The St. Mary and Milk Rivers: The 1921 Order Revisited

R. Halliday and G. Faveri

Abstract: The St. Mary and Milk Rivers arise adjacent to one another in the eastern slopes of the Rocky Mountains; both rivers flow north from Montana into Alberta. Actions taken by American interests to develop irrigated agriculture in the lower Milk River basin and by Canadian interests to develop irrigation, both using St. Mary River water, led to a significant water dispute. This resulted in Article VI of the 1909 Boundary Waters Treaty. Questions over the interpretation of Article VI in turn led to a series of hearings and ultimately to the International Joint Commission’s 1921 Order concerning apportionment of the St. Mary and Milk Rivers. Ever since, the apportionment of the waters of these rivers has followed the 1921 Order, allowing each nation a secure understanding of their respective share of the waters thus permitting the planning and development of irrigation. The terms of the 1921 Order have been questioned at least three times since, most recently in 2003 when Montana requested an evaluation of the 1921 Order pursuant to Article VI of the Boundary Waters Treaty. In response to Montana’s concerns the International Joint Commission held a series of public meetings in the basins in 2004. Following this public process, some 108 documents were placed on the Commission’s website. This paper provides a synthesis of the public record and discusses the public comments in light of the Boundary Waters Treaty, the 1921 Order and the administration of apportionment.

Résumé: Les rivières Ste Marie et Milk sourdent adjacentes des pentes orientales des montagnes Rocheuses; les deux se coulent vers le nord de Montana au Alberta. Les intérêts américains se proposèrent de développer l’irrigation dans la vallée du bas de la rivière Milk avec l’eau de la rivière Ste Marie. Cependant les intérêts canadiens développèrent l’irrigation dans la vallée du bas de la rivière Ste Marie, ce qui causa un conflit important. Ceci amena les deux parties à négocier l’article VI du Traité des eaux limitrophes de 1909. À cause des interprétations diverses de l’article VI par les deux pays, la Commission Mixte Internationale tint une série des procès et finalement donna l’Ordre de 1921 pour la mesure et la répartition des eaux des rivières Ste Marie et Milk. Depuis, lors, la répartition des eaux de deux rivières suivait les termes de l’Ordre, laissant chaque pays avoir une sure compréhension de leur part des eaux pour la planification et développement d’irrigation. Les termes de l’Ordre de 1921 a été contestés au moins trois fois, la plus récente en 2003 quand l’état de Montana demanda une évaluation

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Introduction

A dispute over the sharing of the waters of the St. Mary and Milk Rivers more than 100 years ago was one of the matters leading to the 1909 Boundary Waters Treaty and the establishment of the International Joint Commission (IJC). In 1921 the IJC adjudicated the rights of both governments pertaining to the division of waters defined by Article VI of the Treaty, thus establishing a water sharing arrangement that continues to exist today.

In April 2003 Montana Governor Judy Martz wrote the International Joint Commission (IJC) requesting an evaluation of the 1921 Order. Governor Martz also requested an “evaluation of the assumptions, methods and parameters that are used to establish natural flows, depletions, and apportionments”. A second letter in January 2004 elaborated on Montana’s concerns.

In response to Montana’s concerns and those expressed by the governments of Alberta and Saskatchewan in support of the existing arrangements, the IJC held public meetings in July 2004 in Havre and Malta, Montana, Eastend, Saskatchewan and Lethbridge, Alberta. This paper provides the historical context for the continuing discussions over the sharing of the waters of the two rivers and an analysis of the written presentations submitted to the IJC as part of the recent public consultation.

Interjurisdictional Water Apportionment—An Overview

Several streams in the semi-arid plains of western North America are apportioned internationally or among states or provinces. These apportioned streams include the St. Mary and Milk Rivers, the Poplar River and the Souris River whose watersheds encompass the international boundary and the eastern flowing streams, including the Saskatchewan River watershed, of prairie Canada. Water apportionment is rooted in the tenants of western water law, originating in Australia and the United States, where the exclusive rights to use and divert water in a semi-arid region are needed to justify economic developments such as mines or irrigated agriculture (Lucas, 1990). (Riparian law, based on English common law, as used in eastern North America does not provide for exclusive rights.) Exclusive water rights are granted on the basis of prior appropriation or, first in time, first in right. That is, the water rights of an early licensee must be met before those of later licensees. Wolfe (1992) contrasts the rather robust water licensing system put in place by the Canadian federal government in the early days of western irrigation development with the practices of the fledgling Montana state government.

Apportioning streamflow among jurisdictions depends first of all on the computation of natural flow. Elihu Root, as early as 1907, defined natural flow as “the flow in the river system in question which would pass the point or points specified if no artificial structure had been placed in the stream channel and if no water had been diverted from or turned into it” (IJC, 1917). When natural flow is calculated in this manner the result does not take into account anthropogenic effects on runoff such as climate change or land use change. There are several methods of determining natural flow for apportionment purposes but the most common is the project depletion method. That is, natural flow at the apportionment point is the sum of recorded flow plus change in reservoir storage plus diversions minus return flows. In practice, making these calculations requires that other factors such as reservoir evaporation, evapotranspiration, conveyance losses, ungauged flows, and unmeasured consumptive uses must be taken into account. Since not all factors can be measured, indexes are developed and applied to the entire upstream watershed. For example, total evaporation may be determined for a few small reservoirs and the result applied to all small reservoirs. As another example, conveyance losses may be determined by making releases from reservoirs and measuring the flow at points downstream. The result can then be applied to future releases from storage with adjustments for normal, wet or dry channel conditions.

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Given that natural flow is calculated, apportioning that flow between two jurisdictions may be considered conceptually as installing a barrier in the stream and instantaneously directing flow in the required proportion to each jurisdiction. In the case of the St. Mary and Milk Rivers, the upstream jurisdiction has already removed flow from the stream before the water reaches the apportionment point. Because of the complexities of calculating natural flow, the apportionment determination is made using daily records. Differences between the required proportion and that delivered are reconciled at the end of balancing periods and adjustments are made. In general, surplus deliveries are not credited to the upstream entity but deficit deliveries must be made up in the following balance period. The balancing period for the St. Mary and Milk Rivers is 15 or 16 days, long enough to allow the necessary calculations to be made. The length of the balancing period can affect the proportion of natural flow delivered. Surplus or deficit deliveries for one year are not carried over to the next.

In the interest of achieving more beneficial use of available water supplies, enhancing environmental values or maintaining harmonious relations, the details of interjurisdictional apportionment may be varied by the jurisdictions while adhering to the principles. For example, releases to make up deficits may be postponed to a time when downstream irrigators can best use the water or a riparian flow may be maintained to benefit aquatic species.

### The St. Mary-Milk Rivers, the Treaty and the Order

The St. Mary and Milk Rivers (Figure 1) originate in Montana and flow north into Alberta. However, the St. Mary River rises in the Rocky Mountains ultimately joining the Saskatchewan-Nelson system flowing into Hudson Bay while the Milk River rises in the Montana foothills and returns to that state after looping some 320 km through Alberta to join the Mississippi River system flowing into the Gulf of Mexico. The tributaries of the Milk River that flow from the Cypress Hills in Alberta and Saskatchewan are collectively known as the Eastern Tributaries.

Both rivers pass through semi-arid lowlands that are suitable for agriculture once irrigated. However, the alpine source of the St. Mary River provides a better supply of irrigation water, both in quantity and timing. Table 1 depicts natural flows of the St. Mary and Milk Rivers and those of the Eastern Tributaries of the Milk River at the international boundary for 1950 to 2004. Annual flows for the main rivers and seasonal flows for the Eastern Tributaries are used. The range in flows as a percent of the median provides one measure of the reliability of the flow. It is evident that the St. Mary River flows are not only greater, but also more reliable than those of the other streams.

American proposals for diverting the more bountiful and reliable waters of the St. Mary River to irrigate the arable lower Milk River basin originated

<table>
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<th>Median</th>
<th>Average</th>
<th>Maximum</th>
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¹ at the Eastern Crossing of the International Boundary
Figure 1. The St. Mary and Milk River Drainage Basins. This figure appears with the permission of Environment Canada.
as early as the 1870s but no action was taken until the conduct of a reconnaissance survey in 1891 (Mitchner, 1973). At about the same time the Canadian government planned the use of the waters of the St. Mary River for irrigating lands east of Lethbridge, Alberta. The first successful diversion of the St. Mary River in Canada was in 1889 (Mitchner, 1973). In 1902, the United States Reclamation Service, only weeks after its formation, submitted its Milk River project for approval. The project consisted of storage works in the St. Mary basin and a St. Mary diversion canal to the Milk River, as opposed to a costlier all-American route (Simonds, 1999). To resolve the disputes over the use of these waters, the two jurisdictions proposed first a western water treaty, then a more inclusive boundary waters treaty that included all waters from the Atlantic to the Pacific (Griffin, 1959; Mitchner, 1973). Negotiations over apportioning the waters of the St. Mary and Milk Rivers—transboundary streams, not boundary waters—were therefore subsumed by the treaty negotiations. In general, matters pertaining to other transboundary streams are dealt with through Article IX of the treaty. The Boundary Waters Treaty, signed on 11 January 1909, also established the IJC to investigate and resolve boundary water issues (IJC, 1990).

Article VI of the Treaty deals exclusively with the sharing of the waters of the St. Mary and Milk Rivers and their tributaries. The first paragraph of Article VI states that the two rivers shall be “treated as one stream” and the waters “apportioned equally between the two countries”, but that “in making such equal apportionment more than half may be taken from one river … to afford a more beneficial use to each country”. During the irrigation season, 1 April to 31 October, “the United States is entitled to a prior apportionment of 14.2 m³/s (500 cfs) of the natural flow in the Milk River, or so much of such amount as constitutes three-fourths of its natural flow” and similarly Canada is entitled to a prior apportionment of 14.2 m³/s of the natural flow of the St. Mary River.

The concept of treating the two rivers as one stream was a means of considering diversions between the two watersheds. The construction of Lake Sherburne on Swiftcurrent Creek, a major Montana tributary of the St. Mary River and the diversion of St. Mary waters into the Milk River was an active proposal at the time. As well, building a reservoir in Montana to store both United States and Canadian St. Mary River water for use in the Milk River basin was considered a possibility.

Considering equal apportionment and prior appropriation in the same paragraph was to prove troublesome. Following the Treaty signing, Canadian irrigators were upset by the United States being granted a prior apportionment of 14.2 m³/s on the Milk River, despite the prior water rights being only 9.9 m³/s while Canada had granted a water right on the St. Mary for 56.6 m³/s. Further, at that time only 81,000 ha of irrigable land had been identified in the lower Milk River basin while there were 243,000 ha of irrigable land in the lower St. Mary (Hansard, 1911). It should be noted that the Treaty language states that when natural flows are less than the prior appropriation the flow continues to be apportioned in accordance with the prior appropriation ratio.

The second paragraph of Article VI permits the use of the Milk River channel in Canada to convey United States waters diverted from the St. Mary River, applying the provisions of Article II of the Treaty to compensate for any property damage. The last paragraph of Article VI outlines the responsibility of the IJC to direct properly constituted reclamation officers from the United States and properly constituted irrigation officers from Canada, now known as the Accredited Officers, to measure and apportion the water use of each country from time to time.

The negotiating parties were aware that water supplies in the Milk River were less reliable than those in the St. Mary (IJC, 1915). The prior rights of the United States to the waters of the Milk River and those of Canada to the waters of the St. Mary River were recognized. Canada’s rights to the St. Mary also appear to have been a trade-off for the use of the Milk River channel in Alberta to convey the United States share of the St. Mary River to downstream irrigators in the Milk River basin, as it was the only economic means of doing so.

The Origins of the 1921 Order

In 1914, the two IJC Commissioners assigned to the St. Mary and Milk Rivers, Henry Powell of Canada and Obadiah Gardner of the United States, toured the river basins to investigate the irrigation works in Alberta and the dams and diversions under construction in Montana. The Commissioners discovered that each side
of the international boundary was interpreting Article VI differently and that the different interpretations might lead to serious controversies if not reconciled before the completion of the St. Mary canal. Therefore, the two recommended, "the first step to be taken by the commission is to have a hearing of the Parties interested, with a view of determining the correct construction to be placed upon the words of Article VI" (Gardner and Powell, 1914).

The first IJC hearing was held in May 1915 at St. Paul, Minnesota. Legal counsel for the parties called on United States reclamation officers, Canadian irrigation officers, and Montana and Canadian irrigators to elaborate on the arguments for each side. The presentation of the legal arguments continued in a supplemental brief delivered later in 1915 (MacInnes, 1915), a supplemental argument at Detroit, Michigan in 1917 (IJC, 1917), a re-argument at Ottawa, Ontario in 1920 (IJC, 1920), and public hearings at Chinook, Montana and at Lethbridge, Alberta in 1921 (IJC, 1921).

The significant points presented during the hearings included:

1. The locations at which apportionment balances should be determined. The United States argued that the flow apportionment should be at the crossings of the international boundary while the Canadians argued that it should be at the lowest point of beneficial use or river mouth. That is, the waters of the entire two basins should be apportioned equally. The United States countered that its limited treaty-making powers could not obligate exclusively Montana waters. This question is minor in the case of the St. Mary River as very little of the basin lies in Canada but is extremely important for the Milk River where more than half of this much larger basin lies in the United States. At the time of the first hearing, it was understood that Alberta waters on the St. Mary River comprised about five percent of the annual natural flow in the two basins while Montana waters on the Milk River were about 27 percent of the flow (IJC, 1915). As well, the total natural flow at the mouths of each river was considered approximately equal (52 percent on the St. Mary River and 48 percent on the Milk River).

2. The interpretation of prior appropriations. According to the Boundary Waters Treaty each country was to receive a prior appropriation of 14.2 m³/s of the natural flow of the St. Mary River for Canada and of the Milk River for the United States. The United States argued that for the water to be divided equally after a prior appropriation of 14.2 m³/s was available, the other country should get the next 14.2 m³/s before the waters should be divided equally. However, the Canadians thought that under the traditional sense of prior appropriation all waters in excess of the prior appropriation should be divided equally. Canada took a relatively soft line on this matter compared to the question of the waters to be apportioned.

3. Native water rights. Although not a major part of their deliberations, Commissioners were aware of existing and potential aboriginal water rights. The Fort Belknap, Montana Indian Reservation was granted an entitlement of 3.5 m³/s (125 cfs) from the Milk River pursuant to the American Supreme Court decision in Winters vs. the United States, even though an immediate use for the water was not foreseen (IJC, 1915). The Blood Indian Reserve in Canada had undeveloped lands that were suitable for irrigation development (IJC, 1915).

The arguments of both countries supporting each side's contentions were brought forward over the seven years. The main United States argument supporting the measurement and apportionment of waters at the border is that the Treaty contains ambiguities of language, requiring that the documents leading up to the Treaty be studied to determine the true meaning of the writers of the Treaty. Canadians argued that the Treaty language was clear and should be implemented. An American, Mr. W.B. Sands, of the Water Users Association of the Lower Milk River, recognized the Treaty granted more water to Canada than to the United States under its interpretation, "By terms of this treaty we give to the Canadians 58 per cent, which ought to be fair and ought to be all that they could possibly ask." (IJC, 1915).

During this time, Commissioners devoted enormous effort into understanding just how much
water was available in the two river basins (Burley and Jones, 1920) and how it was being used. There is a sense in the public record that the Commissioners felt that there was sufficient water to meet the needs irrespective of the interpretation of the Treaty language. Following the 1917 completion of the St. Mary canal to the Milk River, the IJC issued annual provisional Orders specifying the water entitlements for each country for the irrigation seasons from 1918 to 1921, while declining to decide exactly what waters were to be apportioned. An exceptionally dry summer in 1919 and the first operational use of Lake Sherburne by the United States in the same year undoubtedly brought matters to a head. The IJC requested that the Accredited Officers seek some compromise that would be acceptable to both governments but that effort failed in March 1921 (IJC, 1921).

After all the arguments and hearings, particularly after the visit to the area in 1921, the IJC proclaimed the Order in the Matter of the Measurement and Apportionment of the Waters of the St. Mary and Milk Rivers and their Tributaries in the State of Montana and the Provinces of Alberta and Saskatchewan in October 1921, known as the 1921 Order. The Order represents the IJC's proper interpretation of the Treaty language.

**The 1921 Order**

The ten articles of the 1921 Order clearly state how the Reclamation and Irrigation Officers are to measure and apportion the waters of the St. Mary River at the international boundary, the Milk River at the boundary, the Eastern Tributaries at the boundary, and the waters that do not cross the boundary. The natural flows of the St. Mary and Milk Rivers in excess of each country's prior appropriation of 14.2 m³/s are to be divided equally during the April 1 to October 31 irrigation season specified in the Treaty. To ensure the upstream country's entitlement to water, the prior appropriation was reduced to three-quarters of the St. Mary River natural flows less than 18.9 m³/s and three-quarters of the Milk River natural flows less than 18.9 m³/s (three-quarters of 18.9 being 14.2 m³/s) during the irrigation season. The natural flows of the Eastern Tributaries at the international boundary are apportioned equally year-round. The natural flows of the streams that do not cross the boundary are apportioned wholly to the country wherein they occur. The 1921 Order establishes that daily records of the natural flow are to be kept and communicated to all interested parties, and the location where, at a minimum, international gauging stations shall be maintained.

The 1921 Order was followed two days later by recommendations to governments concerning reservoir development in the basins. The recommendations called for the construction of a reservoir at St. Mary Lakes in Montana to be jointly funded by the two countries, of a Chain-of-Lakes Reservoir in Montana to be funded by the Reclamation Service of the United States and of a Verdigris Coulee Reservoir in Alberta to be funded by the Canadian Reclamation Service. The prospect of additional storage in the basins could have contributed to the agreement on the 1921 Order.

**Recent Issues and Concerns**

Despite the cooperative foundation that the 1921 Order has fostered for bilateral water management in the two river basins, some outstanding issues and concerns exist. Although the IJC recommended in 1921 that three upstream storage facilities be constructed, the jointly funded reservoir at St. Mary Lakes, Montana, was not built as foundation conditions would not permit construction of a reservoir of the desired size at that time. The United States Bureau of Reclamation did construct Fresno Reservoir on the Milk River slightly downstream of the Chain-of-Lakes site in 1939. Several irrigation works have been constructed in the St. Mary River basin in Alberta, but not the Verdigris Coulee project. Although Alberta has undertaken feasibility studies and engineering reports for a reservoir on the Milk River in Canada, Canada still has no significant storage on the river.

In 1986, in response to Canadian water users, the IJC instructed the Accredited Officers to investigate possible apportionment of the Southern Tributaries of the Milk River, which flow north from the Sweetchgrass Hills in Montana. In September 1985, Alberta had imposed a moratorium on new water rights in the entire Milk River basin, including the Alberta portion of the Southern Tributaries (Morton et al., 1993). In September 1991, the Montana Department of Natural Resources and Conservation issued an order to close the Southern Tributaries to the issuance of additional water permits. Since 1994, the IJC has requested that the Accredited Officers continue to monitor the...
situation and report annually on the recorded flows of the Southern Tributaries. No apportionment is conducted and the 1921 Order has not been revised.

Over the years, the United States infrastructure constructed from 1913 to 1925 to store the St. Mary River water and divert it to irrigation canals in the lower Milk River valley has deteriorated. Major expenditures are required to upgrade the head gates, siphons, and the St. Mary canal to allow the United States to take advantage of its full share of the natural flow of the St. Mary River.

At the February 2003 annual records meeting, where mutual concerns, future plans and changes to the computational procedures are discussed, the Accredited Officers established technical working groups for the Milk River and Eastern Tributaries. The two working groups, comprised of representatives from the State of Montana, the Bureau of Reclamation, the provinces of Alberta and Saskatchewan, and the federal water monitoring agencies of both countries, are collaborating to investigate improvements to the science of the current computational procedures.

In April 2003 Montana Governor Judy Martz wrote the IJC requesting an evaluation of the 1921 Order pursuant to Article VI of the Boundary Waters Treaty. Governor Martz also requested an “evaluation of the assumptions, methods and parameters that are used to establish natural flows, depletions, and apportionments”. A second letter in January 2004 elaborated on Montana’s three reasons for reviewing the Order (Martz, 2004). These included their understanding that the Order does not equally divide the waters of the two river basins, that circumstances today are different than before 1921, and that improvements are required to the administrative procedures that implement the Order. This request led to the IJC holding public meetings in the basins and to the appointment of an International Administrative Measures Task Force, which was directed to examine options for improving apportionment performance.

The Public Process in 2004

The IJC held public meetings at Havre and Malta, Montana, Eastend, Saskatchewan and Lethbridge, Alberta during July of 2004 to identify public concerns regarding the 1921 Order. As a result of the public meetings, the IJC has assembled 108 documents on its website. These include 43 background documents and 65 submissions to the public consultation process. The background documents include copies of correspondence to the IJC or from the IJC to various parties, including the April 10, 2003 letter from Governor Martz, which initiated the process. The submissions to the public process include letters and briefs received by the IJC prior to and following the consultations as well as documents put forward during the consultations. Although the proceedings of the consultations were taped, transcripts have not been prepared. The 108 documents therefore comprise the entire public record of the public consultations. These documents are numbered from 1 to 108 on the IJC website (www.ijc.org) and in the discussion that follows those numbers are used as a means of identification.

Correspondence between representatives of governments and the IJC found in Documents 1 to 43 and submissions to the public meetings found in Documents 44 to 108 have been reviewed for content pertaining to the administration of apportionment of the St. Mary and Milk Rivers and their important tributaries. There are submissions that call for, or would require, reopening the Treaty, or reopening the 1921 Order or modifying the current Administrative Measures. Table 2 presents a summary of the concerns and proposals. There were many thoughtful and, clearly, deeply felt submissions to the IJC. A large number of them simply expressed a desire that the 1921 Order be reviewed or that it not be reviewed and offered reasons for the intervener’s position.

The documents identified in the table are those that not only may have expressed a point of view but also identified a specific issue. The implication of each issue is categorized in the Table (with a few exceptions) as Background, Treaty, Order, or Administrative Measures. Background issues are those where a statement requires that some investigation be made. When the implication is stated as Treaty, Order or Administrative Measures this indicates the mechanism by which the authors feel the issue can be addressed. The issues raised by the public process are discussed in more detail in the following sections.
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**Background Issues**

There are two background issues that could be explored in more detail: hydrologic trends since the *Boundary Waters Treaty* and water shortages pertaining to irrigable lands.

**Hydrologic Trends**

There has been considerable media coverage and scientific investigation pertaining to climate change and its effects on water resources in various parts of the world. Climate scenarios related to climate change in the St. Mary and Milk River basins can be developed and these scenarios can be used to drive hydrologic models that may identify changes in future water availability. Scenarios may also be developed concerning how agricultural practices may adapt to changing water availability and economic models may be used to suggest the long-term future for the region. These are worthy subjects for scientific investigation. Indeed, Document 53 by several investigators from the University of Lethbridge touches on this.
Bonsal et al. (2003) have shown that some global climate models (GCMs) are able to simulate the magnitude and spatial variability of observed mean temperatures and, to a much lesser extent, observed precipitation, over the Western Cordillera for 1961 to 1990. Scenarios of future climate based on these GCMs indicate likely increases in temperatures and possible increases in precipitation in the St. Mary and Milk River basins. More work using coupled atmospheric-hydrologic models is required to develop a flow scenario that is sufficiently robust to allow water managers to modify current practices.

A related line of investigation would be to consider recent trends, if any, in climatological and hydrological data and their potential effects on apportionment. There are well-developed methodologies for identifying statistically significant trends in hydrometeorological data sets. Applying those methods to seasonal or even monthly meteorological data and to natural flow arrays in the basins could be instructive, keeping in mind that a past trend is not necessarily a predictor of the future. Document 85 (Cary and Parrett, 1995) presents a synthesis of monthly natural flows for the basins and this data set can be extended by the natural flows reported by the Accredited Officers to the IJC. Although decreasing trends in annual recorded streamflow have not been detected for the St. Mary and Milk Rivers, there are decreasing flow trends for other streams in the region (Rood et al., 2005; Seneka, 2004).

**Water Shortages**

Turning to irrigation development and water shortages, Documents 66 and 67 provided by the state of Montana say that there are water shortages in the Milk River basin in Montana on average in six of ten years while Document 90 provided by the province of Saskatchewan indicates on average four of ten years in Saskatchewan are water short. Document 88 provided by the province of Alberta says Alberta experiences a shortage in one of ten years on the St. Mary River. Alberta also indicates water application is on average 84 percent of optimum. A typical annual duty in Alberta appears to be 0.30 to 0.38 m (Document 83 by Alberta) while that in Montana and Saskatchewan is 0.61 m (Document 90). The lower duty in Alberta is the result of farmers making significant investments in new technology to improve water use efficiency.

These investments could have been driven, in part, by Alberta farmers having access to a more reliable water supply than farmers in the other jurisdictions. All jurisdictions have stopped issuing new water licences because of water shortages. Finally, an attachment to Document 80 (Azevedo, no date) indicates there are 44,500 hectares of irrigation development in the Milk River basin in Montana, while Document 83 indicates 247,600 hectares in Alberta in the St. Mary, 3,480 hectares in the Milk River basin in Alberta (Document 88), and 13,800 hectares in the apportioned Eastern Tributaries in Canada (Document 90).

There is no reason to expect that the numbers pertaining to irrigation development, water use and water shortages in various subbasins and jurisdictions are directly comparable as they were prepared by different people or agencies at different times. It may be instructive to develop a table showing irrigable area, area developed for irrigation, licensed water use, optimum water use, and average water use for the two principal basins and various subbasins and for each state or province. A set of comparable figures could provide some useful insights. A further task may be to identify specific reasons for water shortages.

**Treaty Issues**

Although most of the 108 documents pertain directly to the 1921 Order, there were a few that raised issues relevant to the interpretation of the Treaty. Documents 45 (Milk River Basin Water Management Committee), 66 (Montana), 75 (Robert Clark), and 88 (Alberta) are examples. Treaty language can be difficult for lay readers and persistent questions of interpretation have existed since the development of the Treaty, hence the need for the 1921 Order. There is one part of Article VI that seems incapable of differing interpretations. The Treaty states that the waters of the St. Mary and Milk Rivers are to be divided differently from April to October than during the rest of the year. Montana's observation that there may be significant runoff in the Milk River in March, more so than in the St. Mary, may be correct but the underlying concern cannot be resolved to Montana's satisfaction without a change in the Treaty itself. The record of the 1915 IJC hearings (IJC, 1915) concerning Article VI contains pre-Treaty documentation that seems to indicate that the “irrigation season” as defined in Article VI pertained
to when water might be applied to the land, not when runoff takes place. Although a storage and diversion project in the United States was contemplated in those early days, early irrigators depended on available runoff for their water supplies.

The hydrological trend analysis suggested in the previous section may indicate whether runoff timing is unchanged from the early days of the Treaty. According to IJC (1931a) runoff in the Milk River basin occurs in “March and April”. Even if a timing difference is determined, it may not be significant.

1921 Order Issues

The interpretation of the Order was the subject of most of the submissions to the IJC. In this discussion the interpretation used will be that in use since the Order was issued by the IJC. That is, when words such as 'entitlement' are used this will mean the entitlement in accordance with the Order as interpreted over the years. That is, under the Order, Alberta is entitled to a greater share of the waters of the St. Mary River at the international boundary than Montana while Montana is entitled to a greater share of the Milk River at the eastern crossing than Alberta. Also under the Order, Montana and Saskatchewan are entitled to share the waters of the Eastern Tributaries equally. That interpretation was the basis for the submissions to the IJC in 2004, with interveners either supporting a new interpretation or wishing to maintain the current interpretation.

The Order treats all the waters of the St. Mary and Milk Rivers, and their tributaries. Articles I and II use identical language to discuss the St. Mary and Milk Rivers, respectively. They identify a prior appropriation of three-quarters of the natural flow on the St. Mary River for Canada and an identical prior appropriation on the Milk River for the United States during the irrigation season. The irrigation season is identified as April 1 to October 31, as per the Treaty, in the recitals of the Order. The entitlement is rooted in early development of irrigation on the St. Mary River by Canada and on the lower Milk River by the United States and the doctrine of prior appropriation under western water law. It is evident from the frequent references to “waste waters” in the early IJC hearings (IJC, 1915, for example) that environmental flows were not a factor in the development of the Order.

Article III pertains to the Eastern Tributaries of the Milk River. The article calls for an equal division of the natural flow, irrespective of time of year.

Article IV indicates that waters arising in a given country and not naturally flowing across the international boundary are apportioned entirely to the country of origin. The emphasis given to maintaining records at boundary crossings in Article V and VII makes it clear that the IJC intended that natural flows at the international boundary be the basis for monitoring apportionment of waters between the two countries.

The strong reliance on measurement and recording of diversions and storage in Article VI implies the use of the project depletion method of calculating natural flow. This has been the practice in implementing the Order. Document 85 (Cary and Parrett, 1995) does present a method for computing natural flows using index station data applied to drainage sub-areas that are considered hydrologically homogenous. The report suggests that this method is not as rigorous as the project depletion method.

One specific issue raised in the public consultation is the applicability of the Order to Lee and Rolph Creeks (Documents 20 and 66 by Montana, and 88 by Alberta) and the Belly River (Documents 63 by Randy Reed and 75 by Robert Clark). Based on a lengthy discussion at the 1931 Ottawa hearing (IJC, 1931b) it appears that Commissioners concluded that tributaries not specifically identified in the Order, such as Lee and Rolph Creeks, are subject to the Order and should be apportioned equally to each country as for the Eastern Tributaries. That is, although Montana's current use of these streams is negligible, Montana may divert up to 50 percent of the waters from these creeks to obtain a beneficial use. On the other hand, the Belly River being neither a tributary of the St. Mary River nor of the Milk River is not subject to the Order.

Administrative Measures

The Treaty and the Order form the basis for determining each country's entitlement to the waters of the St. Mary and Milk Rivers while the Administrative Measures form the basis for calculating the natural flow and determining each jurisdiction's performance in meeting the specifications of the Order. The annual report to the IJC by the Accredited Officers calculates
the natural flow and provides a detailed account of this performance.

Several documents raised issues pertaining to the administration of the Order. Generally these can be categorized as comments or proposals pertaining to the determination of natural flow and those pertaining to the determination of each jurisdiction’s share of the natural flow.

**Determination of Natural Flow**

Documents 45 (Milk River Basin Water Management Committee), 66 (Montana), and 88 (Alberta) discuss points concerning the proposed Milk River dam in Alberta and the upgrading of Montana’s headworks and water delivery systems. Provided that these proposed changes to infrastructure (or any similar changes) result in no jurisdiction capturing or using more than its share of the waters of the St. Mary or Milk Rivers, changes or additions to infrastructure can be accommodated by changes in the current Administrative Measures. That is, adjustments would be made for changes in reservoir evaporation, diversions, etc. This is not to say that major changes to water infrastructure can be accomplished easily. They would, of course, be subject to the financial constraints of the proponent and the potential users, the environmental assessment laws of the jurisdiction, and prior notification or consultation with downstream interests. Infrastructure changes that would allow one jurisdiction to obtain the use of more water than its current entitlement would require a change in the Order.

Several documents discussed the need for environmental flows or the effect of such flows on apportionment of the St. Mary River. These include Documents 63 (Randy Reed), 64 (U.S. Fish and Wildlife Service) and 84 (Alberta). There is a stated need for instream flows to support bull trout habitat. Documents 74 (Kimball River Sports) and 84 discuss releases for recreational use on the St. Mary River. Environmental flows may be necessary to support habitat protection and recreational flows may provide new opportunities and economic benefits. Such flows must, however, be accommodated within the present Order. Winter releases pose a particular problem, as monitoring schedules must be enhanced to document them. It may be useful to examine the effect of environmental and recreational flow requirements on the operating rules for reservoirs in the St. Mary River system.

Several documents discussed water use pertaining to the Milk River loop through Alberta, whether from the Southern Tributaries of the Milk (Document 75 by Robert Clark) or from other tributaries of the River, itself (Documents 20, 66 and 105, all by Montana). Document 105 also raised questions concerning evaporation calculations. Calculation of water use, travel times and channel losses in the reach from the western to the eastern crossing of the Milk is critical to determining natural flow and the apportionment between the United States and Canada. The factors that go into the natural flow calculation vary depending on hydrological conditions, that is, on whether it is a dry, normal or wet year. A close examination of these factors requires special flow releases from storage and therefore improving say, channel loss calculations, is confounded by the value of those releases to water users, especially in dry years. That is, a special flow release aimed at improving natural flow calculations may, in effect, deny a water user some water supply just at a time when water is most valuable. As well, the intensive monitoring required for natural flow studies is not sustainable for year-to-year operations. The Accredited Officers have established a Technical Working Group to examine the calculations. In view of Montana’s concerns the work of the Group should be a high priority.

A further difficulty in the determination of the natural flow of the St. Mary River is that the stage-discharge relation at Eastern Crossing is not particularly stable at low flows. That is, just when water supplies are most important to water users, the data may not be as good as would be desirable. One result may be natural flow calculations indicating negative natural flow. The procedures for dealing with negative natural flows fall within the Administrative Measures.

**Determination of Entitlement**

Assuming that natural flow at relevant boundary crossings is calculated and agreed by the parties, did each party receive the flow to which it was entitled under the Treaty and Order and, if not, why not? When the apportionment balance is determined there are three possible outcomes: the upstream party has delivered exactly the required amount of water, delivered more
water than it was required to, or delivered too little water. In practice, the apportionment balance is determined every 15 or 16 days and adjustments made.

In the case where each party received its exact entitlement there is no problem. In the second case where there is an over-delivery, the upstream party may have had insufficient reservoir storage or diversion capability available to capture its share of the water. Water escapes to the downstream party who may or may not have the ability to put it to beneficial use. Under the current administrative arrangements over-delivers of water are not credited against future under-delivers. In the third case, an upstream party may retain or divert too much water and a deficit is created. The general practice calls for a deficit to be made up in the following period but this practice has been varied to enhance beneficial use of water in both countries.

Under a Letter of Intent signed by the Accredited Officers deficits can be accumulated on the St. Mary and Milk Rivers and a deficit on one stream used to offset the deficit on the other. There is also a practice on the Eastern Tributaries for Saskatchewan to accumulate deficits on Battle Creek and make releases at a time when the water can be put to more beneficial use (there is no storage in the United States on Battle Creek). In general, adjustments to deficits and procedures for trading deficits fall within the ambit of the Administrative Measures. Such deviations from the norm should only be undertaken with the concurrence of the parties and the understanding that the result may not be mutually beneficial in all years. One submission (Document 51 by the Lower Frenchman Water Users) stated that the intervener does not support the trading of deficits between the St. Mary-Milk mainstems and the Eastern Tributaries.

Several documents contrast the requirement to make up deficits with the fact that surpluses are not credited. In general the downstream party benefits from this practice. Typically over-delivers will take place during the spring freshet with deficits, if any, occurring later in the year. The upstream party has the option of developing additional storage, where feasible, to enable it to capture more of its share. The treatment of surplus deliveries falls within the Administrative Measures. Any contemplated changes should be based on an examination of the effects using a number of low, normal and high flow years. Any change should apply to the entire basin, not just part of it.

The other key issue raised in several documents is the length of the balancing period. Again this is within the scope of the Administrative Measures and, in the case of the Eastern Tributaries, the period was increased from ten days to 15 days several years ago. An argument can be made that the balancing period should be long enough to enable a release from an upstream reservoir to be routed to the lower Milk River. A 15-day period accomplishes this in the St. Mary and Milk River basins. As the balancing period lengthens there is also an increased likelihood of the stream channel drying out and therefore releases from upstream reservoirs may be lost to the channel rather than providing a benefit to the downstream party. With a very long balancing period, there is a possibility of there being no riparian flow for much of the irrigation season. As for the previous issue, any contemplated change should be based on an examination of several years of calculations under different flow conditions.

Finally, Documents 90 (Saskatchewan) and 104 (Prairie Provinces Water Board) correctly indicate that, if the apportionment entitlement on the St. Mary River is changed this will lead to a change in the Master Agreement on Apportionment as it concerns Alberta-Saskatchewan apportionment on the South Saskatchewan River as the St. Mary River is a tributary of the South Saskatchewan River.

Discussion

Montana’s recent concerns with Article VI of the Treaty and the 1921 adjudication of the Treaty language must be placed in the context of the long history of mutually beneficial use of the waters of the two rivers. The 1921 Order has been described by many as a trade-off of two fundamental issues: the waters to be apportioned and the question of prior appropriation. The waters to be apportioned were dealt with according to American wishes while the prior appropriation was dealt with according to Canadian wishes (IJC, 1931b). This interpretation of the Order results in Alberta receiving more than half the flow of the two rivers, as determined at the international boundary crossings, while Montana receives a smaller quantity of the flow. The idea that the 1921 Order represents a compromise arises from an exchange of letters between the Accredited Officers early in 1921 and was dismissed at the 1931 hearing (IJC, 1931b) by Canadian counsel stating, “the 1921
Order was an adjudication by the Commission of the rights of the two Governments ... a decision based upon the Treaty.” Issues related to that adjudication are compensation for Montana’s right to route St. Mary flows through the Milk River loop in Canada to irrigators in the lower basin and the inclusion of clause four of the Order concerning apportionment of national streams.

Nonetheless, the clarification and resolution of the Treaty language provided by the 1921 Order allowed irrigation works to proceed in both countries with considerable certainty of water supply. In the summer of 1927, following a very dry year in 1926, the United States State Department requested that the IJC re-open the 1921 Order for consideration (IJC, 1928). This led to a hearing in 1928, and two in 1931. The United States attempted to show that the provisions of the 1921 Order did not equally divide the waters of the two rivers and that circumstances had changed.

The hearings heard testimony concerning the origins of the 1921 Order and the origins of the Treaty. The 1931 hearings devoted considerable attention to the fact that, as the 1921 Order is administered, Canada receives a greater portion of the combined flow of the St. Mary and Milk Rivers as measured at the international boundary than does the United States. There was testimony as well concerning “national waters”, the waters subject to Article IV of the 1921 Order. That is, waters of the lower Milk River that rise entirely within Montana. Depending on how these waters are considered, Montana can even be shown to be receiving more than half the combined flow of the two rivers and their tributaries. There was as well a lengthy discussion of the prior appropriation clause and its effect on Montana’s share. The Commission also heard testimony concerning aboriginal water rights (IJC, 1931a) and Lee and Ralph Creeks (IJC, 1931b). Commissioners heard testimony on the actual streamflows and irrigation water use since the 1921 Order and even had some discussion on matters such as determination of channel losses. Canada noted that average streamflows for the St. Mary and Milk Rivers at the boundary from 1921 to 1930 were almost identical to those from 1911 to 1920 (IJC, 1931b), an indication of no change in circumstances.

The Commissioners’ vote on whether to re-open the Order split on national lines, one of the very few occasions where this has happened in the long history of the IJC. As the members of the IJC had reached no consensus, the 1921 Order remained unchanged, providing for years of joint co-operation.

Montana offered three reasons for reviewing the Order in 2004. These were that the Order does not satisfy the language of the Treaty, that today’s reality is significantly different than that foreseen in 1920 and that there are problems with the administrative procedures that implement the Order. The third reason led to the establishment of an eight-person IJC International Administrative Measures Task Force in December 2004 to examine whether “existing administrative procedures can be improved to ensure more beneficial use and optimal receipt by each country of its apportioned waters”.

Montana’s point concerning whether the Order faithfully implements the Treaty language has been the subject of lengthy debate before the IJC in 1930 and 1931. Prior to that there was an even longer debate before the IJC on the intent and meaning of the Treaty language. Revisiting those arguments almost a century later is likely irrelevant in fact and in law.

The remaining reason for reviewing the Order relates to changing circumstances. Montana identified six such changes. The first relates to federal reserved water rights for American Indians. Montana states that federal reserved water rights were known in the early 1900s, but not defined. This is clearly incorrect as seen in IJC (1915; 1931a). Wolfe (1992) also provides a contemporary review of the issue.

A second changing circumstance is that water supplies were overestimated in 1921. As indicated in IJC (1931b) there was little change in average flows from 1911 to 1930. An examination of similar records since that time also shows little change. Table 3 displays average natural flows for early time periods from IJC (1931b) and long term means based on several sources (IJC, 1931b; Cary and Parrett, 1995; Task Force, 2006). As noted earlier in this paper, trend analyses of the St. Mary and Milk Rivers indicate no trend in annual flows.

A third circumstance is that, although the IJC recommended in 1921 that three storage projects be built, a jointly funded reservoir proposed for Lower St. Mary Lake was not constructed. Simonds (1999) indicates that foundation problems would not permit construction of a dam of sufficient size.

Montana raised other concerns that relate to apportionment procedures and Alberta’s feasibility study for a Milk River dam. The concerns regarding apportionment procedures should be met by the
Table 3. Average Natural Flows of the St. Mary and Milk Rivers.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>St. Mary River at International Boundary (dam³)</th>
<th>Milk River at Eastern Crossing (dam³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1911-1920</td>
<td>722,000</td>
<td>140,000</td>
</tr>
<tr>
<td>1921-1930</td>
<td>743,000</td>
<td>140,000</td>
</tr>
<tr>
<td>1911-2004</td>
<td>773,000</td>
<td>144,000</td>
</tr>
</tbody>
</table>

activities of the IJC Task Force. Those regarding a possible Milk River dam are probably misplaced. If Alberta were able to construct a dam on the Milk River that met economic, social and environmental tests to capture its share of the waters of the Milk River in accordance with the 1921 Order, this would simply be implementation of a long-established right. Any hardship for some Montana water users could be mitigated by more effective use of the state’s entitlement for St. Mary water.

The St. Mary diversion, intended to carry 24 m³/s, now carries only 18 m³/s. This diminished capacity to put its entitlement to beneficial use would likely harm Montana if the 1921 Order were ever to be reopened. Alberta could argue that since it has effectively used all of its entitlement under the 1921 Order and that Montana has not, it should be entitled to more water.

In April 2006, the IJC’s International St. Mary-Milk Rivers Administrative Measures Task Force issued a draft report for further public consultation (Task Force, 2006). The report discusses the current administration of apportionment and provides several options for improving administrative measures. These options pertain to the natural flow calculations, the length of the balancing period, instream flow requirements, and the treatment of surplus water deliveries.

Conclusions

A review of the 108 documents pertaining to Montana’s request that the 1921 Order be reopened indicates that most documents support either of two positions: that the Order be opened or that it not be opened. The position of an intervener almost always can be determined along national lines. The underlying concerns of the interveners wishing change, however, imply that changes be made to the Treaty, the Order or the Administrative Measures used by the Accredited Officers. A synthesis of the public consultation process identifies many concerns and the means by which a specific concern may be addressed.

There are many activities that could be carried out that would allow the Accredited Officers to modify existing methods. Some of the activities have been undertaken during the mandate of the current Task Force; others will take longer and require dedicated staff time in relevant agencies.

No matter what the eventual outcome, there will be a continuing need to closely monitor flow conditions and water use in the St. Mary and Milk River basins and an increasing need to improve computations of natural flows. The Task Force activity has unquestionably led to increased public and institutional understanding of the range of realistic options available for improving the administration of apportionment in these binational river basins. Continuing efforts will be required in the future to continue this process.

There is a risk, however, in viewing the current situation as a technical problem that can be resolved through further analysis. While the IJC Task Force has met its mandate in reviewing a host of technical issues, its real benefit could prove to be the significant engagement of water administrators and water users in considering the positions of the two countries. The IJC’s efforts in bringing this about are commendable. One means of furthering this engagement may be through the implementation of a more broadly-based watershed board in these basins (IJC, 1997).

The basis for moving forward on the current concerns could be a mutual recognition of the benefits the Boundary Waters Treaty have brought to the residents of both countries by permitting irrigation development with a considerable degree of certainty of water supply. Both countries may also recognize that the 1921 Order represents a fair and reasonable interpretation of the Treaty and that the hardships arising from low flows in the late 1920s and in the early 2000s provide insufficient reason to consider re-opening the Order. The certainty of supply provided by the Treaty and Order should be sufficient for Montana to carry out the required revitalization of its water infrastructure.
Acknowledgements

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References


