on the Milk.

It is interesting to note Option 10a (650 cfs canal capacity with 2001 LOI) when compared to the base condition Option 1a has similar results to Option 2a (850 cfs canal capacity without LOI), suggesting the positive benefits of the 2001 Letter of Intent in the change in percentages for D11, D22 and Avg45.

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	94-93 = 1%	137-137 = 0%	104-105 = -1%	27-27 = 0%
D22	91-88 = 3%	142-142 = 1%	106-108 = -2%	17-17 = 0%
Avg45	80-75 = 5%	147-147 = 0%	114-117 = -3%	13-13 = 0%

Adjustments to the Letter of Intent are within the jurisdiction of the AOs and would have limited direct costs.

Capped Credit System

Description: The capped credit option allows credits to be accumulated and used over the water year (Nov. 1 to Oct. 31). Unused credits are zeroed as of October 31. Option MT1a allows a 32,000 ac-ft credit to accumulate on the St. Mary to the benefit of the U.S. and a 16,000 ac-ft credit to accumulate on the Milk to the benefit of Canada. Alberta may draw up to 4,000 ac-ft from the U.S. St. Mary diversions with the rest being drawn from the Milk River entitlements. Montana must maintain a specified flow on the St. Mary at the border.

Result: Option MT1a improves the U.S. access to their entitlement on the St. Mary and for Canada on the Milk River when compared to the base condition Option 1a.

	U.S. St. Mary	U.S. Milk	Can St. Mary	Can Milk
D11	97-93 = 4%	121-137 = -16%	102-105 = -3%	59-27 = 32%
D22	94-88 = 6%	133-142 = -9%	104-108 = -4%	36-17 = 19%
Avg45	82-75 = 7%	141-147 = -6%	112-117 = -5%	23-13 = 10%

Discussion: Access to entitlements for both the U.S. and Canada improves under a capped credit system as shown by Option MT1a. Under a capped credit system Canada has a significant increase in access to its entitlement for the Milk River and the U.S. has a modest increase in access to its entitlement for the St. Mary River. The access to entitlements for the U.S. increase further when combined with structural

improvements in the U.S. and in Canada with Canadian structural improvements. A Capped Credit System as presented by Option MT1a appears to provide mutual benefit.

Option MT1a is within the jurisdiction of the AOs and would have limited cost implications.

Summary

The general findings that can be drawn from the review of options are:

i. Managing access to water is complex given the timing, amount, and form of precipitation along with changes to the timing of spring freshet while apportionment periods and procedures remain unchanged.
ii. It is possible to improve each countries' access to their entitlement in the St. Mary and Milk Rivers during the driest years without building additional infrastructure by modifying the procedures of the AOs.
iii. Availability of water for access by downstream countries may be an issue if apportionment periods are lengthened to all or most or a year.
iv. The timing, amount, and form of precipitation as well as the timing of spring freshet continue to change while apportionment periods and procedures remain unchanged.
v. Equal or near equal sharing of flows in average years will require significant additional infrastructure, close coordination among users and system operators in both countries, and very flexible interpretation of and/or changes to the 1921 Order of which almost all are beyond the purview of the AOs.

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
1.0 Structural Options:					
a. U.S. St Mary Canal Improvements	Modest Improvement	Neutral	Significant cost	Neutral	850 cfs canal and reduced risk of unplanned shutdowns
b. U.S. Lower St Mary Lake Storage Improvements	Modest Improvement	Neutral	Modest cost	Neutral	Blackfeet Tribe consent and participation
c. Canadian Milk River Storage	Neutral	Significant Improvement	Significant cost	Neutral	Potential to store U.S. St Mary water
d. 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
2.0 Administrative Options:					
a. 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
b. 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
c. Deficit Trading - Letter of Intent	Minor Improvement	Minor Improvement for irrigation scheduling	Limited cost	Neutral	Involvement of Alberta and Montana
d. Capped Credit System	Modest Improvement	Significant Improvement in drier years	Limited cost	Neutral	Involvement of Alberta and Montana

Minor: 1 to 4% improvement in D11 and D22

Modest: 5 to 10% improvement in D11 and D22

Significant: greater than 10 % improvement in D11 and D22

Montana Response to Options Summary

October 22, 2018

Mr. John Tubbs,
Director
Montana Department of Natural Resources and Conservation
P.O. Box 201601
Helena, MT 59620-1601

Dear Director Tubbs,

In 2016, the Accredited Officers (AOs) for the St. Mary and Milk Rivers initiated a review of the natural flow and apportionment data for these watersheds from the 1950s to present. They noted that in almost every year the apportionment procedures used to implement the IJC's Order of 1921 limited the ability of the upstream country to utilize its apportioned share of water. The AOs concluded that current administrative procedures therefore may not fulfill the intent of the 1921 Order.

In the spring of 2017, the AOs began a review of these procedures with the goal of recommending changes to administrative procedures. During the course of this review, it became apparent that other factors, such as lack of infrastructure and timing of natural flows were also factors to be considered.

As part of the AO's review process, the AOs reviewed the work of the International St. Mary – Milk Rivers Administrative Measures Task Force (2004-2006) and the ongoing work of the Joint Initiative Team (JIT) of the Montana–Alberta St. Mary and Milk Rivers Water Management Initiative (2008 – present). The AOs found the Modeling and Process Reports, prepared by the Joint Initiative Team, to be particularly informative and direct interaction with the JIT has greatly aided our review of their work.

Most of the options for improving the administrative procedures were considered and modelled by the JIT, however the AOs did consider other options that were not modelled. Also, the JIT modelled a few options that altered or very broadly interpreted the 1921 Order and the AOs considered these options, given that the modelling results were available.

Attached is a document that summarizes the various options that are being considered by the AOs and each option's potential for increasing the ability of the upstream country to utilize its apportioned share of water.

Recognizing the implications of these options on water users in both countries and the inability of the AOs to implement many of these options without active participation by various agencies of the Provinces of Alberta and Saskatchewan and State of Montana as well as the U.S. Bureau of Reclamation, the AOs, through this letter, are requesting the help of you and your staff in evaluating these options.

Specifically, the AOs are seeking your help in identifying, from the perspective of your agency and the stakeholders you serve, which options are most promising and which ones may not be feasible because of high cost/low benefit or legal constraints.

We understand that the optimum approach may involve some combination of the options summarized. Please note, we are not asking for a review of the document itself, which has already been reviewed by the JIT on two occasions. We're simply seeking your input on which options are most likely to help the AOs better implement the 1921 Order.

In order for the AOs to meet the timelines imposed by the IJC for this process, the AOs request you provide your comments by December 7, 2018.

We offer our thanks in advance for your help.

Sincerely,

Dr. Alain Pietroniro
Canadian Accredited Officer for the
St. Mary and Milk Rivers

John Kilpatrick
U.S. Accredited Officer for the
St. Mary and Milk Rivers

Attachment

DEPARTMENT OF NATURAL RESOURCES
AND CONSERVATION

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December 12, 2018

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Dr. Alain Pietroniro, P.Eng.
Executive Director, Hydrological Services
Meteorological Service of Canada
National Hydrology Research Centre
11 Innovation Blvd
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Dear Mr. Kilpatrick and Dr. Pietroniro

The Montana Department of Natural Resources and Conservation (DNRC) respectfully submits the State of Montana's response to the Accredited Officers (AO's) review of the Joint Initiative Results dated October 22, 2018. We appreciate your efforts at reviewing the procedures and available infrastructure for apportioning the flows of the St. Mary and Milk rivers with the goal improving the ability of both U.S. and Canada to access a greater share of the combined flow.

Montana believes that several of the Administrative Options reviewed by the AO's represent the most practical, low-cost opportunity for increasing the U.S.'s access to its St. Mary River entitlement and for Canada's access to its Milk River entitlement. While these options will not, by themselves, result in an equal 50/50 sharing of the combined flows, they represent an improvement over the current procedures. In addition, they can be implemented in the short-term and provides each upstream country with access to a greater volume of its entitlement.

We appreciate the opportunity to provide the AO's with Montana's perspective and look forward to working with you further.

Sincerely,

John E. Tubbs, Director
Department of Natural resources and Conservation

Attachment

Montana's Response to the Accredited Officers Review of the Joint Initiative Results Dated October 22, 2018

The Montana Department of Natural Resources and Conservation (DNRC), on behalf of the State of Montana, submits the following response to the Accredited Officers Review of the Joint Initiative Results Dated October 22, 2018. The purpose of this document is to provide the Accredited Officers (AOs) with Montana's perspective on the options that appear to have the greatest potential for improving access to the shared waters of the St. Mary and Milk rivers.

For the purposes of this document the term "*apportionment*" is defined as "*the process of determining the amount of water to which each country is entitled"*. The term "*entitlement*", is defined as "*the volume of water apportioned to each country by the Accredited Officers under the direction of the IJC.*

Following the format used in the AO's review, results are presented as the change in percentages and/or volume for the average of the driest 11 years (D11), the driest 22 years (D22), and all 45 years (Avg45) modelled for each option. The base conditions used for the comparison are Option 1a, which models 2010 infrastructure with a semi-monthly balancing period and 650 ft^3/sec (18.4 m^3/sec) U.S. St. Mary Canal (Table 1); and Option 2a, which models 2010 infrastructure with semi-monthly balancing period and 850 ft^3/sec (24 m^3/sec) U.S. St. Mary Canal (Table 2).

Table 1: Percent and volume of entitlement received under Option 1a.

	U.S. St. Mary		**U.S. Milk**		**Canada St. Mary**		**Canada Milk**	
	Percent Entitlement Accessed	Volume Accessed (1000s ac-ft)	Percent Entitlement Accessed	Volume Accessed (1000s ac-ft)	Percent Entitlement Accessed	Volume Accessed (1000s ac-ft)	Percent Entitlement Accessed	Volume Accessed (1000s ac-ft)
D11	93%	168.8	137%	40.6	105%	304.5	27%	4.1
D22	88%	183.3	142%	71.6	108%	346	17%	4.5
Avg45	75%	196.4	147%	118.9	117%	443.9	13%	5.6

Table 2: Percent and volume of entitlement received under Option 2a.

	U.S. St. Mary		**U.S. Milk**		**Canada St. Mary**		**Canada Milk**	
	Percent Entitlement Accessed	Volume Accessed (1000s ac-ft)	Percent Entitlement Accessed	Volume Accessed (1000s ac-ft)	Percent Entitlement Accessed	Volume Accessed (1000s ac-ft)	Percent Entitlement Accessed	Volume Accessed (1000s ac-ft)
D11	94%	170.4	137%	40.6	104%	302.8	27%	4.1
D22	91%	188.3	142%	71.6	106%	341	17%	4.5
Avg45	80%	209.4	147%	118.9	114%	430.9	13%	5.6

Structural Options

St. Mary Canal Improvement

The State of Montana continues to pursue and support rehabilitation of the St. Mary Canal to its original design capacity of 850 ft^3/sec (24 m^3/sec). The Montana-Alberta Joint Initiative Team (JIT) recognized the St. Mary Canal is critical to irrigation and municipal water supplies in the Milk River Basin to both Montana and Alberta. Results from modeling conducted by the JIT indicate that an 850 ft^3/sec (24 m^3/sec) canal will allow the U.S. to access an additional 13,000 ac-ft (16,035 dam^3) of its St. Mary entitlement in average years and 1,600 ac-ft (1,974 dam^3) in the 11 driest years. Although an 850 ft^3/sec (24 m^3/sec) canal will decrease surplus deliveries to Canada, they will continue to receive over 100% of their St. Mary River entitlement.

As the Accredited Officers noted, restoring the canal capacity back to 850 ft^3/sec (24 m^3/sec) will have no effect on Canada's ability to access their entitlement from the Milk River. However, Canada does benefit from the augmentation of Milk River flow and the ability for Alberta Milk River irrigators to access some water from the St. Mary Basin through the Letter of Intent (LOI).

Although increasing St. Mary Canal capacity would allow Montana to receive more of its entitlement during most years, it offers a smaller amount of benefit during the 22 driest and 11 driest years, when the apportionment procedures and the 1921 Order—rather than canal capacity—are more limiting factors. This is further discussed under Administrative Option – 1921 Order Re-visited.

Montana does not feel the AOs should spend additional resources investigating increasing the canal capacity to 1,200 ft^3/sec (34 m^3/sec). JIT modeling results indicate that a larger canal capacity provides very little benefit in drier years and no benefits during the driest years.

Lower St. Mary Lake Storage Improvement

Modeling conducted by the JIT indicate that the addition of a control structure at the outlet of Lower St. Mary Lake offers modest potential benefits to Montana, compared to current conditions. The U.S. would receive an additional 2% to 4% (5,500 ac-ft – 7,200 ac-ft [6,784 dam^3 – 8,881 dam^3]) of its entitlement on the St. Mary River (Table 3).

Table 3: Change in percent entitlement received with the addition of storage on Lower St. Mary Lake (Option 4c) compared to current conditions (Option 1a).

	U.S. St. Mary		**U.S. Milk**		**Canada St. Mary**		**Canada Milk**	
	Change in % Entitlement Accessed	Change in Volume Accessed (1000s ac-ft)	Change in % Entitlement Accessed	Change in Volume Accessed (1000s ac-ft)	Change in % Entitlement Accessed	Change in Volume Accessed (1000s ac-ft)	Change in % Entitlement Accessed	Change in Volume Accessed (1000s ac-ft)
D11	+ 3%	5.9	0%	0	- 3%	- 5.9	0%	0
D22	+ 4%	7.2	0%	0	- 3%	- 7.2	0%	0
Avg45	+ 2%	5.5	0%	0	- 1%	- 5.5	0%	0

Although adding storage to Lower St. Mary Lake will decrease U.S. surplus deliveries to Canada, Canada will continue to receive over 100% of its St. Mary River entitlement. This option has no effect on access to entitlement shares of Milk River water for either Country, although it likely would supersede much of the potential benefits to the U.S. currently provided by the Letter of Intent.

While the addition of a control structure provides modest benefits as a standalone option, modeling work conducted by the JIT demonstrated that the ability to regulate outflows from Lower St. Mary Lake added additional benefits to a range of other structural and administrative options.

While Montana supports the addition of storage on Lower St. Mary Lake, we also recognize this option will impact Tribal land and resources. Development of this option would require support from the Blackfeet Tribe.

Canadian Milk River Storage

Montana recognizes that a Milk River storage project would allow Canada access to more of its entitlement share of the Milk River. However, we have concerns with the potential impacts this option will have on Montana's Milk River Project water users. Modeling by the JIT indicated Montana might realize some modest benefits by participating in a joint storage project, but we have concerns that the costs of participation might be higher than the means of Montana irrigators.

Since the natural hydrology of the Milk River varies greatly from year-to-year, Canada will have to build a reservoir with multiple years of hold-over capacity. Alberta has looked at the feasibility of constructing an on-stream storage reservoir ranging in capacity from 122,000 ac-ft (150,486 dam^3) to 237,000 ac-ft (292,337 dam^3). Modeling conducted by the JIT indicates that the U.S. could see a total reduction of flow at the Eastern Crossing ranging from 6,944 ac-ft (8,565 dam^3) in the driest years to 29,666 ac-ft (36,593 dam3) during average years (Table 4).

Table 4: Total reduction in flows to the U.S. at the Eastern Crossing resulting from construction of a Canadian storage project on the Milk River.

	Total Flow Reductions at Eastern Crossing		
Storage Capacity	**D11**	**D22**	**Average**
122,000 ac-ft of storage (150,486 dam^3) (Option 7a)	-6,944 ac-ft (-8,565 dam^3)	-15,895 ac-ft (-19,606 dam^3)	-26,096 ac-ft (-32,189 dam^3)
237,000 ac-ft of storage (292,337 dam^3) (Option 7c)	-6,463 ac-ft (-7,972 dam^3)	-15,473 ac-ft (-19,086 dam^3)	-29,666 ac-ft (-36,593 dam^3)

Montana is also concerned that a storage reservoir on the Milk River may have a negative impact on the Federal water rights of the Ft. Belknap Indian Reservation. The Federal Reserved Water Rights Compact between Montana, the U.S., and the Gros Ventre and Assiniboine tribes of the Fort Belknap Indian Reservation grants the Tribe the right to divert up to 645 ft^3/sec (18.3 m^3/sec) of the U.S. share of the natural flow of the Milk River and its tributaries upstream of the Reservation. The Compact was ratified by the Montana Legislature in 2001. Federal approval is pending.

In addition to mitigating potential impacts to the Tribes' water rights, Canada will have to ensure that reservoir operations do not impede delivery of U.S. apportioned water diverted from the St. Mary River.

Canadian Conveyance Alternative

As the AO's noted, the JIT did not consider the concept of moving St. Mary river water to the Milk River via a Canadian conveyance system. We are familiar with previous Canadian investigations into conveying water via Verdigris Coulee, but we are not acquainted enough with the details to offer a meaningful recommendation to the AO's.

Administrative Options

Montana believes the Administrative Options discussed below represent a low-cost opportunity for increasing the U.S.'s access to its St. Mary River entitlement and for Canada's access to its Milk River entitlement. While these options will not, by themselves, result in an equal 50/50 sharing of the combined flows, they can be implemented in the short-term and do provide each country with access to a greater volume of water. Once implemented, the administrative options offer flexibility to adjust to changing conditions and can be improved as more is learned.

1921 Order Re-visited

Montana supports the AOs efforts to explore alternative allocation formulas in the 1921 Order. Montana believes the Order, as written, represents a major impediment to the U.S. receiving 50% of the combined flows of the St. Mary and Milk rivers as provided in Article VI of the 1909 Treaty. Changing the current allocation formula is a low-cost procedural step towards addressing the unfairness inherent in the 1921 Order.

Under the current allocation formula, Canada receives 75% of the first 666 ft^3/sec (18.9 m^3/sec) from the St. Mary River while all flows above 666 ft^3/sec (18.9 m^3/sec) are divided equally. This provides Canada with a guaranteed 334 ft^3/sec (9.5 m^3/sec) benefit from the St. Mary River over the range of flows. This built-in Canadian advantage on the St. Mary River constrains the U.S. to receiving 41% (315,301 ac-ft [388,920 dam^3]) of the combined natural flows in average years and 40% (209,342 ac-ft [258,221 dam^3) in the 11 driest years (Figures 1 and 2).

During the JIT process, Montana proposed several modifications to the allocation formula to allow the U.S. to reach 50/50 parity with Canada while honoring the prior appropriation stipulations in the Treaty. Montana's proposed modifications would alter the volume and timing of the water allocated to each county during the irrigation season (April 1 – October 31). During the non-irrigation season (November 1 – March 31) flows in both rivers would continue to be allocated equally between the U.S. and Canada.

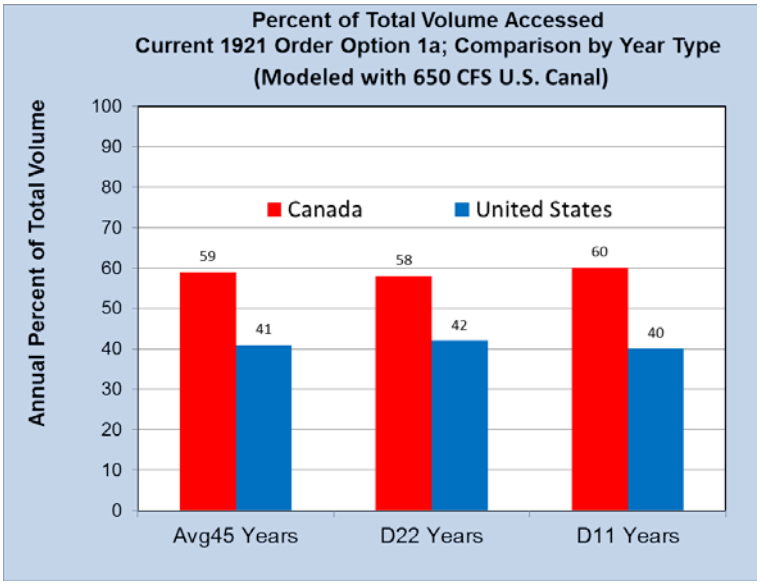

Figure 1: Percentage of combined natural flows allocated to the U.S. and Canada under the 1921 Order.

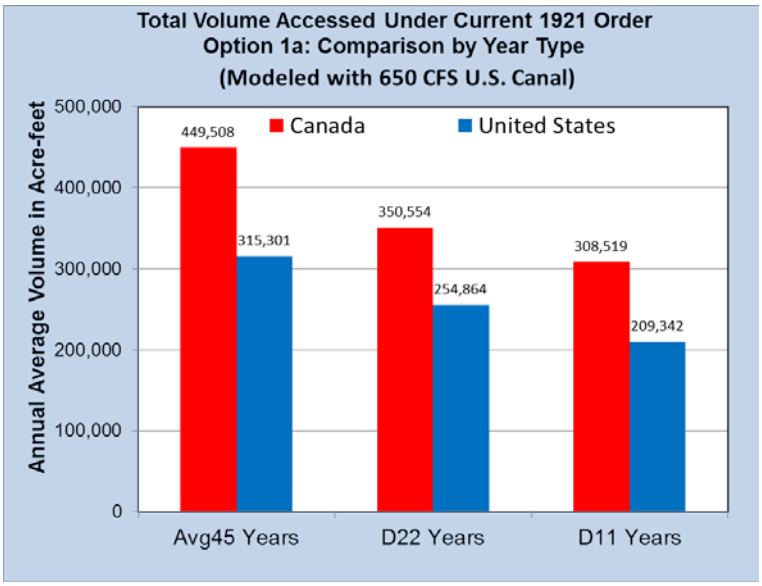

Figure 2: Total volume of combined natural flows allocated to the U.S. and Canada under the 1921 Order.

The following discussion focuses on the modeled results for a plausible revised formula as described in Table 5. Although the revised formula does not result in 50/50 parity of access to the combined flow, it does demonstrate the potential for a revised allocation formula that brings the U.S. closer to accessing 50% of the combined flows.

Table 5: Revised formula for apportioning the shared waters of the St. Mary and Milk Rivers.

St. Mary River

	St. Mary River		
Flows	≤ 666 ft^3/sec (18.9 m^3/sec)	667 ft^3/sec – 1,332 ft^3/sec (18.9 m^3/sec – 37.7 m^3/sec)	≥ 1,332 ft^3/sec (37.7 m^3/sec)
Canada Share	75%	25%	50%
U.S. Share	25%	75%	50%

Milk River

	Milk River		
Flows	≤ 666 ft^3/sec (18.9 m^3/sec)	667 ft^3/sec – 1,332 ft^3/sec (18.9 m^3/sec – 37.7 m^3/sec)	≥ 1,332 ft^3/sec (37.7 m^3/sec)
Canada Share	25%	75%	50%
U.S. Share	75%	25%	50%

Figures 3 and 4 show the modeled results of a 650 ft^3/sec (18.4 m^3/sec) canal operated according to the revised formula show above. Modifying the allocation of flows between 666 ft^3/sec – 1,332 ft^3/sec (18.9 m3/sec – 37.7 m3/sec) results in the U.S. receiving an additional 11,694 ac-ft (14,424 dam^3) in average years (Avg45) and 16,571 ac-ft (20,440 dam^3) in the 11 driest years (D11). This equates to the U.S. receiving 43% of the total combined natural flow in average years and 44% in the 11 driest years. Canada will continue to receive over 50% of the combined natural flows over through the range of years modeled.

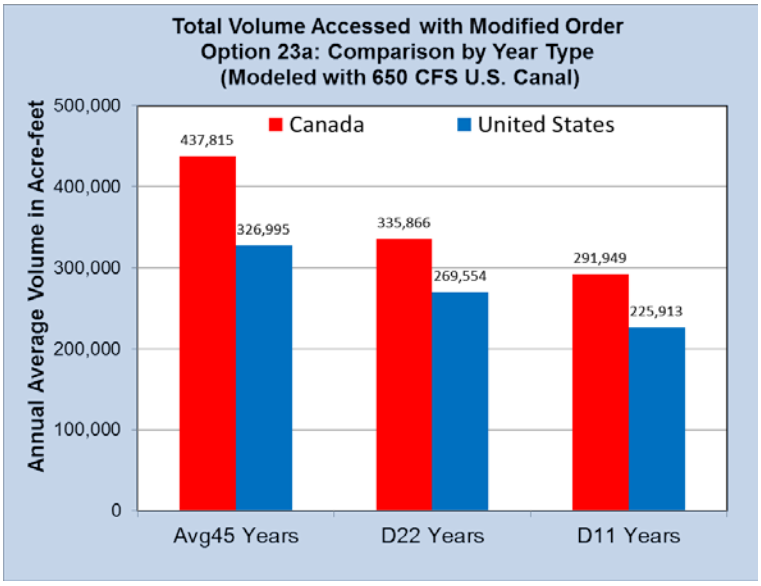

Figure 3: Total volume of combined natural flow allocated to the U.S. and Canada under a modified allocation formula (Modeled with a 650 cfs canal).

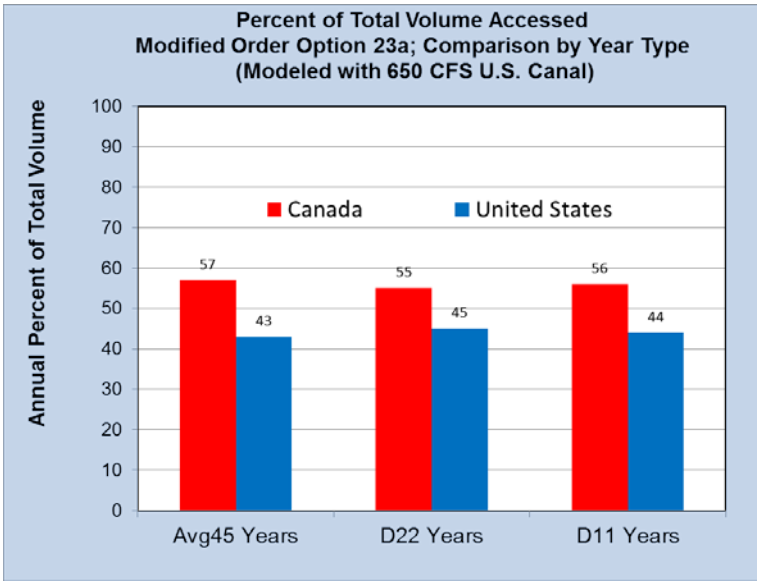

Figure 4: Percentage of combined natural flows allocated to the U.S. and Canada under the modified allocation formula (Modeled with a 650 cfs canal).

When this revised formula is combined with an 850 ft^3/sec (24 m^3/sec) canal, the U.S. receives an additional 36,168 ac-ft (44,612 dam^3) in average years (Avg45) and 24,953 ac-ft (30,779 dam^3) in the 11 driest years (D11) (Figure 5). This equates to the U.S. receiving 46% of the total combined natural flow in average years and 45% in the 11 driest years (Figure 6). Canada will continue to receive over 50% of the combined natural flows through the range of years modeled.

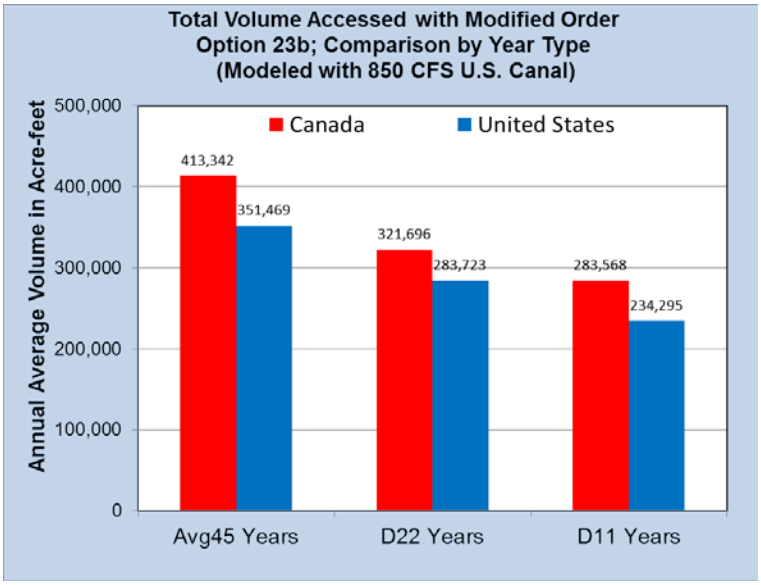

Figure 5: Total volume of combined natural flow allocated to the U.S. and Canada under a modified allocation formula (Modeled with a 850 cfs canal).

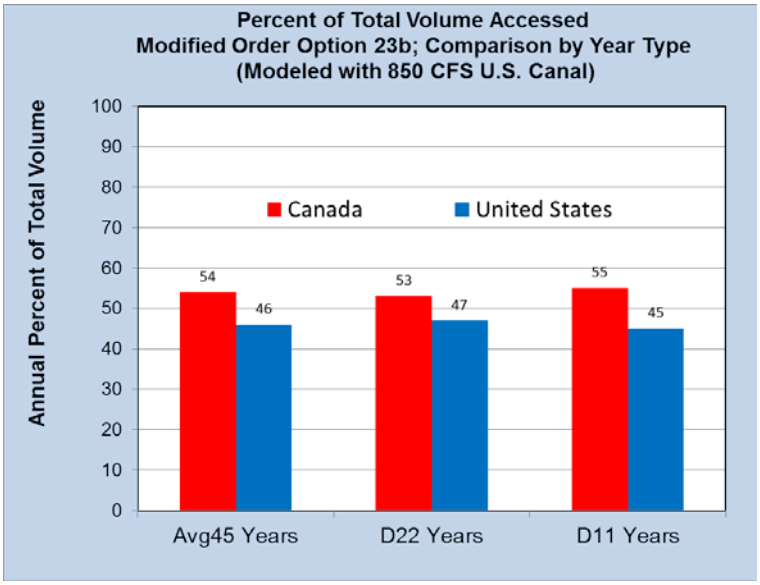

Figure 6: Percentage of combined natural flows allocated to the U.S. and Canada under the modified allocation formula (Modeled with a 850 cfs canal).

Modified Balancing Periods

Montana supports the AOs efforts to explore the benefits of longer balancing periods. The current semi-monthly balancing period and its administration result in disadvantages to the upstream country. First, any surplus deliveries to the downstream country during this relatively short accounting period are automatically forfeited. Surplus deliveries can occur from lack of infrastructure capacity to capture all flow, but surplus deliveries also could be due to temporary infrastructure or stream gage failures, or from stream discharge rating curve shifts, which are beyond the control of the operator. Modified balancing period options are the easiest way to increase the U.S.'s access to its St. Mary River entitlement and for Canada's access to its Milk River entitlement and are within the scope of the Administrative Procedures.

Based on modeling conducted by the JIT, we feel that annual balancing periods offer the greatest potential benefits. Figure 7 compares the modeled St. Mary River water accessed by the U.S. for the following three balancing periods: (1) the current semi-monthly, (2) an April 1 through October 31 seasonal, and (3) a November 1 through October 31 annual. All results are for scenarios with an 850 ft^3/sec (24 m^3/sec) St. Mary Canal, so the effects of the balancing period change are isolated. As depicted in the graph, increasing the balancing period from semi-monthly to seasonal does not increase the U.S.s modeled access to St. Mary River flow during the driest years and only results in a modest increase in access during the drier than median years. During drier years, infrastructure capacity during the irrigation season often is not the limiting factor. Only during the wetter years would substantial benefits be realized with the seasonal balancing period. The annual balancing period far out performs the seasonal balancing period during drier than median years because it allows the U.S. to accumulate, and later draw on, a credit during the non-

irrigation season (November through March) when the U.S. is almost always delivering surplus St. Mary River water to Canada.

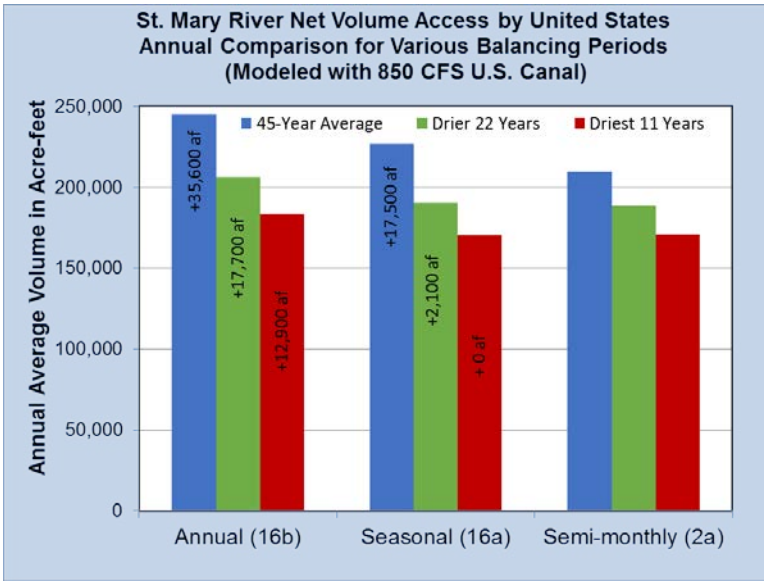

Figure 7: Comparison of modeled annual volumes of St. Mary River water accessed by the United States under an annual, seasonal, and semi-monthly balancing period. (16b, 16a, and 2a correspond to options modeled by the JIT.)

In combination with a rehabilitated 850 ft^3/sec St. Mary Canal, an annual balancing period would allow the U.S. to access almost 100% its 1921 Order St. Mary River share in all but the wettest of years (Figure 8).

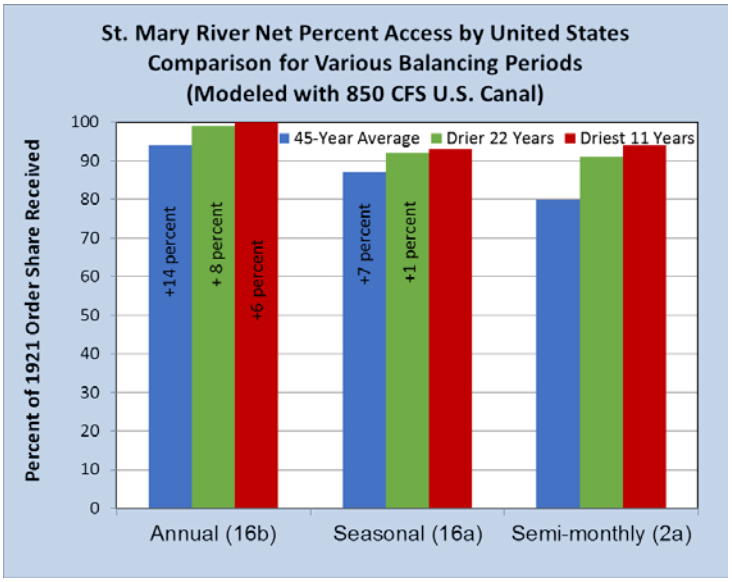

Figure 8: Comparison of modeled percent of United States annual share of St. Mary River water accessed under an annual, seasonal, and semi-monthly balancing period (16b, 16a, and 2a correspond to options modeled by the JIT.)

The seasonal balancing period does provide the U.S. with increased access to its St. Mary River entitlement over the semi-monthly, but the benefits are mostly during the wetter years.

On the Milk River side, a seasonal balancing period would allow Canada to carry forward surplus Milk River flow deliveries at the Eastern Crossing during the spring, when its share of Milk River natural flow typically exceeds irrigation demands. An annual balancing period also would encompass winter surplus deliveries by Canada at the Eastern Crossing. A limitation for Canada with longer balancing periods would be that later in the summer, especially during drier years, the total natural flow of the Milk River is less than the Canadian irrigation demand.

Deficit Trading – Letter of Intent (LOI)

Montana is open to exploring options that modifying the Letter of Intent (LOI) to make it more advantageous to both countries. Mutual benefits might be realized through changes in the deficit accumulation and balancing periods. Although the JIT's modeling work indicates that both the U.S. and Canada might benefit from the ability to incur higher deficits, the modeling results also show that there is a corresponding risk of the upstream country accumulating a deficit that is too large to reconcile by the end of the balancing period. Modeling results seem to indicate that the deficit volumes allowed with the existing LOI might be of an appropriate level. The AOs may also consider incorporating aspects of the LOI into an annual balancing/credit-based system.

Capped Credit System

Montana strongly supports efforts by the AOs to explore the benefits of incorporating a credit system into the Administrative Procedures. Credit system options would allow the U.S. on the St. Mary River and Canada on the Milk River to build a credit for surplus water deliveries crossing the border within a specified balancing period, such as seasonal or annual. A credit-based system would diminish the possibility of the upstream country ending a balancing period with a deficit. Credit systems administered under an annual balancing period would offer the best potential for each country to access more of their 1921 Order share.

There were concerns during the JIT discussions that an unconstrained credit system could expose the downstream jurisdiction to an unacceptable level of risk. JIT members recognized a viable credit system would have to address the following three concerns.

1. Risk to the downstream country if the upstream country incurred a large credit early in the balancing period and then redeemed the credit by diverting an excessively large portion of the flow later in the irrigation season.
2. Risk to the downstream country if the upstream country delivered surplus flows when the downstream country does not have the ability to capture and store the surplus for later use.
3. The need to maintain instream flow in the St. Mary River at the International Boundary and the Milk River at its Eastern Crossing of the International Boundary.

To address these concerns the JIT modeled a credit system with annual balance caps (for example 32,000 ac-ft on the St. Mary River and 16,000 ac-ft on the Milk River). Limiting the upstream jurisdiction to a defined amount of credit will limit the level of risk borne by the downstream jurisdiction. Risks are further

reduced by zeroing out all unused credits at the end of the balance period. The JIT's credit system model also contains provisions for maintaining instream flows on the St. Mary and Milk Rivers.

How Annual Balancing Through a Credit System Might Work

Figure 9 presents an example of how an annual balancing system using capped accumulated credits might work on the Upper St. Mary River. The example is presented using modeled results from the DNRC/Bureau of Reclamation St. Mary River-Milk River system model and is for describing the concept in general rather computing specific credit volumes accumulated or accessed. Data from the year 1982 are depicted, which was a slightly below average year as measured by the computed natural runoff volume.

The solid blue line in the figure is the modeled flow of the St. Mary River at the International Boundary, the flow after as much of the U.S. share as possible has been simulated to be diverted by the St. Mary Canal diversions or stored in Sherburne Reservoir. The red line is Canada's share of natural flow as computed daily. When the blue line exceeds the red line, surplus deliveries are occurring, and the opportunity exists for building a credit. When the lines overlap, the daily Canadian share and modeled discharge at the International Boundary is balanced. The axis of the graph coincides with a date of about November 1, the beginning of an annual apportionment period.

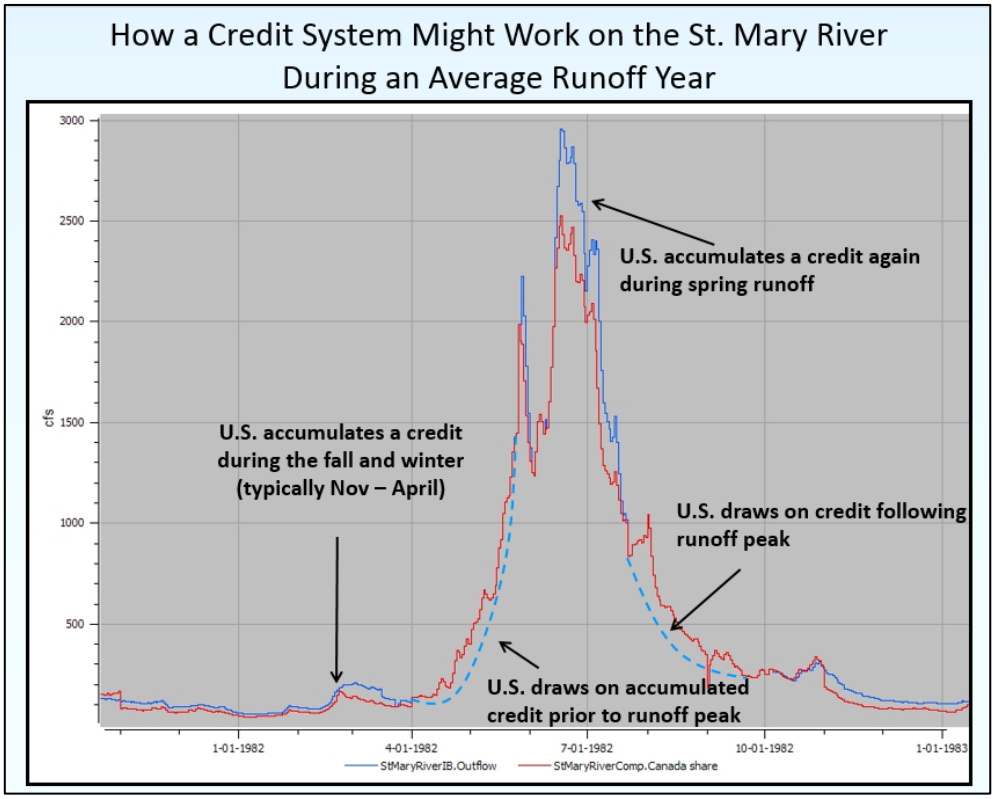

Figure 9: Example of how a credit-based annual balancing period might work for the Upper St. Mary River

Note that the U.S. is delivering a surplus of water throughout the winter period until April 1, after which the apportionment formula changes with the beginning of the irrigation season. At that point the red line overlaps the blue and the delivered flow matches the Canadian share. When the St. Mary River peaks

during late May and June, the flow delivered to Canada exceeds its daily share because the U.S. does not have the canal and storage capacity to capture its entire share. For the modeled year, this situation persisted until the end of July when the streamflow at the International Boundary and Canadian share again matched, as depicted by the overlapping lines.

Under an annual balancing system with accrued credits, the U.S. would have steadily built a credit volume during the November through March winter period. It might have then drawn on the credit during the April and May period prior to peak runoff, as depicted by the dotted blue line. The second period when a credit could have then been accumulated by the U.S. would have been from late May through mid-July, when the amount of natural flow available to the U.S. exceeded its capacity to divert or store it. At least some of this accumulated credit then could have been utilized by the U.S. during late July, August, and September, as depicted by the second dotted line. In this example, the total credit withdrawn during the late summer was likely less than that accumulated during the runoff peak, as might occur with a credit cap. Also note that a minimum instream flow is depicted at the International Boundary throughout.

Canada could accumulate credits in a similar fashion on the Milk River through surplus deliveries during the winter and early spring when natural streamflow typically peaks. A mechanism that allowed Canada to redeem some of its Milk River natural flow credits through access to imported U.S. St. Mary River water, when total Milk River natural flow is less than the Canadian demand, was considered through the Montana-Alberta Initiative process. Modeling results and experience have shown that access to a maximum of 4,000 ac-ft St. Mary River water is generally sufficient to cover Canadian Milk River irrigation shortfalls.

The JIT analyzed a number of stipulations that might be applied to extended balancing periods, with or without deficit trading and credit systems, to protect the interests of the downstream country. Although we believe these types of considerations have merit, Montana is concerned that a too restrictive procedure could negate potential benefits. Figure 10 compares the net percent of the U.S. St. Mary River share accessed for annual balancing Option 16b, which contains only minimum instream flow stipulations, to that for option MT1b, which contains credit caps, more restrictive instream flow stipulations, and allows Canada Milk River irrigators some access to U.S. imported St. Mary River water. On a percentage accessed and volumetric basis, the restrictions would have the greatest effect during the higher flow years.

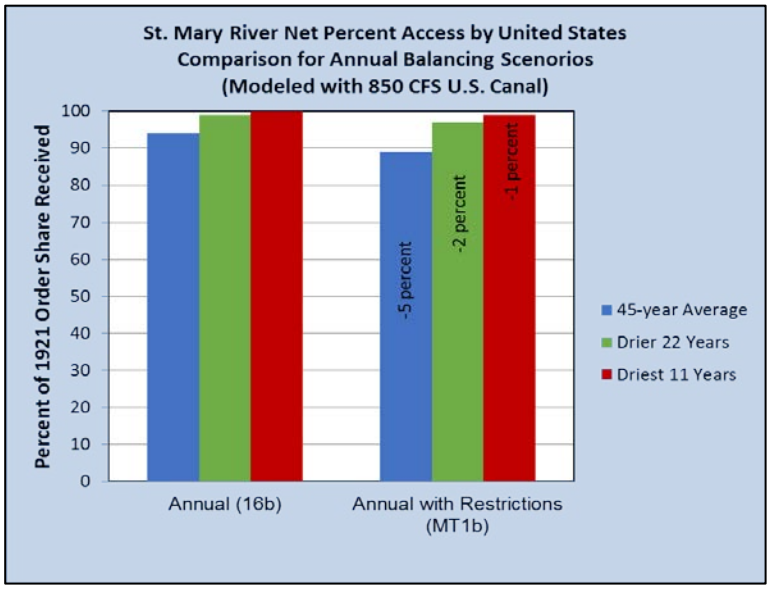

Figure 10: Impact of restrictions on net percent of U.S. St. Mary River share accessed under Option 16b

The results discussed above anticipate the eventual rehabilitation of the U.S. St, Mary Canal and a return to an effective capacity of 850 ft^3/sec.

The JIT also analyzed the benefits of a capped credit system under current conditions. Table 6 compares annual volumes and percent of shares accessed by each country on each stream for JIT option MT1a, an annual balancing with a 650 ft^3/sec (18.4 m^3/sec) St. Mary Canal under a capped credit system with instream flow stipulations and some Canadian access on the Milk River to imported St. Mary River water, to that for a semi-monthly (15/16 day) balancing with a 650 ft^3/sec (18.4 m^3/sec) St. Mary Canal (JIT option 1a). The capped credit system would allow the United States modest increases in access to its St. Mary River share. It would result in substantial increases in the amount of water available to Canadian Milk River irrigators.

Table 6: Change in percent allocation and volume accessed under Option MT1a (capped credit system) in comparison to Option 1a (semi-monthly balancing).

	U.S. St. Mary		U.S. Milk		Canada St. Mary		Canada Milk	
	Change in % Entitlement Accessed	Change in Volume Accessed (1000s ac-ft)	Change in % Entitlement Accessed	Change in Volume Accessed (1000s ac-ft)	Change in % Entitlement Accessed	Change in Volume Accessed (1000s ac-ft)	Change in % Entitlement Accessed	Change in Volume Accessed (1000s ac-ft)
D11	+ 4%	8.4	-16%	-4.9	- 3%	- 8.4	32%	4.8
D22	+ 6%	12.1	-9%	-4.7	- 4%	- 12.1	19%	4.7
Avg45	+ 7%	18.1	-6%	-4.5	- 5%	- 18.1	10%	4.5

Summary

Montana agrees with the conclusion of the AO's letter dated October 22, 2018, that the current Administrative Procedures do not fulfill the intent of the 1921 Order. We appreciate the AO's efforts to review the procedures with an eye towards achieving a more equitable distribution of the shared waters. Montana believes that several of the Administrative Options reviewed by the AO's represent the most practical, low-cost opportunity for increasing the U.S.'s access to its St. Mary River entitlement and for Canada's access to its Milk River entitlement. While these options will not, by themselves, result in an equal 50/50 sharing of the combined flows, they represent an improvement over the current procedures. We look forward to providing the AO's with additional information and the expertise of the DNRC hydrology staff.

Alberta Response to Options Summary

October 22, 2018

Ms. Bev Yee
Deputy Minister
Alberta Environment and Parks
Commerce Place, 12th Floor
10155 - 102 St. NW
Edmonton, Alberta T5J 4G8

Dear Ms. Yee,

In 2016, the Accredited Officers (AOs) for the St. Mary and Milk Rivers initiated a review of the natural flow and apportionment data for these watersheds from the 1950s to present. They noted that in almost every year the apportionment procedures used to implement the IJC's Order of 1921 limited the ability of the upstream country to utilize its apportioned share of water. The AOs concluded that current administrative procedures therefore may not fulfill the intent of the 1921 Order.

In the spring of 2017, the AOs began a review of these procedures with the goal of recommending changes to administrative procedures. During the course of this review, it became apparent that other factors, such as lack of infrastructure and timing of natural flows were also factors to be considered.

As part of the AO's review process, the AOs reviewed the work of the International St. Mary – Milk Rivers Administrative Measures Task Force (2004-2006) and the ongoing work of the Joint Initiative Team (JIT) of the Montana–Alberta St. Mary and Milk Rivers Water Management Initiative (2008 – present). The AOs found the Modeling and Process Reports, prepared by the Joint Initiative Team, to be particularly informative and direct interaction with the JIT has greatly aided our review of their work.

Most of the options for improving the administrative procedures were considered and modelled by the JIT, however the AOs did consider other options that were not modelled. Also, the JIT modelled a few options that altered or very broadly interpreted the 1921 Order and the AOs considered these options, given that the modelling results were available.

Attached is a document that summarizes the various options that are being considered by the AOs and each option's potential for increasing the ability of the upstream country to utilize its apportioned share of water.

Recognizing the implications of these options on water users in both countries and the inability of the AOs to implement many of these options without active participation by various agencies of the Provinces of Alberta and Saskatchewan and State of Montana as well as the U.S. Bureau of Reclamation, the AOs, through this letter, are requesting the help of you and your staff in evaluating these options.

Specifically, the AOs are seeking your help in identifying, from the perspective of your agency and the stakeholders you serve, which options are most promising and which ones may not be feasible because of high cost/low benefit or legal constraints.

We understand that the optimum approach may involve some combination of the options summarized. Please note, we are not asking for a review of the document itself, which has already been reviewed by

the JIT on two occasions. We're simply seeking your input on which options are most likely to help the AOs better implement the 1921 Order.

In order for the AOs to meet the timelines imposed by the IJC for this process, the AOs request you provide your comments by December 7, 2018.

We offer our thanks in advance for your help.

Sincerely,

Dr. Alain Pietroniro
Canadian Accredited Officer for the
St. Mary and Milk Rivers

John Kilpatrick
U.S. Accredited Officer for the
St. Mary and Milk Rivers

Attachment

CC: Mr. Brian Yee, Director Transboundary Water Secretariat

Accredited Officers Review of the Joint Initiative Results – Alberta Team comments

Page Reference	Current Text	Proposed Text (proposed changes in blue)	Rationale
Page 1	The FRs have considered the Entitlement Access Summaries found in the Results Viewer provided by the Joint Initiative Team, particularly the "Annual Percentage of Entitlement Accessed". These results are presented as percentages of entitlement accessed by each country.	The FRs have considered the Entitlement Access Summaries found in the Results Viewer provided by the Joint Initiative Team, particularly the "Annual Percentage of Entitlement Accessed". These results are presented as percentages of entitlement accessed by each country. For the upstream country, 'the percentage of entitlement accessed' is water that is stored, diverted or used by the upstream country. If the upstream country does not access its full entitlement, then the downstream country receives more than 100% of their entitlement, which is considered a surplus.	The added text was moved from page 2 as it fits better in this location.
Page 1	The base conditions used for the comparison of the identified options are Option 1a, which models 2010 infrastructure with a 650 cfs U.S. St. Mary Canal; Option 2a, which models 2010 infrastructure with a 850 cfs U.S. St. Mary Canal; or Option 10a, which is Option 1a with deficit trading as per the 2001 Letter of Intent.	The base conditions used for the comparison of the identified options are Option 1a, which models 2010 infrastructure with a 650 cfs U.S. St. Mary Canal; Option 2a, which models 2010 infrastructure with a 850 cfs U.S. St. Mary Canal; Option 10a, which is Option 1a with deficit trading as per the 2001 Letter of Intent; or Option 11a which is Option 2a with deficit trading as per the 2001 Letter of Intent.	In this report, Option 11a was used as a comparison against Option 7a, so it could be added here to the other base conditions.
Page 2	The results summarised in the tables show the change in the percentage of entitlement accessed by each country in comparison to Option 1a.	The results summarised in the tables show the change in the percentage of entitlement accessed by each country in comparison to one or more of the base conditions.	Since the comparisons were not always made to 1a, but other base conditions as well.
Page 3	**Discussion**: Option 4c improves the ability for the U.S. to access more of its entitlement and reduces the percentage of surplus water to Canada on the St. Mary River. Additional benefits are realised if the additional Lower St Mary Lake storage is used in conjunction with improvements to restore the St. Mary Canal canal's conveyance to 850 cfs.	**Discussion**: Option 4c improves the ability for the U.S. to access more of its entitlement and reduces the percentage of surplus water to Canada on the St. Mary River. Additional benefits are realised if the additional Lower St Mary Lake storage is used in conjunction with improvements to restore the St. Mary Canal canal's conveyance to 850 cfs (Option 4a).	This would be a 'nice to have' reference to the option's number, for those who may want to look at the results viewer.
Page 3	The development of a control structure on Lower St. Mary Lake requires engagement with the Blackfeet Tribe, as the improvements are on Tribal lands, and the Province of Alberta, if there was a demonstration of shared benefits to Alberta.	The development of a control structure on Lower St. Mary Lake requires engagement with the Blackfeet Tribe, as the improvements are on Tribal lands. The Province of Alberta would likely also be engaged. The development of a control structure would reduce surpluses on the St. Mary River entering Alberta but may have some benefit to Alberta Milk River water users under the current, or an updated, Letter of Intent.	Since Milk River storage and Lower St. Mary storage are similar options, but in different jurisdictions, the discussion should be similar. If engagement with Montana is not mentioned in the Milk River storage option, it should not be mentioned here. Or, mention in both places if that is what the AO's think is needed. Certainly, it is likely that either jurisdiction would engage with the other on storage, whether or not it is technically required by the Treaty or not. The fact that there will be reductions in surpluses should be mentioned in both cases as well.
Page 4	(**Tables**: in both tables third row shows "Avg")	Text should be "Avg45"	Row label is corrected.

Page Reference	Current Text	Proposed Text (proposed changes in blue)	Rationale
Page 4	**Discussion:** Option 7a provides the ability for Canada to store Milk River natural flow that results in a significant increase in access for Canada to its Milk River entitlement. The storage on the Milk River in Canada, if designed only for Milk River natural flows, would have no benefit to the U.S. with respect to their access to Milk River or St Mary River entitlements. Increasing the size of a Milk River reservoir in Canada was considered under Options 7b and 7c. The percentage improvements for Canada to access its entitlement over Option 7a are minor, suggesting that the limiting factor is water availability. However, a larger Milk River reservoir with a 850 cfs St Mary Canal would have the potential to store some U.S. St. Mary River and Milk River water, resulting in an overall potential benefit for both countries.	Discussion: Option 7a provides the ability for Canada to store Milk River natural flow that results in a significant increase in access for Canada to its Milk River entitlement and reduces the percentage of surplus water to the U.S. on the Milk River. The storage on the Milk River in Canada has a small benefit to the U.S. access to their St. Mary River entitlements due to the model favouring higher canal diversions over Milk River storage use, at times, to meet the instream flow need below the reservoir. Increasing the size of a Milk River reservoir in Canada was considered under Options 7b and 7c. The percentage improvements for Canada to access its entitlement over Option 7a are minor, suggesting that the limiting factor is water availability. However, a larger Milk River reservoir with a 850 cfs St Mary Canal would have the potential for upstream jurisdictions to increase access to their entitlements when compared to Option 1a.	Suggest that the two storage discussions should be similar. (Same comment as above.) The numbers in the table show that there is a small benefit to the U.S. of Milk storage. The U.S. access for 11, 22, and 45 for 7a: 171215, 190322, 213591 acre-ft, 2a: 170403, 188275, 209370; 10a: 172171, 186186, 199028, and 1a: 168777, 183253, 196392. 7a-2a is an increase in the U.S. access to their St. Mary entitlement of 0.45, 0.99, and 1.62%. There is a less than 1% increase in access even at the driest 11 years (rather than zero). This increased access should be addressed in some way. The storage was modelled to only capture Milk River natural flows, with the canal moving directly through the U.S. to a node just downstream of Eastern Crossing. Additional canal diversions are allowed in this option, when available, to meet a minimum flow of 15 cfs in winter and 25 cfs in summer. There are impacts to the total flow across the boundary to Canada on the St. Mary, but less impact (compared to 1a) than under the current LOI. Presenting this helps demonstrate that there are opportunities, even under non-shared storage, for there to be benefits to the U.S. of having the storage available.
Page 4	Option 7a is considered a high cost option, however there are potential mutual benefits for Canada and U.S., which should be further investigated.	Option series 8 considered shared storage between Alberta and Montana which has increased benefits for the U.S. These are considered high cost options, however there are potential mutual benefits for Canada and U.S., which should be further investigated.	Since shared storage was modelled, it should be noted here, including the assumptions for the shared storage. Could include the results in a table as well.
Page 5	This option would improve the security of water supply in the Milk River basin in Alberta and could improve U.S. access to their St Mary River entitlement under a shared benefit approach. The shared benefit consideration is based on the principle that Canada could move a portion of the U.S. St. Mary entitlement via the infrastructure built in Canada, complementing the St. Mary Canal.	This option would increase water supply in the Milk River basin in Alberta and could improve U.S. access to their St Mary River entitlement under a shared benefit approach. The shared benefit consideration is based on the principle that Canada could move a portion of the U.S. St. Mary entitlement via the infrastructure built in Canada, complementing the St. Mary Canal. This would be another shared infrastructure approach, possibly at a lower overall cost than shared storage or shared canal improvements. For transfer of Canadian St. Mary entitlement, additional cost would be incurred to purchase a current water licence, as the St. Mary basin in Alberta is closed to new allocations. Increasing flow supplements greater than 850 cfs to the Milk River would have the same erosion issues as a larger canal.	Because the Alberta St. Mary basin is closed to new allocations, transfer of Canadian St. Mary River entitlement for use in Milk River is viewed by stakeholders and water managers as a low viability option. An order-in-council is required to transfer water between major basins. These are fairly large challenges in the system, though there is no outright ban on transfers. **Once that water flows into Canada, Alberta's regulatory system may require that water to be licensed**. So, even if only U.S. entitlement (i.e., surplus water) is transferred in this option it would likely still require transfer (i.e., purchase a current licence), and an act of the Legislature (order-in-council). This option would need further legal advice. Besides this, further investigation of this option would involve estimating the cost to obtain the licence as well as the construction costs to convey the water (and then compare that full cost to other options).

Page Reference	Current Text	Proposed Text (proposed changes in blue)	Rationale
Page 5		**Canal and On-Farm Water Use Efficiency Improvements** Options 1b, 2b, 21a looked at improvements to irrigation infrastructure in the Milk River basin in Montana. This included USBR canal capacities as well as on-farm efficiencies. Results: Improvement of irrigation efficiency in Montana resulted in considerable reduction of irrigation shortages in Montana with modest improvement in shortages in Canadian St. Mary.	The Canadian conveyance option was considered in this report, which was not considered in the JIT work. However, US infrastructure improvement in the Milk River basin in Montana was not commented on in this report, but was considered in the JIT work. The USBR report, "St. Mary River and Milk River Basins Study Summary Report Milk River Project, Montana Great Plains Region" comments on these additional infrastructure improvements. "*Canal and On-Farm Water Use Efficiency Improvements Alternative: This alternative would improve water delivery to farms and on-farm irrigation systems. For this alternative, irrigation district total efficiencies were assumed to increase by 17 percent (10 percent conveyance and 7 percent on-farm), for an overall efficiency ranging from 37 to 57 percent. This alternative provided the single-most potential for decreasing shortages and is projected to reduce the irrigation depletion shortages by 20,000 AF in an average year and 15,000 AF in a dry year."* While this option also has issues in Montana—effects to downstream water users' return flows—there are also fairly significant issues with the Canadian Conveyance option due to the fact that no new licences are permitted in the St. Mary River basin in Alberta (requiring purchase of current licence), and the requirement for a cabinet level decision for the inter-basin transfer. Both of these options have their own barriers to implementation, but both should be commented on, not just the Canadian conveyance option.
Page 6	The JI attempted to rebalance the flows between Canada and the US within the irrigation season. It would be informative to investigate other options for rebalancing flows that could include: i. balancing outside of the irrigation season, ii. adjusting prior appropriation numbers, and/or iii. allowing for flexibility in defining an irrigation period for a particular year. Given the shift in recent years to an earlier spring for both runoff and irrigation, these options may warrant further consideration.	Since the JI considered changes to the Treaty to be out of scope, the JI attempted to rebalance the flows between Canada and the US within the irrigation season and its prior appropriation amounts. It would be informative to investigate other options for rebalancing flows that could include: i. balancing outside of the irrigation season, ii. adjusting prior appropriation numbers, and/or iii. allowing for flexibility in defining an irrigation period for a particular year. Given the shift in recent years to an earlier spring runoff and onset of irrigation, these options may warrant further consideration. However, these options would require changes to the Treaty and are also beyond the purview of the AOs.	Mike had pointed out that the definition of the irrigation season is in the Treaty. The prior appropriation amounts are too. It should be noted that these are Treaty items that are also beyond the purview of the AOs.
Page 6	**Description**: Natural flows during the irrigation season are reported daily and balanced twice monthly. The JI looked at a number of options using seasonal and annual balancing periods. They are shown as Options 16a to 16f.	**Description**: Natural flows during the irrigation season are reported daily and balanced twice monthly. The JI looked at a number of options using seasonal and annual balancing periods. They are shown as Options 16a to 16g.	Just a correction, as the options went to 16g, and there are comments below this paragraph that refer to 16g.
Page 7	**Result**: Option 16a with a seasonal balancing period some improvement for the U.S. to access its entitlement on the St. Mary River and for Canada to access its entitlement on the Milk River when compared to Option 2a.	**Result**: Option 16a with a seasonal balancing period will provide some improvement for the U.S. to access its entitlement on the St. Mary River and for Canada to access its entitlement on the Milk River when compared to Option 2a.	Grammar correction

Page Reference	Current Text	Proposed Text (proposed changes in blue)	Rationale
Page 7	In summary, lengthening the balancing periods enables the U.S. to access more of its entitlement on the St. Mary and for Canada to access more of its entitlement on the on the Milk. The implications for downstream water managers with the longer balancing periods are that water is not necessarily available according to the historical apportion pattern that was used to design and operate the existing infrastructure and is insensitive to the timing of water demands in the downstream country. To satisfy the timing of downstream water demands under a longer balancing period scenario could require increased multi-year downstream storage.	In summary, lengthening the balancing periods enables the U.S. to access more of its entitlement on the St. Mary and for Canada to access more of its entitlement on the on the Milk. The implications for downstream water managers with the longer balancing periods is that water delivery may occur too late in the season to meet irrigation needs within that year. To satisfy the timing of downstream water demands under a longer balancing period scenario could require increased multi-year downstream storage.	Hopefully this is a simpler explanation, but highlights the key concern.
Page 8	Although not shown by the table above, Canada realises an improvement in the Milk as the Letter of Intent allows Canada to access either a greater percentage of the Milk natural flow later in the irrigation season, if available, or some of the U.S. St. Mary water that is transferred by the U.S. St. Mary Canal. As well, the analysis considering only percentages, however considering only percentages does not demonstrate the benefit of the Letter of Intent with respect to the volume of water available later in the season, which is important to Alberta Milk River irrigators.	Although not shown by the table above, Canada realises an improvement in the Milk River basin, as the Letter of Intent allows Canada to access some of the Canadian St. Mary River entitlement that is transferred by the U.S. St. Mary Canal (shown in the third column). Because the entitlement percentages are for each river, it does not demonstrate the benefit of the Letter of Intent with respect to the water available to Alberta Milk River irrigators ('Can Milk' plus a portion of 'Can St. Mary').	This is a very key issue that requires a common understanding. The annual access to Milk River entitlement is not increased for Canada under the LOI, it is a minor decrease. Surpluses to the U.S. on the Milk River are increased, as shown in the table. Instead, because it is deficit trading, the U.S. uses greater than its entitlement for some periods, which increases its annual access to its entitlement. The Milk River users can access half of that U.S. deficit. The total volume reduction in flows across the boundary to Canada on the St. Mary is split 50-50 between the Milk River basin users and Montana.
Page 8	As with Option 10a Canada realises further improvement in the volume of water available for Milk River irrigators as the Letter of Intent allows Canada to access either a greater volume of the Milk natural flow later in the irrigation season or some of the U.S. St. Mary water that is transferred by the U.S. St. Mary Canal.	As with Option 10a Canada realises further improvement in the total volume of water available for Milk River irrigators as the Letter of Intent allows Canada to access a larger portion of 'Can St. Mary'. The Letter of Intent is effectively shared St. Mary storage, and conveyance of Canadian water through U.S. infrastructure. The U.S. stores and transfers more than their entitlement early in the season, with the agreement that Canada can use a portion of that water later in the season.	As above, correction to Canada St. Mary entitlement being used for the LOI, as it is deficit trading. Tried to explain further with an additional paragraph. The LOI allows greater use of the St. Mary storage and canal diversions when the U.S. entitlement is smaller than what could be accessed.
Page 8	Many of the modelled deficit trading options also included infrastructure improvements. As a consequence, when deficit trading is modelled in combination with other options, access to entitlements improves, however this is not related to the Letter of Intent.	Many of the modelled deficit trading options also included canal improvements. Deficit trading options require canal diversions to continue to operate. Canal improvement shows additional benefits to both countries when combined with the LOI.	It would be good to note that deficit trading depends on the inter-basin transfer in the U.S. to be functioning. That is why these options were also modelled with canal improvements (not other infrastructure improvements).
Page 9	The 2001 Letter of Intent allows Canada to indirectly access more of its entitlement in the Milk River basin, by having access to a greater volume of the Milk natural flow later in the irrigation season or to some of U.S. St. Mary water being diverted to the Milk River.	The 2001 Letter of Intent allows Milk River users in Alberta to access part of the Canadian St. Mary entitlement. This is dependent on the U.S. being able to access more than its entitlement of the St. Mary River early in the season.	As above, the original description is not correct. The LOI does NOT give Alberta Milk River users access to US St. Mary water.
Page 9	Alberta may draw up to 4,000 ac-ft from the U.S. St. Mary diversions with the rest being drawn from the Milk River entitlements. Montana must maintain a specified flow on the St. Mary at the border.	Delete	The description is from the option MO2A—modified order options, not the capped credit system options. We suggest that "CrSysLOICap1 and 2" are included separately, and with their own results table. These last two credit system options included a modified LOI and the instream flow needs requirements, but the MT1 series did not.

Page Reference	Current Text	Proposed Text (proposed changes in blue)	Rationale
Page 10	iii. Availability of water for access by downstream countries may be an issue if apportionment periods are lengthened to all or most or a year.	iii. Availability of water for access by downstream countries may be an issue if apportionment periods are lengthened to all or most of a year.	typo
Page 10	v. Equal or near equal sharing of flows in average years will require significant additional infrastructure, close coordination among users and system operators in both countries, and very flexible interpretation of and/or changes to the 1921 Order of which almost all are beyond the purview of the AOs.	v. Equal or near equal sharing of flows in average years will require significant additional infrastructure, close coordination among users and system operators in both countries, and very flexible interpretation of and/or changes to the 1921 Order and Boundary Waters Treaty, of which almost all are beyond the purview of the AOs.	
Page 11	(Title Row) Considerations	(Title Row) Other Considerations	This column could be used to characterize the benefits to Alberta Milk or impact to Alberta St. Mary of the options, as this is not possible to separate out when only looking at the entitlements to each river. It is recommended to include the increases or decreases in volumes accessed, as well as the impacts in terms of irrigation performance (i.e. shortages).
Page 11	(St. Mary Canal, U.S. Access to St. Mary) Modest Improvement	(St. Mary Canal, U.S. Access to St. Mary) D11: Minor Improvement, only with LOI D22: Minor Improvement (with or without LOI)	According to the legend at the bottom, Minor is 1 to 4% for D11 and D22. As the results are different for D11 and D22, it should be separated out. In the driest 11 years, it is actually worse to have an 850 canal than it is to have a 650 canal with an LOI. Even when 850 canal with a modified Sherburne drawdown curve (2a1) is compared to 650 with the LOI, access to St. Mary entitlement is worse than 650 with an LOI.
Page 11	(U.S. Lower St Mary Lake Storage Improvements, U.S. Access to St. Mary) Modest Improvement	Minor Improvement	To match the legend. 1-4% is minor
Page 11	(Canadian Milk River Storage, Considerations) 850 cfs canal and reduced risk of unplanned shutdowns	(Canadian Milk River Storage, Other Considerations) 850 cfs canal; reduced risk of unplanned shutdowns (operation of canal diversions required for infrastructure storage options in U.S. St. Mary basin, for shared-benefit storage in the Milk River basin, and for deficit trading options)	As mentioned in the above comments there is a minor improvement, due to additional canal diversions modelled in this option.
Page 11	(U.S. Lower St Mary Lake Storage Improvements, U.S. Access to St. Mary) Modest Improvement	(U.S. Lower St Mary Lake Storage Improvements, U.S. Access to St. Mary) Minor Improvement	To match the legend. 1-4% is minor
Page 11	(Canadian Conveyance Alternative, U.S. Access to St. Mary) Neutral	(Canadian Conveyance Alternative, U.S. Access to St. Mary) Minor improvements if shared	This is what was discussed earlier in the report, that there may be benefits to the U.S. access to their entitlement if the infrastructure is shared.
Page 11	(Canadian Conveyance Alternative, Canada Access to Milk) Modest improvement for irrigation scheduling	(Canadian Conveyance Alternative, Canada Access to Milk) Neutral	This should not confuse the benefits to Alberta Milk River users from 'access to Milk River natural flows', which is what is covered in this column. Canadian conveyance is neutral with regard to access to Milk River natural flows, because it would access Can St. Mary entitlement.

Page Reference	Current Text	Proposed Text (proposed changes in blue)	Rationale
Page 11	(Canadian Conveyance Alternative, Considerations) Potential alternate route to move U.S. St Mary water to the Milk	(Canadian Conveyance Alternative, Other Considerations) Potential alternate route to move U.S. St Mary water to the Milk; could have similar Milk River erosion issues as a larger than 850 canal; increased benefits to AB Milk River users and possible impacts to AB St. Mary users, depending on volume and timing of St. Mary entitlement accessed as compared to U.S. access to full entitlement).	Since the benefits of accessing St. Mary water for the Milk River users cannot be characterized in the Milk River entitlement column, suggest that this be included in the last column.
Page 11	(1921 Order Revisited, U.S. Access to St. Mary) Access to 50% of St Mary natural flow in drier years	(1921 Order Revisited, U.S. Access to St. Mary) Modest improvement; D11: access to greater than 100% of current entitlement	The total St. Mary natural flow for D11: 473,068; D22: 529,148; and 45: 640,117 acre-ft. The U.S. access for Option 23a is 185,142. This is an improvement over 10a of 7%--D11, and 5%--D22. This is a modest improvement according to the legend, and the total access to entitlement increases to 102% for D11. The access is greater than 100% of the current entitlement but it is not 50% of the natural flow.
Page 11	(1921 Order Revisited, Can. Access to Milk) Access to 50% of Milk natural flow in wet years	(1921 Order Revisited, Can. Access to Milk) Minor impacts	This option has reduced access to Milk River natural flows.
Page 11	(1921 Order Revisited, Considerations) Revisit of Article VI issues and arguments	(1921 Order Revisited, Other Considerations) Revisit of Article VI issues and arguments; significant benefits to Milk River users in irrigation performance for options with access to U.S. St. Mary entitlement; minor benefits to AB St. Mary when compared to U.S. accessing full entitlement.	The volume and irrigation performance benefits are available in the results viewer and could be either generally discussed in the report and this summary table, or numbers included for comparison. This is the only way to get at the concrete benefits to the users, since the percentage entitlement is not comparable between the two rivers. For this option, for example, Milk River Irrigation, years with shortages of greater than 4 inches are reduced by 3 years over 10a, and the average weekly deficit over 45 years goes from 4.37 to 4.23 inches. St. Mary Irrigation shortages greater than 4 inches remain the same, and the average weekly irrigation deficit over 45 years goes from 0.75 (Option 9) to 0.72 inches. A base case for irrigation performance in the St. Mary in AB was Option 9, which was the U.S. full access to entitlement. For Milk River users, Option 10a—with the current LOI—was used as a base case.
Page 11	(Modified Balancing Periods, U.S. Access to St. Mary) Minor Improvement for seasonal Modest to significant improvement for annual in drier years	(Modified Balancing Periods, U.S. Access to St. Mary) Minor Improvement for seasonal Modest improvement for annual	The legend is for D11 and D22; there are minor improvements to both for seasonal balancing, modest improvements to both for annual balancing.
Page 11	(Modified Balancing Periods, Considerations) Modest to Significant implications for the downstream country	(Other Considerations) Minor impacts for AB Milk from current LOI for both seasonal and annual; Neutral for AB St. Mary for seasonal; minor impacts to AB St. Mary for annual, compared to U.S. accessing full entitlement.	
Page 11	(Deficit Trading – Letter of Intent, Can Access to Milk) Improvement for irrigation scheduling	Minor impacts	This option has reduced access to Milk River natural flows.

Page Reference	Current Text	Proposed Text (proposed changes in blue)	Rationale
Page 11	(Deficit Trading – Letter of Intent, Considerations) Involvement of Alberta and Montana	Involvement of Alberta and Montana; modest benefits to Milk River users in irrigation performance; minor benefits to AB St. Mary compared to U.S. accessing full entitlement.	Milk River irrigators access 3100 acre-ft of additional water, a 64% increase than without the LOI (4925 acre-ft). The number of years with shortages greater than 4 inches decreases from 36 to 21, and the average deficit decreases from 7.67 inches to 4.37 inches.
Page 11	(Capped Credit System, Considerations) Involvement of Alberta and Montana	Involvement of Alberta and Montana; significant benefits to Milk River users in irrigation performance; minor benefits to AB St. Mary as compared to U.S. accessing its full entitlement.	Milk River irrigators access 2800 acre-ft more water over the LOI case; a 34% increase. The number of years with shortages greater than 4 inches decreases from 21 to 10, and the average deficit decreases from 4.37 inches to 2.46 inches.

Alberta Environment and Parks

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March 12, 2019

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Canadian Accredited Officer
St. Mary River and Milk River
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John Kilpatrick
United States Accredited Officer
St. Mary River and Milk River
jmkilpat@usgs.gov

Dear Dr. Alain Pietroniro and John Kilpatrick

In follow-up to my letter of November 28, 2018, to you, I am pleased to provide further response to your report: "Accredited Officers Review of the Joint Initiatives Results." I understand Alberta's team of provincial and private-sector members met with you and Russ Boals, former Regional Chief with Water Programs, Environment and Climate Change Canada, on January 11, 2019. The Alberta team – including water users of the St. Mary and Milk river basins – appreciated the opportunity to connect with you directly. This response is provided in addition to the detailed information sent to you on December 7, 2018, which the team believes corrects some errors and improves the comparison of options. We have commented on those options that merit further review and analysis for their potential to help you better implement the 1921 Order, and we have identified those that are more difficult to implement.

Options that Alberta Supports for Further Investigation

Administrative

Modified Balancing Periods – Lengthening the balance period (even without structural change) can significantly increase U.S. access to St. Mary River entitlement (14 per cent, on average) and can significantly increase Canadian access to Milk River entitlement (seven per cent, on average). There is risk to downstream users where water may be delivered too late to satisfy irrigation needs within a particular calendar year. Alberta supports work that would further characterize this risk, as well as options to mitigate it. We note that longer balance periods would be even more valuable (less risky) to water users if they were considered in combination with downstream infrastructure. We suggest further work to verify this potential option.

Deficit Trading – Letter of Intent – This option provides an improvement to the Milk River Basin. Canadian Milk River water users can access Canadian St. Mary River entitlement (with minor impact to Canadian St. Mary irrigators) from water that is transferred to Canada via the U.S. St. Mary canal. The U.S. also benefits through increased access to its St. Mary River entitlement. Alberta recognizes that deficit trading options require ongoing operation of the U.S. St. Mary canal. Additional benefits accrue to each jurisdiction when improvements to the canal are combined with the Letter of Intent (LOI). Larger LOI increases benefits in the Milk River Basin in Canada and the U.S., and increases the impact to Canadian St. Mary irrigators. Alberta supports work that would investigate additional LOI options, characterize the risks, and develop alternatives to mitigate them.

Capped Credit System – A capped credit system (such as “CrSysLOICap1” and “2”) provides Canada with a modest increase to its entitlement on the Milk River while reducing shortages, and with less impact to Canadian St. Mary irrigators than does a larger LOI. A capped credit system also provides the U.S. with a modest increase in access to its entitlement on the St. Mary River.

Infrastructure

U.S. St. Mary Canal Improvements – Of all infrastructure options, canal rehabilitation is likely the most broadly supported. Rehabilitation of the canal to its 850 cubic feet per second (cfs) design capacity was a preferred option identified by Montana and supported by Alberta. An 850 cfs canal would allow Montana to divert an additional 12,500 acre feet of water in average years and 1,900 acre feet in the driest 11 years. While Alberta identified erosion under an 850 cfs canal flow as a concern, the impacts were not studied beyond noting that increased flows could be extended over two months to control that erosion.

Storage in Milk River Basin – Options that involve storage in the Alberta Milk River Basin were reviewed during the Joint Initiative Team process. This work did not consider recent and projected variability in the hydrology, such as earlier and larger spring run-off volumes; and longer, drier summers. For example, significantly reduced flow in summer 2017 in the Milk River Basin resulted in hardship for irrigators in both Alberta and Montana. Consequently, Alberta feels there is merit in further investigating storage and shared storage in the Alberta Milk River Basin to reduce future vulnerability to such events.

Canadian Conveyance Alternative (new shared storage on the Alberta St. Mary River with a diversion to the Alberta Milk River) – Conveyance alone may not improve access to current or predicted spring run-off volumes; however, this option could facilitate improved access to the more variable distribution of water supply, and provide a backup alternative to move water from the St. Mary to the Milk system in case of canal failure in the U.S. There is a greater and more reliable yield in the St. Mary Basin, and this option could provide benefit to both the St. Mary and Milk river basins in contrast to storage in Milk River Basin only. Water quality and regulatory processes for inter-basin water transfer are not insurmountable. This option was not investigated as part of the Montana-Alberta joint initiative.

Options that Alberta Cannot Currently Support

1921 Order Revisited – Because of significant investments made by Canada, Alberta, and the irrigation districts based on the entitlement under the 1921 Order, Alberta does not support alterations to the 1921 Order. We believe that opening the order would place those investments at risk.

U.S. Lower St. Mary Lake Storage Improvements – Due to the complex and involved nature of this option, Alberta does not see the value in pursuing this option at this time.

Other Comments

As identified during the joint initiative process, it is important to model canal and on-farm delivery systems throughout the basin to understand the risks and benefits of the various options. The timing of flows to reservoirs, the ability to capture those flows, the delivery requirements, environmental flow requirements, and any on-farm shortages are important metrics to Alberta.

Alberta supports the Accredited Officers in a desire to promote options that will give both jurisdictions access to more of their entitlement under the 1921 Order. Alberta suggests that the formation of a cooperative mechanism that involves state, province, Canada/U.S. and water users in decisions would promote understanding and help achieve the most benefit for all stakeholders.

Sincerely,

Bev Yee
Deputy Minister of Environment and Parks

cc: Brian Yee, Environment and Parks
Tim Toth, Environment and Parks
Jamie Wuite, Agriculture and Forestry
Jennifer Nitschelm, Agriculture and Forestry
Ken Miller, Milk River Public Member
Tom Gilchrist, Milk River Public Member
Gerald Perry, St. Mary River Public Member
Duncan Lloyd, St. Mary River Public Member

United States Bureau of Reclamation

Response to Options Summary

October 22, 2018

Mr. Stephen Davies
Montana Area Manager
U.S. Bureau of Reclamation
P.O. Box 30137
Billings, MT 59101

Dear Mr. Davies,

In 2016, the Accredited Officers (AOs) for the St. Mary and Milk Rivers initiated a review of the natural flow and apportionment data for these watersheds from the 1950s to present. They noted that in almost every year the apportionment procedures used to implement the IJC's Order of 1921 limited the ability of the upstream country to utilize its apportioned share of water. The AOs concluded that current administrative procedures therefore may not fulfill the intent of the 1921 Order.

In the spring of 2017, the AOs began a review of these procedures with the goal of recommending changes to administrative procedures. During the course of this review, it became apparent that other factors, such as lack of infrastructure and timing of natural flows were also factors to be considered.

As part of the AO's review process, the AOs reviewed the work of the International St. Mary – Milk Rivers Administrative Measures Task Force (2004-2006) and the ongoing work of the Joint Initiative Team (JIT) of the Montana–Alberta St. Mary and Milk Rivers Water Management Initiative (2008 – present). The AOs found the Modeling and Process Reports, prepared by the Joint Initiative Team, to be particularly informative and direct interaction with the JIT has greatly aided our review of their work.

Most of the options for improving the administrative procedures were considered and modelled by the JIT, however the AOs did consider other options that were not modelled. Also, the JIT modelled a few options that altered or very broadly interpreted the 1921 Order and the AOs considered these options, given that the modelling results were available.

Attached is a document that summarizes the various options that are being considered by the AOs and each option's potential for increasing the ability of the upstream country to utilize its apportioned share of water.

Recognizing the implications of these options on water users in both countries and the inability of the AOs to implement many of these options without active participation by various agencies of the Provinces of Alberta and Saskatchewan and State of Montana as well as the U.S. Bureau of Reclamation, the AOs, through this letter, are requesting the help of you and your staff in evaluating these options.

Specifically, the AOs are seeking your help in identifying, from the perspective of your agency and the stakeholders you serve, which options are most promising and which ones may not be feasible because of high cost/low benefit or legal constraints.

We understand that the optimum approach may involve some combination of the options summarized. Please note, we are not asking for a review of the document itself, which has already been reviewed by the JIT on two occasions. We're simply seeking your input on which options are most likely to help the AOs better implement the 1921 Order.

In order for the AOs to meet the timelines imposed by the IJC for this process, the AOs request you provide your comments by December 7, 2018.

We offer our thanks in advance for your help.

Sincerely,

Dr. Alain Pietroniro
Canadian Accredited Officer for the
St. Mary and Milk Rivers

John Kilpatrick
U.S. Accredited Officer for the
St. Mary and Milk Rivers

Attachment

United States Department of the Interior
BUREAU OF RECLAMATION
Great Plains Region
Montana Area Office
P.O. Box 30137
Billings, Montana 59107-0137

IN REPLY REFER TO:
MT-452
2.2.4.23

DEC 20 2018

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Subject: Review of Options to Improve Access to Entitlements by Canada and the United States of St. Mary and Milk River Water

Dear Mr. Kilpatrick:

Reclamation has reviewed your October 22, 2018, request to evaluate options being considered to improve access to entitlements by Canada and the United States for St. Mary and Milk River waters. Reclamation agrees the United States has not been receiving their apportioned share of the combined flows and welcomes efforts to improve availability for Milk River Project water users. The following comments and review were based on the perspective of Reclamation and the Milk River Project as requested. It should be noted that Reclamation has not been involved in the Joint Initiative activities to date and did not conduct any analysis specific to this review. Therefore, our review was a high level fatal flaw review that relied on our limited understanding of the analyses conducted and options presented. The options are referred to by the numbering and titles used in the table on page 11 of the document provided, with our comments separated into Structural and Administrative Alternatives below.

Structural Options:

Milk River water users pay a majority share of Operation, Maintenance and Replacement (OM&R) Costs associated with the system and while we recognize the value of additional storage within the system, significant hurdles exist with the OM&R of existing infrastructure and any of these structural alternatives identified would likely need other funding sources and Congressional Authorization to be feasible. Reclamation supports improvements to the St. Mary Canal (Option 1a) and has for several years pursued ways to rehabilitate all of Reclamation owned St. Mary infrastructure. Due to the significant costs to Milk River Project water users, large scale rehabilitation efforts have not moved forward.

In your summary document under Option 1a, there is discussion of increasing capacity of the canal to 850 cubic feet per second (cfs) or 1,200 cfs. Several canal capacities in the range of 500 to 1,000 cfs were evaluated by Reclamation during the design process for the replacing the St. Mary Diversion Dam. A capacity of 850 cfs was selected by Reclamation for several reasons including this equaling Reclamation's water right on the St. Mary River. Any water use greater than 850 cfs for the Milk River Project would require negotiations with the Blackfeet Tribe. This reason alone may not halt pursuit of canal larger than 850 cfs but diversions larger than this would likely not directly benefit the Milk River Project.

The next three structural options, Options 1b, 1c, and 1d, appear to benefit one country far more than the other and may not be feasible pursuing as a joint effort due to issues with Milk River Project water users' ability to pay. Improving storage on Lower St. Mary Lake, Option 1.b would improve United States use of St. Mary River water. The implementation of this option would require support of the Blackfeet Tribe as Tribal resources would be impacted by this option. If the additional storage would benefit the Milk River Project water users, it would likely result in additional OM&R costs for the water users which under current conditions of existing infrastructure would not be favorable. Option 1c., Canadian Milk River Storage, would allow Canada greater access and use of its apportionment of Milk River water. Without conducting any analysis, this option does not appear feasible as a joint effort as the benefits to the Milk River Project would be small compared to potential construction and OM&R costs. A Canadian Conveyance Alternative, Option 1d, does not appear feasible for the same reasons.

Administrative Options:

Generally, Reclamation supports further evaluating all the administrative options presented as they appear to represent low cost opportunities for increasing availability of water to Milk River Project water users.

It appears the greatest impact would be from revisiting the 1921 Order to revise the current allocation formula. This would help to recognize both the timing and variability of flows in the Milk and St. Mary Rivers as well as current infrastructure limitations.

The benefits associated with other administrative options is obscured by the analyses at greater canal capacities. It should be noted that the analyses provided are based on modeling the canal capacity at 650 cfs and 850 cfs, making it difficult to evaluate current benefits. The current capacity of the St. Mary Canal is approximately 600 cfs. As analysis of the options moves forward, the options should be evaluated with the current St. Mary Canal capacity. This would capture current conditions and recognize that administrative options may be implemented long before the capacity of the St. Mary Canal is restored to its' original capacity since the administrative options are comparatively low in cost to implement compared to the structural options.

All administrative options potentially impact how Lake Sherburne Reservoir, and/or the St. Mary Canal are operated. Reclamation would support altering operations as long as there is clear benefit to the Milk River Project water users.

Thank you for the opportunity to review the options being considered. Reclamation is pleased to see the effort to make changes and understands most of these efforts cannot be implemented without the cooperation, effort, and support by everyone involved.

Please include Mr. Clayton Jordan of Reclamation's Montana Area Office in discussions and evaluations as the process moves forward. If you have any questions or need additional information, please feel free to contact me at 406-247-7298 or via e-mail at sdavies@usbr.gov.

Sincerely,

Steve Davies
Area Manager

cc: Mr. Paul Azevedo
Bureau Chief, Water Management
Montana Department of Natural Resources and Conservation
1424 9th Avenue
Helena, MT 59620-1601

Saskatchewan Response to Options Summary

October 22, 2018

Mr. Jeff Woodward
Director of Hydrology and Groundwater Services
Water Security Agency
101-111 Fairford St. E
Moose Jaw SK S6H 7X9

Dear Mr. Woodward,

In 2016, the Accredited Officers (AOs) for the St. Mary and Milk Rivers initiated a review of the natural flow and apportionment data for these watersheds from the 1950s to present. They noted that in almost every year the apportionment procedures used to implement the IJC's Order of 1921 limited the ability of the upstream country to utilize its apportioned share of water. The AOs concluded that current administrative procedures therefore may not fulfill the intent of the 1921 Order.

In the spring of 2017, the AOs began a review of these procedures with the goal of recommending changes to administrative procedures. During the course of this review, it became apparent that other factors, such as lack of infrastructure and timing of natural flows were also factors to be considered.

As part of the AO's review process, the AOs reviewed the work of the International St. Mary – Milk Rivers Administrative Measures Task Force (2004-2006) and the ongoing work of the Joint Initiative Team (JIT) of the Montana–Alberta St. Mary and Milk Rivers Water Management Initiative (2008 – present). The AOs found the Modeling and Process Reports, prepared by the Joint Initiative Team, to be particularly informative and direct interaction with the JIT has greatly aided our review of their work.

Most of the options for improving the administrative procedures were considered and modelled by the JIT, however the AOs did consider other options that were not modelled. Also, the JIT modelled a few options that altered or very broadly interpreted the 1921 Order and the AOs considered these options, given that the modelling results were available.

Attached is a document that summarizes the various options that are being considered by the AOs and each option's potential for increasing the ability of the upstream country to utilize its apportioned share of water.

Recognizing the implications of these options on water users in both countries and the inability of the AOs to implement many of these options without active participation by various agencies of the Provinces of Alberta and Saskatchewan and State of Montana as well as the U.S. Bureau of Reclamation, the AOs, through this letter, are requesting the help of you and your staff in evaluating these options.

Specifically, the AOs are seeking your help in identifying, from the perspective of your agency and the stakeholders you serve, which options are most promising and which ones may not be feasible because of high cost/low benefit or legal constraints.

We understand that the optimum approach may involve some combination of the options summarized. Please note, we are not asking for a review of the document itself, which has already been reviewed by the JIT on two occasions. We're simply seeking your input on which options are most likely to help the AOs better implement the 1921 Order.

In order for the AOs to meet the timelines imposed by the IJC for this process, the AOs request you provide your comments by December 7, 2018.

We offer our thanks in advance for your help.

Sincerely,

Dr. Alain Pietroniro
Canadian Accredited Officer for the
St. Mary and Milk Rivers

John Kilpatrick
U.S. Accredited Officer for the
St. Mary and Milk Rivers

Attachment

CC: Mr. John Fahlman, Vice President, Technical Services and Chief Engineer