Montana State Legislature

2011 Session

Exhibit 7

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EXHIBIT 7
DATE 02-01-2011
HB 49

The Milk River: International Lifeline of the Hi-Line

A Guidebook

Milk River International Alliance
Bureau of Reclamation, Montana Area Office
Montana Department of Natural Resources and Conservation

Photo: Airphoto -Jim Wark.

About this Guidebook

From cold winters to hot summers, from strong thunderstorms to prolonged drought, from the Rocky Mountains to the high plains, from Canada to the United States, from small cities to scattered ranches—the Milk River Watershed has these and more. What is it about this watershed that makes folks want to call it home? What characteristics of the physical topography, history, water and land resources, and the lifestyles make this such a special place? The information here will help you answer these questions.

This guidebook was prepared under the direction of the Milk River International Alliance as an learning tool to accompany the video *The Milk River: International Lifeline of the Hi-Line.** The video was the first product of an information and education effort begun in 1998, and it was shown publicly at a Milk River Know Your Watershed Workshop in Havre in January 1999.** The Milk River International Alliance is a spin-off from this same Know Your Watershed Workshop. A primary goal of the Alliance is to provide educational opportunities to help residents make informed decisions regarding the future of the watershed. (For more about the Alliance see Chapter 9 page 30.) Together, the video and this guidebook provide an enduring information package to advance the Alliance's goal of providing an ongoing forum for education about the Milk River Watershed.

Compilation of a comprehensive book about the Milk River Watershed would take volumes. Of necessity, this guidebook's contents are limited—it takes a mere step towards expanding our knowledge of the watershed. Additional resources are identified at the end of each chapter for those who want to learn more.

So sit back. Relax. See if you can discover something new of interest. And enjoy your journey through Milk River country—a unique international watershed!

— Kristi Kline, Member of Milk River International Alliance
Brent Esplin, USDI Bureau of Reclamation

* *The Milk River: International Lifeline of the Hi-Line* video was made possible with support of the following organizations: Blackfeet Conservation District; Fort Belknap Tribes; Blaine, Hill, Phillips and Valley Conservation Districts; Alfalfa Valley, Fort Belknap, Glasgow, Harlem, Malta, Paradise Valley and Zurich Irrigation Districts; Environment Canada; E.P.A.; Alberta Environmental Protection; Montana Community Foundation; DEQ; FWP; DNRC; Montana Watercourse; North Central Montana Stockgrowers' Association; SaskWater; BOR; Walleyes Unlimited–Fresno Chapter.

** The video is available at conservation districts in Hill, Blaine, Phillips and Valley counties. See p. 41 for contact details.

The Milk River: International Lifeline of the Hi-Line
A Guidebook

Contents

Acronyms Used in this Guide

BLM – Bureau of Land Management (U.S. Department of the Interior)
BOR – Bureau of Reclamation (U.S. Department of the Interior)
DNRC – Montana Department of Natural Resources and Conservation
EPA – Environmental Protection Agency
FEMA – Federal Emergency Management Agency
MCA – Montana Code Annotated
DEQ – Montana Department of Environmental Quality
FWP – Montana Department of Fish, Wildlife & Parks
MSU – Montana State University
NRCS – Natural Resources Conservation Service (U.S. Department of Agriculture)
USDA – U.S. Department of Agriculture
USDI – U.S. Department of the Interior
USGS – U.S. Geological Survey (U.S. Department of the Interior)
USFWS – U.S. Fish and Wildlife Service (U.S. Department of the Interior)

Common Measures

1 cfs (cubic foot per second) = 7.48 gallons/second
= 448.8 gallons/minute
= 40 miner's inches
= 646,272 gallons/day
= 1.98 acre-feet/day

1 acre-foot = volume of water that covers an acre to a depth of 1 foot
= 43,560 cubic feet
= 325,851 gallons
= supplies a family of 5 for 1 year

Glossary

Italicized items throughout the text are defined in the glossary at the end of this booklet.

Desolate? Forbidding? There was never a country that in its good moments was more beautiful....

Chapter 1

The Milk River Watershed

...Even in drought or dust storm or blizzard it is the reverse of monotonous, once you have submitted to it with all the senses. You don't get out of the wind, but learn to lean and squint against it. You don't escape sky and sun, but wear them in your eyeballs and on your back. You become acutely aware of yourself. The world is very large, the sky even larger, and you are very small.

--Wallace Stegner, Wolf Willow

Residents of Milk River, Alberta; Glasgow, Montana; the Rocky Boy's Indian Reservation; and Val Marie, Saskatchewan all have something in common. They live in the Milk River *Watershed.*

Watersheds can be very large or quite small. The Milk River Watershed is a long drainage, with tributaries originating in Glacier National Park, the Cypress Hills, the Bears Paw and Little Rocky Mountains, and the Sweetgrass Hills (see map pp. 22-23). Tributaries like Sage Creek or Battle Creek are smaller watersheds that 'nest' within the larger Milk River Watershed. Whether you have lived in the Milk River Watershed for a month or for a lifetime, there's something still to be learned about this special place. Let's explore the unique characteristics of the Milk River Basin.

Geography and Climate

From the headwaters of the Rocky Mountain Front near Glacier National Park, the Milk River Watershed (see map pp. 22-23) covers about 23,800 square miles in Montana, Alberta, and Saskatchewan. Of the total drainage area, 8,279 square miles lie in Canada and 15,521 square miles in Montana. The Milk River flows 700 miles from its headwaters to its mouth at the Missouri. Along its way, it crosses the international boundary twice—once as it moves northeast from the Blackfeet Reservation in Montana into Alberta and once again 216 miles downstream, where it turns south, reentering Montana. From this border crossing over the next 50 miles, the river follows an ancient Missouri River channel where it becomes Fresno Reservoir near Havre. From Fresno, the river turns east and travels many miles before joining the Missouri River below Ft. Peck Reservoir.

Thirty tributaries contribute to the Milk River. *Tributary* inflows are small in the narrow upper basin. In the broad lower portion, tributaries drain the Bears Paw and Little Rocky Mountains from the south, and several large tributaries flow from Alberta and Saskatchewan. Despite the expansive drainage, natural flows are often minimal, except for spring runoff or the infrequent rainstorm.

The climate of the Milk River Watershed is semiarid, characterized by moderately low rainfall, low humidity, hot summers, cold winters, and many sunny days. Precipitation varies dramatically from the mountains to the plains. The plains are relatively dry, with mean annual precipitation ranging from 10 to 14 inches. They receive most of their precipitation (6-7 inches) between April 1 and July 31, with lesser amounts (4-5 inches) falling between August 1 and March 31. The *island mountain ranges* are slightly wetter, averaging 14 to 25 inches. Mean annual precipitation is 20 to 40 inches in the headwaters mountain areas.

Summer temperatures range from 85°F in the highest elevations in the Bears Paw Mountains south of Havre, to 102°F at the lowest elevation in the watershed near Glasgow. In winter, arctic air masses can plunge temperatures to -35°F.

Elevation in the Milk River Watershed varies dramatically—from 9,553 feet to 2,035 feet. However, the average *gradient* on the Milk River is modest—1.5 feet per mile between Havre and Malta, and 1.0 foot per mile between Malta and its *confluence* with the Missouri River.

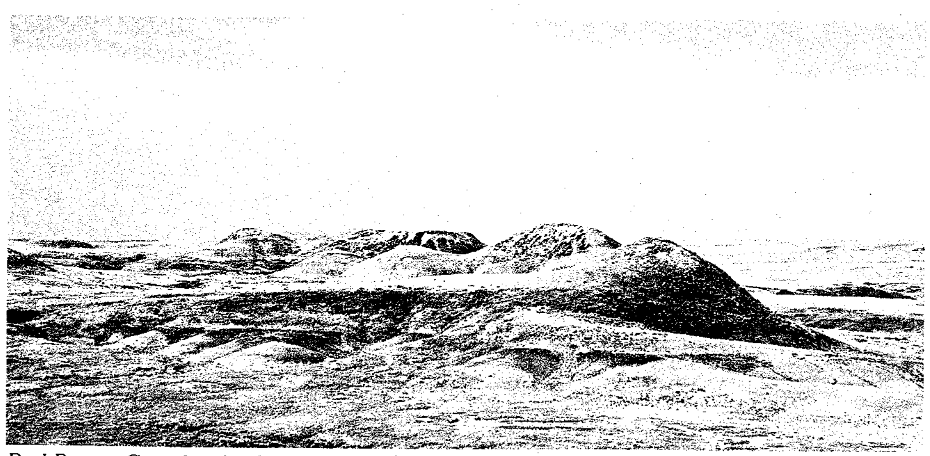

Photo by James R. Page, courtesy of Grasslands National Park of Canada.

Red Buttes, Grasslands National Park of Canada.

Geology

The ancient action of wind, water, *glaciers,* and *tectonics* shaped the *geomorphology* of the Milk River Watershed. The Missouri River once ran north from Virgelle to near Havre, where it flowed east into what is now the Milk River Valley. About 2.5 million years ago, climate changes caused formation of the 2,000-foot thick Keewatin ice sheet. The Keewatin Glacier pressed south from Canada, forcing the Missouri River to cut a new channel. Left behind was the Milk River, which now flows in the old Missouri River channel from near Havre to its mouth at the present-day Missouri.

Acting like a giant bulldozer, the glacial movement pushed a mixture of materials ranging from clay sized particles to boulders the size of a house. This material, known as *glacial till,* shaped most of the landforms in the watershed. The scraping and depositing action left mostly coarse and rocky soils, though sand, silt, and clay exist throughout the watershed. Generally, clay soils are found in the valley floors, with silts and sands in the uplands.

The ice age ended about 15,000 years ago causing the huge ice sheet to melt. Glacial melt-water transported large quantities of sand and gravel, depositing them into large flat areas known as *glacial outwash plains.* The Flaxville gravels near Turner, Montana north of Harlem are one example. The erosive forces of glacial outwash streams cut through the glacial till to form "coulees." In these deeply eroded drainages the Bearpaw Shale is sometimes exposed. This formation was shaped by an inland sea about 71,000,000 years ago.

In other areas, exposed layers of sandstone, siltstone and shale reveal the Judith River Formation. Here flood waters from the Milk and Missouri rivers spread out on the surrounding *flood-plain* dropping sediments forming soils called *alluvium.* This alluvium is the irrigated portion of the Milk River Valley.

Mountainous areas in the watershed are important geological features. The Rocky Mountains, Little Rocky Mountains, Bears Paw Mountains, Sweet Grass Hills and Cypress Hills are collection areas for water, replenishing *surface water* and *aquifers.*

The Cypress Hills are comprised of *sedimentary rocks* and *conglomerates,* while the other three mountain ranges formed from volcanoes. The Rocky Mountain Uplift caused these mountain ranges to rise several thousand feet above the surrounding plains. The *bedrock* in these mountain ranges is much more resistant than the surrounding glacial till or Bearpaw Shale. Thousands of years of *erosion* has removed several thousand feet of the softer material, leaving the island mountain ranges relatively untouched, standing high above the surrounding prairie.

Why is the River Valley So Broad?

River valleys are classified by geologists as 'young,' 'middle age,' or 'mature.' Young valleys are 'V' shaped, lack wide floodplains and meanders, and few cotton-woods and willows grow there. Middle age valleys are 'U' shaped; tend to have small meanders, and some cottonwoods and willows. Mature or old age valleys are broad, flat bottomed, have many large meanders, and cottonwood and willow are common. As a general rule, the size of a river valley is determined by the size of its river. In Blaine and Phillips counties, the Milk River Valley is much larger and wider than could ever have been created by a river its size. What accounts, then, for the broad river valley in this area?

Answer: The ancient course of the Missouri River carved the broad valley occupied, today, by a considerably smaller Milk River.

A Cross-Section of the Milk River Watershed

This cross-section applies for the Milk River Watershed from Blaine County through Valley County. The Milk River Watershed from Glacier through Hill County is slightly different in that the channel is not cut as deep and the floodplain is not as broad, but the soils are similar.

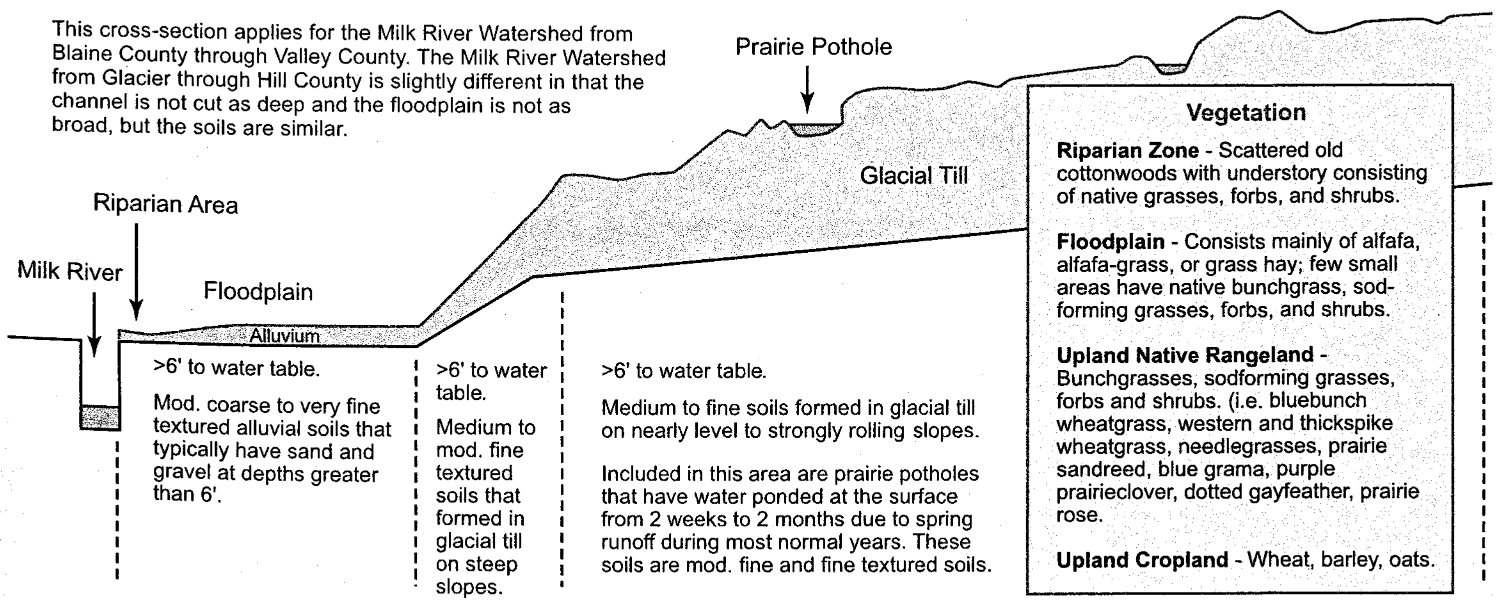

Diagram by Rick Bandy, USDA-NRCS.

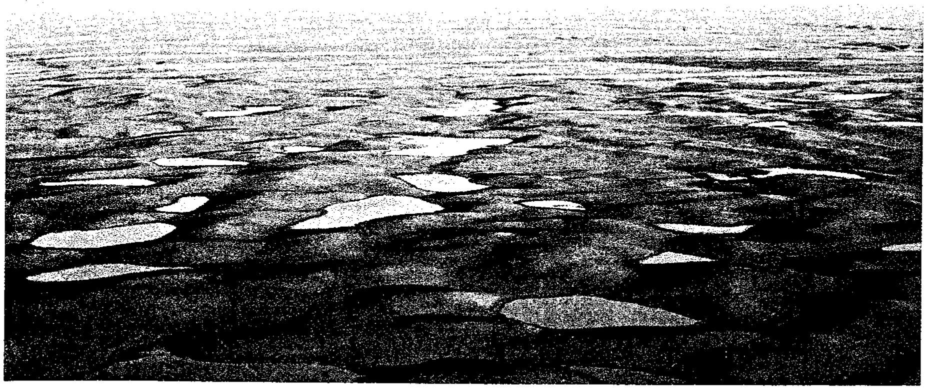

Photo by Jim Stutzman, USFWS.

Prairie potholes in northern Montana.

Of the total land area in the Milk River Watershed, rangeland is the most abundant land type (3,704,300 acres or approximately 50%). Rangeland, where the landscape has not been altered, is comprised of grasses, *forbs*, shrubs, and trees. Rangelands within the floodplain of the Milk are generally level. Outside the Milk River floodplain, the landscape turns to rolling hills crossed by drainages. Soil moisture varies on these rolling landscapes, but concentrates in the drainages, and north facing slopes.

Potholes, another important feature of the watershed, are numerous in a large area in the northern third of the *basin.* The average size is less than two acres, but can be up to ten acres. In years of average precipitation, potholes will dry up by June or July, but in spring they provide water and a temporary habitat for livestock and wildlife. *Prairie potholes* provide particularly important habitat for annual waterfowl migrations north and south.

Badlands are yet another geologic formation within the watershed. These have highly erodible soils, steep and sparsely vegetated slopes, and deeply incised drainages. Even with good rainfall, erodible soils make the badlands unproductive.

Riparian areas are located close to water sufficient to support woody vegetation and water loving plants. Riparian areas are a valuable resource because their water and diverse vegetation provides habitat for many diverse wildlife species. Riparian areas along the Milk River tend to be very small because the river channel is *incised* along most of its reach. From the normal water level to the top of the bank is at least ten feet in many areas. Along the Milk, the riparian area is usually somewhere between the normal water level and the top of the riverbank.

Other riparian areas include *oxbows* and *sloughs* along the river. Beyond the river corridor, springs, stock water dams, irrigation reservoirs, and tributaries also provide riparian areas.

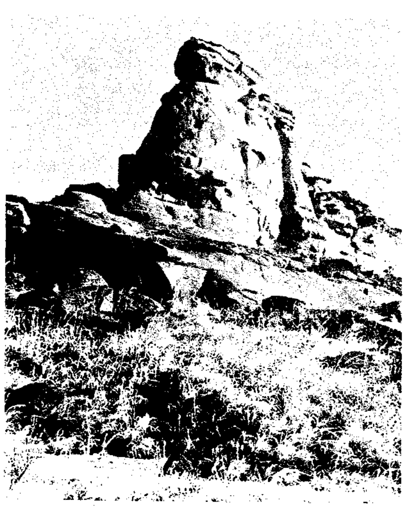

Photo by George Bendo.

A rock formation in the Havre badlands.

Photo courtesy of USDA-NRCS.

Milk River riparian area north of Hinsdale.

Rangeland Uses in the Milk River Watershed

Livestock production is the major use of rangeland in the Milk River Watershed. As of January 1, 2000, there were 242,700 cattle and 9,900 sheep in Valley, Phillips, Blaine, and Hill counties. There were also 2,372 farms in the same counties. Other uses of rangeland are hunting, fishing, and wildlife viewing. Minerals beneath the rangeland make the Milk River Basin one of the largest natural gas producing areas in the nation, and rich in archeological and paleontological resources.

—*Agricultural Statistics*

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This chapter contributed by:
Huey Long, BLM;
Marv Cross, Havre Regional Office of DNRC.

Throughout the history of the Milk River Watershed, the river has brought residents together and thrust them apart. Time and time again, through droughts, floods, and even the 'average' water year, Canadian and American watershed residents are reminded they share a common need for water.

An Historical Sketch

The labor of diverse populations laid the foundations of today's agricultural watershed economy. From the early buffalo trade of resident Native American tribes; to explorers and trappers; to the coming of the transcontinental railroad and homesteaders, water was always at the center of life. By the end of the 19th century, serious efforts were being made on both sides of the 49th Parallel to develop a reliable water supply for farmers homesteading arid land. The abbreviated history below provides a snapshot of the rich history of the Milk River Watershed, highlighting five topics that laid the foundations for life in the watershed today.

Natives and Early Inhabitants

The first residents of the Milk River Watershed were Indian tribes. The Blackfeet (comprised of three bands—the Blood, Piegan and Blackfeet); the Gros Ventres; Assiniboine; Chippewa; and Cree occupied different areas of the watershed. The Blackfeet ranged from the Missouri River north to Upper Saskatchewan. The Gros Ventre, descendants of the Algonquin, occupied some of the same area further east, ranging from north of the Missouri to the Cypress Hills in Alberta and Saskatchewan. The Assiniboine roamed the region between the Saskatchewan and Assiniboine Rivers in the North, and the Bears Paw and Little Rocky Mountains, south, in Montana. Often called 'the landless Indians' because they were scattered throughout the region, the Chippewa and Cree migrated to the Milk River area from Canada in the 1870's.

Early records of white men in the region indicate that the first Europeans to reach the Rocky Mountains, in 1742, were the sons of French fur trader Pierre Caultier de La Verendrye. Other trappers followed, but Americans Meriwether Lewis and William Clark get credit for naming the Milk River as they journeyed west on the Missouri River in 1805. The famed American explorers paused at the Milk River's confluence with the Missouri on May 8, 1805 and observed:

> *"The water of this river possesses a peculiar whiteness, being about the color of a cup of tea with the admixture of a tablespoon of milk. From the color of its water, we called it the Milk River."*

Prior to the white man's arrival, the natives were nomads and traders. They followed the abundant buffalo herds to supply their fundamental needs. The arrival of white hide hunters and others brought dramatic changes. Some white hunters reportedly killed up to twenty-five buffalo a day. With buffalo hides selling for three dollars apiece, many native peoples also capitalized on the trading opportunity. By the spring of 1880, the buffalo had entirely disappeared from the Milk River country. By 1881, many of the Indian tribes were destitute. By the turn of the century, the tribes were confined to reservations.

Photo courtesy of Montana Historical Society.

Piegan camp on St. Mary Lake, Montana 1916.

Photo courtesy of Montana Historical Society.

Track-laying crew between Havre and Ft. Assiniboine, 1887.

The Arrival of the Railroad

The vagaries of carving out a successful existence in the Milk valley did not produce much permanent white settlement on the American side of the border until James J. Hill brought the Great Northern Railroad through the Hi-Line region in 1887.

The railroad workers reached Fort Assiniboine on September 6, 1887 where they were met by the fort's brass band. Originally, the fort served as the railroad's western headquarters, but when Beaver Creek's water supply proved unreliable, Hill moved the headquarters to Bull Hooks Siding (a name later changed to Havre), which was said to have exceptional well water and lots of it. In addition to Havre, most of the largest communities on the Hi-Line today owe their origin to the Great Northern, for they were established as railroad stops along the line.

Following the Milk River from its mouth near Nashua, the railroad had a tremendous impact on the settlement of the watershed. Although stockmen like Simon Pepin had been in the basin since 1882, the coming of the railroad (and the severe winter of 1886-1887) caused a real influx of cattlemen seeking new grazing lands and easy transport for their livestock to eastern markets. Homesteading farmers followed, attracted by the opening of the first irrigation project in the lower Milk River Watershed in 1895. Early farmers located near the river or its tributaries, where it was easiest to construct irrigation canals. The first irrigation project on the lower Milk River began near Chinook in the fall of 1889, when T.B. Burns joined with neighbors to build a canal from the river to irrigate their land. Two years earlier, a colony of Mormons fleeing prosecution from anti-bigamy laws in Utah, imported their experiences with irrigated agriculture to lands they claimed, upstream, in southern Alberta.

Montana Water Development: The Milk River Project

In addition to the settlement momentum created by the coming of the railroad, the federal government encouraged agricultural settlement through the U.S.'s Homestead (1862) and Desert Land (1877) Acts. The Homestead Act gave the farmer 160 acres 'free,' except for a small filing fee. After a five year period of working the land, the homesteader got full title to it. The Desert Land Act allowed homesteaders to obtain a full section of land (640 acres) for only $1.25 per acre, if the land was worked and irrigated within three years. In Montana, stockmen benefited more from these acts than farmers, who could not avoid the expensive challenge of bringing water to lands far from a water source.

Between 1887 and 1910, most incoming settlers were ranchers and dry land farmers. But with the election of Theodore Roosevelt in 1901, and with creation of the Reclamation Act of 1902, the stage was set for improved agricultural conditions in the Milk River Watershed. The Reclamation Act authorized construction and maintenance of irrigation works for the storage, diversion and development of waters for reclamation of specified lands. It created a Reclamation Fund to help finance construction and land reclamation. And it aimed to recover the costs of the funded projects over time, by assessing fees on those whose lands benefited from the irrigation projects. The intent was that after the project costs were recovered, an irrigation project would be turned over to local water users' associations for ongoing operation and maintenance.

The Milk River Irrigation Project, authorized in 1903, was one of the first irrigation projects initiated in the United States under the 1902 Reclamation Act. The project's objective was to provide a stable source of water for irrigation of the lower Milk River valley. Landowners had learned early that snowmelt in the Rockies would not provide reliable flows in the Milk for irrigation in the downstream end of the watershed. Consequently, a plan to divert water from the St. Mary River to augment the Milk was a key component of the project. The plan would also create water storage for flood control and agricultural *water uses* along the Milk River.

Excavation of the American St. Mary Canal began in 1907. Many Blackfeet Indians hired on to work the canal, all built with horse drawn *fresnos* and *tumble bug scrapers*. However, further development was slowed, pending resolution of international tensions caused by competing development plans.

Photo courtesy of Montana Historical Society.

Southeast 1st Street and 3rd Avenue, Havre, Montana 1890. Sitting are Simon Pepin and A. G. Station

Canadian Water Development and the St. Mary River

In contrast to policy in the United States, irrigation was initially not part of the Canadian government's plan for development of the west. So early irrigation in the Canadian portion of the Milk River Watershed was on a limited scale, primarily as community efforts begun by ranching companies to improve pasturelands and create garden plots.

Contrary to the active role of the U.S. government in Montana's water development, the Canadian government's response to public pressure for water development was to support private companies such as the Canadian North West Irrigation Company (CNWICo). One way they did this was by selling the company 500,000 acres of land northeast of Milk River Ridge (about 1900), at the same time authorizing diversion of water from the Milk River.

The shift to more large scale development of irrigation in western Canada began in 1898 when construction started on an irrigation project on the St. Mary River. One important motive driving its development was concern that Montana was making plans to divert water from the St. Mary River to the Milk. The successful creation of Canada's St. Mary project gave Canada first claim to water from the St. Mary River. This fact was of considerable significance as competition for water between Montanans and Albertans escalated at the turn of the century.

In 1902 Canada asked the U.S. not to proceed with plans to develop an American St. Mary canal because it would be "injurious to Canadian interests." Initial diplomatic discussions of the issue held late that year were unsuccessful.

In spite of additional informal conversations held between Canada and the U.S. between 1903 and 1905, the CNWICo began constructing a Canadian Milk River Canal. They hoped to divert any water Americans might obtain from the St. Mary River (intended to increase Milk River flows in Montana) and, instead, irrigate Albertan land east of Milk River Ridge. Though the Canadians' long term plan, including two dams, never came to fruition, this so-called 'Spite Canal' demonstrated that competition for scarce water had reached international dimensions.

The Malta Plan Meets the Milk River Irrigation Project

The Great Depression and drought of the late 1920s and 1930s prompted America's first resettlement program: "the Malta Plan." Located in Phillips County, Montana, the plan involved retirement of submarginal farm lands and relocation of the impoverished families who worked them. This plan, together with the Milk River Irrigation Project, made for dramatic changes.

"From the inception of the Milk River Project until the 1940s, the economic and settlement patterns had shifted from a predominantly ranching, small-scale irrigation, and dry farming pattern, to a pattern dominated by irrigation farming. Previously, residents planted a few crops of oats, wheat, and clover for forage. Farmers on the transformed project, however, expanded the crops to include planted grains, sugar beets, potatoes and an array of other vegetables. In 1913, only forty-one farms with a population of 126 people were irrigated by the Milk River Project. The project had three towns with five churches and two banks. The total population of the area was 1,679 people. By 1940, the project served almost 700 farms, having a population of 2,684 people. The number of towns had mushroomed to seventeen, the number of churches to thirty-six, and the number of banks to seven. Thirty-three schools served the populace.....the Milk River Project, like other irrigation projects in Montana and the west, transformed the cultural landscape of the area."

—Excerpted from "The Historic and Cultural Resources of the Milk River Project", Rolla L. Queen, U.S. Bureau of Reclamation, 1991.


Photo courtesy of Montana Historical Society.

Old threshing rig on the Wilson Ranch, Kremlin. 1915.

The Boundary Waters Treaty of 1909

American and Canadian actions and reactions finally brought the U.S. and Canada together to negotiate. The Boundary Waters Treaty of 1909 was the result. Article VI of the treaty apportioned the waters of the Milk and St. Mary Rivers as one stream for purposes of irrigation. The agreement was revised in 1921, and today, the waters of the two rivers are divided "equally" during the *irrigation season.* During the irrigation season, the United States receives 3/4 of the flow of the Milk River (below 666 cubic feet per second) and Canada receives 1/4 of the flow. On the St. Mary River, Canada receives 3/4 of the flow and the United States receives 1/4 (below 666 cubic feet per second) during the irrigation season. Flows in excess of 666 cubic feet per second are to be divided equally for both streams. During the non-irrigation season, the flows are to be divided equally for both streams.

The Treaty also addresses the division of flows for tributaries of the Milk that originate in Canada, such as Lodge Creek, Battle Creek, and the Frenchman River. During the irrigation season, flows from these streams are divided equally (50% to each country). A set of rules and a series of gauging stations operated by the United States Geological Survey and Water Survey of Canada help to ensure that each country gets their proper share of water.

An Agricultural Economy

Settlement of competing claims for the Milk and St. Mary Rivers opened the door to eventual completion of the Milk River Irrigation Project in Montana, first begun in 1907 (see map pp. 22-23). The major components of the Milk River Irrigation Project were constructed between 1907 and 1939. Most parts of the project were in place by 1924, though Fresno Dam and Reservoir were not completed until 1939. All told, the St. Mary Diversion Canal and Milk River Project involved construction of seven major storage and diversion dams and approximately 419 miles of canals and laterals, making reclamation of approximately 125,000 acres of agricultural land possible in the lower Milk River Valley. For a region plagued by chronic water shortages, the Milk River Irrigation project made successful agricultural production possible, on a scale that was, otherwise, impossible .

In sum, the 20th century history of the Milk River Watershed was marked by the changing face of agriculture. Irrigation secured the 'backbone' of the region's agricultural economy. The history of the Milk River Watershed does not end here. But space limits dictate a mere historical overview. The legacies of the events described above linger. American Indian residents remain proud inhabitants of the Milk River Watershed. Hardy remnants of homesteading populations still inhabit the towns and farms built along the old Great Northern Railway tracks. The agricultural lifestyle and economy created through Canadian and American water development, shaped by the Boundary Waters Treaty of 1909, persists. Then, as now, residents of the Milk River Watershed have adapted, endured and coped with nature's less than predictable water supplies.

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This chapter contributed by: Mary Ellen Wolfe.

Where the Milk River's Water Comes From, Where It Goes

Water Supply & Distribution

Inter-basin water transfers, treaties, and *compacts* present many unique challenges for Milk River Basin water managers. Eight *irrigation districts*, four Indian reservations, two countries, and numerous other entities must find a way to share and manage a water supply that is frequently less than optimal for many water users.

Sources of Surface and Groundwater

Mountain snowmelt, tributary inflows, and precipitation are the main sources of surface water flows in the Milk River. Between 50 to 80 percent of the water that flows into the Milk River comes from snow melt in Glacier National Park. The remaining 20-50 percent of the water in the river comes from surface runoff throughout the basin.

Mountainous regions also take in water that infiltrates to groundwater aquifers. In the western part of the watershed, for example, terrace gravels have potential for groundwater supplies of good quality and quantity.

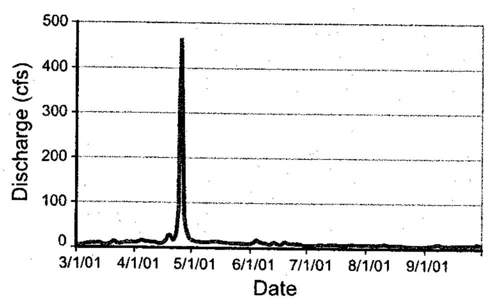
Groundwater supplies in the Milk River Basin vary sharply in availability, yields and quality based on location, geology and climate. Recharge for shallow aquifers tends to come from precipitation and irrigation waters infiltrating downward through soil.

In the western part of the basin, the Virgelle Sandstone is a prolific and important aquifer. In the northeastern portion of the basin, large gravel deposits provide fair to good quality water for irrigation and domestic use. The Bear Paw Shale dominates much of the plains with very limited potential as a water supply. Sandstone portions of the Judith River Formation supply limited quantities of water that is often highly mineralized. Other aquifers in the watershed, such as the Kootenai and Madison Formations, have not been evaluated for their potential due to depth.

The valleys surrounding the larger tributaries of the Milk River have gravelly alluvium that produces water suitable for domestic and livestock use, but the quantity can be unreliable, and quality undesirable. Valley gravel and coarse sand varying in depth from 45-200 feet can yield adequate quantities of groundwater, but most have high sodium concentrations. The Flaxville Gravel yields good quality water for domestic, livestock and limited irrigation use.

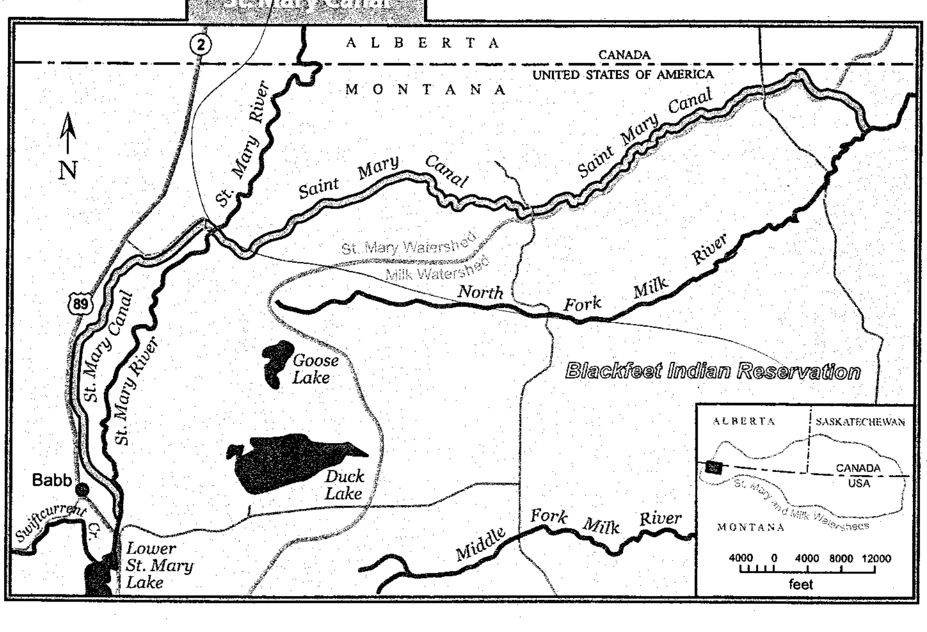
Inter-Basin Water Transfer

As described on the next page, the water diverted from the St. Mary River to the Milk River is essential to Montanans. Without it, basin runoff alone would not keep the Milk River flowing 6 out of 10 years. If the Milk River stopped flowing, the towns of Havre, Chinook and Harlem, and some 820 irrigated family farms, would be without water.



Natural river flow in the Milk River basin is indicated by this hydrograph of USGS gauge data from station 061133500 on the North Fork Milk River above the point where the St. Mary Canal brings in water from the St. Mary River basin.

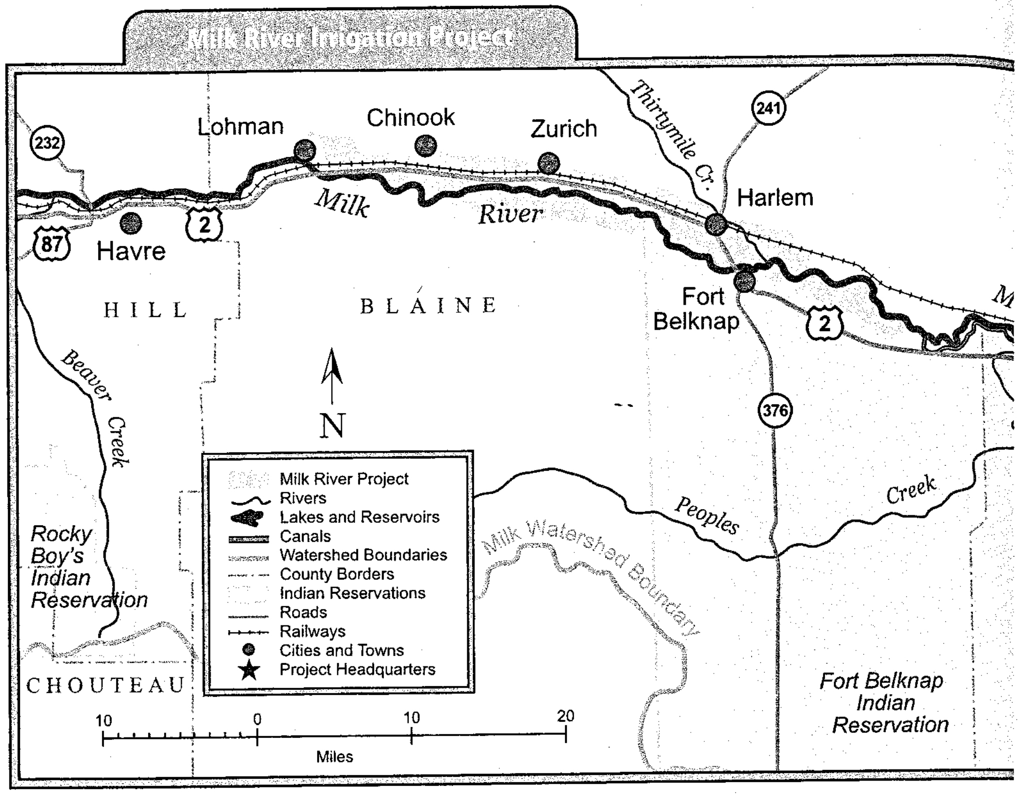
St. Mary Canal



Surface Water Supply

Water managers say that the Milk River has two 'classes' of water: one is 'natural flow,' and the second is 'project water.' Natural flow is water from runoff that originates in the basin and is not stored in a Milk River Project facility. Project water is stored Milk River water plus water imported from the St Mary River Basin(see map p. 22).

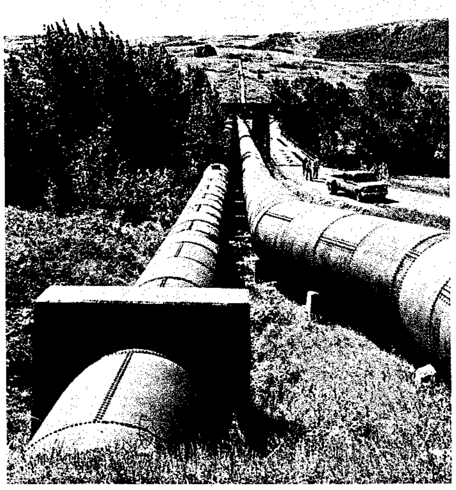
All of St. Mary River water would flow north into Hudson Bay without a very important, but aging, set of water diversion structures near Babb known as the St. Mary Reserved Works. The Reserved Works consist of a diversion dam and the 29 mile St. Mary Canal. The St. Mary Canal in Montana diverts water from the St. Mary River, and carries it to the Milk River North Fork. (There is also a St. Mary Canal in southern Alberta.) Without this imported St. Mary water, natural flows alone would not keep the Milk River flowing 6 out of 10 years. If the Milk River stopped flowing, some 820 irrigated family farms and the towns of Havre, Chinook and Harlem, would be without water. (Combined, these towns use 4.8 million gallons per day or 7.4 cfs during the summer while most farm turnout deliveries range from 2 to 6 cfs). Because of this, supplemental water stored in Fresno and Nelson Reservoirs is essential to maintaining a reliable Milk River water supply.



The most reliable water supply results from the Milk River Irrigation Project storage facilities. Sherburne, Fresno, and Nelson Reservoirs store and regulate water to sustain irrigated agriculture along the Milk River during the summer, and maintain winter flows for municipalities. During dry years, imported St. Mary water can account for as much as 95 percent of Milk River flows. Fisheries, wildlife, recreation, and several municipalities also benefit from Milk River Project water.

The right to use project water is limited to those who have a contract to use it. Those with contract water include the Milk River Project Irrigation Districts, reclamation pump contractors, the municipalities of Havre, Chinook, and Harlem, the Fort Belknap Indian Irrigation Project, and the Bowdoin National Wildlife Refuge.

The Milk River Project Irrigation Districts consist of the Alfalfa Valley, Dodson, Ft. Belknap, Glasgow, Harlem, Malta, Paradise Valley, and Zurich



Syphons are part of the St. Mary gravity diversion system.

Photos courtesy of USDI Bureau of Reclamation.

Irrigated agriculture along the Milk River depends upon the reliable water supply provided by the Milk River Irrigation Project.