Milk River

3rd Edition

Transboundary State of the Watershed Summary

Introduction

The Milk River watershed is transboundary, spanning southern Alberta and southern Saskatchewan (Canada), and northern Montana (U.S.A.). The watershed is a unique and diverse landscape, comprised of large contiguous tracts of native grassland and shrubland, dotted with sandstone outcrops, and enveloped by forested mountainous areas including the Cypress Hills (AB and SK), Sweetgrass Hills (AB and MT), and the Bears Paw and Little Rocky mountains (MT). The watershed is within the traditional territories and current-day lands of the Blackfoot Confederacy People (Niitsitapi) (AB, MT), Cree (Aaniih and Nakoda; Chippewa and Nekaneet) (SK, MT), and Assiniboine Sioux (MT), and is the present-day homeland to many descendants of European settlers who came to homestead in this semi-arid region.

The Milk River Transboundary State of the Watershed (SOW) Report

It is recognized in the Milk River Transboundary SOW Report (full report) that the flow of surface and groundwater, migration of fish and wildlife, and dispersal of plants, are not contained within political boundaries. Cross-border collaboration and management are essential to maintaining a healthy watershed, as well as thriving communities, in the future.

Data from numerous sources throughout the watershed has been compiled within the report with assistance of multi disciplinary teams. Indicators of watershed condition were identified related to water supply, allocation and use, water quality, riparian and wetland health, biodiversity (species composition, diversity and abundance) and land use. In some cases, comprehensive data sets were available to support condition assessments of various indicators, and in other cases, data was sparse, unavailable or non-existent. The rankings (inset) were used to summarize the condition assessment. The absence of data resulted in an unknown status designation for some indicators.

Indicator Ranking

State
(what is the current situation?)

✓	–	X	?
good	fair	poor	unknown

Trend
(what does trend through time indicate?)

↑	–	↓	?
improving	stable, mixed or no change	deteriorating	unknown

Information
(was there adequate information to assess this indicator?)

✓	–	X	?
adequate	partial	inadequate	unknown

Note: A subject matter expert or team determines the indicator rankings

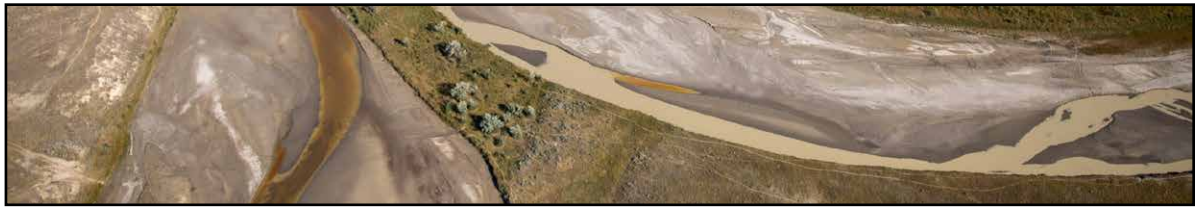
This summary report highlights some of the main findings from the full Milk River Transboundary SOW Report which is available online at the Milk River Watershed Council Canada's website: mrwcc.ca.

The Watershed

The Milk River watershed spans an area of 59,865 km^2 (14,792,963 acres) in Alberta, Saskatchewan and Montana. Alberta (11%) comprises the smallest part of the watershed area, and Montana (65%) encompasses the largest area. The watershed is the only one in Canada that drains to the Gulf of Mexico.

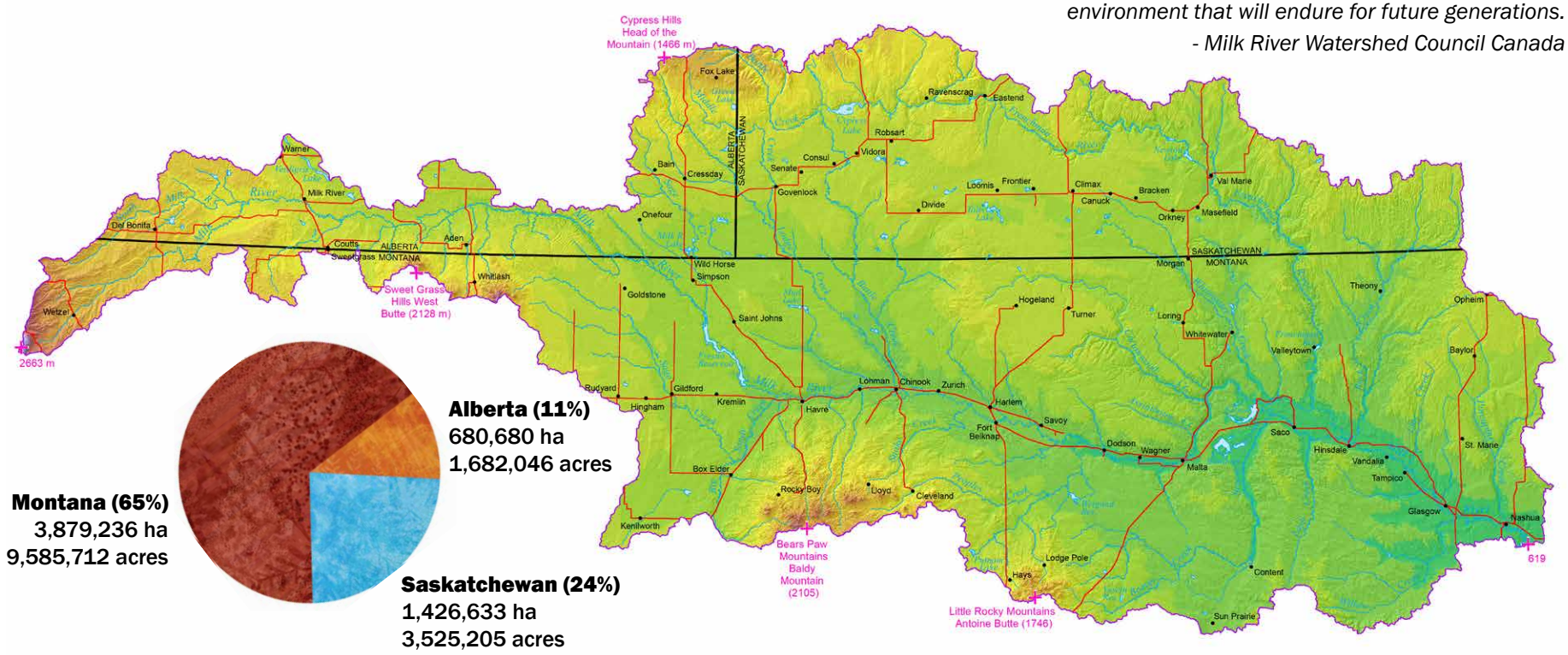
The mainstem Milk River rises in the forested lands in Montana and flows northward into Alberta before flowing eastward a distance of approximately 288 km (179 mi) and roughly parallel to the Canada-United States border. The river then flows south and returns to Montana where it flows into Fresno Reservoir and continues to flow south-east a distance of 710 km (441 mi) before joining the Missouri River. There are many tributaries that contribute flow to the Milk River, as well as an annual diversion of water from the St. Mary River to the Milk River resulting from the Boundary Waters Treaty of 1909.

The Milk River watershed is represented by the Canadian Rockies, Middle Rockies, Cypress Uplands, Northwestern Glaciated Plains and the Northwestern Great Plains ecoregions. Precipitation (and streamflows) are highly variable through time, and include periods of flood (e.g., 2011), and extended periods of drought. Historically, drought has persisted for periods between 2 to more than 20 years (Sauchyn and Steward 2023; Martin and Pederson 2022).



Our vision is a watershed where community well-being is supported by a vibrant economy and sustained by a healthy environment that will endure for future generations.

- Milk River Watershed Council Canada



Montana (65%)
3,879,236 ha
9,585,712 acres

Alberta (11%)
680,680 ha
1,682,046 acres

Saskatchewan (24%)
1,426,633 ha
3,525,205 acres

Water Management

Water management in the Milk River watershed is founded on the international water-sharing agreement that was negotiated between Canada and the United States (1909), and an inter-provincial agreement signed by Alberta and Saskatchewan (1969) to ensure that transboundary waters are shared among water users. The Treaty and the Master Agreement still provide the premise for water management in the watershed today.

St. Mary and Milk Rivers

The apportionment (sharing) of the waters of the St. Mary and Milk rivers is governed by Article VI of the Boundary Waters Treaty of 1909 between Great Britain and the United States. The terms of the Treaty were clarified by the 1921 Order of the International Joint Commission (IJC). In addition, two letters of intent were mutually agreed upon by the Accredited Officers: the 2001 Letter of Intent to Better Utilize the Waters of the St. Mary and Milk Rivers and the 2007 Letter of Intent to Better Utilize the Waters of the Eastern Tributaries of the Milk River (Pietroniro and Kilpatrick 2023) (Figure 1).

The St. Mary River Diversion was constructed to allow Montana access to their entitlement to St. Mary River water. The St. Mary River Diversion also benefits Alberta residents and irrigators by improving access to the limited natural flow of the Milk River during the irrigation season, as well as access to the additional water that may become available through accumulated U.S. deficits of St. Mary River water under the Letter of Intent (Refer to Section 3.0 in the full report). Higher flows during the summer months also increases recreational opportunities (e.g., river sports).

Each provincial and state government has developed unique approaches to how they allocate water among water users.

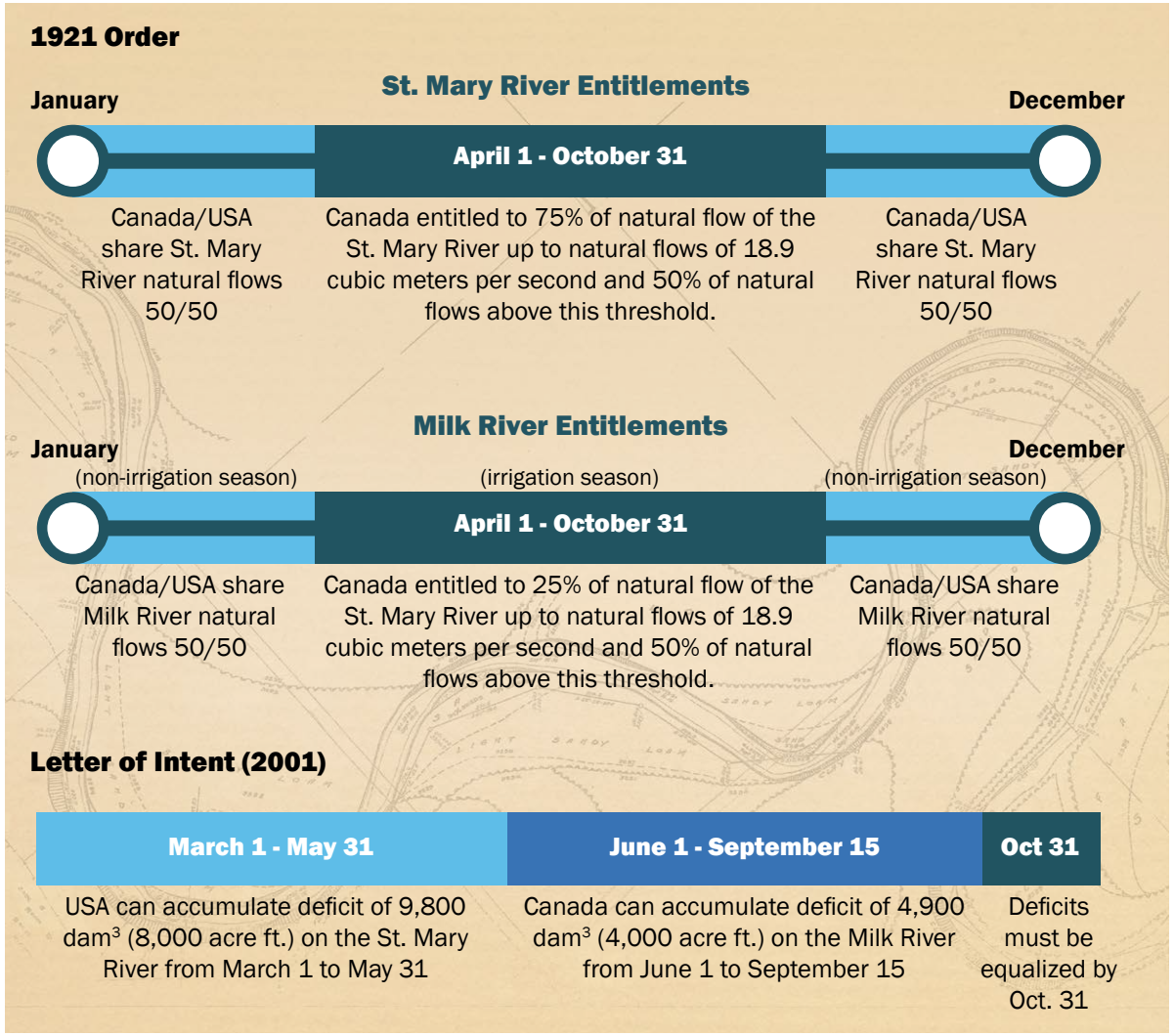


Figure 1. Graphic showing water entitlements, and the administration of the Letter of Intent (EPA 2020).

Surface Water Quantity, Supply, Allocation and Use

Water availability and supply is highly variable in the Milk River watershed, both seasonally and annually. The Milk River is considered a water-short basin (meaning that evaporation exceeds precipitation).

Milk River Mainstem

The Milk River mainstem flows are ephemeral and intermittent, meaning water only flows in the river in response to precipitation and/or where groundwater discharges at surface. It is typical to observe low flow in July, and virtually no flow in the mainstem upstream of the confluence with the North Fork Milk River in late summer in Alberta (August and September) (Figure 2).

Milk River at the Eastern Crossing

At the Eastern Crossing, the Milk River drains an area of about 6,807 km^2 (2,628 mi^2). The median annual natural flow volume (1912-2022) was 116,700 dam^3 (94,610 acre-ft) (average: 133,384 dam^3; 108,136 acre-ft), and median annual recorded flow volume was 291,550 dam^3 (236,363 acre-ft) (average: 294,625 dam^3; 238,856 acre-ft). The difference between the natural and recorded flow volumes was due to the diversion of flow from the St. Mary River to the Milk River via the U.S. St. Mary Canal (Figure 3).

The 110-year natural flow record at the Eastern Crossing provides insight into the annual variability of streamflow in the Milk River. The lowest natural flow volume on record occurred in 2001 (21,730 dam^3; 17,617 acre-ft). The highest natural flow volume occurred in 1927 (449,200 dam^3; 364,172 acre-ft) (Figure 3).

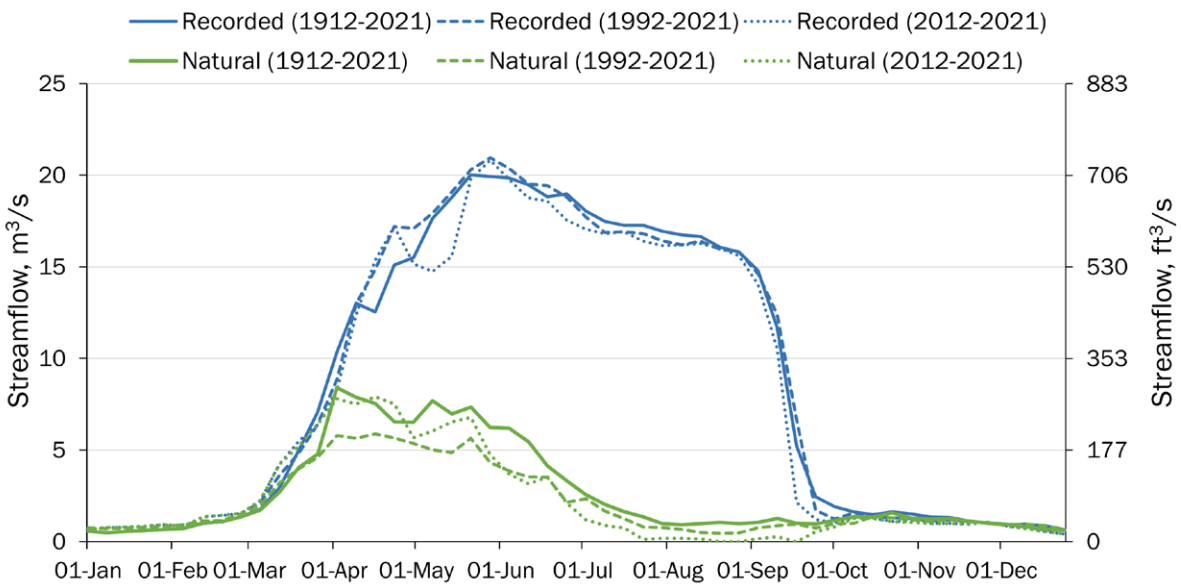


Figure 2. Comparison of median weekly recorded and natural flow for Milk River at Town of Milk River (WSC-11AA005).

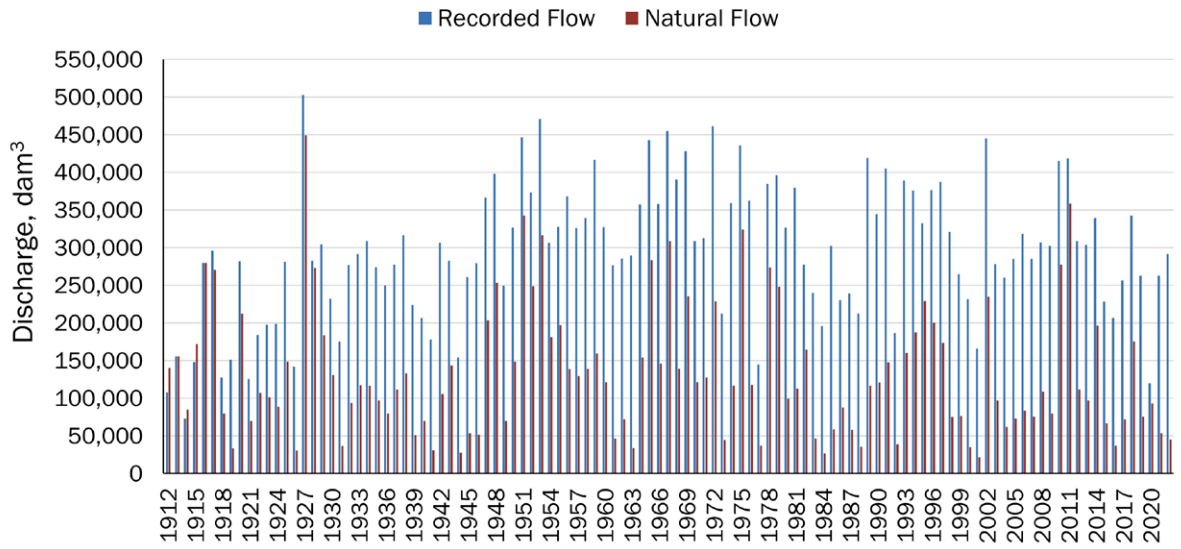


Figure 3. Annual discharge (March-October) at the Milk River at Eastern Crossing gauging station, 1912-2022. Annual discharge for years 1912-15, 1917-21, 1925-28, and 1931 represent the April-October period. Natural-flow computations prior to 1985 did not account for consumptive use, thus values after 1985 are not directly comparable to previous years.

The estimated natural flow for the Eastern Crossing does not include channel losses or gains; losses could be up to 11% of the annual flow in the Milk River in Alberta, or about 37,004 dam^3 (30,000 acre-ft) (MacCulloch and Wagner-Wachtel 2011).

Water Allocation and Use

The Milk River provides water for various purposes such as municipal, domestic, agricultural and recreational activity; however, irrigation is the main water use across the watershed. Various storages and diversions are operated in the watershed in Saskatchewan and Montana to meet irrigation demand. Such infrastructure is not available in the Alberta portion of the Milk River.

The St. Mary River Diversion has moderated the impact of variable precipitation on water supplies (Figure 2). However, in recent years, periodic shut-downs of the St. Mary River Diversion have occurred due to natural and unpredictable variations in precipitation, and maintenance requirements for aging infrastructure. St. Mary River water diversions were limited in 2016, 2017 and

2020 due to system repairs (e.g., failure of Diversion Drop Structure 5). These events, coupled with reoccurring drought, create uncertainty and risk to safe and secure water supplies for communities, the environment, and the economy. The events also highlight the need for increasing water storage in the basin to meet demand, particularly in Alberta, the only jurisdiction without storage.

Overall, the condition of surface water supplies in the watershed ranges from 'poor' to 'fair' due to uncertainties regarding water supply, combined with increasing surface water allocation and use across the basin.

Apportionment has been met in all years for the Milk River, and a few minor exceedances have occurred at Lodge Creek (SK-MT).

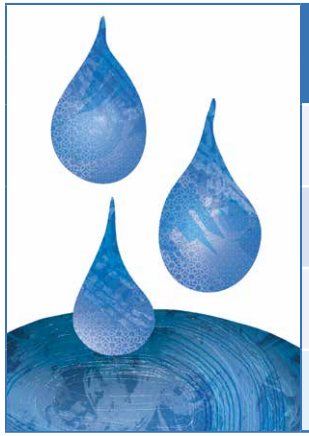
Recommendations

- Transboundary water management has increased in recent years, expanding from traditional exercises of managing apportionment, to engaging in broader discussions on water-sharing opportunities and the understanding of overall basin hydrology and watershed dynamics. Ongoing effort is required to nurture collaborative relationships among all governments and agencies to identify new strategies that will make the best use of the limited, shared and highly-valued water resource.
- When determining new strategies, the transboundary teams should consider the interconnectivity between surface water supply, allocation, and conservation (drought strategies), and water storage (including dams, soil moisture retention and wetland retention).

Surface Water Quality

Blackfeet Nation has been collecting water quality data in the headwaters of the Milk River and North Milk River, as well as in mainstem and tributary watercourses. Water quality is generally meeting nutrient criteria, with occasional exceedances of nitrogen criteria in select locations.

In Alberta, the main driver of water quality in the Milk River is the St. Mary River Diversion. Diversion period flow decreases specific conductivity (salts) values, and increases total phosphorus and total suspended solids concentrations. Significant decreasing trends



Surface Water Indicators	Measures	State			Trend			Information		
		AB	SK	MT	AB	SK	MT	AB	SK	MT
Supply	Annual streamflow deviation from normal	– / X	–	– / X	–	–	–	✓	✓	✓
Allocation and Use	Water licences and registrations; industrial water use reports	–	–	–	↑	↑	↑	✓	✓	✓
Apportionment	Percentage of years that international and interprovincial apportionment is met	✓	✓	✓	–	–	–	✓	✓	✓
Quality	Nutrient, sediment, metal and pathogen concentrations	✓ / –	?	✓ / ?	–	?	– / ?	✓	X	–

for several parameters were detected for the 15 years of data collected at the site Milk River at Hwy 880 site, including decreases in total phosphorus and total suspended solids concentrations, and fecal coliform bacteria counts. Although fecal coliform counts showed a significant decreasing trend, counts are still often above applicable water quality guidelines. Sources of fecal coliform bacteria have been tracked to cliff swallows, wildlife, natural environmental sources, and livestock. While improving trends may be partly explained by drier conditions and decreased streamflow during the last 5 years, increasing water quality awareness and stewardship activities in the basin may also be contributing to streambank stability through improved management of livestock near surface water.

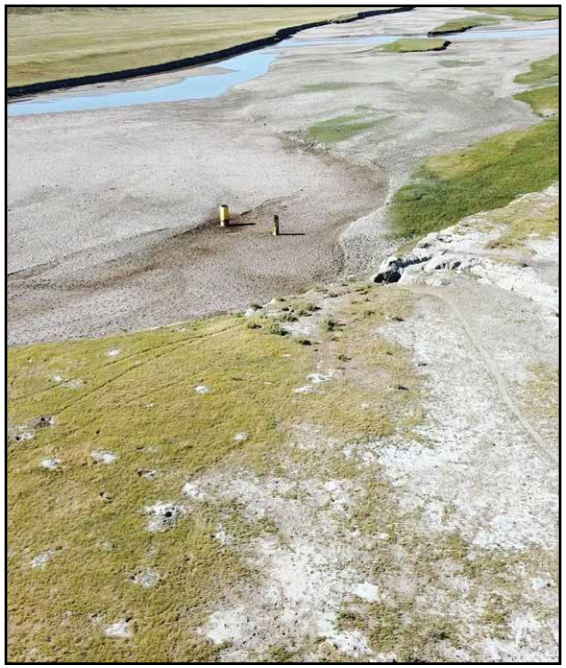
In the lower reach Montana, Aaniih and Nakoda Nation and the Aaniih Nakoda College have been monitoring water quality in the mainstem Milk River and several tributaries. At tributary sites, water quality is generally meeting nutrient criteria with occasional maximum total nitrogen concentrations exceeding the nutrient criteria (1.3 mg/L) at People's Creek and White Bear Creek, and maximum total phosphorus concentrations exceeding the criteria (0.110 mg/L) at White Bear Creek. Insufficient data prevented a more comprehensive assessment of water quality impairments for the Milk River in Montana.

Recommendations

- Water quality monitoring should continue to be a priority in the watershed, particularly in Saskatchewan where little environmental monitoring data was available.
- A meeting to discuss a standardized water monitoring program at strategic sites should be held across borders. Data collected at select sites could be used collectively to report on conditions in the future.

Groundwater Supply, Allocation and Use

Groundwater is an important resource for many urban and rural residents in the Milk River watershed. The most significant groundwater effort during the 2013-2022 period involved the completion of a comprehensive assessment of the transboundary Milk River Aquifer. The Groundwater Atlas, and several other related studies, document the state of the aquifer resource, and provide a mechanism to continue the ongoing dialogue across borders for groundwater management (Rivera et al. 2017). Groundwater well



density ranges from 0.12/km^2 (0.05/mi^2) in Saskatchewan to 0.37/km^2 (0.14/mi^2) in Alberta. Montana has a well density of 0.20/km^2 (0.08/mi^2). In Alberta, the largest licenced volume is allocated to municipal use, followed by agricultural use. Montana's groundwater appropriations are mainly for domestic use and stockwater use; however, there are 241 wells developed for irrigation purposes.

Recommendations

- Although raw data can be found online, existing groundwater monitoring programs should periodically consolidate, interpret and report on groundwater levels in the watershed.
- Consider establishing a long-term isotope monitoring network in the Milk/St. Mary's basins to support water balance and hydrologic estimation (Stadnyk 2022).

Groundwater Quality

Groundwater quality varies across the watershed, depending on the aquifer or formation that is sourced, which determines the depth of groundwater and other geologic impacts. The Milk River Aquifer, which spans Alberta and Montana, varies in depth. Deeper stores of groundwater tend to be high in total dissolved solids (TDS). In Alberta, a re-occurring assessment of groundwater in wells across the watershed found that 74% (94/127) of samples analysed for TDS, and 61% (78/127) of samples analysed for sodium, exceeded the Canadian Drinking Water Quality Guidelines. No new groundwater quality data was available for comparison in this report for Saskatchewan. In Montana, groundwater

quality ranged from 0 to 11,789 mg/L TDS, from 0.005 to 600 mg/L nitrate-nitrogen, 0 to 3,448 mg/L sodium, from 0 to 4,135 mg/L chloride, and 0 to 1,190 µg/L selenium. Highest values were observed in the Judith Formation (TDS, sodium and chloride), the Drift Formation (selenium), and the Two Medicine Formation (nitrate-nitrogen).

Recommendations

- Assessment of baseline groundwater quality data, including hydrocarbon data, should be collected every 3 to 5 years and reported publicly. This activity could be coordinated across provincial and international boundaries, and be used as the basis to compare and report on groundwater conditions in the future. A transboundary groundwater committee, similar to the one established to complete the MiRTAP project, could direct this effort.

Riparian Ecosystems

Riparian areas and wetlands consist of diverse plant communities that thrive in areas where soil moisture is high, either from periodic flooding of streams, or interactions with groundwater (depressions, springs and seeps). Healthy riparian areas provide important ecosystem services in watersheds as the transition zones between the upland and aquatic environment. Healthy riparian areas help to maintain water balance, water quality, and provide important habitat for numerous species through all life stages. Although riparian areas and wetlands make up a small part of the watershed's total area (7%), they have an essential role in maintaining overall watershed condition.

Riparian assessments are completed by various governments, agencies and organizations in the watershed. In Alberta, the overall average riparian condition is considered 'healthy but with problems'. Six of sixteen indicators rated 'healthy' in all reaches, including human-caused bare ground, and preferred shrub regeneration. Indicators that rated poor included the regeneration of cottonwood, poplar, and other native trees, riverbank root mass protection, and the presence of disturbance and invasive plants. The overall health trend for the five reaches assessed ranged from 'stable' to 'improving'.

At the Frenchman River and Rock Creek (SK), the overall riparian condition was rated 'fair'. Indicators that rated 'good' included vegetative cover and human-caused bare ground. Indicators that rated poor were related to the density and distribution of invasive and disturbance-caused plants, and

Groundwater Indicators	Measures	State			Trend			Information		
		AB	SK	MT	AB	SK	MT	AB	SK	MT
Water Supply	Number of wells (well density)	✓	✓	✓	↑	↑	↑	✓	✓	✓
	Number of licences	✓	✓	✓	↑	↑	↑	✓	✓	✓
	Water level and yield	✓	✓	✓	–	–	–	–	–	–
Water Quality	Nutrient, sediment, metal and pathogen concentrations	✓ –	?	✓ ?	–	?	– ?	–	?	–

utilization of preferred trees and shrubs. There was a degrading trend for several indicators, including the presence of trees and preferred shrubs. Conditions were somewhat better at Rock Creek compared to the Frenchman River.

There was little to no publicly available data to inform riparian and wetland condition assessment for Montana, with the exception of two wetland assessments completed in 2011, and three completed in 2016.

Recommendations

- Additional resources should be directed to the ongoing effort to manage invasive plant species, and the detection of new infestations.
- Water management planning should give consideration to streamflows necessary for cottonwood regeneration and maintenance.
- Programs should continue to support stewardship activities that help ranchers maintain healthy riparian conditions.

Biodiversity

Fisheries

Several fisheries assessments have been completed in the Milk River and its tributaries in the past 10 years. While trends in species composition are difficult to determine due to changing field methodologies and sampling objectives, it is clear that there is an increasing number of species in the watershed, and that some of the species present are expanding their range (e.g., Trout-perch in Alberta). Overwintering studies indicate the importance of deep pools to maintain fish through periods of low flow in winter.

Recommendations

- Long-term fisheries monitoring sites should be established in each of the major fishery reaches in the Milk River, and at select tributaries. These sites should be monitored routinely, approximately every 3 to 5 years so that trends can be determined.
- Sampling methodologies should be selected to reduce potential bias.
- Collaborative discussion regarding the prevention and emergency response measures and procedures should continue to address the emerging threat of aquatic invasive species (e.g., Quagga and Zebra mussels).

Aquatic Invasive Species (AIS), including mussels, invasive aquatic plants, fish, and invertebrates, threaten water resources and water-related industries in the Milk River watershed. Mussels have been detected on about 0.3% of inspected boats at the international border. For the level of threat that AIS poses to ecosystems and water users, increased capacity to inspect incoming watercraft at provincial, state and international borders is critical.

Riparian Indicators	State			Trend			Information		
	AB	SK	MT	AB	SK	MT	AB	SK	MT
Riparian Health Assessment Scores	–	–	?	–	–	?	–	–	X
Riparian Plant Composition	✓ –	?	?	?	?	?	–	?	?
Wetland Presence/Absence	–	–	–	?	?	?	–	–	–
Wetland Health Assessment Scores	–	–	?	↑	?	?	–	?	X

Wildlife

Due to the diverse nature of habitat, the Milk River watershed supports between 230 to 280 species depending on the season. The watershed supports about 80% of Alberta's species at risk, and is the most important landscape for prairie species at risk in Canada. Although there are external factors that can impact wildlife composition and distribution, many of these species are at the northern limit of their North American distribution in the Milk River watershed (AB and SK).

In this report, the status of 11 select wildlife species was assessed by documenting trends in population numbers, where possible. The presence of a variety of resident and migratory wildlife species in the watershed indicate that supporting habitat (e.g., grassland, riparian) is available and in good condition. There has been increasing effort to reintroduce species into the watershed, including the northern leopard frog, Greater Sage-Grouse, and swift fox. Mapping tools, such as the resilient lands map and native vegetation maps provide a good indication of critical habitats that should be retained to mitigate additional risks to wildlife.

Recommendations

- Future efforts may consider periodic and consistent monitoring programs across the entire watershed to confidently determine the status of species in the watershed (e.g., northern leopard frog).
- Effort should be made to restore the Milk River Breeding Bird Survey (BBS) route which has long-term data from 1970 to 2018, but is currently not active.

Upland Vegetation

Native vegetation, including forests, shrubland, grasslands and sparsely vegetated badlands, covers approximately 63% of the entire Milk River watershed. The watershed in Montana is represented by a greater percentage of shrubland compared to Alberta or Saskatchewan. The diversity of plants supports the abundance of wildlife that is observed in the basin. There are many unique plants that can be observed at various times of the year, including prickly milk vetch, soapweed, tufted hymenopappus, small-flowered hawk's beard, and western blue flag. Some of these species are abundant in Montana, but are relatively rare in Alberta and Saskatchewan.

Invasive plants can displace native plant communities, alter wildlife habitat, reduce forage for wildlife and livestock, and lower biodiversity. Some invasive plants will alter plant communities with allelopathic properties that inhibit growth of native plants, destabilize soil properties, and reduce rootmass protection on streambanks. Currently, the distribution and occurrence of invasive plants is only partially understood. New technology and tools have advanced the mapping of invasive plant location to help track the spread and the effectiveness of controls. EDDMapS is one tool that has helped to track invasive plants and prompt early response measures.

Recommendations

- Continue to expand cooperative management programs and strategies that involve the inventory and control of invasive plants across the watershed.
- Further research should be undertaken to understand how climate change may affect native plant communities resistance to invasive and/or disturbance-caused plants.

Biodiversity Indicators		Measures	State			Trend			Information		
			AB	SK	MT	AB	SK	MT	AB	SK	MT
Fish	Species composition	Number and variety of species	✓	✓	✓	↑	–	–	✓	–	–
	Species designation	# of listed species, or up-grading of species to higher risk designation rating	–	–	–	↓	↓	–	✓	✓	✓
Wildlife	A variety of seasonal, migratory and resident species	Grassland BBS Individuals	–	?	–	↓	?	–	–	?	–
		Grassland BBS Total Species	–	?	–	–	?	↑	–	?	–
		Ferruginous Hawk	X	?	–	↑	?	–	✓	✓	–
		Burrowing Owl	X	X	–	↓	↓	↓	✓	✓	–
		Greater Sage-Grouse	X	X	–	↓	↓	–	✓	–	✓
		Sharp Tailed Grouse	–	?	✓	–	?	–	✓	?	✓
		Northern Leopard Frog	X	?	–	↓	?	–	X	?	–
		Great Plains Toad	?	?	?	?	?	↓	X	?	X
		Plains Spadefoot	?	?	✓	?	?	–	X	?	X
		Prairie Rattlesnake	?	?	✓	?	?	–	X	?	–
		Pronghorn	✓	✓	✓	–	↑	–	✓	✓	✓
	Species designation	# of Species at Risk, or change in designation (e.g., 'secure' to 'at risk')	–	–	–	–	–	–	–	–	–
	Disease and parasite status	Presence of disease in key wildlife populations	?	?	?	?	?	?	?	?	?
Upland Vegetation	Native vegetation and rare plants	Percentage cover	–	–	–	–	–	–	–	–	–
		Species composition	?	?	?	?	?	?	X	X	X
	Invasive and disturbance-caused plants	Distribution and occurrence	X / –	?	X / –	–	?	–	–	?	–
	Vegetation health	Edible plants (roots, stems, leaves) and berries are safe to consume.	?	?	?	?	?	?	X	X	X

Land Use and Development

Access

Road networks are an essential part of the built environment, creating social connection and allowing for the transport of goods and services. The type and length of access roads provides an indication of fragmentation and disturbance on the landscape. The road network in the Milk River watershed includes dry-weather roads, local roads, two-lane highways, and divided highways. Road access (linear development) is considered stable in Alberta, and increasing in Saskatchewan and Montana.

Land Accessibility for Cultural Uses

Accessibility to lands for cultural use by First Nations is increasing in Saskatchewan, largely through the work of the Treaty Land Sharing Network. In Montana, lands transferred to First Nations has increased accessibility, in the headwaters area, and in areas south of the Saskatchewan border and north of the Milk River (Turtle Island lands).

Parks, Protected and Conservation Areas

The percentage of the watershed maintained in parks, protected or conservation-type managed area is an indicator of landscape condition, as well as social quality of life. Parks and protected areas (PPAs) have a significant role in conserving natural and historical features, providing refuge for wildlife, maintaining critical habitat for the future, and facilitating important opportunities for people to practice their cultural traditions and connect with the land. In Alberta, there has been a minor increase in PPAs, largely due to the work of the NCC in the watershed, through conservation agreements with landholders. In Saskatchewan, there was an increase in the PPAs due to expansion of Grasslands National Park, The state of PPAs is considered 'fair' in Alberta and Saskatchewan, with the ongoing need to manage invasive plants, riparian areas, and trails to minimize impacts on the unique landscape features. The state of PPAs in Montana are unknown at this time.

Tourism and Recreation

Based on visitation estimates, tourism and recreation activities are increasing in Alberta, Saskatchewan and Montana. Hunting and fishing trends remain 'stable' to 'increasing' in Montana, depending on the species (deer, pronghorn or upland birds).

Agriculture

Agriculture is the predominant land use in the Milk River watershed. Agricultural activity supports rural communities and the local economy, and it is an indicator of the social welfare of residents. Since 2011, the average farm size in the counties of Warner and Forty Mile increased by 5% and 12%, respectively, as smaller operations are amalgamated into larger farms. Cardston and Cypress counties both experienced a decrease in average farm size (-13% and -8%, respectively). The number of farm operators also remained stable (-2.2%).

The overall crop footprint remained the same. In 2023, the top three crops grown in the watershed (AB), as a percentage of the cropped area, were alfalfa (33%), durum wheat (31%), and barley and canola (11% each).

Public and private rangeland (including forests, shrubland, native grassland and tame grass) comprises about 76% of the watershed in Alberta, 69% in Saskatchewan, and 64% in Montana. For the 2,758 range health assessments completed in the watershed (AB) for the period 2013 to 2022, 60% of sites rated healthy, 32% rated healthy but with problems, and 8% rated unhealthy.

Energy Sector

The energy sector is comprised of oil and gas, and wind and solar power production. Hydropower production accounts for a substantial amount of energy produced in Montana, although not in Alberta or Saskatchewan.

Oil and gas activity in the watershed is considered 'stable' in Alberta and Saskatchewan, and 'increasing' in Montana. There is an increasing focus on the reclamation of orphaned wells in the watershed in Alberta. Generally, greater attention is being given to industrial developments in the watershed as its impacts on native grasslands, habitat

fragmentation, and species-at-risk is better understood.

Wind power is being generated in a few places in the watershed in Montana, but not in the watershed in Alberta or Saskatchewan. Although solar power is being explored in areas across Alberta, no solar farms have been constructed in the Milk River watershed. Solar power is being generated in Montana, just south of the Milk River watershed boundary, near the community of Sweetgrass.

Mining

Sand and gravel extraction is the most common mining activity in the Milk River watershed. The last glaciers deposited much of Alberta's sand and gravel, which is mainly used in cement-making and as construction aggregate for roads, buildings and other large structures. There are approximately 50 quarries in the watershed, divided mostly between Alberta and Montana.

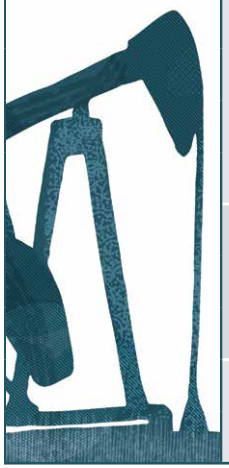
The exploration for gold and other minerals has been conducted to a greater extent in Montana compared to Alberta, mainly due to the large number of exposed Late Cretaceous to Early Tertiary intrusions in Montana (e.g., Sweet Grass Hills, Little Rocky Mountains, Bears Paw Mountains).

Recommendations

- Future effort may consider the role of mining in the watershed, and its impact on water supply and quality.

Human Footprint

The human footprint is an important overall indicator of watershed health. The cumulative impact of land use activities in the watershed can affect local hydrology, water quality, riparian areas and wetlands, and biodiversity by altering the natural system that functions to maintain balance in the watershed. In 2023, the total human footprint covered about 20,649 km^2 (7,972 mi^2) (34%) of the entire Milk River



Land Use Indicators	Measures	State			Trend			Information		
		AB	SK	MT	AB	SK	MT	AB	SK	MT
Access	Road density	✓	✓	✓	–	↑	↑	✓	✓	✓
Cultural Uses	Accessibility	?	?	?	–	↑	↑	X	X	X
Parks and Protected Areas	Percentage of watershed in parks and protected areas	✓	✓	✓	↑	↑	↑	✓	✓	✓
Tourism and Recreation	Number of visitors to serviced areas	–	✓	✓	↑	↑	↑	X	X	X
	Number of anglers and hunters	✓	✓	✓	–	–	–	–	–	✓
Agricultural Activity	Farm size	?	?	?	↑ ↓	↑	↑	X	?	X
	Number of farm operators	?	?	?	–	?	?	–	?	?
	Crop footprint	?	?	?	–	↓	↓	✓	✓	✓
	Rangeland condition	–	?	?	–	?	?	–	X	X
Energy Activity	Oil and gas footprint	?	?	?	–	–	↑	✓	✓	✓
	Wind footprint	?	?	?	–	–	↑	✓	✓	✓
	Solar footprint	?	?	?	–	–	X	✓	✓	✓
Mining	Sand and gravel	?	?	?	?	?	?	–	–	–
	Minerals	?	?	?	?	?	?	X	X	X

watershed, with agriculture comprising 96% of the footprint. With conservation in mind, the cumulative effects of diverse land uses can be reduced or mitigated to maintain and/or improve ecosystem health, while supporting social and economic development.

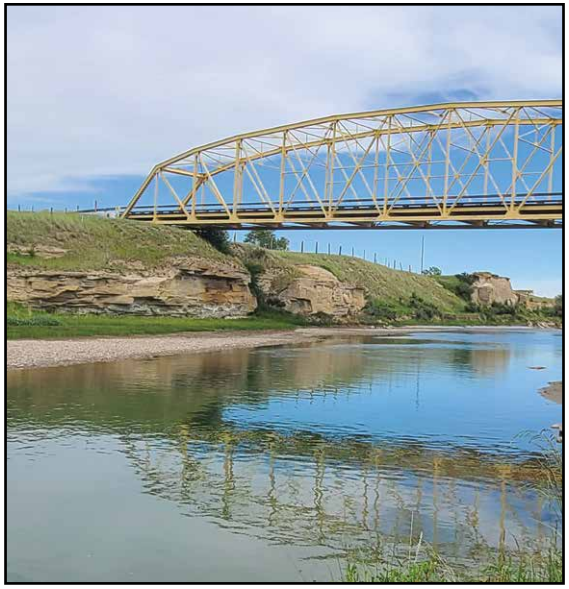
Efforts should be made to continue to track the human footprint in each jurisdiction, and work to develop a common approach to reporting this footprint at the transboundary watershed scale. The human footprint map may be considered in land use planning, to minimize increasing disturbance in critical wildlife habitat areas and maintain resilient lands.

Community

The Milk River watershed contains small communities, rich in history, that are all connected by the flow of the Milk River in Alberta and Montana, and by its tributaries in Saskatchewan. It is difficult to assess socio-economic indicators at a watershed scale because statistics are collected by census division and not by watershed boundaries. For some areas in the Milk River watershed, the majority of the population resides in communities or in rural areas outside of the watershed boundary. Local knowledge is key to informing these metrics.

Population in the Milk River watershed has remained relatively stable since 2011. The current population, as of 2021, for the entire watershed is approximately 44,124 people based on the original census approach and municipal input. Most of the population resides in Montana. Using the building-weighted population approach, there are 41,860 people in the basin. The building-weighted population estimate is likely more accurate, as the population in Saskatchewan in the rural areas were in the census boundary, but residing north of the watershed boundary. The population density is low, ranging from 0.5 people/km^2 to >25 people/km^2. Large tracts of land are still considered uninhabited.

The social and economic activity in the watershed is largely limited by the lack of secure water supplies in Alberta, and large tracts of public lands. The location of the Milk River watershed next to the international border and major transportation corridors, is promising for



future economic opportunities pending improved water security.

Communities value the unique and important landscape in the watershed. Stewardship continues to increase as landholders and land managers continue to participate in programs and workshops, and implement projects that maintain water quality, healthy riparian areas and wetlands, and healthy, productive rangelands.

Community Indicators	Measures	State			Trend			Information		
		AB	SK	MT	AB	SK	MT	AB	SK	MT
Population	Number of people in the watershed	–	–	–	–	–	–	–	–	–
Industry and employment	Size of workforce, number of unemployed, housing affordability	?	?	?	?	?	?	?	?	?
Stewardship	Stewardship actions and participation in programs	✓	✓	✓	↑	↑	↑	–	–	–

Looking Ahead

The Milk River Transboundary State of the Watershed Report, 3rd Edition is the culmination of ongoing dialogue, collaboration, and the dedicated effort put forward by a large group of people working in many different disciplines, all who have interest in maintaining the long-term cultural, environmental and economic condition of the Milk River watershed. The findings in this report indicate the ongoing need for increased flood and drought planning, both locally and across provincial and international borders as climate variability and change continues to challenge communities. Maintaining the resiliency of the Milk River watershed, including healthy forests, shrublands, riparian areas and wetlands, and native grasslands are essential to maintaining water supplies and biodiversity in the future.

Water is fundamental to life in the basin. Addressing the lack of a reliable water supply in the watershed remains a priority for Alberta, Saskatchewan and Montana. An interdisciplinary approach to assessing water supplies for the future is needed. The ongoing discussions regarding water sharing, and the commitment of the International Joint Commission to support the International St. Mary and Milk Rivers Study is encouraging.

In recent years, there was great effort to increase awareness of the importance of retaining what is left of native grasslands, globally. As a watershed that has retained 50% of its native grassland, the Milk River watershed provides an example of how it can be managed as productive rangeland for sustainable livestock production and still provide services of carbon storage, and habitat. Ongoing effort is required to maintain native rangelands, and support stewardship efforts while allowing local economies to thrive.

Future transboundary efforts will benefit from:

- Increased resource and data sharing to reduce redundancies where programs overlap.
- Utilizing watersheds as the basis for data collection and analysis at all scales.
- Improved timeliness of reporting.
- Improved data management that promotes sharing and accessibility, and maintenance of long-term records.
- Continuing on the path of reconciliation with First Nations. Create opportunities to learn more about Indigenous knowledge to inform watershed condition assessment and management.

Accessing the Full Report

The full report can be accessed electronically at the Milk River Watershed Council Canada's website: mrwcc.ca

Hard copies of the report can be requested by contacting:

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Photo Contributions
Thank you to the many photographers who contributed photos that are found in the full report. For this summary document, the photo credits are:

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