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# The Missouri River

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Water Protection Program fact sheet

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## **How did the Missouri River come to be?**

The present course of the Missouri was formed about 115,000 years ago when streams flowing eastward from the Rocky Mountains encountered the western edge of the Illinoian ice sheet. These streams were diverted southward until the southern edge of the glacier was reached near present day Kansas City. From there, the river flowed east along the southern border of the glacier, through what is now central Missouri.

## **How long is the Missouri River?**

From Three Forks, Montana, to St. Louis, the river is 2,300 miles long.

## **What was the historical river basin like?**

Eighty-seven percent of the basin's 338.5 million acres was originally prairie. The floodplain of the Missouri and its tributaries were a mixture of grasslands, forests and wetlands.

## **What did the original river look like?**

The river was filled with islands, side channels flowing around islands, quiet backwaters and marshes as well as the main channel of the river. Today's river has a nine-foot navigation channel and, at 1,000 feet wide, is roughly half the width it used to be before it was channelized.

## **What were the March and June rises?**

Prior to upstream reservoir construction, the Missouri River experienced two general periods of high water. The first, often referred to as the March rise, was caused by snow melt on the plains and the break-up of ice in the main channel and tributaries. The second, called the June rise, resulted from run-off of melting mountain snow and rainfall throughout the basin. The reservoirs were constructed to help minimize the frequent downstream flooding from these rises.

## **Were there any benefits to the rises?**

The natural spring rises in river flow often flooded nearby land. The flood waters deposited sediments rich in organic matter. This increased productive plant communities along the river, particularly marshes that produced huge quantities of insects and other small invertebrate animals that served as important food supplies for fish and waterfowl, including ducks and geese.

## **Changing the River - A time line of the historical Missouri**

**1804 to 1806** - The first formal exploration of the Missouri River by Lewis and Clark. They saw the value of the river as a convenient avenue of travel into the Great Plains and Rocky Mountains that would help increase fur trading with the American Indians.

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**1838** - Removal of snags to promote steamboat traffic.

**1867** - The first government survey of the Missouri River was made by Charles Howell.

**1882 to 1902** - Congress appropriated \$8 million for channel improvements. This resulted in the construction of a 5.5-foot-deep navigation channel for the first 44 miles of the river upstream from the mouth to Augusta in St. Charles County.

**1933** - Construction of the first major dam, Fort Peck, on the Missouri River's main stem begins in Montana.

**1944** - The Flood Control Act required a basin-wide plan, known as the Pick-Sloan Plan. The plan recognized the need to provide for multiple uses, such as irrigation, navigation, hydropower, flood control, water quality, water supply, fish and wildlife and recreation. The major result of this plan was the construction of an additional six dams of the main stem Missouri to join the Fort Peck Dam.

**1945** - The Rivers and Harbors Act established the dimensions of the present navigation channel, which is 9 feet deep and 300 feet wide. The Rivers and Harbors Act also required the navigation channel to be extended to Sioux City, Iowa.

### **What about the fish?**

Together with the removal of snags, the loss of good habitat has caused an estimated loss of more than 80 percent of the fish in the river. Changes in habitat and increased water clarity due to the trapping of sediments in the main stem reservoirs has caused an increase in the numbers of species such as skipjack herring, gizzard shad, white bass, bluegill, white crappie and the emerald, river and red shiners. In Missouri, two large river species, the pallid sturgeon and the flathead chub, are in serious decline. In Nebraska, serious declines in seven species of minnow, burbot and sauger have occurred. If trends continue, some of these species may become lost from the Missouri River system. The loss of fish species signifies damage to the river's ecosystem.

### **Have land-use changes affected the Missouri River?**

Changes in the river have been accompanied by land use changes as well, particularly on the channelized lower river. Between 1892 and 1982 on floodplain land between Sioux City, Iowa, and St. Louis, cultivated land increased 4300 percent, while tree cover declined 41 percent, wetlands declined 40 percent, sandbars declined 97 percent, and grasslands declined 12 percent.

### **What's the Missouri River like today?**

Channelization and dam building have greatly changed the Missouri River. Today, 67 percent of the Missouri is either channelized for navigation (650 miles) or impounded by dams (903 miles). Most of the remaining free-flowing portions of the river are near the headwaters in Montana. Channelization has resulted in the lower river being about 50 percent narrower. Most of that loss in width has been in the more biologically productive off-channel backwaters and marshes.

### **Can I swim in the Missouri River?**

The Missouri Department of Natural Resources does not recommend swimming in the Missouri River. Because of the strong current, the state does not recognize swimming as a protected use of the Missouri River, and wastewater discharges to the river are not required to disinfect. The river has higher bacterial counts than most other surface waters in Missouri, and these higher levels present an increased health risk to those who do swim in the Missouri River.

### **Can I fish in the Missouri River?**

Although the pesticides DDT, dieldrin and chlordane have been banned from use in the United States, some of their residues are still found in Missouri River fish. While most residues are not in quantities considered harmful, the Missouri Department of Health has advised that no one consume sturgeon caught in the Missouri River due to chlordane and PCBs found in them. The Department of Health has also advised the public to limit consumption of carp, catfish, suckers and buffalo to one pound per week.

### **What is the history of the quality of the water in the Missouri River?**

There have been several water quality concerns expressed over the use of Missouri River water in the past 200 years. Mark Twain noted that when a drinking glass was filled in the river, only about half the glass contained water. The rest was sediment, reflecting the river's nickname, the Big Muddy. Twain said that some people would let the glass set awhile and drink just the water but that most people took the two together. A more serious problem before adequate water treatment was waterborne diseases such as typhoid. Many river travelers and residents of towns along the river died of typhoid fever after drinking Missouri River water.

**1920s** - By the 1920s, larger towns along the river were disinfecting river water by lime treatment, with mixed success.

**1940s** - Chlorine was in general use for disinfection of drinking water supplies. This proved to be very effective against bacteria and viruses.

**1950s** - At about the time we were solving the problem of removing bacteria from drinking water, we were acquiring another water quality problem. The growth of human and domestic animal populations and increased industrial activity, most notably meat packing, resulted in increasing amounts of sewage, animal wastes and garbage being disposed of untreated into the Missouri River. By the 1950s, much of the lower river was seriously polluted. Garbage and giant grease balls floated on the surface, sludge deposits coated sections of the river bottom, and much of the river smelled.

**1964** - Following a rain, a large section of the river below Kansas City suffered a massive fish kill due to a loss of dissolved oxygen. Because there was not enough oxygen in the water, the fish died. The problem was attributed to the amount of sewage or other organic solids in that section of the river.

**1972** - Cities began addressing sewage problems and, in 1972, passage of the Federal Clean Water Act set strict new rules for water quality and provided large amounts of grant money for construction of wastewater treatment plants.

**1997** - The water quality of the Missouri River is now much improved. Garbage dumping has been eliminated, and all wastewater must be treated before discharge. Although the pesticides DDT, dieldrin and chlordane have been banned from use in the United States, some of their residues are still found in Missouri River fish. While most residues are not in quantities considered harmful, the Missouri Department of Health has advised that no one consume sturgeon caught in the Missouri

River due to chlordane and PCBs found in them. The Department of Health has also advised the public to limit consumption of carp, catfish, suckers and buffalo to one pound per week.

### **Can I drink the water from the Missouri River?**

The Missouri Department of Natural Resources recommends that you do not drink untreated water from any surface water, especially an unprotected river, lake, stream or creek. This is because surface water that is used as a drinking water supply is generally treated, including disinfecting, with chlorine, before the water is safe for people to drink. This treatment process protects humans against bacteria and other chemical contaminants that might enter an unprotected river, lake, stream or creek. A popular agricultural herbicide, atrazine, is detected frequently in the Missouri River, although not at levels that pose a significant health threat.

### **Does this affect my drinking water?**

Mean annual levels of atrazine in the Missouri River are less than one part per billion; the drinking water standard is three parts per billion. Even though extensive monitoring has shown that the atrazine levels on Midwestern rivers do not exceed drinking water standards, most drinking water suppliers provide extra treatment of drinking waters during spring and summer when atrazine levels are highest.

### **Can I use the Missouri River as a source of drinking water for my livestock?**

Yes.

Today there are no serious chemical water quality problems on the Missouri River, although there is serious and historical degradation of aquatic habitat. The Missouri Department of Natural Resources is concerned with the management of watersheds of major tributaries and the possible need for additional water treatment to remove contaminants, such as parasitic protozoans like cryptosporidium and chemicals like atrazine. Because of our great reliance on the Missouri River as a drinking water supply, the Missouri Department of Natural Resources is dedicated to protecting and preserving this great natural resource.

### **For more information call or write:**

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