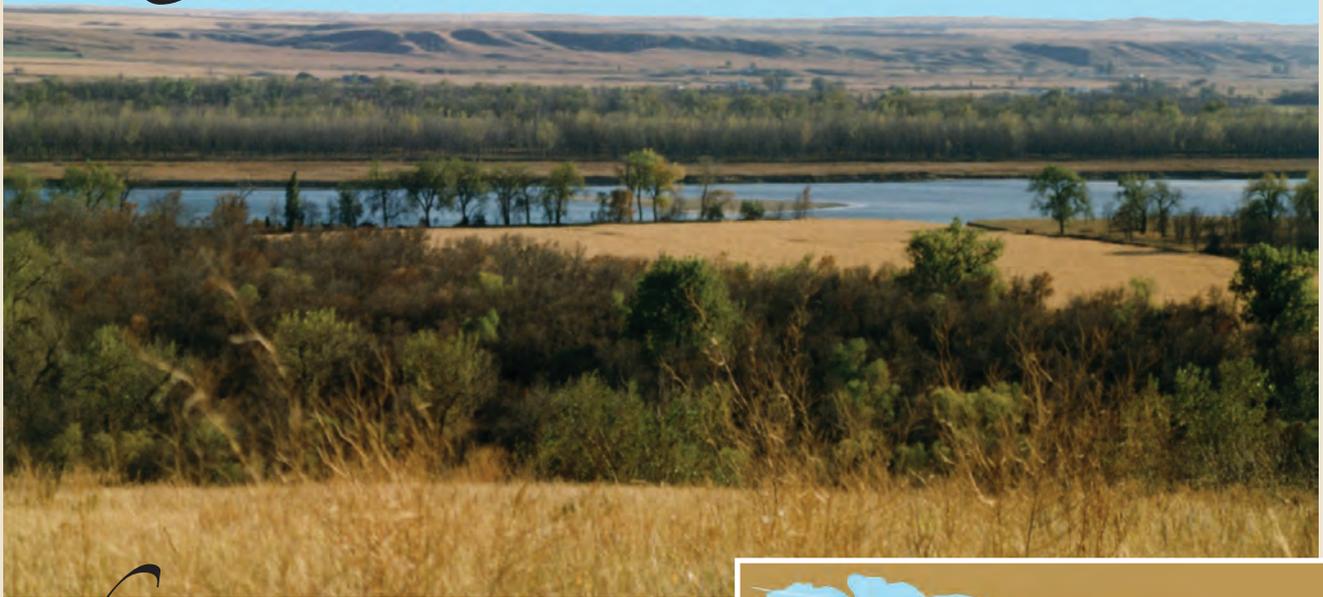


# Today's Missouri River

## A NORTH DAKOTA PERSPECTIVE



For years, man has tried to bridle the mighty Missouri River. As self-appointed manager, he has sought to slow its destructive flooding instincts, fashion its resources to match contemporary expectations, and control flows and storage for a multitude of purposes. The six mainstem dams along the Missouri have harnessed the river's waters for more than half a century - with the goal of bringing substantial economic, environmental, and social benefits to North Dakota and nine other states.

However, along with the many benefits that the mainstem dams provide, the attempt to lasso Big Muddy's natural course has not come without controversy. Competition between water users, loss of

valuable habitat, endangered species impacts, bank erosion, and delta formation are just a few of the complex contemporary issues related to Missouri River management today.

The purpose of this educational booklet is to celebrate many of the benefits that the Missouri River provides, and summarize some of the most pressing issues that are facing natural resource managers and residents alike in all parts of the basin.

### *The Reservoir System*

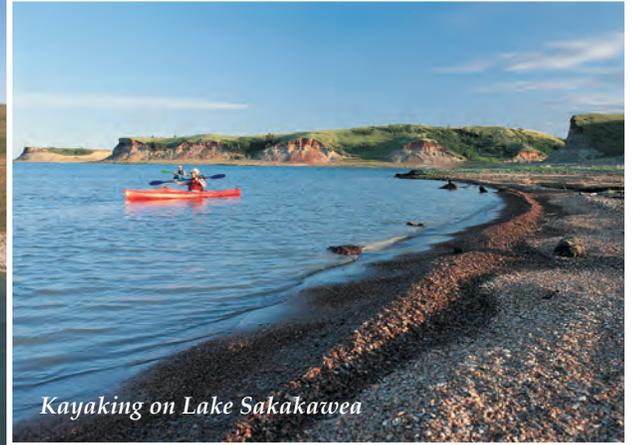
Six dams and reservoir projects make up the Missouri River

reservoir system. Each of the projects were constructed by the federal government, and they are operated and maintained by the U.S. Army Corps of Engineers for the purposes of flood control, water supply, recreation, irrigation, hydropower, water quality, fish and wildlife habitat, and navigation.

The first of the mainstem



*Garrison Dam Powerplant*

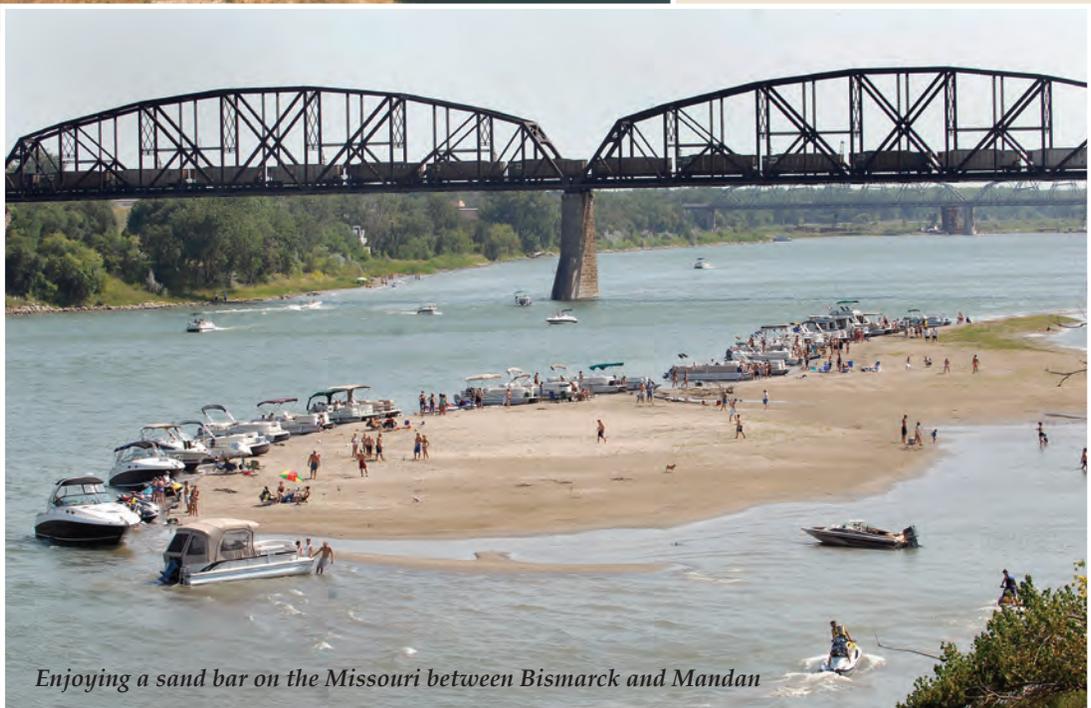


*Kayaking on Lake Sakakawea*

PHOTO BY NORTH DAKOTA TOURISM/J. LINDSEY

dams to be constructed was Fort Peck, which was completed under an authorization by Congress as part of the Rivers and Harbors Act of 1935. Later, the Pick-Sloan Plan, a cooperative effort between the U.S. Army Corps and Bureau of Reclamation, called for the construction of five more mainstem dams along the Missouri River. Authorization of the Pick-Sloan Plan came with Congressional passage of the Flood Control Act of 1944.

The other five mainstem dams built on the Missouri River are Garrison, Oahe, Big Bend, Fort Randall, and Gavins Point. The reservoirs behind each of the six mainstem dams are Fort Peck Lake, Lake



*Enjoying a sand bar on the Missouri between Bismarck and Mandan*

PHOTO BY THE BISMARCK TRIBUNE

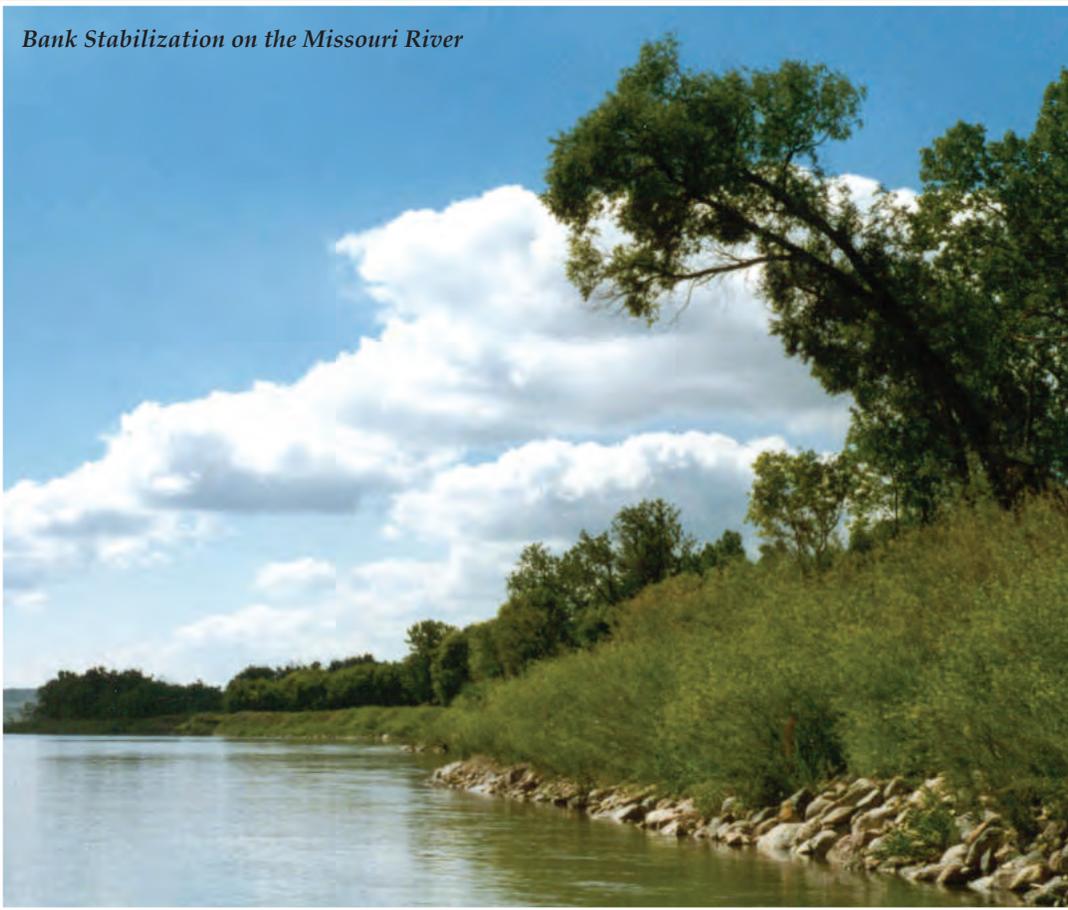
Sakakawea, Lake Oahe, Lake Sharpe, Lake Francis Case, and Lewis and Clark Lake.

The Army Corps operates the Missouri River mainstem system under the guidance of the Missouri River Master Water Control Manual, also known as the Master Manual. The Master Manual was originally developed in 1960, and it has undergone a series of revisions – the most recent of which was completed in 2004.

## *Recreation*

According to the Army Corps, recreation on the Missouri River system, especially along the six mainstem reservoirs, contributes about \$85 million in National Economic Development (NED) benefits annually. Some of the more popular recreational uses include boating, fishing, hunting, camping, sightseeing, and swimming. There are about

*Bank Stabilization on the Missouri River*



cutthroat trout, and white and smallmouth bass.

More recently, low water levels in the upper three reservoirs, caused by years of drought and system operation, have resulted in negative impacts to recreational users.

However, access for boating and fishing has been maintained relatively well

80,000 acres of recreational land and nearly 6,000 miles of shoreline throughout the reservoir system. And, approximately 70 percent of the 10 million plus recreation days that take place annually occur in the upper basin reservoirs and river reaches in Montana, North Dakota, and South Dakota. Lakes Sakakawea and Oahe alone, account for about 30 percent of annual recreation days on the entire system.

One of the most popular water-based recreation activities in and along the Missouri system is fishing. The Missouri River in North Dakota provides a renowned fishery, often considered one of the best in the country. And of native and non-native species, walleye are by far the most

sought after game fish by boat and shore anglers alike. According to the North Dakota Game and Fish Department, there were about 1.5 million boat and shore angler hours logged during the summer of 2006, with 586,000 walleye harvested from the Missouri River system. During that same summer, catch rates on Lake Sakakawea for boat and shore anglers were about 0.4 and 0.8 walleye per hour; and 0.4 and 0.5 on the Missouri River and Lake Oahe - with more than one million walleye caught. Other popular game fish sought by Missouri River system anglers in North Dakota include, sauger, northern pike, chinook salmon, black and white crappie, yellow perch, channel catfish, burbot, rainbow trout, brown trout,

through the lengthening and relocation of boat ramps.

### *Bank Stabilization*

The two banks of the Missouri River cover 174 miles of the 87-mile stretch from Garrison Dam to the beginning of the Oahe reservoir (at normal elevation). Presently, there are 52 miles of stabilized bank (bank protected from erosion by rip-rap or other structures), 17 miles that are proposed for stabilization, and 105 miles that are not considered in danger of erosion. If the remaining 17 miles proposed for bank stabilization (10 percent of total river miles) were completed, only 60 percent of the Missouri River in North Dakota would remain unprotected.

*Piping Plover*



*Least Tern*

*Bald Eagle*



*Threatened and Endangered Species*

Loss of habitat due to dam construction and river channelization, along with use of certain pesticides and over exploitation, have led to

the endangered or threatened status of three birds and one fish that are dependent on the Missouri River. The three federally listed endangered species living along the Missouri River system include the piping plover, least tern, and pallid sturgeon. The bald eagle at one time was also listed as endangered, but because of recovery efforts, was upgraded to threatened in 1995.

The Missouri River reach between Garrison Dam and Lake Oahe seems to be a favored location of both the piping plover and least tern. Studies between 1988 and 2000 indicated that 23 percent of piping plovers and 25 percent of least terns living along the Missouri River system were located in that area. Bald eagles are also found throughout the Missouri River system. And though few are observed in North Dakota around Lake Sakakawea,

populations exceeding 100 have been observed wintering between Garrison Dam and Lake Oahe. Because of habitat loss, the future of the pallid sturgeon is questionable, despite continued reintroduction through stocking, and recent efforts to modify river flows and construction of back channels to improve spawning habitat. Currently, there are believed to be only about 650 pallids left in the entire Missouri River system. Very few still remain in North Dakota.



*Pallid Sturgeon*

## *Floodplain Management*

Issues surrounding the Missouri River floodplain range from the changes created by the construction and operation of the mainstem reservoirs to development along the floodway and within the floodplain. Existing and new development within the floodplain is regulated by local entities using standards required by the National Flood Insurance Program. While the Garrison Dam provides significant flood protection for Bismarck-Mandan, continued growth of the Oahe delta south of Bismarck, and the Sakakawea delta near Williston have raised concerns.

Updated Flood Insurance Rate Maps (FIRMs) for the Missouri River in Bismarck and Mandan were completed in 2005. The



*Missouri River in north Bismarck*

result was anywhere from little or no change in the base flood elevation, to a one foot increase in some areas in south Bismarck-Mandan. Delta formation near Williston at the headwaters of Lake Sakakawea could also mean an increase in the base flood elevation for that area. But until updates of FIRMs for Williston are completed, the impact of the growing delta is only speculative.

## *Riparian Woodland/ Adjacent Wetlands*

Natural habitats of the floodplain include wetlands, river bottom forests, and native grasslands. Controlled flows from the dams have allowed for much of the natural habitat to be cultivated for cropland. Most of the remaining forested area is also grazed to varying



*Wetland  
area near the  
Missouri-  
Yellowstone  
confluence*

degrees. The lack of flooding has prevented regeneration of native cottonwood and willow forests, causing continued decreases in their numbers. North Dakota's Garrison reach of the river is a prime example of this trend, where only aging and dying stands remain.

### *Sediment Deposition and Delta Formation*

Lakes Sakakawea, Oahe, and the other mainstem reservoirs continue to act as collection sites for sediment carried by the Missouri River. The silt load that used to move through the Missouri system with greater ease before the dams were built is now deposited when it hits the headwaters of the mainstem reservoirs. It is estimated that as much as 100,000 acre-feet of sediment enters the six mainstem reservoirs each year. And, since the mainstem reservoirs were built, approximately 5 percent

of the system's storage capacity has been filled with sediment.

In the Garrison reach of the river, bank erosion has actually declined since the closure of the dam in 1953 - from 200 to 250 acres a year pre-dam, to 60 acres a year post-dam. However, before the dam was closed, erosion was accompanied by accretion along the river. Today, there is little accretion occurring. But in its place, siltation and delta formation are becoming a bigger problem.

Deltas can increase groundwater levels, reduce the amount of river channel capacity, and result in ice jam flooding during fall freeze and spring thaw. This in turn can result in flood risks to urban developments, public infrastructure, and riparian habitats. Williston and Bismarck-Mandan will continue to face ever-growing problems associated with delta formation at the headwaters of Sakakawea and Oahe.

### *Riparian Development*

Development along the Missouri River is one of the more contentious issues concerning the river, as there is an ongoing tug-of-war between residential development, agriculture, recreation, and preservation. Numerous conservation groups have expressed opposition to residential development of the river, while private homes, marinas, and subdivisions continue to spring up along valuable riverfront property.



*Homes on the Missouri River near Mandan*



*Sediment deposition and south Bismarck-Mandan Marinas*



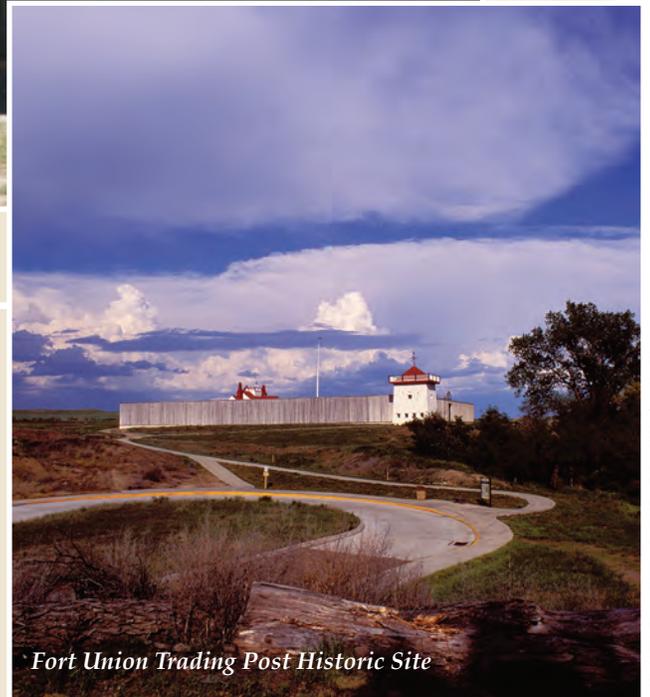
*Fort Mandan Historic Site*

## *Historical and Archaeological Features*

The Missouri River has long served as an important travel artery linking diverse peoples and places. Archaeological surveys have discovered about 2,840 sites around the system reservoirs, and almost half of those sites were located in and around Lake Sakakawea.

Some of the historic sites located along the Missouri River system in North Dakota include Fort Buford, Fort

Clark, Fort Mandan, Molander Indian Village, Double Ditch Indian Village, Huff Indian Village, Fort Rice, and the Sitting Bull Burial site. Shoreline and bluff erosion continue to pose a constant threat, exposing artifacts at many cultural and historic sites along the Missouri River system.



*Fort Union Trading Post Historic Site*

PHOTO BY NORTH DAKOTA TOURISM/J. LINDSEY

## *Water Quality*

Historically, the Missouri River was one of the greatest silt carriers in the world. But the dam system has drastically reduced turbidity and contributed to clearer water and cooler temperatures. Today, water quality in the Missouri River is among the best in North Dakota for domestic and industrial purposes.



*Reconstructed On-A-Slant Mandan Indian Village*

PHOTO BY NORTH DAKOTA TOURISM/G. KELLOGG

## *Water Supply*

Not only is Missouri River water of high quality, there is a lot of it. Nearly 96 percent of the annual flow in North Dakota's rivers and streams flows through the Missouri River. And, Lake Sakakawea and Lake Oahe account for 97 percent of all available water storage in the state.

On Lake Sakakawea and along the Garrison reach of the river, there are 423 water supply intakes, including municipal, domestic, industrial, and irrigation uses. One of those intakes, the Southwest Pipeline Project, is a regional water supply system that draws water from Lake Sakakawea and serves 35,000 people in southwest North Dakota, including 28 communities, and 3,100 rural hookups.

The Northwest Area Water Supply (NAWS) is another regional water supply system that will use Missouri River water, and is currently under construction. When completed, NAWS could serve as many as 81,000 people in northwest North Dakota.

The state is also looking to solve expected drought-related water supply shortages in the Red River Valley through the development of the Red River Valley Water Supply Project. This project will transfer Missouri River water to areas throughout the eastern portion of the state – including the Wahpeton-Breckenridge, Fargo-Moorhead, and Grand Forks-East Grand Forks communities.



*Sovereign land on the Missouri River*

## *Sovereign Land Management*

When some people hear the term sovereign land, they immediately think of Native American-related, or reservation lands. In this case, however, the term sovereign land actually refers to land owned and controlled by the state that is in and around navigable lakes and streams, including islands. In North Dakota, the Missouri River is considered to be navigable. And more specifically, sovereign lands are those areas located below what is known as the ordinary high water mark – which basically is the line created by the river when it is at an ordinarily high level.

The Missouri River's expansive sand bars, clear water, and general aesthetic appeal have drawn tremendous interest from recreators, homeowners, and developers alike – particularly in the Bismarck-Mandan portion of the Missouri River corridor. And along with increasing usage and pressure for more development, comes conflicts between users, and thus, a more active role in sovereign land management is required. In 2007, the Office of the State Engineer completed a sovereign land management plan, primarily to provide improved consistency in the management of sovereign land and administration of regulations.

For More Information Contact:

North Dakota State Water Commission  
900 E Boulevard Ave. Dept. 770, Bismarck, ND 58505-0850, 701-328-2750

North Dakota Water Education Foundation  
P.O. Box 2254, Bismarck, ND 58502, 701-223-8332

*The information in this booklet was compiled from interviews and materials provided by the ND Game and Fish Department, ND Health Department, ND State Historical Society, ND State Water Commission, U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service.*