Upper Missouri Wild and Scenic River Management Plan

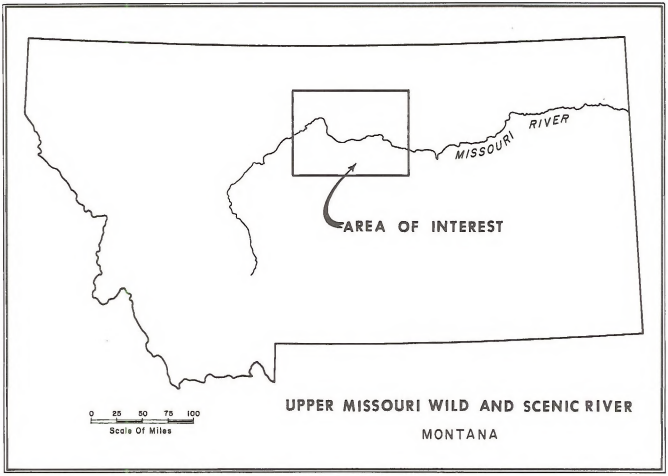
Supplemental Document

FINAL

U.S. Department of the Interior
Bureau of Land Management

White Rocks area, Upper Missouri River

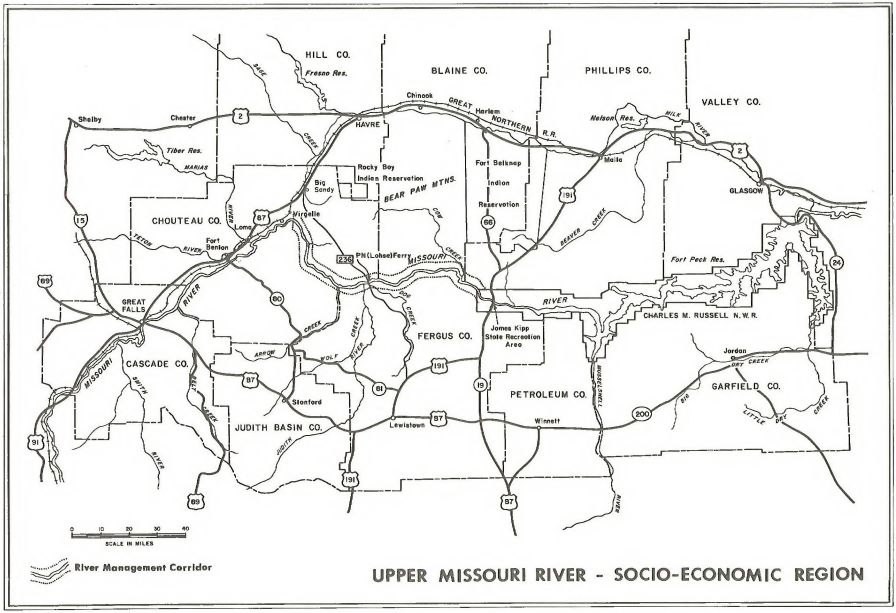
Contents



Regional Setting

The river management area is situated in north-central Montana between the community of Fort Benton and the U.S. Highway 191 river crossing (Robinson Bridge). For purposes of this plan, the regional setting of the resource management area is considered to be an area in north central Montana consisting of the following 10 counties: Blaine, Cascade, Chouteau, Fergus, Garfield, Hill, Judith Basin, Petroleum, Phillips, and Valley. The counties of Chouteau, Fergus, Blaine, and Phillips border the Missouri River Management Area.

A part of the Great Plains physiographic province, the region consists primarily of high rolling plains with mixed prairie grasses. This high-



UPPER MISSOURI RIVER - SOCIO-ECONOMIC REGION

land plain has been dissected by the Missouri River and its tributaries. The river lies roughly 18 miles south of the base of the Little Rocky Mountains at Robinson Bridge, curves around the southern base of the Bear Paw Mountains for some 80 miles at distances varying from approximately 16 miles to the south at Cow Creek to about 8 miles at Little Sandy Coulee, and lies approximately 17 miles north of the base of the Highwood Mountains at Fort Benton.

Transportation

Major highways facilitate transportation throughout the region, although some communities and ranches are not provided with surfaced roads. The basic network of highways in the region consists of east-west highways U.S. 2 and State 200; and north-south highways U.S. 87, 98, 91, and 191, and State 19, 13, 24, and 236. The Missouri River area is the hinterland of the 10-county area and there is a general lack of access to the river. A hard-surfaced highway, U.S. 87, parallels the river from Fort Benton to near Virgelle, but from Virgelle to U.S. 191, which crosses Robinson Bridge, highways are located a considerable distance from the river. There are no bridges between Fort Benton and Robinson Bridge, a distance of 149 river miles, but ferries cross the river at Loma, Virgelle, Judith Landing, and above Dauphine Rapids. Ferry operation is seasonal in nature, with service disruptions during periods of winter ice and high spring water levels. None of the ferries are served by

all-weather roads. A bridge is scheduled for construction in the near future at Judith Landing, and shortly after that time, Montana Secondary 236 will probably be improved to all weather capability over a period of time. With construction of the bridge, the ferry at this location and the McClelland (Stafford) Ferry located just above Dauphine Rapids may be retired.

Socio-Economic Characteristics

Blaine, Chouteau, Fergus, and Phillips Counties, Montana, constitute the immediate socio-economic region of the Upper Missouri River Management area. In addition to these 4 counties which are directly affected by management alternatives, there are 6 counties which are affected to a lesser extent. These counties are Cascade, Garfield, Hill, Judith Basin, Petroleum and Valley. Since the impact on these counties is much less than on the 4 primary counties, they were not included in the following discussion.

Population -

Geographically, the socio-economic region which will be effected by management alternatives constitutes a significant portion of the total land area of the state of Montana. However, the region is sparsely populated.

Table 1 shows that Fergus County (Lewistown) had roughly twice the population of the other three counties in 1970. Each of these counties lost 10 percent or more of their 1960 populations between 1960 and 1970. However, it has been estimated that both Blaine and Fergus Counties had increased their populations slightly by 1973. Chouteau and Phillips Counties, it was estimated, continued to show declines in human population.

Figure 2 displays net migration rates of all Montana counties from 1960 to 1970. It reveals that each of the four counties in the socio-economic region would have had severe population losses had it not been for natural increases (surpluses of births over deaths) during this same period. In each of the counties, the net migration rate is negative. This means that the economic base is not growing rapidly enough in these counties to provide employment opportunities for persons seeking work. This is likely due to the consolidation of farms, mechanization of agricultural labor, and similar factors that are affecting the population of agriculturally-based economies in rural areas around the country, and in particular the Northern Great Plains.

The population density of Montana in 1970 was 4.8 persons per square mile. None of the counties in the socio-economic region exceed this level. Since Montana as a whole is not densely populated relative to the rest of the country, this indicates that counties such as Blaine and Chouteau (both 1.6) Counties are very sparsely populated. Blaine, Chouteau, and Phillips Counties did not have designated urban areas in 1970.

Two Indian reservations are located in the socio-economic region. The Fort Belknap Indian Reservation is located in Blaine and Phillips Counties and the Rocky Boy Reservation is located in Hill and Chouteau Counties.

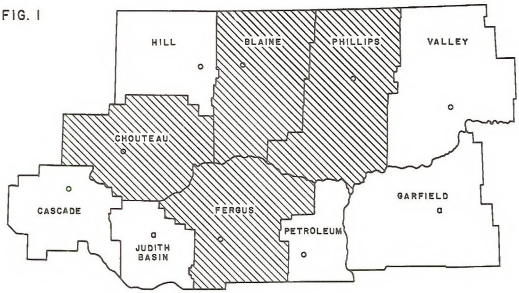
The Fort Belknap Reservation consists of 28,000 acres of land and a total Indian population of approximately 2,800 people.

The Rocky Boy Reservation contains 108,015 acres with a population of 2,436 Indian people.

Economic Conditions -

Evidence has been presented, through migration rates, indicating that economic opportunities are generally lacking in the region. This problem for the region as a whole, does not appear to originate in chronically low wages or salaries. In 1969 only Chouteau county exceeded the national average per capita income. Chouteau County was also the only county that exceeded the Montana-wide median family income levels in 1969. While these data are somewhat dated, they do suggest that the existing jobs in the area are not of a chronically low-paying nature. Local dependence on agricultural production, however, suggests that fluctuations in production and market prices will affect the local economies quite dramatically. Therefore, the selection of only one year to look at income (per capita and median family) may lead to distortions in interpretation.

FIG. 1

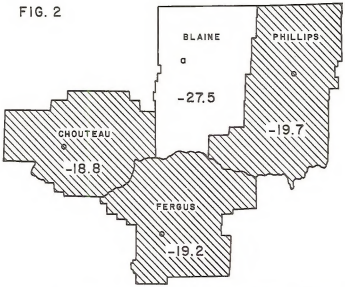


PRIMARY SOCIO-ECONOMIC REGION

SECONDARY SOCIO-ECONOMIC REGION

UPPER MISSOURI RIVER MANAGEMENT PLAN
AREAS OF SOCIO-ECONOMIC INFLUENCE

FIG. 2



0-24.9% OUT MIGRATION

GREATER THAN 25% OUT MIGRATION

MAP SOURCE: Montana Agricultural Experiment Station, Montana State University, Selected Characteristics of Montana Population, 1960-1970.

MIGRATION TO MONTANA COUNTIES FROM 1960 TO 1970 AS PERCENT OF 1960 POPULATION

Some economic stimulus is influencing the area from renewed oil and gas leasing and production activities. A number of minuteman missile sites are located in the region. Periodic contract work for servicing the missiles provides short-term economic stimulis.

Table 2 displays employment by the major economic sectors in 1974. This information is quite current and shows that in all counties, the government sector is the leading employment sector in the local economy. Wholesale and retail trade is also an important sector in each of the counties. Farm employment is the leading sector in Chouteau County and is an important element in the regional economy of the socio-economic region. Because of the small employment bases of the local economies, county specific information on such sectors as mining (for every county), manufacturing (Chouteau), and other sectors is withheld because of disclosure limitations.

TABLE 1

POPULATION CHANGE: 1960-1973

	1960	1970	60-70 % Change	60-73 % Change*
Primary Socio-Economic Region: Blaine	8,091	6,727	-16.9	1.4
Chouteau	7,348	6,473	-11.9	-4.5
Fergus	14,018	12,611	-10.0	.1
Phillips	6,027	5,386	-10.6	-2.1

*estimated for July 1, 1973

Sources: Tables 1-1 and 1-2, USDI, Bureau of Land Management, Socio Economic Profiles (Montana), 1975.

TABLE 2

EMPLOYMENT BY SECTOR: 1974

Primary Socio-Economic Region	Total Employment	Farm	Mining	Manuf.	Const.	Gov.	Trans., Comm., Public Utilities	Wholesale/ Retail	Fin., Ins., Real Estate	Services
Blaine	2,744	330	(D)	26	79	579	(D)	397	61	265
Chouteau	3,136	648	(D)	(D)	36	402	27	266	39	194
Fergus	5.541	319	(D)	283	337	977	173	915	146	550
Phillips	2,218	243	(D)	53	27	413	95	281	36	213

(D) undisclosed information

Source: USDC, Bureau of Economic Analysis, REIS, unpublished, 1975.

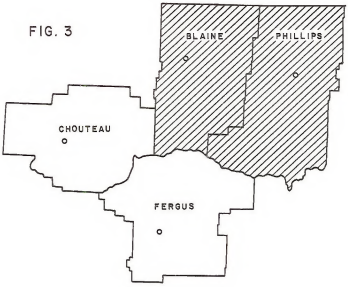
To summarize the demographic and economic situation in the Upper Missouri socio-economic region, it can be said that: (1) the region is quite sparsely populated, (2) that present opportunities for employment appear to be limited, (3) that this has led to net out-migration within all counties, and (4) that population losses would be even more severe if births did not exceed deaths. The following sectors are the most important employment sources in the local labor market: (1) governments, (2) wholesale/retail, (3) agriculture, and (4) services. Mining, manufacturing, construction, and other sectors do not appear to be important contributors (relative to the leading sectors) to the local economies.

Infrastructure -

Infrastructure refers to the facility and service base upon which local citizens are dependent. It includes both the public and private sectors, but usually is used in relation to the public sector. Information on two important components of infrastructure is presented here. Alone, these data do not adequately portray quality of the existing service/facility base of the area. However, they do offer clues that serious quality and quantity shortfalls do exist in the region as a whole in regards to other, non-documented components (i.e., educational opportunities, indoor recreational facilities, etc).

Fig. 3 displays one element of the infrastructure in the socio-economic region. It deals with housing quality and shows that two of the four

FIG. 3



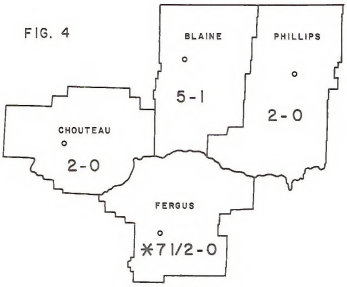
Over 16% of Units Have Incomplete Plumbing Facilities

(Average for the state: 8.1%)

MAP SOURCE: Department of Intergovernmental Relations, Montana's Housing Needs, July 1974

HOUSING UNITS WITH INCOMPLETE PLUMBING FACILITIES

FIG. 4



First figure represents 5-1 General Practioners, second figure represents Specialists

* One is semi-retired.

MAP SOURCE: State Department of Health and Environmental Sciences

PHYSICIANS BY COUNTY AS OF JANUARY 10, 1973

counties have 16 percent or more housing units with incomplete plumbing facilities. Details of housing quality cannot be determined from such a generalized map, but it does indicate that housing in these two counties is likely a serious infrastructural problem. It is a reflection of economic opportunity shortcomings, and in turn, effects the attraction of these areas to potentially in-migrating workers.

Fig. 4 is concerned with medical care in the state of Montana. It shows that for such a large area, there are very few physicians (both specialists and general practioners) in the region. The region had a total of only 17½ (one physician was semi-retired) doctors. Given the population density of the region, this information is not unexpected.

Climate

The climate along the Missouri River in central Montana is marked by extremes of the climatic variables. Large scale fluctuations of temperature and humidity can be diurnal as well as seasonal. The complex topographic system of coulees, buttes and ridges in the area has a pronounced influence on the aerial distribution of precipitation, wind and the stability of the air. Annual precipitation is roughly classified as semi-arid although approximately 7 inches of the yearly total of 13.5 inches falls during the months of May, June and July alone.

This climate is well within the limits of the modified continental type although some characteristics, such as the occurrence of warm westerly winds (chinooks), tend to moderate the mean temperature so that conditions are warmer than usual for this latitude. The warm winds are more pronounced in the western portions of the area. In the winter, cold waves frequently associated with snow and below zero temperatures occur 5 to 10 times each season. These cold spells seldom last more than 5 days at a time, but can produce minimums in the 20° F. to 40° F. range. A -52° F. reading was recorded at Big Sandy in February, 1936. Summers are pleasant with average afternoon maximums of approximately 90° and comfortable nighttime minimums of 56° F. during July. The summertime growing season lasts approximately 120 days.

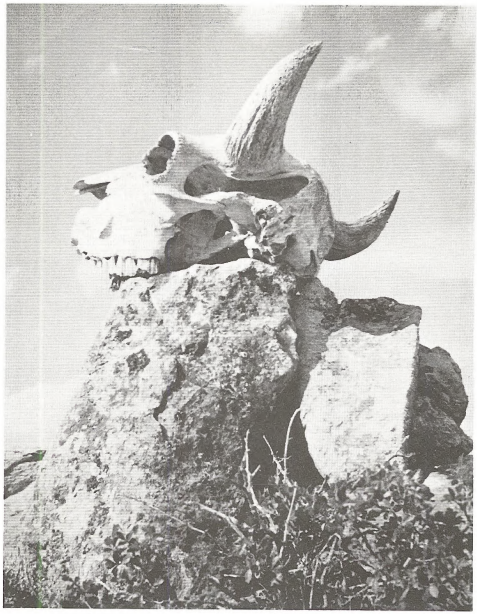
The effectiveness of the precipitation in exerting an influence upon the production of forage is maximized by the large amount of rainfall which occurs in the first half of the growing season. During the late spring, showers and steady rains occur extensively over the area. During the summer, precipitation is poorly distributed over time and area and is occasionally associated with heavy, late-afternoon and evening thunderstorms accompanied by strong hail locally. Late summer and fall storms are frequently represented by light showers followed by wind and/or bright sunshine. Winter is characteristically the driest part of the year with a total of 40 inches of snow occurring over the average season.

The greatest average monthly snowfall occurs during March. Vegetation suffers from recurrent periods of drought which occur in central Montana about once every ten years.

Evaporation has a variable distribution over time and area. On north-facing canyon walls which receive less of the suns' direct solar radiation and on concave topographic positions protected from the windy plains, evaporation of water from the land surface as well as transpiration of water from vegetation are reduced. The soil is capable of retaining enough water to allow for the growth of pine trees in these areas.

There is evidence of air inversion along the bottoms of the Missouri River during winter months. Average monthly temperatures at Loma are generally cooler than those at Geraldine and Winifred during the months of December, January and February. Such conditions are indicative of the inversion. As the nighttime air cools, it tends to move downslope into the canyon bottoms where, because of stable circulation at certain periods of the winter, it becomes trapped. Air warmed by daytime sun on the surrounding plains may move over the trapped layer inducing the inversion.

Tables representing climatic data in detail are contained in Appendix D.



DESCRIPTION OF THE ENVIRONMENT

Pre-History

The Upper Missouri River area served as an environment for man from the paleo-Indian inhabitation of the North American continent to the present time. Numerous physical evidences bear witness to their presence and

provide insight into the roles they played. Though no intensive survey of the lands included in the management area has been made, some 173 known sites testify to aborigine occupation of this wild and scenic area. These sites provide evidence of temporary camping areas, an evolving stone age technology, sources of subsistence, ceremonial performance and burial practices.

A Hell Gap and an Eden point found at a Missouri River site indicates the presence of a paleo-Indian culture, or the early big-game hunter of the late Pleistocene times around 8500 B.C. The environment during this period of time was cooler and wetter than the present-day climate. Lush grasslands, swamps and lakes south of the continental glacial ice mass proved ideal habitat for herds of now extinct mammoth, mastodon and giant bison. The paleo-Indian wandered in small groups pursuing game herds, the major source of his subsistence. Always on the move, the early big game hunter left little evidence of his presence.

Evidence of occupation of the Missouri breaks region during the Middle Prehistoric Period (5500 B.C. to A.D. 200) is comparatively more abundant than that of the early period. As the altithermal climate grew warm and dry, many of the large game species became extinct, and the subsistence patterns of the wandering bands changed. In addition to bison, antelope, deer and elk, smaller mammals, reptiles and birds fell prey to the hunter. Meals often included seeds, roots and berries,

indicating a hunter-gatherer society. Relative scarcity of food again suggests small groups of people moving about to find adequate means of subsistence.

From A.D. 200 to about 200 years ago, the late prehistoric Indian frequented the Missouri River area in a climate much like our own. About this time, a major change in technology occurred with the bow and arrow replacing the spear or lance. Around A.D. 1700, the introduction of the horse proved to be a major advancement for the hunting economy.

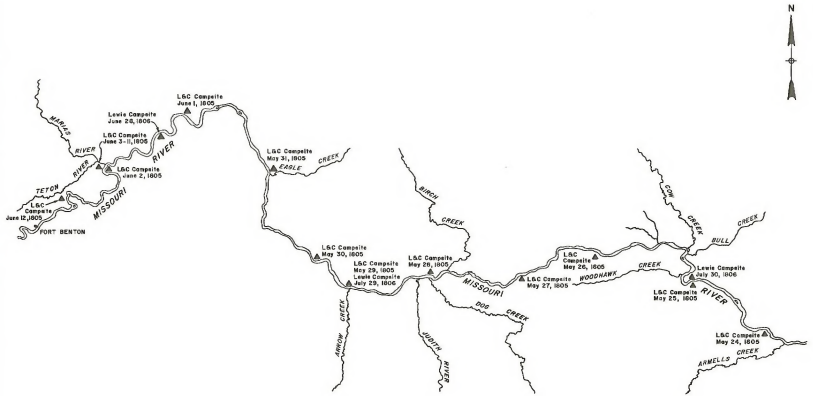
Bison, the basic food source, was generally plentiful and the herds permitted larger groups of people to subsist together and required less time for the hunt.

In spite of a somewhat higher standard of living, there were still times of dire need. The Lost Terrace Site, an antelope butchering station, shows that the Indians used every possible bit of their prey.

Other significant sites testify to the presence of technological changes during the Old Women's Phase, Avonlea Phase, and Besant Phase of the Late Prehistoric Period. Life evolved but slowly for these people until they were confronted by a transplanted European civilization that thirsted for a westward expansion across an uncharted land.

Historic Setting

The Upper Missouri National Wild and Scenic River contains features of outstanding national historical significance. It is the last major



UPPER MISSOURI WILD AND SCENIC RIVER

MONTANA

▲ LEWIS AND CLARK CAMPSITES

5 0 5 10 15 20

Scale Of Miles

section of the Missouri River which does not contain major impoundments and therefore presents a relatively unspoiled historic setting.

The Lewis and Clark Expedition, the first party of white men to break the wilderness barrier that now conveniently divides prehistory and history, traversed the Upper Missouri area in 1805 using the Missouri as a waterway route to the Rocky Mountains, westward to the Pacific Coast, and again upon their homeward bound journey in 1806. Physical evidence of their exploration have not been found in the river management area, but the journals of Lewis and Clark help present-day researchers identify their campsites and delight readers with descriptions of the unspoiled beauty of the area that persists to the present day. Thirteen Lewis and Clark campsites have been identified between Fort Benton and the Robinson Bridge.

Lewis had this to say about the "White Cliffs" area on May 31, 1805.

> "The hills and river clifts which we passed today exhibit a most romantic appearance. The bluffs of the river rise to the height of from 2 to 300 feet and in most places nearly perpendicular; they are formed of remarkable white sandstone which is sufficiently soft to give way readily to the impression of water; two or three thin horizontal stratas of white freestone, on which the rains or water made no impression, lie imbeded in these clifts of soft stone near the upper part of them; ... The water in the course of time in decending from these hills and plains on either side of the river has trickled down the soft sand clifts and woarn it into a thousand grotesque figures, which with the help of a little imagination and an oblique view, at a distance are made to represent eligant ranges of lofty freestone buildings, having their parapets well stocked with statuary; collumns of various sculpture both grooved and plain, are also seen supporting long galleries in front of those buildings."

In stark contrast to the "White Cliffs" are the dark volcanic dikes which have impregnated the shale bluffs and white sandstone. Of these Captain Lewis wrote, "for here it is too that nature presents to the view of the traveler vast ranges of walls of tolerable workmanship, so perfect indeed are those walls that I should have thought that nature had attempted here to rival the human art of masonry had I not recollected that she had first begun her work. These walls rise to the height in many places of 100 feet, are perpendicular, with two regular faces and are from one to 12 feet thick, each wall retains the same thickness at top which it possesses at bottom.... These walls pass the river in many places rising from the water's edge much above the sandstone bluffs, which they seem to penetrate; ...these walls sometimes run parallel to each other, with several ranges near each other, and at other times intersecting each other at right angles, having the appearance of the walls of ancient houses or gardens."

In describing the "Badlands" on May 27, 1805, Captain Clark said:

"the bluffs are very high steep rugged, containing considerable quantities of stone and border the river closely on both sides; once perhaps in the course of several miles there will be a few acres of tolerably level land in which two or three impoverished cottonwood trees will be seen. Great quantities of stone also lye in the river and garnish it's borders, which appears to have tumbled from the bluffs where the rains had washed away the sand and clay in which they were imbeded. The bluffs are composed of irregular tho' horizontal stratas of yellow and brown or black clay, brown and yellowish white sand, of soft yellowish white sandstone and a hard brown freestone, also of large round kidney formed and irregular separate masses of a hard black Iron stone, which is imbeded in the Clay and sand. Some little pine spruce and dwarf cedar on the hills. Some coal or carbonated wood still makes it's appearance in those bluffs, pumicestone and birnt hills it's concommutants also are seen."

Twentieth century visitors to the Upper Missouri will recognize many of the features described by Lewis and Clark more than 170 years ago. Bullwacker Coulee, then called Turtle Creek, marks the point where on May 26, 1805, Captain Lewis accended the highlands and first caught a distant view of what he thought to be the Rocky Mountains, "the object of all our hopes and the reward of all our ambitions."

Present day Arrow Creek was called Slaughter River by expedition members because of the remains of hundreds of buffalo which they found there - evidently stampeded over a cliff by Indians.

The Judith River was named by Captain Clark for a childhood sweetheart who later became his wife. The Marias River was named for a cousin of Meriwether Lewis. These places and many more, are present day reminders of the tremendous contributions of "the Corps of Discovery".

For several decades after the Lewis and Clark Expedition, the war-like Blackfeet kept the upper Missouri area in a constant state of peril. Not until the fall or early winter of 1830 did a small party of white men from Fort Union penetrate the upper Missouri and make contact with a band of Piegan Blackfeet. This meeting succeeded in establishing trade relationships with the upper Missouri tribes and in the fall of 1830, Kenneth McKenzie sent James Kipp with forty four men upriver to the mouth of the Marias where Fort Piegan was established. This fort was also known as Fort McKenzie and after the first season, the original fort was destroyed and a second Fort McKenzie was built on Brule Bottoms. This post flourished until 1844, when hostilities with the Blackfeet were renewed and the furtrader Chardon withdrew to establish a short-lived post, Fort Chardon, opposite the mouth of the Judith River. Fort McKenzie was burned by either whites or Indians and the site where it was located is known today as Brule' (burned) Bottom.

The following summer, another party was sent out from Fort Union to try to recover the Blackfeet trade. Alexander Culbertson led this group. He abandoned Fort Chardon and established a new post about three miles upriver from present-day Fort Benton. This post was named Fort Lewis in honor of Captain Meriwether Lewis. Culbertson was able to renew peaceful contacts with the Blackfeet and Fort Lewis was the scene of brisk trading activity until 1847, when the fur company post was moved downriver approximately three miles to a site on the north bank of the Missouri. It was here that the new post, Fort Clay, soon to be renamed Fort Benton, became the most important trading center in Montana and the head of navigation on the Missouri River.

In 1833, the upper Missouri was to see several distinguished travelers in the form of the German scientist, naturalist and explorer, Prince Maximilian of Wied-Neuwied and the Swiss artist Karl Bodmer. The Prince's graphic written accounts of the "White Cliffs" area, the river breaks and life at Fort McKenzie have provided modern scholars with a priceless legacy. These accounts were ably illustrated by Bodmer who painted Missouri River scenes, the abundant wildlife and free-roaming Indian tribesmen.

The fur trade era stimulated the first extensive use of the Missouri River as an avenue of transportation. Keelboats, mackinaws, bullboats and canoes plied the upper river bringing trade items for the Indians

and returning with a wealth of furs bound for markets in the United States and abroad. The vast amount of capital to be obtained from such trading ventures, encouraged steamboat captains to brave the rapids above Fort Union. In 1859, the steamboat Chippewa reached Brule Bottoms.

The discovery of gold in the northern Rockies in the 1860's gave increased impetus to steamboat use as the major means of transporting people and supplies to the gold fields. The heavy steamboat traffic created need for woodyards or refueling stations manned by colorful "woodhawks" who eked out a meager, lonely and dangerous existence. Their sandstone dugouts, cabins, deserted woodpiles and even their untimely graves remind the Missouri River recreationist of this by-gone era.

The first shallow-draft paddle wheel steamboat reached Fort Benton in 1860. The increasing numbers of whites invading the western mountains and high plains country in the 1860's invoked the wrath of the Indian tribes of the area. It was during this time, that the Indian Wars had an impact on this area of Montana.

The confluence area of the Judith and Missouri Rivers provided the setting for two important Indian peace councils. In 1846, the famous Catholic missionary Father DeSmet and a band of Flathead Indians held a meeting here with the Blackfeet. In 1855, Washington Territorial Governor Isaac Stevens conducted a large treaty council.

In 1866, the Army built Camp Cooke near the mouth of the Judith River. This location proved to be poorly chosen and there was very little for the inhabitants of the fort to protect. The post was abandoned in 1870. The nearby Fort Clagett trading post, operated by T.C. Powers and Company, continued in operation for a few years longer. Today, the PN Ranch headquarters is located on this historic ranch built in the 1880's.

The last attempt at commercial use of the Missouri River occurred from 1909 to 1916 by river steamers. The Josephine, a government snag boat, made trips up the river as late as the 1920's.

Today, a number of steamboat wrecks and other physical evidence of the steamboat era, can be found along the reaches of the Wild and Scenic Upper Missouri River. At least two homesteads are believed to be partially constructed from the remains of steamboat planking.

During the mid 1800's, the Indian nations had suffered terribly from the effects of smallpox and other white men's diseases. In the latter half of the century, the buffalo herds were all but wiped out and the native inhabitants were placed on reservations away from the river.

Not only the Indian found himself displaced. As placer mining gave way to more expensive quartz operations, many miners left their camps to run cattle in the wide expanses of available land. The cowboy instituted

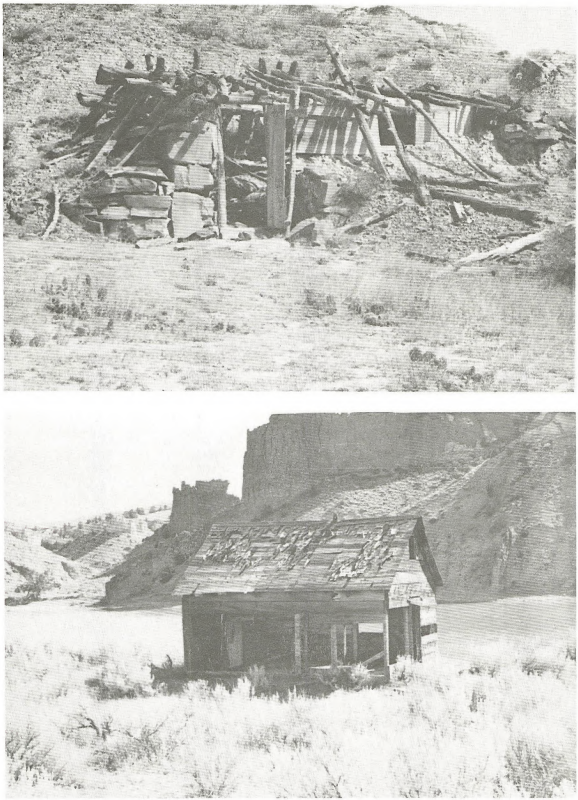
the open range cattle industry. Other frontier-types including rustlers and vigilante groups appeared on the scene.

The Great Northern Railroad crossed the continent in the late 1880's and with the railroads came the homesteaders. These bottom-land farmers fenced the open range cattle country and attempted to cultivate the sage-covered river terrace.

The valley of the Upper Missouri proved too harsh an environment for the small plot farmer. Drought, grasshoppers and the unsuitability of the land for cultivation combined to drive the homesteader from his claim. The rustic frame and log structures of the homestead era line the river corridor today - reminders of dreams that were not to be.

Today, the grasslands of the Upper Missouri are grazed by herds of cattle. Some irrigated farming is practiced, although most of the Wild and Scenic River shows little evidence of modern man. The present-day cultural remnants viewed by the modern traveler weave together the threads of the long continuum of human use and occupation of this nationally significant element of our heritage.

A number of Missouri River sites have been included in the National Register of Historic Sites. These include the Grand Union Hotel in Fort Benton, the community of Fort Benton and the Fort Benton Historic District, Citadel Rock, Slaughter River confluence area and Judith Landing Historic District.



Homestead dwellings along the banks of the Upper Missouri River.

THE RIVER AND ITS SETTING

The Missouri River flows through a relatively deep valley varying from 500 to 1,000 feet below the average elevation of the adjacent plains. The soils are extremely unstable. Erosion and tributary drainage have produced highly dissected, rough terrain, resulting in scenic badlands and breaks. These breaks and bluffs are from two to ten miles in width adjacent to the river valley and of lesser width along tributary streams. This greatly eroded section of the region is commonly known as the Missouri River Breaks.

The Marias River, including its tributary the Teton, and the Judith River are the principal tributaries joining the Missouri River. These tributaries along with Shonkin Creek, Eagle Creek, Arrow Creek, Birch Creek, and Cow Creek are the major drainages in the management area.

In addition to differences in the geologic components carved by the river, part of the contrasting scene is due to the differences in the amount of time the river, or preceeding rivers have been cutting their way into the plains. In pre-glacial times the river occupied its current channel along the first 42 miles between Fort Benton and Coal Banks Landing. At that time, the river was directed northeasterly through the pre-glacial valley of Big Sandy Creek where it continued into the Milk River Valley. Between Fort Benton and Coal Banks Landing, the Missouri today occupies a nearly mature valley that is broad with some steeply inclined bluffs, straight to slightly meandering channel (sinuosity 1.05 to 1.39) and a well developed floodplain with numerous islands and groves of cottonwood trees.

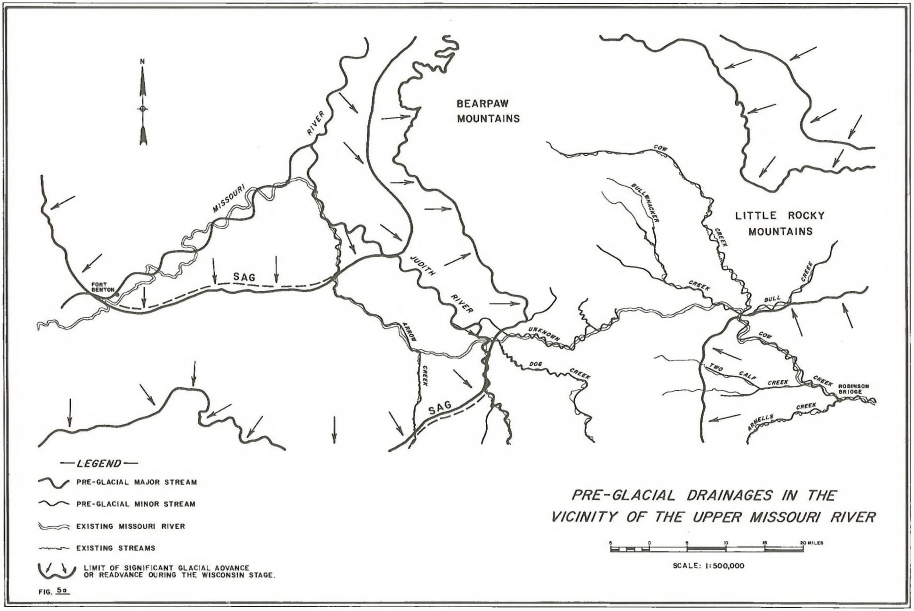

N
BEARPAW MOUNTAINS
LITTLE ROCKY MOUNTAINS
MISSOURI RIVER
JUDITH RIVER
FORT BENTON
SAG
SAG
ARMS CREEK
DOG CREEK
BULL CREEK
ROBINSON BRIDGE
—LEGEND—
PRE-GLACIAL MAJOR STREAM
PRE-GLACIAL MINOR STREAM
EXISTING MISSOURI RIVER
EXISTING STREAMS
LIMIT OF SIGNIFICANT GLACIAL ADVANCE OR READVANCE DURING THE WISCONSIN STAGE.
PRE-GLACIAL DRAINAGES IN THE VICINITY OF THE UPPER MISSOURI RIVER
0 5 10 20 30 MILES
SCALE: 1:500,000

FIG. 5a

The present location of the Missouri River below Coal Banks Landing came about during the last period of glacial advance. The great mass of ice which moved in from the north blocked the northeasterly course of the river and forced it southward. At that time, the river channel was probably located along the southern extremities of the advancing ice sheet. As the ice moved, the river was forced continually southward. Thus the Missouri made several false starts at establishing an eastward channel. Remnants of these early channels can be seen in the form of broad valleys located south of the present river valley.

By examination of topographic maps a gently rolling to level terrain appears to have characterized the pre-glacial landscape of the region. Streams drained northward toward the Missouri River and occupied broad valleys and meandering channels. The pre-glacial Arrow Creek occupied a channel located approximately in the present-day Missouri River valley below Coal Banks Landing. This stream flowed in a northwesterly direction joining the Missouri River in the area of Little Sandy Coulee. The valley of the Judith River extended north of its present location in the Judith Landing area approximately paralleling Arrow Creek and joining it somewhere near the present-day mouth of Eagle Creek. Birch and Cow Creeks probably occupied valleys located about where they are today. A map showing the approximate location of pre-glacial drainages and glacial ice advances is depicted in figure 5a.

The relocated Missouri was directed across drainage divides between Arrow Creek and Judith River and between the Judith River and Cow Creek. Downcutting on the sedimentary plain was relatively rapid where less resistant shales and siltstones presented a weaker barrier to erosion. The resultant valley was steep and narrow. The river was straightened and the flood plain was less well developed with fewer islands and cottonwood groves.

The present-day valley of the Missouri River below Coal Banks Landing deepens and narrows towards the former drainage divides and broadens where it follows or crosses ancient valleys. Thus todays valley below Coal Banks Landing gradually narrows and deepens towards the ancient Arrow Creek - Judith River divide. As it approaches the Judith Valley, it opens into a broad plain. Towards the ancient Judith River - Cow Creek divide it narrows once again. In this area, steep badlands have developed and the canyon sides rise to nearly 1,000 feet above the valley floor. Below the mouth of Cow Creek the valley becomes gradually more mature probably because it follows the ancient valley of Cow Creek.

In addition to different stages of river valley maturity, evidence of the glaciers can be found in the upper reaches of the management area in the form of glacial outwash deposits. Recent cutting by the river has exposed several cross sections of the material and surface exposures are common on the plains adjacent to the river valley.

Water

The Missouri River is slow moving as it meanders through fertile bottomland in the Missouri Breaks area. It carries an average annual volume of 5,622,000 acre-feet as it enters the Wild and Scenic River area at Fort Benton. The average streamflow of 7,759 cubic feet per second at Fort Benton is discharged by a 600 foot wide channel which averages 3 feet in depth. The current carries a floater about 5 miles per hour. The channel widens to over 1,000 feet in many areas where islands have forced the river to spread laterally. The average depth decreases abruptly in these areas making navigation difficult for large craft. At the community of Loma, the Marias River adds approximately 590,000 acre-feet per year, augmenting average streamflow by about 800 cubic feet per second. The velocity of the river decreases to about 4 miles per hour and the average depth increases to about 3½ feet. Below the Marias River confluence about 525,000 acre-feet are contributed annually by tributaries joining the Missouri above Robinson Bridge, the largest of which is the Judith River. The tributaries increase the average streamflow in the Missouri by about 725 cubic feet per second as measured at the Robinson Bridge station.

Annually, the river rises in response to spring snowmelt originating in the headwater drainages to the south and west. Average annual peak flows amount to about four times the average annual flow. These floods fill the active channel, thereby increasing significantly the average depth and flow velocity. Occasionally, spring floods overtop the banks

of the active channel spreading water onto the floodplain. Such flooding begins at streamflow rates higher than approximately 28,000 cfs above the Marias River, 32,000 cfs between the Marias and Judith Rivers and 36,000 cfs below the Judith. The frequency of occurence of these floods is shown by the flood frequency curve in Appendix E.

The largest flood ever recorded on the Missouri occurred in 1908 when an estimated 140,000 cubic feet per second was discharged in the Fort Benton area, creating significant damage. Floods of 70,000 cubic feet per second in 1964, 75,000 cfs in 1953, 66,000 cfs in 1892 and more recently 59,000 cfs in June 1975, have also been recorded at Fort Benton.

Streamflow has been as low as 895 cfs in January, 1932, and 627 cfs in July, 1936, at Fort Benton. Minimum flows in recent years have seldom been below 2,000 cfs because of upstream flow regulation by 27 irrigation and power production reservoirs.

Hydrologic analyses of streamflow data on the Missouri including flow-duration, flood frequency, and flow distribution analysis are contained in Appendixes E, F, & G.

The graph in figure 5 illustrates the streamflow hydrograph for a period in 1977 on the Missouri River at Fort Benton. Streamflow fluctuations were abrupt during the periods June 26 to June 30, and July 14 to July 18, 1977. Periods of rapid increase in streamflow did not coincide with rainstorms at Fort Benton and Great Falls. These flow

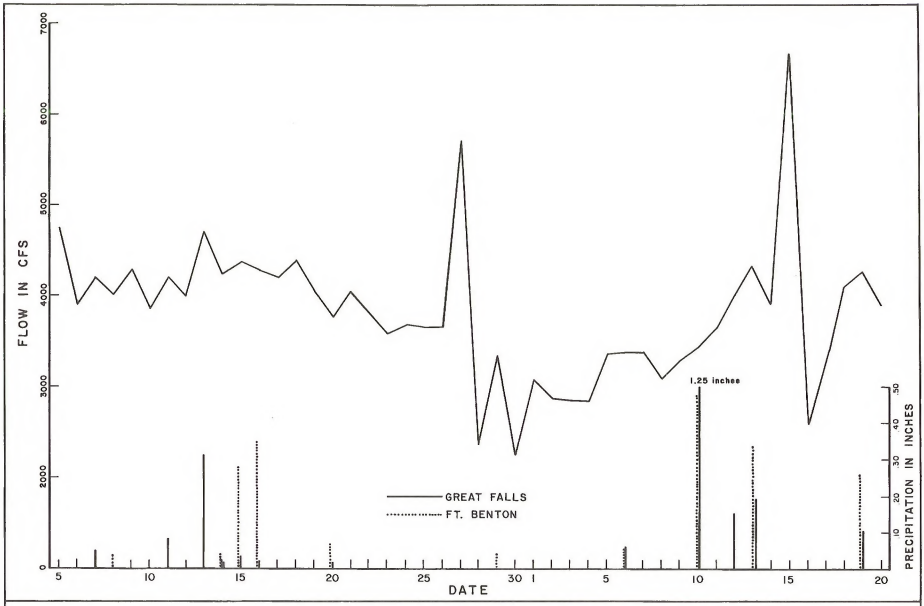


FIG. 5 HYDROGRAPH FOR THE MISSOURI RIVER AT FT. BENTON AND RAINFALL AS MEASURED AT FT. BENTON AND GREAT FALLS, JUNE 5 TO JULY 20, 1977.

changes may be controlled by releases from upstream reservoirs. Discharge records at Morony Dam near Great Falls were not available for the same period. A 1,200 cfs change within 24 hours however was noted on the 13th and 14th of October, 1977.

Water Quality -

The river normally carries large sediment loads and has been popularly referred to as "The Big Muddy". There is an obvious increase in the amount of sediment transported by the river between Coal Banks Landing and the Robinson Bridge. This has been determined by analysis of water quality data obtained from U.S. Geological Survey studies at those locations. A graph of sediment concentrations for varying rates of streamflow illustrates the downstream increase in sediment concentration as shown in Figure 6. Arrow Creek, Marias and Judith Rivers all contribute waters higher in sediment concentration than the Missouri. Turbidity analysis on these three tributaries in May, 1977, indicated slight increases on the Missouri from the Marias and Judith River contributions while significant increases were observed below Arrow Creek. Silt loads added to the Missouri by Arrow Creek in July, 1974, accounted for 41% of the river's total sediment load below the confluence (Montana State Water Quality Bureau, 1975). Other Missouri River tributary streams posing silt problems according to the Water Quality Bureau (1975) are: Bullwacker, Two Calf and Cow Creeks.

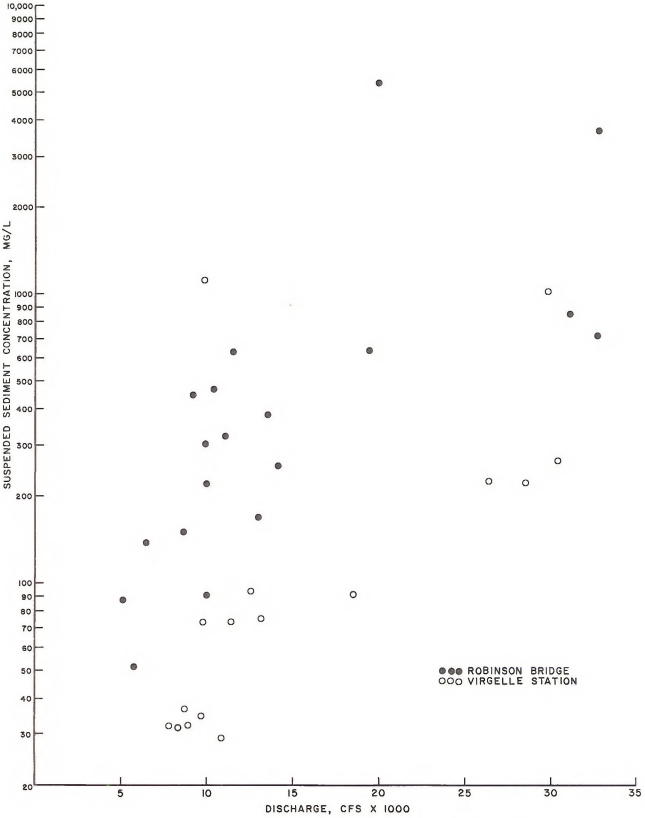


FIG. 6

VARIATION IN SUSPENDED SEDIMENT CONCENTRATION
WITH DISCHARGE ON THE MISSOURI RIVER
AT VIRGELLE AND ROBINSON BRIDGE

The chemical character of the Missouri River reflects primarily the geologic environment through which the river flows. A breakdown of major chemical constituents as averaged from 35 samples at Virgelle and 12 samples at Robinson Bridge is shown in Figure 7. At both stations the Missouri River may be characterized as a very hard, calcium-bicarbonate water. The figure shows an increase in all the major chemical constituents from Virgelle to the Robinson Bridge. Increases in sodium and sulfate are greatest. The geologic environment through which the river passes consists of shales, siltstones and sandstones. Chemically, waters from saline seeps associated with these rocks are known to contain high concentrations of sodium and sulfate. One spring adjacent to the Stafford Ferry road, approximately 1 mile from the river, measured a sulfate concentration of 3,100 milligrams per liter. High dissolved loads on tributaries to the river are probably a reflection of this local geologic environment. Such streams may therefore account for major increases in the total dissolved solids. Total dissolved solids concentration at Robinson Bridge averages about 17% higher than concentrations in the Coal Banks area upstream.

Statistical analysis shows that average total dissolved solids concentrations, suspended sediment concentrations and dissolved sulfate concentrations are significantly greater at the downstream station. Details of the data analysis, graphs of streamflow-water quality relationships and water quality profiles are contained in Appendix H.

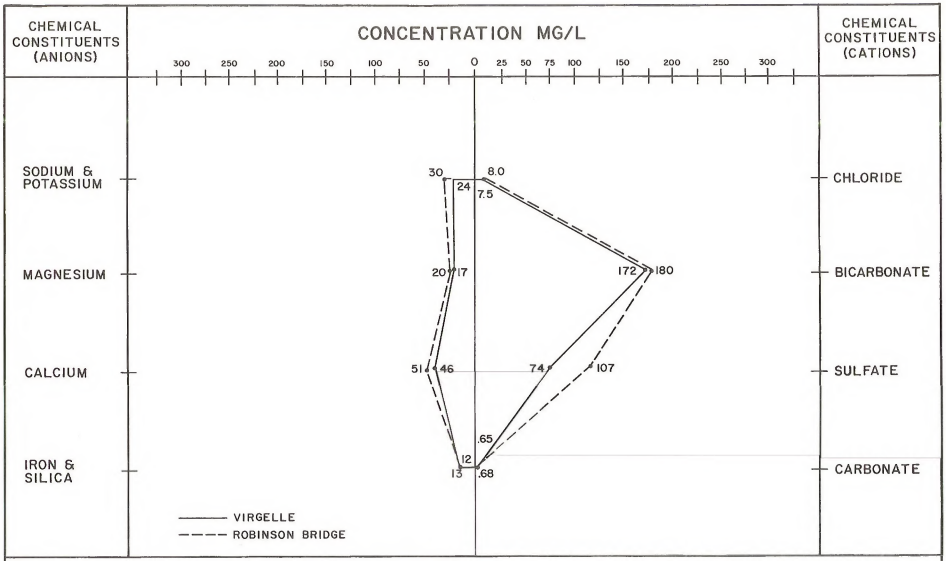


FIG. 7

AVERAGE CONCENTRATION OF MAJOR IONS AND CATIONS OF THE MISSOURI RIVER (U.S.G.S. WATER QUALITY DATA, HELENA)

Bacteriological sampling of fecal coliform and fecal streptococcus indicator organisms has been conducted on a monthly basis at Virgelle since October, 1974 (U.S.G.S. Water Quality Data, Helena). Bacterial densities per 100 ml samples were highest during the period from April through November. Examples of high counts of fecal coliform are: 130 (May, 1975); 120 (June, 1976); 120 (August and September, 1976) and 110(December , 1976). Examples of high counts of fecal streptococcus are: 180 (April 1975); 170 (May, 1975); 170 (September, 1976); 190 (June, 1977) and 150 (July, 1977). The ratio of fecal coliform to fecal streptococcus can be used as a general indicator of the fecal origin of the bacteria. Waters with ratios above 2.0 generally indicate a human fecal source. When the ratio is less than 1, principal bacteriological sources are probably livestock,poultry or wildlife. Examples of high ratio samples included: 2.4 (August, 1975); 10.2 (September, 1975); 2.3 (June, 1976); 3.5 (October, 1976); and 4.4 (November, 1976). The impacts of recreation are not known. The human origin of bacteria could be non-recreational since several communities are located adjacent to the river above the sampling station. Low FC/FS ratios were normally measured during winter months.

Soils

Soils are mixtures of weathered rocks and minerals, organic matter, water and air. Variations in any of these from place to place is what differentiates, to a large extent, one soil from another. During soil formation, five factors interact to give the soil physical characteristics

at a specific location. These include parent material, climate, plant and animal life, topography and time. In the vicinity of the Missouri Breaks area, parent materials often vary considerably over short distances. Likewise, the topography varies from flat stream terraces to steep badlands. Consequently, soils are highly variable throughout the area.

Soil surveys are presently being completed by the Soil Conservation Service, in those counties bordering the Missouri River. Fergus, Blaine and Phillips counties are mapped and are in the process of being published. The survey for Chouteau County has just been started.

On the nearly level to rolling plains above the river, deep (40 inches or more in depth) well drained, clay loam and silty clay loam soils have developed. Salt is picked up from Cretaceous formations and deposited in low-lying areas and drainages. Clay pans, or small areas of bare ground having dense compact clayey layer in the subsoil, have developed on some of the low terraces and along some of the drainageways.

Soils of the high benches and piedmont fans are generally well drained loams of varying depths. Some of these soils have a high lime content in the subsoil with layers of gravel.

Soils of the rolling residual uplands vary in depth and usually have textures of loam, clay loam and clay. These soils can range from shallow (10-20 inches in depth) to deep (40 inches or more in depth) over shale and to a lesser extent over sandstone. Rock outcrops are common along the portions of the Missouri River canyon walls. Large areas are affected by variable amounts of saline-sodic conditions which are responsible for much of the moderate to severe erosion hazards.

Soils of the river floodplains and low terraces within the management area, are predominantly deep, well drained soils that have formed in stratified alluvium of mixed mineralogy. These soils generally have a loam texture on the surface and are generally underlain by textures ranging from loam to fine sandy loam. Permeability is moderate and thus runoff is slow.

Within this portion of the topography, there are also found lesser areas of deep, well or moderately well drained soils that have formed in calcareous clayey floodplain and river terrace deposits. These soils have silty clay loam textures on the surface and are underlain by textures ranging from clay to clay loam with thin strata of loam, silt loam and fine sandy loam. Permeability is slow and because of their level position, runoff is slow.

Havre, Harlem and Glendive soils are those located on river terraces and in campsites along the Missouri River. Engineering properties, interpretations and limitations for camping, trail and other development uses are provided in Appendix I.

Geology

Sedimentary Rocks -

Geologically, the landscape has been carved from a series of sedimentary rocks of Upper Cretaceous age. The story of the origin of these rocks, and of the present course of the Missouri River is interesting and an important chapter in natural history.

The course of the river flows through a fine section of generally horizontal to slightly dipping sedimentary strata of Upper Cretaceous age, crossing progressively younger beds of this series, representing 10 million years or more of time. During Upper Cretaceous time (roughly 80 to 70 million years ago) most of the present Great Plains were beneath the waters of a great inland sea. This sea however, did not continuously cover the Missouri River country. On the contrary, now and then during the Upper Cretaceous this area had seashore conditions with deltas and coastal plane deposits laid down. Because the margin of the sea moved back and forth as the sea advanced and retreated, the varied rocks - some marine deposits with sea animal fossils, some land deposits with

coal and dinosaur remains - represent a rather complete record of changing geologic conditions.

From Fort Benton, the river passes bluffs of marine deposits of the Colorado Group. The Colorado Group shales (the oldest rock exposed) is a dark, grayish-blue marine shale containing numerous calcareous concretions, veins of selenite (transparent gypsum) and scattered beds of bentonite. Most of the fine-grained sediments that compose the Colorado Group shales were deposited in shallow sea conditions. The dark gray rock exposed from Fort Benton, underlying the yellowish sandy rock is the Marias River shale.

The Telegraph Creek formation represents a transition zone between the Marias River shale and overlying Eagle sandstone. It is composed of alternating thin beds of sand and grayish-blue marine shale. Variations in source rock composition and supply are attributed to this change.

At Coal Banks Landing, and for 15 miles downstream, the rocks of the Colorado Group lie beneath the surface, except where thrust up along faults, and the overlying Eagle sandstone forms the canyon walls. The Eagle formation in this area is commonly known as the "white rocks". The upper and middle members are alternation beds of gray to buff sandstone, shale, carbonaceous shale, and coal. The lower member, the Virgelle sandstone, is a massive white to buff sandstone, locally cross-bedded, containing numerous sandy limonitic concretions. The sands comprising the Virgelle member were deposited along the shoreline of a

shallow marine sea, followed by the deposition of the alternating beds of sand, silt, clay and coal of the middle and upper members, which were laid down in a continental environment of swamps, lagoons, and shallow lakes.

From about 15 miles below Coal Banks Landing the soft shales of the Colorado Group, which have been upthrusted along faults, form gently sloping walls to about the confluence of Arrow Creek, except where replaced by the Eagle sandstone.

Below the confluence of Arrow Creek the second advance of the marine sea manifests itself as the Claggett shale formation. The Claggett formation is a brownish-gray marine shale. The upper 150 feet is sandy and yellowish-gray, and the lower 100 feet contains bentonite beds to 18 inches thick. The Claggett formation forms badland topography and is exposed almost continuously to Stafford Ferry.

In the same stretch of river, the Claggett shale is conspicuously overlain by the Judith River formation. Rock of the Judith River formation generally forms striking badlands-type topography; the shale weathers to rounded slopes, and the sandstone to steep cliffs. It is composed of interbedded light-gray to buff thin-bedded to massive nonmarine sandstone and gray to buff clay and shale. This formation was deposited in an environment similar to that of the middle and upper members of the Eagle formation. Although Judith River rocks outcrop in the canyon walls a few miles below the Judith River, it does not appear at the water surface until below the Power Plant Ferry. From this point downstream,

to the end of the area, faulting has produced an unusual mosaic outcrop pattern. The base of the formation is repeated as many as eight times.

The Bearpaw shale, which marks the last great advance of the sea into Montana, can be seen as low gray bluffs capping the Judith River formation. It is a thick monotonous unit of medium to dark-gray, soft shale with disseminated bentonite layers. This and the Claggett formations form the "gumbo" in the region. The Bearpaw shale becomes quite conspicuous about 3 miles above Robinson Bridge.

The continental beds might well be found to contain fossils of such dinosaurs as, Ornithominus and Trachadon, and possible remains of primitive mammals.

The marine deposits might be found to contain such typical fossils of this period as sea-going reptiles Monassaurs and Plesiosaurs. Invertebrates such as Ammonites and Baculites are known to be locally abundant.

Igneous Rocks -

Of the many striking scenic features observed and described by early travelers were the high, thin, black "rock walls" that frequently may be seen in the banks between Arrow Creek and Eagle Creek. These "walls" are formed by a comparatively rare igneous rock named shonkinite. Shonkinitic rocks are dark-gray to black, fine to coarse grained, porphyritic, and contain augite, sanidine, biotite, and olivine. These intrusive rocks are believed to be controlled by planes of weakness in the basement rock and were probably emplaced in Eocene time.

Structural Deformation -

After deposition of the sedimentary rocks and before the location of the river in its present course, an upwelling of the earth's crust occurred at the site of the present Bearpaw Mountains causing the sedimentary rocks to arch upward. Later extrusion of volcanic material on top of this arch caused an unstable condition which resulted in massive sliding of rock off the arched area towards the plains below. This slippage occurred along thrust fault planes which extend outward from the Bearpaw Mountain area distances of up to 35 miles. These faults break through to the surface and manifest themselves as steeply dipping rocks adjacent to flat lying rocks (see figure 8). The fault plane itself can rarely be seen because it is lost in the thick shale beds. On the state geologic map, the effect of these faults is seen as slices of Judith River Formation showing through the Bearpaw Formation (Ross, Andrews and Witkind, 1958).

Figure 8. Thrust fault in the Missouri Breaks.

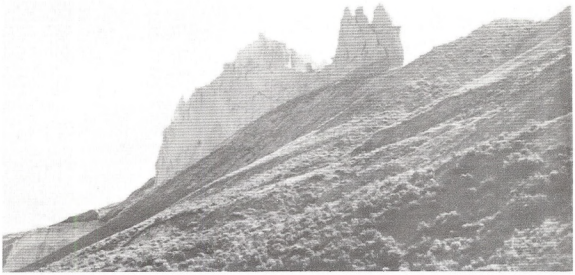
Geologic Features

A number of significant erosional and other geologic phenomena are located in the management area. The following photographs illustrate some of the more important features.

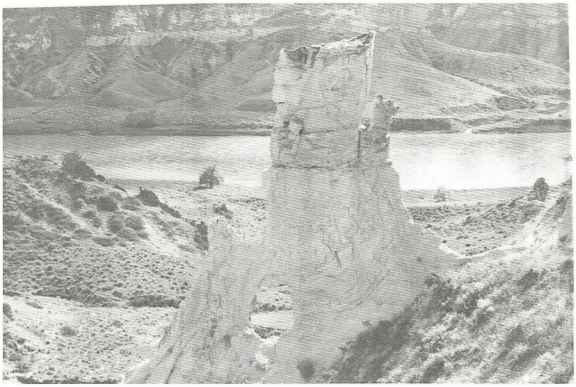
Piping is a condition which occurs when sub-surface waters encounter a layer of bedrock or soil such as clay pan which prevents downward movement of water. Water above the retarding layer is forced, under hydraulic gradient, to move laterally to an outlet. The resultant subsurface erosion produces tunnels. Overburden above the tunnels sometimes slumps into the cavity as shown in this photograph.

Honeycombed and pedestaled rocks are common to the White Rocks segment of the river area. They are sculptured by the processes of weathering (the chemical action of rain water and air, and the mechanical action of temperature whereby the rocks gradually decay) followed by wind which removes the products of weathering. Lenses and layers of more resistant sandstone lie within the bedrock. When exposed, these weather slowly while surrounding rocks, by comparison, weather rapidly. After the loosened materials have been blown away the pedestal and honeycomb shapes remain. Pedestaled rocks are commonly referred to as "toad stools."

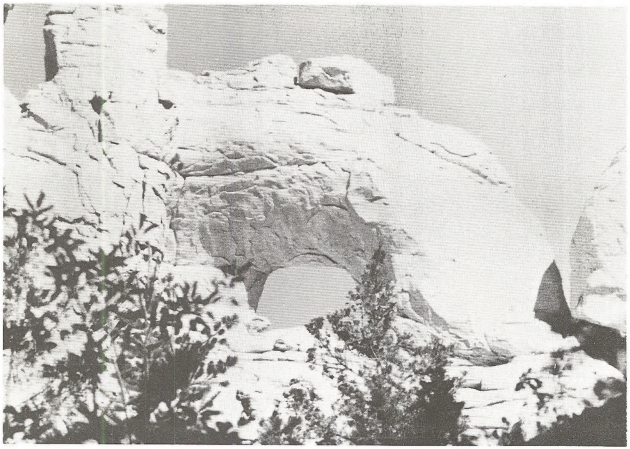
Joints are smooth vertical cracks in bedrock. They determine, to a large extent, how the rocks will initially erode. Whenever bedrock becomes exposed to erosion, the joints begin to open. Water and air begin to enter the cracks and dissolve the rock material. During cold periods, water in the joints freezes and expands. The force of expansion, when confined in the cracks, can pry rocks apart. On cliffs, the process of joint weathering produces large separated vertical blocks that eventually detach when overcome by gravity. Cliffs recede by this process allowing for development of large, free-standing blocks of rock.



Monuments resemble some architectural feature or statue. They have been described as towers, castles, temples, cathedrals, or churches. Isolated blocks such as Steamboat Rock, shown above, usually form monuments. Blocks which are wider than they are high are called Mesas. Buttes are created from former mesas which are as high as they are wide. Remnants of buttes that are higher than they are wide are called spires (see photograph on next page).



Windows form in isolated, wall shaped blocks. In the White Rocks area, walls are fairly common, especially where igneous dikes lend support to standing blocks of sandstone. Weathering has worn holes in the walls creating windows as shown above.



Arches are created by weathering and removal of rock material along sandstone beds of relatively lower resistance as compared with overlying beds. Arches require, before development, the formation of an isolated, wall-shaped block of sandstone.

Capping certain ridges is a hard reddish material called scoria, which is a burned and baked rock formed during the burning of an associated coal seam which was probably ignited by a lightning strike or range fire.

Erosion

Downcutting in the sedimentary plains has been fairly rapid as evidenced by the youthful topography developed along the river. The relatively higher erosive energy of the large river as compared to its small tributaries in Central Montana allowed the Missouri to cut a narrow trench as it proceeded to wear down the upland. When the walls of the trench became steep enough to exceed the maximum slope at which rock and soil will remain stable (angle of repose), mass movement by slipping allowed materials to slough off into the river causing a greater amount of river energy to be consumed in load transport and less in downcutting.

Erosion rates are influenced by the resistance of soil and geologic materials to weathering and removal by wind or water. In the Missouri Breaks, geologic materials consist largely of soft shales and siltstones and, to some extent, more resistant sandstones. Soils that have developed on these rocks contain large percentages of fine-grained clay. Where these soils are located on slopes, conditions are adverse to the development of vegetation. Such areas are common in the management area below Arrow Creek where they are identified as badlands. Vegetation development is more successful on level areas above the canyon and on floodplains and terraces. Infiltration characteristics of the soil are comparatively more favorable in these areas, consequently erosion rates are reduced.

The characteristics of the climate in the river area are conducive to infrequent, high sediment yielding runoff events. Short duration, high intensity thunderstorms in summertime produce rainfall at rates well above the infiltration capacities of most of the soils.

Erosion may become accelerated by the activities of man. Principal causes are overgrazing and road building. In some areas intensive grazing has been concentrated in the floodplains adjacent to the river. Within cottonwood groves are numerous examples of ungulate damage from concentration of livestock for shade and water. Roads descending the canyon's hillsides are difficult to maintain and very slow to heal when abandoned. Their compact surfaces absorb very little rainwater, thereby holding on the surface, a large portion of the moisture which runs down the steep grades, carrying sediment from the road to gullies below.

A more recent impact to soil and cover has been the introduction of recreational use of bottomlands for camping. A number of the more popular sites show vegetation removal and soil compaction from trailing, fire pits, garbage pits, outdoor toilets and shelter set ups.

Erosion condition was determined in many sites using a standard method of evaluating surface litter, erosion pavements, pedestalling, rill and gully densities and soil movement evidences (see Appendix J for detailed description). Erosion condition was rated moderate in most locations although critical conditions existed at some heavily used sites.

Visual Resources

There are four visually distinct units within the 149 miles of river corridor addressed in this management plan. They consist of the Fort Benton - Virgelle Unit, the White Rocks Unit, the Badlands Unit and the Charles M. Russell National Wildlife Range Unit. Each of these areas has its own distinctive characteristics. The readily accessible Fort Benton - Virgelle Unit is considered the least scenic and supports the most man-made developments. The White Rocks Unit has a highly scenic character with unique and unusual eroded forms. The Badlands Unit is the least accessible, contains quality scenery and possesses some wilderness characteristics. The Charles M. Russell National Wildlife Range Unit is characterized by a broad river valley, planned land uses, and possesses the finest wildlife habitat.

Fort Benton - Virgelle Unit (Mile 0 to Mile 51)

The characteristic landscape varies from rather level cultivated fields to gently rolling toe slopes to barren cliffs with sharply contrasting layers of tan and gray-green shale. Some of the cliffs are abruptly cut by numerous, deeply incised washes and coulees. There are a few examples of massive, active block slumping near the river. Sagebrush and native grasses are the most predominant vegetative species observed. The riparian vegetative zone is well defined along both sides of the river and on islands. The riparian zone is characterized by dense growths of willow with larger cottonwood trees forming a backdrop which at times, screen numerous man made intrusions from view from the river.

Some works of man contrast with the natural landscape and are seen infrequently along the broad floodplain. These intrusions include silos, utility lines, railroad tracks, ranch houses, barns, fences, roads, irrigation pumps and pipelines.

Color is generally expressed as earth tone shades in greens, sage green, tans and brown. Green coloration predominantely occurs in the riparian vegetation. In addition, green can be found in hay and wheat fields on the upper plains at various times of the year. Sage greens are visible on the native undisturbed plains and hillsides. Tans and browns occur in the exposed strata of the surrounding hillsides.

White Rocks Unit (Mile 51 to Mile 88)

This reach of the river is characterized by extraordinary and unusual erosive forces which have carved many hundreds of "grotesque figures" as Captain Lewis described the stone pinnacles and balancing rocks in 1805. Magnificent land forms tempt the imagination with some of the more notable ones named LaBarge Rock, Eagle Rock, Castle Rock, Grand Natural Wall, Citadel Rock and Hole-in-the-Wall.

Very few signs of man are visible within the seen area. A few abandoned homesteads, fences and corrals are the infrequently seen signs of man's intrusions into the area.

Towering white cliffs contrast sharply with scattered stands of cottonwood near the river's edge, limber and ponderosa pine and some Douglas fir occur on the mid slopes while juniper occupies the deeply incised

coulees. In most areas, the floodplain is closely confined between the towering bluffs, while in some reaches, rounded sagebrush covered slopes gradually ascend to the steep cliffs. Dark igneous dikes penetrate the white eagle sandstone and can be seen as contrasting cross-fractured walls leading to the waters edge. Igneous stocks and plugs form unique land features and steep-walled canyons running at right angles to the Missouri River extend into the surrounding prairie.

From about the mouth of Arrow Creek at mile 78, the white eagle sandstone can be seen descending to mid-slope level and gradually dipping in an easterly direction until it disappears entirely below the level of the river. As the white sandstone disappears, the brownish Judith sandstone occupies the rim areas adjacent to the river, until it gradually inclines downward as it approaches the Judith River area where it disappears, only to be thrust up at occasional locations downstream in this reach of river.

At the Judith River confluence area, the river valley takes on some of the characteristics of the Fort Benton - Virgelle Unit. Here and just upstream from the mouth of Arrow Creek, several ranch buildings, roads and fences are visible from the river. The Judith Landing area is characterized by a broad flood plain with a much more open view, both north and south, exposing sagebrush covered slopes and some irrigated fields.

Badlands Unit (Mile 88 - Mile 131)

The badlands unit is a rugged area of largely barren bluff and cliff-type landforms interspersed with occasional pillars, balancing rocks with scattered stands of conifer, grass, sagebrush and greasewood.

For the most part, the bottomlands are somewhat wider than in the White Rocks Unit although numerous towering bluffs descend directly to the river's edge in some locations.

Scattered stands of cottonwood trees provide shade for livestock and campsites for river floaters. Dense growths of sagebrush and greasewood are found on the more level to gently rolling toe slopes. In places, the sagebrush is six feet or more in height.

Judith sandstone and associated Ponderosa pine growth at times caps the bluffs or penetrates the multi layered and deeply eroded slopes seen from the river. Fault lines and massive block slumping are commonly seen landform characteristics. White Eagle sandstone is thrust up near Iron City Islands and Sugar Loaf Rock. Thrust fracturing of sandstone is a predominant visual feature at Chimney Bend and Greasewood Bottom.

Charles M. Russell National Wildlife Range Unit (Mile 131 to Mile 149)

The topography in this area changes from the rugged badlands to a more open character with a wider floodplain and extensive bands of riparian vegetation on both river banks. Many more cottonwood trees and willows line the river banks and islands are covered with dense growths of underbrush.

Wildlife species which frequent the river are much more common here. Some irrigated fields are located on the benchlands above the river, but most of these are not visible from the river. The exposed bluff surfaces are located farther back from the river in most areas than is characteristic of the Badlands Unit, giving the appearance of being somewhat lower than the bluffs in the preceding section.

Colors which predominate in the Badlands are commonly seen with greater seasonal textures of green and yellow reflected in the cottonwood and willow vegetation. Pine trees are commonly seen thinly scattered across the crests of the bluffs.

Land Ownership

Land ownership within the wild and scenic river corridor (rim to rim boundary portions) consists of 85,946 acres federal lands (65%); 35,860 acres private lands (27%); 10,032 acres state lands (7%), for a total land base of 131,838 acres. These totals include island areas, but not water surface acres.

Shoreline ownership on the north bank of the Missouri River within the total management area consists of 63.15 miles federal ownership (41.2%); 4.91 miles state ownership (3.2%); and 85.37 miles privately-owned lands (55.6%).

Shoreline ownership on the south bank within the total management area is 59.64 miles federal ownership (39%); 8.26 miles state ownership (5.4%) and 85.08 miles privately owned lands (55.6%).

See detailed discussion of river ownership by wild and scenic river classification in Appendix K.

THE RESOURCES AND THEIR UTILIZATION

Recreation

In recent years, interest in river float trips as a recreational pursuit has surged nationally. On a growing number of rivers, the number of visitors has increased to the point that the very resource which has attracted recreationists, is beginning to deteriorate. This in turn, is lowering the quality of the recreational experience that is achieved.

For many years, the Upper Missouri River area has been popular for the hunting and fishing opportunities to be found along its course. These activities were centered around the few existing access points and in the surrounding river breaks. Prior to the 1960's, the majority of recreational boating use on the river stemmed from interest created by local residents. Recreational use gradually increased as stories of what the river had to offer were spread by word of mouth. The Glasgow Chamber of Commerce was an early regular user when this group started an annual cruise in 1957. In 1960, a group of teachers from Fort Benton started making annual treks down the river at the end of each school year. Members of this group were later to form the Upper Missouri Wilderness Waterway Cruise Company.

In 1963, the Departments of Interior and Army released the Missouri River, Fort Peck to Fort Benton joint study. This study led to more river publicity and an increase in recreational use.

Through the 1960's and into the early 1970's, media exposure relating to the river was centered around discussions on reservoir construction or alternatives to such construction. River use increased gradually and some resources have suffered as a consequence of the unrestrained use.

Local residents who are familiar with the river area report that many homesteads have been vandalized. Ferry operators have noted homestead materials such as pot-bellied stoves, wagon wheels and other large items being borne downstream on recreational watercraft.

The archeological resource has also suffered from the actions of recreational floaters and from the meanderings of the river itself. Cultural materials protruding from river cutbanks become obvious targets for those floaters who become adept at spotting such evidence. It will never be known how much of the total resource has suffered from natural and man-caused actions. Professional archeologists employed by the Bureau of Land Management engaged in reconnaisance surveys in 1975 and 1977, did note significant changes in some sites from both causes.

Some natural values have deteriorated from the desire of some recreationists to record their presence in the form of graffiti on sandstone formations. Some delicate rock formations have also been destroyed by individuals rolling or tumbling rocks down steep canyon slopes.

The limited number of cottonwood groves located along the floodplain are focal points for much of the overnight camping use which is occuring. Some sites are more popular than others and a number of sites are showing signs of deteriorating quality. Numerous scattered firepits, garbage and human waste disposal are growing problems at some of the more popular undeveloped sites.

The lack of potable water over long stretches of the river creates some difficulty for use and is a management concern. Potable water can be obtained at Fort Benton, Coal Banks Landing, Hole-in-the-Wall Campground, Judith Landing Campground and Kipp State Park.

Primary launch points for visitors embarking on a Missouri River float trip are located at Fort Benton, near the Loma Ferry adjacent to the mouth of the Marias River, Coal Banks Landing State Campground, Judith Landing State Campground and Kipp State Park.

The Missouri River between Fort Benton and the Robinson Bridge is considered a family-type float stream. The Missouri's slow-moving currents and usually sunny days make it an ideal river for beginning canoeists.

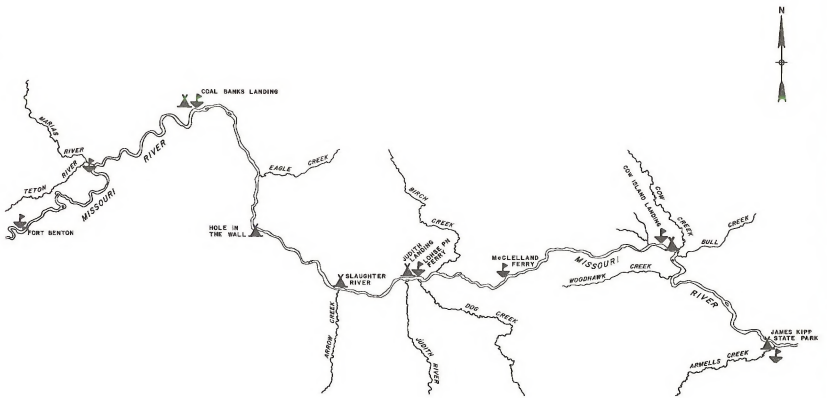
The scenery along the river, especially in the "White Rocks" segment, is substantially different from the mountains and plains county of north-central Montana. Individuals accustomed to alpine meadows or deep forests find a special attraction in this unique area. The river also offers opportunities to view dynamic geologic processes and free-roaming wildlife.

The Missouri has gained a reputation as an easy float river, but there are some inherent dangers. Sudden gusts of strong wind may be encountered at unexpected times. Rattlesnakes can be found in the bisected canyonlands and sagebrush-covered river terraces. Cold, and sometimes heavy thundershowers are a frequent occurence during the primary recreational use season. Temperatures exceeding 100° F can be expected in mid and late summer. A few inexperienced climbers have slipped and fallen from river bluffs, sometimes experiencing broken bones or bruises.

State - Owned Campsites

Since 1959, the Montana Fish and Game Department has undertaken some limited recreational development along the Missouri River to accommodate the increase in river use.

In 1966, the State Fish and Game Department purchased twenty-nine acres of land on the north bank of the river adjacent to the old Coal Banks



UPPER MISSOURI WILD AND SCENIC RIVER

MONTANA

STATE CAMPSITES

MAJOR RIVER BOAT LAUNCHING POINTS

Scale Of Miles

steamboat landing site. Coal Banks Landing State Campground is located approximately 1½ miles northeast of the community of Virgelle, Montana. A boat ramp, water well, pit toilets, garbage pits, and areas for primitive-type camping have been set aside for the benefit of recreationists.

The 10 acre Hole-in-the-Wall State Campsite was acquired in 1966. The Fish and Game Department has developed rustic lean-to shelters, pit toilets, garbage pits, and a water well for the benefit of river users. The site is located approximately one mile west of the famous Hole-in-the-Wall natural landmark.

The state acquired 42 acres on the north bank of the river across from Arrow Creek (Lewis and Clark's Slaughter River) in 1967. Very little facility development has occurred at the Arrow Creek campsite, but it is a popular overnight camping area for river floaters.

The Judith Landing campsite was acquired in 1967. The campground is located on the north bank of the Missouri River near the Lohse/PN Ferry, opposite the mouth of Judith River. Access to the campsite can be gained from State Secondary 236 or from the river. There are 6 acres of state leased property at this location. Recreation facilities consist of pit toilets, picnic tables and a water well.

Cow Island Campsite was acquired in 1967 and consists of 21 acres located on the north bank of the Missouri River, approximately one mile upstream from the old Cow Island steamboat landing. This campsite is equipped with pit toilets and garbage pits.

River Mileage Between Selected Sites

Fort Benton*										
21	Loma Ferry*									
42	21	Coal Banks Landing* Campground								
52	31	10	Beginning of White Cliffs							
63	42	21	11	Hole-in-the-Wall Campground						
77	56	35	25	14	Slaughter River Campground					
88	67	46	36	25	11	Judith Landing* Campground				
102	81	60	50	39	25	14	McClelland* Ferry			
125	104	83	73	62	48	37	23	Cow Island Landing Campground		
139	118	97	87	76	62	51	37	14	C.M. Russell National Wildlife Range Boundary	
149	128	107	97	86	72	61	47	24	10	Robinson Bridge* James Kipp Park

*Launch and/or take-out points

James Kipp State Park, a 465 acre developed site adjacent to U.S. Highway 191, has been administered by the state of Montana since 1959 through a lease agreement with the U.S. Army Corps of Engineers. The Robinson Bridge is located on the upstream side of Kipp State Park and is the downstream termination point of the Upper Missouri Wild and Scenic River. The state park has been developed to accommodate overnight campers, picnickers and fishermen. Recreationists have been provided with picnic tables, pit toilets, a water well and camper pads.

Commercial Outfitters

At the present time, eight commercial outfitters provide river excursions on the Missouri River. Six of the Missouri River outfitters are based in Montana, while the remaining two are based in Washington and Oregon.

Visitor Use

In recent years, recreational use has changed from limited use by local hunters and fishermen to recreational boating and camping.

Statistical use samples were taken during the summers of 1975, 1976 and 1977 by BLM personnel.

A sample taken between June 9 - August 24, 1975, identified 5,553 floater days. Another sample taken between May 23 and September 5, 1976 identified 9,313 floater days. (2,228 floaters) The 1975 figures were further expanded by trend analysis from the 1976 figures as only a portion of the use season was sampled in 1975. On the basis of the 1976 trend, 6,890 floater days and 1,648 floaters were projected for the 1975 season. The 1976 totals represented a thirty five percent increase over 1975.

The average party size for the two years was 7.5 floaters and the average length of stay was 4.18 days.

During the summer of 1977, floater use was limited due to extremely low water levels. BLM personnel recorded use from May 26 to September 6 and tabulated 5,025 floater days or 1,289 floaters. The 1977 average party size was 4.5 floaters and the average length of stay was 3.9 days. This represented a 42 percent decrease from the previous season.

1977 was an atypical year and it is reasonable to expect 35 to 40 percent annual visitor use increases on the Missouri River.

Wilderness

Review of Bureau of Land Management lands for areas suitable for inclusion in the National Wilderness System is currently being conducted and includes properties adjacent to the management corridor of the Upper Missouri Wild and Scenic River. This study will be conducted in Montana until Fiscal Year 1991. Protection of wilderness resources is specifically provided for by the Federal Land Policy and Management Act of 1976 (PL 94-579).

Eleven areas totaling about 272,240 acres have been identified as potential roadless areas for possible wilderness study. All of these areas are adjacent to the river management corridor. Wilderness designation for some of these areas may occur at some future date and may have an effect on river management.

Wildlife

The abundance and diversity of wildlife along the Missouri River breaks area has been noted since the days of the Lewis and Clark Expedition. At the present time, 60 species of mammals, 233 species of birds, 20 species of amphibians and reptiles and 49 species of fish inhabit the Missouri Wild and Scenic River Area (a detailed list of individual species is available in the Lewistown District Office).

The river area provides several special and unique habitats which provide for the abundance and diversity of wildlife found near the river. Unique habitats consist of cliffs, talus slopes, and caves. Cliffs and talus habitats are located primarily between Coal Banks Landing and the mouth of the Judith River - locally known as the "White Rocks" area. Several species of animals are more abundant along this section of the river because they require these habitats in their life cycle. The area anticipated to have the greatest potential for bat habitat is found between Stafford Ferry and the Charles M. Russell National Wildlife Range, where more small caves exist.

An important habitat type is the riparian area associated with surface water. The riparian habitat exists as scattered narrow bands of mixed vegetative types on the river banks, supplying diverse foliage strata and a greater number of habitat types for wildlife. The majority of the

riparian habitat is confined to one-half of the total river: Fort Benton to Little Sandy Creek - 47 miles; mouth of Arrow Creek and Judith River - 3 miles; Cow Island to Robinson bridge - 22 miles. Most wildlife species in the river area require riparian habitat in their life cycle.

Snags are important raptor perches and nest sites for tree cavity nesters.

River islands are in a near primitive state and provide major deer fawning, elk calving, and goose nesting sites by providing an area free of livestock disturbance. Increased recreational use of islands could adversely affect wildlife use.

Cliffs, talus slopes, caves, riparian zones and islands are special and unique wildlife habitat since these land forms occupy a small percentage of the total area, are restricted in locations, and dependent wildlife are concentrated into small areas.

The expansion of small grain farms has reduced wildlife habitat such that wildlife species are more dependent upon the river area to meet their key habitat requirements.

Mammals

Members of the Lewis and Clark Expedition observed bison, bighorn sheep, mule deer, white-tailed deer, elk, antelope, beaver, black bear, grizzly bear, wolves, swift fox, and mountain lion along the wild and scenic segment of the Missouri River. The coming of fur traders and the establishment of trading posts marked the permanent presence of white

men in the area. Later, cattlemen settled the area followed by dryland farmers. All these demands on the land greatly reduced the native prairies and marked the decline of wildlife. The bison, black bear, grizzly, wolves, and swift fox are no longer found in the river area.

The major emphasis of past wildlife studies by state agencies and universities has been on game species. Since little information is available on non-game species, the effects of recreational use in the river area on these species is unknown.

However, sensitive breeding birds such as the prairie falcon and great blue heron could be adversely affected from potential increases in human encroachment during the nesting season.

Major Game Species

Mule deer are an important big game animal along the river. They are closely associated with the breaks and adjacent agricultural lands. Low mule deer populations in the lower half of the river are due to poor productivity and or survival. Populations in the upper half of the river are in somewhat better condition. Seasonal distribution of this species shows a preference for grassland-sagebrush and riparian type vegetation in the spring and summer, moving to the heads of the breaks and benches in winter. River islands are an important area for fawning, free from livestock disturbance.

White-tailed deer are restricted to the narrow riparian habitat and agricultural lands along the river bottoms. During periods of heavy snow, these animals will move to the sagebrush-grasslands of the breaks. The river islands provide a major fawning area as well as supplying food and cover.

Where the terrain is open, with easy access to the river, small bands of antelope will utilize the sagebrush-grasslands on the river bottom in summer. During the spring and fall, antelope utilize adjacent small grain fields. During severe winters, antelope will migrate into the breaks for shelter and food.

The last native elk was believed to have vanished from the breaks during the 1860's. This species was reintroduced in 1951 and has increased to the point of providing some limited hunting opportunities. Recent Montana Fish and Game reports show a westward expansion of their range along the river, as far west as Stafford Ferry. River islands and riparian zones are major calving areas for elk in the managment area.

Lewis and Clark reported seeing bighorn sheep along the river bluffs. This species became extinct by 1916. A reintroduction by the Montana Fish and Game Department was made in 1958 and 1961. Forty-three Rocky Mountain bighorn sheep were placed in a 1,400 acre enclosure adjacent to the river within the C.M. Russel National Wildlife Range. The herd grew to at least 90 animals, providing limited hunting until the winter

of 1971-72, when a die-off occurred, reducing the herd to twenty-three animals where it remained until the winter of 1977-78. Another die-off occurred, reducing the herd to nine animals. Starvation was the apparent cause of mortality.

Coyotes are numerous in some river segments and provide a recreational pursuit for fur hunters.

The black-footed ferret is an endangered species with historical presence in the river area. Presumptive evidence of ferret activity has been found in the area, although no ferrets have been observed. Black-tailed prairie dog towns provide the necessary habitat requirements for the ferret. A number of prairie dog towns near the river might support a population of this species. Eleven prairie dog towns have been identified on the river flood plains.

Birds

The great diversity and number of birds found along the river can be attributed to a diversity of special habitats. The scattered narrow bands of riparian habitat contains the greatest diversity of bird species by providing more diverse foliage strata and a greater number of niches for food, cover, and nest sites.

Canada geese and mallards are the primary waterfowl species nesting on the river. Canada geese almost exclusively nest on river islands. The largest number and variety of waterfowl occur during the fall migration when the birds utilize standing grain crops and marshes long distances from the river and return to the river for resting, cover, and some feeding.

A variety of shorebirds are found on the river throughout the spring and summer.

Cottonwood groves provide nesting sites for great blue herons, cormorants, ospreys, and raptors. To date, four great blue heron rookeries have been identified within the management area.

Where sufficient residual vegetation is available to provide nesting habitat and protection, several upland game birds occur. These include sharp-tailed grouse, sage grouse, gray partridge, pheasants and Merriam's turkey. Sharp-tailed grouse are common and widely distributed on the benches.

The most common birds of prey include the buteo hawks, such as the red-tail hawk and Swainson's hawk. Golden eagles are common and nest within the area. Bald eagles over-winter along the river, with some nesting pairs being reported.

Burrowing owls are commonly associated with prairie dog towns. The endangered peregrine falcon and prairie falcon have a history of nesting along the river. The Montana Fish and Game Department has reported a pair of peregrine falcons on the river. However, nest sites have not been located.

Eighty percent of the passerine birds found within the river area are year-around residents. The range of eastern and western species overlap

where suitable riparian habitat exists. Late summer concentration of nearly one-half million doves have been reported by Montana Fish and Game Department observers.

Amphibians and Reptiles

Amphibians are primarily concentrated along side drainages and stream channels where there is riparian vegetation and surface water. Turtles are found in the Missouri River proper. Lizards and snakes prefer the sagebrush-grassland floodplains.

Fish

The Missouri River supports a significant fishery, with greater use being placed on this resource annually. The river has a greater diversity of aquatic habitats with a larger variety of fish species than many river drainages in Montana. Forty-nine species representing 14 families are known to occur in the river and its tributaries. Thirty-five species are found in the Missouri River proper, primarily warm water fisheries, with the remaining 14 species in tributaries, primarily cold water fisheries.

Snagging for paddlefish continues to be a popular fishing activity. Only seven known spawning populations of paddlefish exist today. One of those populations occurs in the Missouri Wild and Scenic River area and Fort Peck Reservoir. This is one of the last known "stable" populations of paddlefish.

Threatened and Endangered Species

The black-footed ferret, peregrine falcon and bald eagle have been sighted in the Missouri Wild and Scenic River area in the past century. The present status of these species is unknown. If these or any threatened or endangered species are encountered they will be protected as provided by the Endangered Species Act of 1973 along with other federal and state regulations.

Range

Within the Wild and Scenic portion of the river, agricultural land use is limited almost exclusively to the grazing of livestock because of the unsuitability of terrain for cultivation. The vegetation present has evolved under a long history of use. An account provided by the diary of David Thompson records a statement by the Piegen Indians that the bison sometimes grazed during the summer and fall along the Missouri River until the ground was essentially bare and the bison could no longer live there (England and DeVos, 1969). Audubon (1897) also commented on the influence of the extraordinary animal populations on the vegetation along the Missouri River in what is now North Dakota. He states:

> "At both the previous islands we saw an immense number of Buffalo tracks, more, indeed, than I had anticipated. The whole of the prairies as well as the hills have been so trampled by them that I should have considered it quite unsafe for a man to travel on horseback. The ground was literally covered with their tracks and also with bunches of hair. While the bushes and the trunks of the trees, between which they passed, were hanging with the latter substance. We landed for the night on an island so thick with underbrush that it was no easy matter to walk through; perhaps a hundred Buffalo calves were dead in it and the smell not pleasant as you might imagine."

Much of the grazing within the river corridor is on land administered by the Bureau of Land Management. The BLM recognizes livestock grazing as an important and viable resource use and at present there are fifty-four (54) grazing authorizations permitted on National Resource Lands within the river area. These authorizations include both lands leased to operators under Section 15 of the Taylor Grazing Act of 1934 and

lands licensed or permitted to be grazed under Section 2. These lands support 8,876 animal unit months (a unit of measure for the amount of feed needed to feed one mature cow or its equivalent for one month).

Forage on bottomlands along the Missouri River is important for livestock grazing; however, the greatest value for livestock is for use of the river for drinking water and use of the groves for shade. This is where most of the use conflicts between livestock grazing and the recreation resource occur. The following conflicts or problems have been addressed in the proposed management of the area:

- Lack of cottonwood reproduction
- Camping vs. livestock grazing conflicts in cottonwood groves
- Livestock vs. wildlife conflicts
- Visual resource and range improvement location conflicts
- Lack of stockwater development for acceptable livestock distribution
- Unsatisfactory forage and watershed conditions

Appendix L is a list of range condition by acres of river terraces and bottoms for each allotment along the river corridor. More detailed information on range condition, watershed condition, and carrying capacity are found on overlays, but these cannot be shown in this document due to size limitations.

The BLM goal for the range program along the Missouri River, is to manage livestock in a manner which will improve the rangeland environment. The major mechanism for reaching this goal is through the

implementation of allotment management plans (AMP's). Several AMP's have been implemented in past years on well blocked National Resource Lands along the river. As the result of a court order (National Resource Defense Council vs. Morton), the BLM was directed to assess the impacts of grazing on public lands. The Bureau was required to prepare management plans for each grazing allotment and prepare environmental impact statements to assess the proposed management plan. All of the plans have been written for allotments along the river corridor and are being analyzed in the Missouri Breaks Grazing Management Environmental Statement, scheduled to be completed in 1979.

In developing these AMP's, inventories of range condition, suitability for livestock grazing, existing range improvements, wildlife habitat, and erosion condition were conducted on each grazing allotment. After considering all uses of the land and needs of the livestock operators, grazing systems were developed, management facilities (fences, reservoirs, (etc.) were planned, and adjustments in amounts of authorized use were often made, generally due to the requirement that acreage unsuitable for livestock grazing be subtracted from the carrying capacity.

The main component of each of these specific management plans for meeting certain range, watershed, wildlife, and aesthetic objectives is the proposed grazing system. These grazing systems involve the sequential rotation of livestock through various pastures of an allotment over a period of time. Appendix M includes examples of typical sequences and treatments for deferred-rotation and rest rotation grazing systems which comprise the two main systems proposed or presently existing along the river corridor.

Allotment management plans will naturally vary with each ranch unit and therefore are based on the needs of the resource and the individual ranch operations. The ranches encompass varying proportions of public domain land, depending on their location. Some ranches use only small isolated tracts.

The allotments and lease areas within the wild and scenic river corridor were given special consideration during the AMP development phase. Intensive review by specialists in range management, wildlife management, recreation management, and watershed management was made of the proposed plans in the river corridor. Difficult decisions were made to arrive at the best possible management alternative for each allotment.

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Vegetation

General

The upper section of the Missouri Wild and Scenic River from Fort Benton to near the mouth of Arrow Creek falls within the Western Glaciated Plains; Silty and Silty-Clayey Range Site Complex. The breaks from Arrow Creek to the Robinson Bridge are within the Western Sedimentary Plains; Riverbreaks Range Site Complex. The Western Glaciated Plains and Western Sedimentary Plains are geographic areas descriptive of the geology which has influenced the vegetation composition. The Silty, Silty-Clayey, and Riverbreaks Range Site Complexes are soil associations within these geographic areas (Climax Vegetation of Montana 1976). The entire area is within the 10-14 inch rainfall zone.

The entire management area is within the grama-needlegrass-wheatgrass (Bouteloua-Stipa-Agropyron) physiognomic type of the Central Grasslands province. The dominant species are western wheatgrass (Agropyron smithii), blue grama (Bouteloua gracilis), and needle-and-thread (Stipa comata).

Other important species in this grassland type include green needle grass, bluebunch wheatgrass, little bluestem, big sagebrush, silver sagebrush, fringed sagewort, threadleaf sedge, prairie junegrass, plains muhly, sandberg bluegrass, needle-and-thread grass, prickly pear cactus, greasewood, winterfat, prairie sandreed, and others.

Range Sites

There are many vegetation complexes within the general grassland type above. The local conditions which determine the vegetation include nearly permanent characteristics such as soil depth, soil texture, topography, parent materials, alkalinity or acidity, stoniness, slope, exposure, and organic matter. These stable factors comprise range sites. A range site is influenced by such factors as grazing management, fire, erosion, amount of precipitation and season of occurrence.

A system of rangeland inventory known as the Ecological Site Method is used to first classify an area into range sites and then determine the relative quantity of plants on that site in relation to the climax or ideal plant composition. This system classifies plants according to their resistance to grazing. Desirable plants that decline under grazing pressure are called Decreasers. Intermediate plants which take the place of these decreasers are called Increasers. Undesirable plants such as weeds and annuals, which replace increaser plants, are called Invaders. Climax vegetation for a range site is made up of a high

percentage of decreaser species and is the highest ecological development capable of perpetuation under the prevailing climatic and edaphic conditions. A range site such as the Badlands, which has a very low productive potential, may be in excellent ecological condition, although it is very poor rangeland.

The Ecological Site Method of range inventory was used in the early 1960's to develop data for the Missouri River Basin studies. Data from that study was recently updated for the Missouri Breaks Grazing Management Environmental Statement. This information will be available in detail upon completion of the environmental statement. A brief discussion of the ecological condition of the vegetation of the management area is as follows:

Four distinct topographic areas which are important in the management of the forage resource are: (1) the sandy islands and river bottoms, (2) the alluvial fans and river terraces, (3) the steep, eroded breaks and cliffs, and (4) the upland benches.

Islands and Sandy River Bottoms

The sandy, subirrigated, and wetland range sites comprise a small but extremely important component. These sites support the cottonwood groves and willow thickets that are favored as campsites. Cottonwood groves are limited to these sites, and normally occupy the sandy riverbanks to the point the sandy river deposit meets the clay on silty outwash from the above.

The present range condition of this site is not known, as these small areas were included with surrounding river terraces in determining range condition. The islands, with a few exceptions, do not receive grazing use and are in pristine condition. The cottonwood groves on the riverbanks receive heavy use from livestock seeking shade and are generally associated with fair range condition. Vegetation of the larger islands is indicative of the climax composition of the riverbank sites. The islands are surrounded by dense willows which occupy the wettest areas. Above the willow zone, dense grasses and sagebrush are found in association with cottonwood and boxelder trees. Rose, snowberry, and other shrubs often grow so densely that the islands are undesirable for camping. The following list illustrates the plant relationships within the Subirrigated and Wetland Site Association.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Tall reedgrasses	Kentucky bluegrass
Tufted hairgrass	Redtop
Slender and bearded wheatgrass	Low sedges
Northern mannagrass	Foxtail barley
Prairie cordgrass	Meadow barley
Tall sedges	Horsetail
Basin wildrye	Golden pea
Canada wildrye	Iris
Willows	Cinquefoil forbs
Cottonwood	Thistles
Boxelder	Other weedy forbs
	Annuals

Alluvial Fans and River Terraces

The silty, clayey, panspot, gravel and saline range sites are found in this zone. These range sites correspond to the Havre, Harlem, and Glendive soil series described in the soils section.

Blue grama, a low growing increaser, is the dominant forage plant on the silty-panspot sites, which are the most common in this zone. Blue grama forms a dense sod on the silty sites that restricts reproduction of more desirable plants. Associated with the silty soil are adjacent panspots, barren claypans, which are occupied by thin stands of western wheatgrass. Prickly pear cactus is prevalent on poorer condition sites. Decreaser species such as green needlegrass, winterfat, and Gardner's saltbush are found in the protection of the cactus or under big sagebrush and silver sagebrush. On better condition sites, green needlegrass and western wheatgrass comprise a greater percentage of the composition, and prickly pear declines. This relationship is illustrated as follows (1):

Silty Range Site, 10-14" P.Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Needle-and-thread	Blue grama
Western and thickspike wheatgrass	Needle-and-thread
Green needlegrass	Sandberg bluegrass
Bluebunch wheatgrass	Threadleaf sedge
Basin wildrye	Hairy goldenaster
Prairie junegrass	Golden pea
Native legumes	Fringed sagewort
Silver sagebrush	Other weedy forbs
Blue grama	Big sagebrush
	Rabbitbrush
	Broom snakeweed
	Plains prickly pear
	Clubmoss

The clayey and shale river terraces are dominated by western wheatgrass and are often saline. Salt tolerant shrubs such as greasewood and fourwing saltbush are found here. These sites are more resistant to grazing pressure than the silty-panspot sites because the soil does not compact easily. The dominant grass, western wheatgrass, reproduces by rhizomes and does not need a seed source. Response to improved grazing management is much more rapid in these sites than the silty panspot terraces. This relationship is illustrated as follows: (1)

Dense Clay-Clayey-Saline Upland Range Site Complex, 10-14" P.Z.

Dense Clay:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Big sagebrush
Green needlegrass	Sandburg bluegrass
Basin wildrye	Golden pea
Prairie junegrass	Curly cup gumweed
Nuttall saltbrush	Eriogonum
Greasewood	Other weedy forbs
	Plains prickly pear
	Annuals

The Breaks and White Rocks

The thin breaks, badlands, shallow clay and shale range sites, are a jumble in the Breaks and White Rocks. These sites are generally in good or excellent ecological condition due to light grazing use. Much of this area is unsuitable for grazing and considered as wasteland.

Bluebunch wheatgrass, plains muhly, green needlegrass, western wheatgrass, needle-and-thread, big sagebrush, and greasewood are the most common forage plants. Yucca and prairie sandreed are indicative of sandy areas and are more prevalent in the White Rocks. Ponderosa pine, limber pine, Douglas fir, and Rocky Mountain juniper are present in scrub stands. Understory browse is skunkbrush, chokecherry and rubber rabbitbrush. Common associations within these sites are illustrated for the western sedimentary plains - Riverbreaks as follows: (1)

Riverbreaks, 10-14" P.Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Ponderosa pine	Needle-and-thread
Rocky Mountain juniper	Blue grama
Limber pine	Sandberg bluegrass
Douglas-fir (north slopes)	Prairie junegrass
Bluebunch wheatgrass	Threadleaf sedge
Western and thickspike wheatgrass	Big sagebrush
Green needlegrass	Rabbitbrush
Prairie sandreed	Creeping juniper
Basin wildrye	Fringed sagewort
Needle-and-thread	Pussytoes
Greasewood	Hairy goldenaster
Big sagebrush	Other weedy forbs
Creeping juniper	Annuals
Native legumes	
Prairie junegrass	

Upland Benches

The upland benches are seldom seen by the river floater. The management area boundary does include some of these important areas, however. The majority of these benches are silty and panspot sites, predominated by blue grama, western wheatgrass, and needle-and-thread. Some benchlands in the Woodhawk Creek area are shale or shallow clay and western wheat-

grass and green needlegrass are prevalent. Range condition of these sites varies from excellent to fair, depending on past grazing management. The vegetation composition is similar to the silty and dense clay-clayey saline upland range site complexes previously described.

Poisonous Plants

Cocklebur (Xanthium) is the most troublesome poisonous plant in the management area. Livestock losses are likely to occur when fall rains make cocklebur green and succulent while desirable forage is matured and dry. Death camas (Zygadenus) is a common poisonous plant but losses are few since the plant must be pulled up and the bulb eaten. Losses due to death camas are likely to occur if a range is excessively grazed. In areas with ponderosa pine, many instances of abortion have occurred in late fall, winter, and early spring when animals may be deficient in vitamin A and desirous of green plant material, and thus ingest pine needles.

Edible Plants

River visitors can find a variety of edible plants to augment their diet and enhance their recreation experience. A handy source of information for identifying these plants and their uses is Free for All, Edible and Useful Wild Plants of North Central Montana, L.W. Hagener and A.R. Hagener 1977.

Wildflowers

Springtime visitors are treated to a delightful array of colorful wildflowers. Hues of yellow, blue, red, and white, contrast with the bright green of spring grasses to provide an eye-filling experience for the

early visitor; as well as endless opportunities for the camera bug. Below is a list of the most commonly seen wildflowers; many, many more can be found.

Common Wildflowers

Common Name	Scientific Name
Yucca	Yucca glauca
Dotted gayfeather	Liatris punctata
Purple prairie clover	Petalostemon purpureum
Sweetclover	Melitotus officinalis
Scarlet globemallow	Sphaeralcea coccinea
Rose	Rosa arkansana
Pasqueflower	Anemone patens
Western yarrow	Achillea lanulosa
Textile onion	Allium textile
Prairie coneflower	Ratibida columnifera
Common prickly pear	Opuntia polyacantha
Nuttall violet	Viola nuttallii
Golden pea	Thermopsis rhombifolia
Missouri goldenrod	Solidago missouriensis
Slimflower scurfpea	Psoralea tenuiflora
Common breadroot scurfpea	Psoralea esculenta
Common sunflower	Helianthus annuus
Curlycup gumweed	Grindelia squarrosa
Broom snakeweed	Gutierrezia sarothrae
Rubber rabbitbrush	Chrysothamnus nauseosus
Pin cusion cactus	Coryphantha spp.

Ecologically Unique Areas

Grand Island, Upper Two Calf, and Hammond Island, which are within the Charles M. Russell National Wildlife Refuge, have been designated for natural areas study. These islands are representative of a wheatgrass-bluestem-needlegrass association. This grassland type is associated with cottonwood and willows on the three nominated natural areas.

A rough fescue (Festuca scabrella) community has been reported on the north side of the river below Stafford Ferry. The occurrence of rough fescue is unique in the badlands since the only other locally known

locations of this plant are in the Bearpaw, Little Rockies, and Judith Mountain Ranges, and even in these more mesic locations, its abundance is limited.

Rare and Endangered Plants

No federally listed rare, threatened, or endangered plants are presently known to exist within the management area. A more thorough examination of habitat requirements for listed plants which could potentially be found in this vicinity, should be pursued. If any plants are determined to be found within habitats encompassed by the management area, a thorough check should be made of habitats in which the plant(s) may be potentially found. At the present time, only four (4) rare or endangered plants are listed for Montana.

There is a possibility of the Montana Department of Agriculture listing a greater number of species than listed federally; in accordance with BLM policy, consideration must be given in the Bureau's planning and decision-making process to state-listed rare, threatened, or endangered plants.

Literature Cited

1. Ross, Robert L., and Harold E. Hunter, 1976. Climax Vegetation of Montana. U.S. Dept. of Agriculture, Soil Conservation Service.

Forestry

The tree species that presently exist along the Missouri River are:

Acer negundo	Inland Boxelder
Pinus ponderosa	Ponderosa Pine
Pseudotsuga menziesii	Douglas-fir
Juniperus scopulorum	Rocky Mountain Juniper
Populus deltoides	Plains Cottonwood
Pinus flexilis	Limber Pine
Salix spp.	Willow

Most of these species were present along the river when Lewis and Clark made their journey up the river in 1805. The broadleaf trees are found on the islands and river banks very close to water. The pine, junipers and Douglas-fir are scattered throughout the steep slopes and sharp coulees adjacent to the river. Very few conifers are found up river from the White Rocks area.

Forest products have been a necessity and therefore used extensively by man in the past. Some of the uses included building construction, fuel for steamboats, fuel for home heating and cooking, and fence construction.

Use of the forest products by natives was minimal. White man's demand for timber was much greater. Trading posts such as Forts Piegan, McKenzie, Chardon, Lewis, Nottingham, and Clagett were all constructed with timber cut along the river. The military also cut trees to build camps Cook and Otis, and to construct summer camps at Dauphine Rapids and Cow Island. The steamboat towns of Fort Benton, Eagle Creek, and Judith Landing required large amounts of wood for construction and everyday use. It was the steamboats themselves that placed the heaviest demand on the timber resource along the Missouri River. Each steamboat

coming up the river between 1860 and 1890 burned an estimated 25 to 40 cords of wood each day. All of this steamboat wood came off the river bottoms and adjacent breaks.

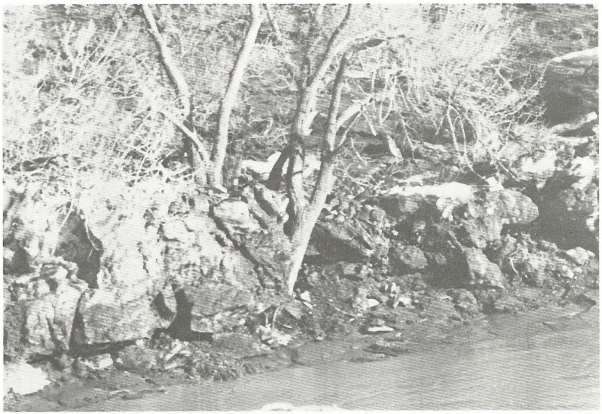
After the steamboat era came the permanent settlers and homesteaders. They needed forest products to construct buildings, corrals, and fences. Wood was still used during this time to heat homes and cook food. Many homesteaders found a new use for trees. They transplanted native trees and introduced new species, such as Russian-olive, to serve as windbreaks, shade and landscaping around their buildings. Some of these trees are still present today.

The demand for forest products along the river has steadily declined since the homestead era. Present day use is limited to firewood by campers and a few fence posts or corral poles by local ranchers. Campers and other users of the area enjoy the trees for their scenic value and use the cottonwood groves along the river for shade and shelter. These groves provide the favored campsites and are used as shade for livestock.

Cottonwood Ecology

The cottonwood groves along the Missouri River are areas which are of major concern to this management effort. These groves provide shelter and firewood for campers as well as being important habitat for many species of wildlife. At the present time there is concern that many of the groves are being reduced without new groves being established.

There are many factors which affect cottonwood reproduction. Probably one of the most dramatic influences is the river itself. As a result of being found within the floodplain, these groves are periodically flooded by water, are subject to severe soil erosion and deposition, as well as receiving physical damage from transported debris, (especially from ice, as shown in the accompanying photo).



This photo is an example of the amount of ice which may be pushed into cottonwood groves when the ice goes off the river during spring breakup.

Cottonwood reproduction occurs primarily on recently deposited alluvium. These sites are generally formed by a combination of deposition on the inside of river curves and the deposition from overbank flows (Wolman and Leopold, 1957). This is illustrated by the accompanying set of photographs. Photo 1 is a photo of Iron City Island in 1905. Photo 2 was taken in 1964 and Photo 3 in 1978.

Photo 1. Stanton #145 - Published in U.S. Geological Survey Bul. 257. 1905.

Photo 2. Burr #457-458 - BLM, 1964.

Photo 3. Gilkerson #45, August, 1978.

The most noticeable change in the photos, is the island itself. Notice how in 1905 it was covered by cottonwoods and stood well out of the water even though the flow of the river is much higher than the flow in the other two photos. In the later photos, the original island has disappeared and two new islands have appeared to the right of the original island. Notice how the point of land which juts out from the right side of the photos, has been narrowed considerably from both sides. Notice the mud flat in 1905 where the river is depositing alluvium material on the far right of the photo in the bend above the point previously discussed. In 1964 trees are growing on this alluvial area and in 1977 a distinct river bank has formed leaving the area with the trees well above the normal level of the river.

Recently deposited alluvium is low in organic carbon and available nitrogen and high in percent sand content (Burgess et. al. 1973). Because of the high sand content of newly formed point bars, these soils have a low available water capacity thus these sites will not provide reproduction sites without the periodic flooding. This flooding provides two very important things, according to Burgess et. al. (1973); first - the silt carried by floodwaters contains high nutrient concentrations and second - spring floods result in soil profile recharge that provides moisture for growth during the summer that would not otherwise be available (see accompanying photo) in a semi-arid region. This leads to the question of how much affect do the 27 major reservoirs, irrigation systems and numerous stock dams have on the flow and fluctuations of the river

This photo demonstrates how groves survive on sites with sandy alluvial deposits and a high water table. Deposition has occurred on the bend of the river at Snake Point, leaving old trees far from water where they could not survive. Young trees are establishing a vigorous stand below the old grove.

compared to times past when the present groves were established? Also how much affect has this had on sites which could potentially produce cottonwood seedlings?

From Coal Banks Landing to Cow Creek, cottonwood groves are characteristically narrow bands one tree in width. Examination of these groves suggests that a closed community exists. Suitable soil and soil moisture are already occupied and the low shade tolerance of cottonwoods allows no new trees to become established within the grove (the following photo illustrates this).

This photo was taken on Cow Island where old trees cover the whole island except for this location where beavers have cleared several trees, allowing new trees to establish in the opening.

These environmental factors together, limit and confine the reproduction of cottonwoods to specific types of sites. It is at these specific sites that management is needed for it is here that camping, fires, beavers, browsing, and trampling by big game and livestock can be manipulated to enhance reproduction.

The cottonwood groves are a precious, slowly renewable, resource. They may well be as abundant now as when Captain Lewis described them in his journal when he stated "ther is now no timber on the hills, and only a few scattering cottonwood, ash, box elder, and willows to be seen along the river." More study of cottonwood ecology and careful management will be needed to preserve this resource.

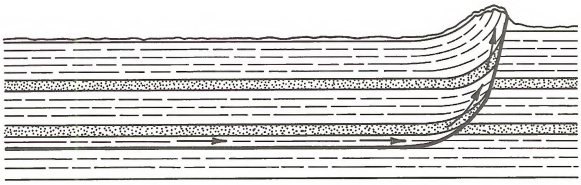
Literature Cited

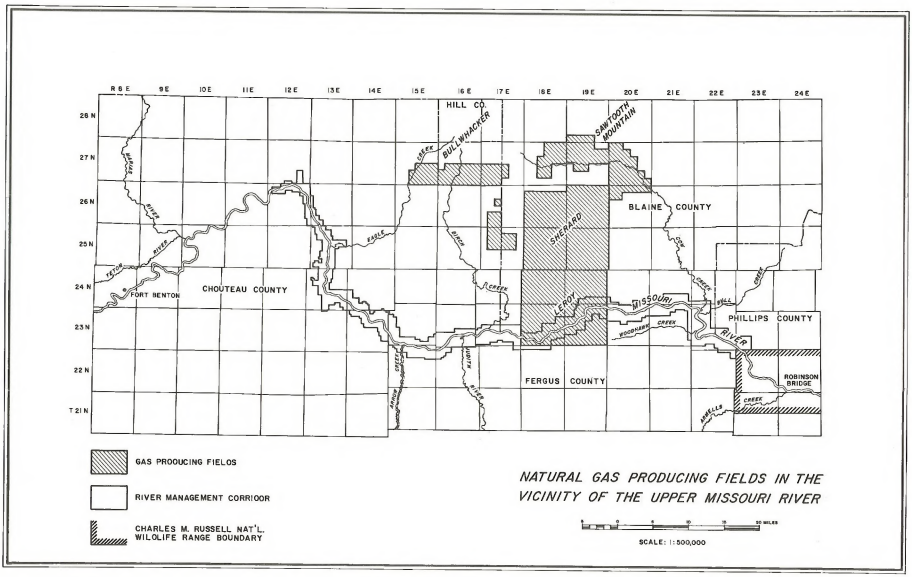
1. Wolman, M.G., and L.B. Leopold, 1957. River Floodplains: Some Observations on Their Formation. U.S. Geological Survey, Prof. Pap, 282-C. pp. 87-107.
2. Burgess, et. al., 1973. Vegetation of the Missouri River Floodplain in North Dakota. Department of Botany, North Dakota State University, Fargo, North Dakota.
3. Lewis & Clark, Original journals of Lewis and Clark expedition. Edited by Rueben Gold thwaites 1904-1905.

Minerals

Most of the recent mineral activity near the river has been explored for shallow natural gas reservoirs in primarily the Cretaceous Eagle and Judith River sandstones. These two formations are usually less than 2,000 feet deep in this area and are the reservoirs from which Montana's most productive gas field, Tiger Ridge, on the north flank of the Bearpaw Arch is producing.

As stated in the Geology Section, local uplift of the Bearpaw Arch and subsequent plainsward sliding of the Cretaceous sediments caused both radial, and concentric thrust faulting. The faults are of the reverse type as shown below.

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SAWTOOTH MOUNTAIN
BULLWHACKER CREEK
BLAINE COUNTY
SHERARD
MISSOURI
RIVER
FORT BENTON
CHOUTEAU COUNTY
PHILLIPS COUNTY
FERGUS COUNTY
ROBINSON BRIDGE
GAS PRODUCING FIELDS
RIVER MANAGEMENT CORRIDOR
CHARLES M. RUSSELL NAT'L. WILDLIFE RANGE BOUNDARY
NATURAL GAS PRODUCING FIELDS IN THE VICINITY OF THE UPPER MISSOURI RIVER
SCALE: 1:500,000

Permeable sandstones, depicted by the dotted formations were thrust up against impermeable shales, shown by the dashed formations, thus forming a structural reservoir where gas may be trapped.

Within the last four years, four natural gas fields have been designated south of the Bearpaw Mountains; the Sherard, Bullwacker, Leroy, and Sawtooth Mountain fields. Map space shows their relative locations. There are many shut-in gas wells outside of these designated units which will in the future probably be incorporated into one of the fields. These same wells indicate a high probability that more producible wells will be drilled throughout the area.

Montana Power and Fuel Resources Development Inc. are the two most active companies drilling in this area. Fuel Resources was recently issued a certificate to build a gathering system in the Leroy Field by the Federal Power Commission.

Construction of the system has begun. It will be designed to deliver gas into the northern Montana transmission system. A pipeline corridor across the river may be required to develop those shut-in wells south of the river.

Some wells have been drilled to approximately three thousand feet to the Carlyle formation, with only marginal success. To date, no drilling has

discovered commercial hydrocarbons from deeper formations. Due to the inaccessibility of the region, and distances from market, exploration equipment capable of deeper drilling have barely explored this area. The possibility of deeper hydrocarbons does exist and with the ever increasing demand for domestic petroleum, deeper wildcat drilling is imminent.

Coal occurs on several stretches of the river. From Virgelle to the vicinity of Eagle Creek, coal in the Eagle formation is visible from the river. There are several beds, the thickest of which is generally less than 2½ feet thick. Early in the century, small quantities were mined domestically and commercially. Coal was shipped by wagon to Great Falls from the Sexton Mine in Sherry Coulee near Eagle Rock. This was a very small operation, the remains of which are not readily visible from the river.

Below Pablo Rapids, coal can be found in the Judith River formation, primarily near its contact with the overlying Bearpaw formation. Near the turn of the century this coal was mined near Power Plant Ferry to fire electric generators to supply power to the gold mines in the Little Rocky Mountains.

There has been no significant coal production in the "seen area" of the river, nor has there been any production within the past several decades.

Bentonite can be found in all three shale formations exposed in the management area. The bentonite beds vary in thickness, but are generally less than eighteen inches thick. Overburden ranges from 50 to 100 feet thick, which warrants these bentonites non-economic at this time. Samples were taken from various beds. Analysis revealed that some were satisfactory for brick, while others were suitable for light weight aggregate and possibly for foundry sand.

Watershed

Erosion Conditions -

Watershed conditions within the management area were evaluated from inventory data obtained during the 1976 and 1977 field seasons. Thirty-five study sites from BLM's Phase I watershed inventory program which was located in or near the river area, were used in the evaluation. Soil and cover characteristics, erosion conditions and sediment yield rates were evaluated for major landforms adjacent to the river and in the canyon walls.

Approximately 23 percent of the river area is represented by badlands consisting of very steep slopes, shallow clayey soils, and interbedded shale, siltstone, and sandstone rock outcrops. Severe to critical upland erosion conditions and sediment yields ranging from 1.1 to 3.5 acre - feet per square mile per year were estimated for this area. Ground cover measured at badland study sites ranged from 12 percent to 58 percent of the total area covered by rock, litter, and vegetation.

Rolling to steep upland slopes and areas of slump represent about 45 percent of the river area. On the canyon slopes, these lands consist of poorly developed silt, sand and clay loam soils locally covered with scattered pine. Measured ground cover ranged between 47 and 89 percent. Upland erosion conditions were measured in the slight to critical range, while sediment yields were estimated at 0.52 to 0.80 acre - feet per square mile per year.

Colluvial and alluvial fans located at the base of slopes on the river bottoms represent about 18% of the river area. Ground cover ranged widely from 45 to 90 percent. Upland erosion conditions were within the slight to moderate range while the estimated sediment yield was 0.38 to 0.50 acre feet per square mile per year. Inventory data indicated that some areas may be improved with watershed treatments where erosion conditions have been worsened by over-grazing.

Prairie lands and gently rolling areas above the canyon rims consist of glacial ground moraine, outwash and kettle deposits. Shale, siltstone, and sandstone bedrock on which silt loam soils have developed are also found. Upland erosion conditions were in the stable to slight range with sediment yields between 0.28 and 0.38 acre feet per square mile per year. Percent ground cover was in the 75 to 90 percent range.

River terraces located adjacent to the Missouri consist of fluvial deposits of silt, sand and gravel with deep, well to moderately well-drained soils, having textures of clay, clay loam, silty clay loam,

fine sandy loam and sandy loam. Erosion conditions were stable and sediment yields ranged between 0.10 and 0.20 acre feet per square mile per year. Ground cover of between 80 and 90 percent was measured. Study sites were located in cottonwood groves presently unaffected by river recreation use. Estimates of the total sediment yielded to the Missouri River by lands within the wild and scenic river area indicated that badlands account for approximately 45% of the total, while rolling to steep upland slopes and slump areas contribute 39%, alluvial and colluvial fans 11% and prairie flats and river terraces 5%. Sediment from the total area constitutes about 4% of the Missouri River's total sediment load or about 300,000 tons per year.

Lewis and Clark Memorial
Fort Benton, Montana

Glossary

1. A crewman is an employee of a commercial company.

2. A passenger is either a noncrew member of a river party or a member of a private party.

3. A user day (U/D) is one person, passenger, or crewman, on the river for one calendar day or portion thereof.

4. A passenger day (P/D) is one commercial paying or nonpaying passenger on the river for one calendar day or portion thereof.

5. An operation is commercial if any fee, charge, or other compensation is collected for conducting, leading, guiding, or outfitting a river trip.

6. A river trip is noncommercial if there is a bona fide sharing of actual expenses, and when no member of the river party is profiting from the trip. (Nonprofit status does not in itself make an operation noncommercial.)

7. Recreation use carrying capacity is the optimum floater/camper use permitted on the river or designated river segments on any given day.

8. Seen area are lands within the management area which are visible from any of the common types of watercraft (includes pontoon boats, canoes, rafts, motorboats) operating on the Missouri River.

9. Management corridor is that area between Coal Banks Landing and the C.M. Russell National Wildlife Refuge afforded rim to rim protection as directed by the Missouri River Amendment to the National Wild and Scenic Rivers Act (PL 94-486) and delineated on the map entitled "Missouri Wild and Scenic River," accompanying this document.

10. One hundred year floodplain is that area subject to inundation by a flood which has a one percent or greater chance of occurrence in any given year.

11. Fifty year floodplain is that area subject to inundation by a flood which has a two percent or greater chance of occurrence in any given year.

12. Locatable minerals generally involve deposits containing valuable, precious, or base metals such as gold, silver, copper, lead, zinc, etc. Also included are valuable nonmetallic minerals such as gemstones, gypsum, mica, asbestos, fluorspar, jasper, and the uncommon varieties of sand, stone, pumice, pumicite, cinders, and clay.

13. Leasable minerals are generally defined by law to be deposits of minerals or fuels such as oil, gas, coal, potassium, sodium, phosphate, oil shale, native asphalt, solid and semi-solid bitumen and bituminous rock, including oil impregnated rock or sands from which oil is recoverable only by special treatment after the deposit is mined and quarried. In Louisiana and New Mexico, sulphur is also a leasable mineral. Geothermal resources (natural heat of the earth usually recovered in hot water or steam from wells) may be acquired by lease in much the same manner as leasable minerals.

Appendixes

Appendix A

Missouri River Issues

By legislative mandate, the Upper Missouri National Wild and Scenic River is to be managed under principles of multiple use and sustained yield. As with any area with a large variety of uses, a certain amount of controversy on management alternatives is bound to occur. The BLM planning process requires that public input be solicited to assist in the making of management decisions.

In order to obtain public input, meetings were held in Great Falls, Helena, Missoula, Billings, Bozeman, Lewistown, Fort Benton, Glasgow, and Havre, and for those unable to attend, written statements were solicited. Three hundred forty nine individuals registered at the nine meetings. Because of the volume of input received, comments cannot be presented in their entirety. Thus a statement on the general consensus of public opinion will be presented. Individuals desiring more specific information should contact the Bureau of Land Management in Lewistown, Montana 59457, where detailed records of the meetings are on file.

In order to ensure that input was received on a variety of issues, a list of 11 important or potentially controversial issues were presented at the public meetings. Each of these issues was assigned to a random group of people at each public meeting. Each group had the option of going on to other issues listed or issues suggested by their group once they had disposed of those issues assigned. Following is a statement on the general consensus of the 11 issues.

1. WHAT TYPE OF RECREATION DEVELOPMENT WOULD YOU PREFER ON THE UPPER MISSOURI NATIONAL WILD AND SCENIC RIVER?

   Most people felt that there should be very little recreation development on the river and that all developments which were determined to be necessary, should be constructed in a rustic manner and either be screened or placed out of view from the river.

2. THERE WILL OBVIOUSLY BE SOME CONFLICTS BETWEEN RECREATIONISTS AND OTHER RESOURCE USES WITHIN THE MISSOURI RIVER CORRIDOR. WHAT MAJOR CONFLICTS DO YOU SEE AND HOW SHOULD THEY BEST BE RESOLVED?

   Most of the topics which were discussed under this issue were related to the other 10 issues. One topic which was discussed but not covered under the other issues, was the issue of grazing. Many comments were expressed stating that livestock grazing should continue as a valid use. A number of people expressed the view that cattle waste detracts from campsites and that campsites should be fenced to reduce or eliminate this conflict.

   The Missouri River Bridge crossing at Judith Landing was discussed as a possible conflict. It was pointed out however, that P.L. 94-482 permitted the bridge crossing at or near the proposed site at Judith Landing.

   A Chouteau County representative indicated that search and rescue capability of the county was very limited and that such activity on the Missouri River should be the responsibility of the federal government.

Other discussion centered around the use of irrigation pumps. Most individuals agreed that pumps should be allowed, but that care be taken to keep them hidden from view and that noise associated with the pumps should be eliminated as much as possible.

Adequate ferry crossing warning signs were also discussed as a conflict issue.

3. A RECREATION USE CARRYING CAPACITY SHOULD BE ESTABLISHED TO PRESERVE WILD AND SCENIC RIVER VALUES FOR FUTURE GENERATIONS. WHAT FACTORS SHOULD BLM CONSIDER IN ESTABLISHING A CARRYING CAPACITY?

Most individuals felt that a carrying capacity limitation should not be imposed until it was absolutely necessary. When campsite use approached carrying capacity, then numbers of people should be limited.

The majority of individuals responding to this issue felt that a carrying capacity limitation was a valid management concern and should be addressed in this plan. (See visitor use and carrying capacity section of this plan.)

4. INDUSTRY REPRESENTATIVES HAVE PROPOSED A PIPELINE CROSSING ACROSS THE MISSOURI RIVER. THE PURPOSE OF THE CROSSING IS TO LINK NATURAL GAS FIELDS LOCATED NORTH AND SOUTH OF THE RIVER. THERE ARE CURRENTLY EIGHT PRODUCING NATURAL GAS WELLS SOUTH OF THE MISSOURI RIVER AND POTENTIAL EXISTS FOR MORE LOCATIONS. DO YOU FEEL THIS CROSSING SHOULD BE PERMITTED IN ITS PRESENT LOCATION? AT ALTERNATIVE LOCATIONS? NOT PERMITTED?

Most individuals agreed that the pipeline should be allowed if construction of the line did not seriously detract from the environmental quality of the area. Many comments were received which stated that the line be of an adequate size to allow for future expansion needs.

No decision will be made on this proposal until after wilderness review has been conducted and appropriate environmental assessment completed.

5. HUMAN WASTE DISPOSAL IS A GROWING PROBLEM AT SOME HEAVILY USED MISSOURI RIVER CAMPSITES. WHAT RECOMMENDATIONS WOULD YOU MAKE TO ALLEVIATE OR REDUCE THIS PROBLEM?

It was agreed that sanitation facilities should be built and maintained only in high use campsites or at river points where man-made structures existed. The public felt that the structures should be hidden or screened from view and that they be constructed in a rustic manner to blend into the scenery as much as possible. It was also generally agreed that human waste disposal by burial be permitted and that a pack in - pack out policy be implemented except for those sites accessible by major highway.

6. CONFLICTS HAVE DEVELOPED BETWEEN MOTORIZED AND NON-MOTORIZED WATERCRAFT USES ON A NUMBER OF RIVERS WITHIN THE UNITED STATES. WHAT PROCEDURES WOULD YOU RECOMMEND TO MINIMIZE THESE CONFLICTS ON THE MISSOURI RIVER?

There was vocal opposition to permitting motorized watercraft on the Missouri River at the Helena and Missoula public meetings. However, the total public comment favored continued motorized use with a speed limitation.

7. SHOULD MINERALS ACTIVITY BE PERMITTED WITHIN THE WILD AND SCENIC RIVER MANAGEMENT CORRIDOR? IF SO, WHAT KIND AND WHERE?

Minerals activity is permitted within the concept of P.L. 94-486. However, most individuals said that mineral activity that would detract from scenic values, should not be permitted within the seen area from the river.

8. WHAT TYPES OF ACCESS ROADS SHOULD BE PERMITTED WITHIN THE MANAGEMENT CORRIDOR?

A strong concensus was expressed that access to the river was presently adequate, but upgrading of some existing roads was necessary.

9. THE BLM NEEDS TO DEVELOP AN ACQUISITION POLICY FOR MISSOURI RIVER SITES. WHAT CRITERIA WOULD YOU RECOMMEND BE DEVELOPED FOR OBTAINING ACCESS POINTS, CAMPSITES, AND HISTORIC SITES PRESENTLY LOCATED ON PRIVATE LANDS?

Most individuals felt that acquisition should be on a willing seller basis and that condemnation authority be limited to very necessary acquisitions when no other type of agreement could be achieved.

10. IN YOUR OPINION, IS THE DISCHARGING OF FIREARMS IN OR NEAR MISSOURI RIVER CAMPSITES A PROBLEM?

Many individuals agreed that this could be a problem, but few suggestions were made for methods of control. The most common suggestion was that good gun etiquette should be encouraged and that shooting from the river and in or near campsites should be discouraged.

11. DO YOU THINK THAT THERE IS PRESENTLY A NEED FOR INTERPRETIVE TRAIL DEVELOPMENT WITHIN THE MISSOURI RIVER CORRIDOR?

The majority of the public responding to this question indicated that there should be no interpretive trail development. Informational materials in the form of brochures should be made available to the public instead.

Appendix B

State Water Quality Standards

Water Quality at Virgelle Station (USGS)

Specific water quality criteria

(aa) The average number of organisms in the fecal coliform group is not to exceed 200 per 100 milliliters nor are 10 percent of the total samples during any 30-day period to exceed 400 fecal coliforms per 100 milliliters. The average number of organisms in the coliform group is not to exceed 1,000 per 100 milliliters, nor are 20 percent of the samples to exceed 1,000 coliforms per 100 milliliters during any 30-day period.

	Range	Mean
a) coliforms		
fecal	0-130	39

(ab) Dissolved oxygen concentration is not to be reduced below 5.0 milligrams per liter.

b) Dissolved oxygen	7.3 mg/l to 13.4 mg/l	10.4 mg/l

(ac) Induced variation of hydrogen ion concentration (pH), within the range of 6.5 to 9.0, is to be less than 0.5 pH unit. Natural pH outside this range is to be maintained without change. Natural pH above 7.0 shall be maintained above 7.0.

c) pH	8.0 - 8.9	8.5

(ad) The maximum allowable increase above naturally occurring turbidity is 10 Jackson Candle Units, except as is permitted in the general water quality criteria.

d) Turbidity	1 JTU - 300 JTU	31.1 JTU

(ae) A 3° F. maximum increase above naturally occurring water temperature is allowed within the range of 32° F. to 77° F.; within the naturally occurring range of 77° F. to 79.5° F., no thermal discharge is allowed which will cause the water temperature to exceed 80° F.; and where the naturally occurring water temperature is 79.5° F. or greater, the maximum allowable increase in water temperature is 0.5° F. A 2° F. per hour maximum decrease below naturally occurring water temperature is allowed when the water temperature is above 55° F., and a 2° F. maximum decrease below naturally occurring water temperature is allowed with the range of 55° F. to 32° F.

e) Temperature	32° F. to 69° F.	49.8°F.

This applies to all waters in the state classified B-D3, except from the Billings water supply intake to the water diversion at Intake, a 3° F. maximum increase above naturally occurring water temperature is allowed within the range of 32° F. to 79° F.; within the range of 79° F. to 81.5° F., no thermal

Specific water quality criteria continued.

Range Mean

(ae) discharge is allowed which will cause the water temperature to exceed 82° F.; and where the naturally occurring water temperature is 81.5° F. or greater, the maximum allowable increase in water temperature is 0.5° F.

From the water diversion at Intake to the North Dakota State line, a 3° F. maximum increase above naturally occurring water temperature is allowed within the range of 32° F. to 82° F.; within the range of 82° F. to 84.5° F., no thermal discharge is allowed which will cause the water temperature to exceed 85° F.; and where the naturally occurring water temperature is 84.5° F. or greater, the maximum allowable increase in water temperature is 0.5° F.

(af) No increases above naturally occurring concentrations of sediment, settleable solids or residues, which adversely affect the use indicated, are allowed.

f) Suspended Sed. 6 mg/l 179 mg/l to 1180 mg/l

(ag) Concentrations of toxic or other deleterious substances, pesticides, and organic and inorganic materials including heavy metals, after treatment for domestic use, are not to exceed the recommended limits contained in the 1962 U.S. Public Health Service Drinking Water Standards or subsequent editions; also, maximum allowable concentrations are to be less than acute or chronic problem levels as revealed by bioassay or other methods.

g) Toxic materials *See footnotes

(ah) True color is not to be increased more than five units above naturally occurring color.

h) True Color No available data

Appendix B

EPA Water Quality Criteria for Recreational Waters (Includes Swimming)	Water Quality at Virgelle Station (USGS)	
	Range	Mean
1. Clarity: Should be such that a Secchi disc is visible at a minimum depth of 4 feet.	1. Clarity No available data	
2. Microorganisms: Maximum acceptable limit for fecal coliform is the log mean of 200 per 100 ml, and not more than 10% of total samples during a 30 day period are to exceed 400 per 100 ml.	2. Fecal Coliform 0 per 100 ml. to 130 per 100 ml	39 per 100 ml
3. pH: Acceptable range of pH is 6.5 to 8.3 except where due to natural causes.	3. pH 8.0 - 8.9	8.5
4. Temperature: Except where caused by natural conditions, water temperatures in excess of 8.6° F. are not acceptable.	4. Temperature 32° F. to 69° F.	49.8° F.

Note:
Arsenic and dissolved iron are the only known deleterious substances whose mean concentrations exceed Public Health Service Drinking water standards. Concentrations of manganese occasionally exceed those standards.

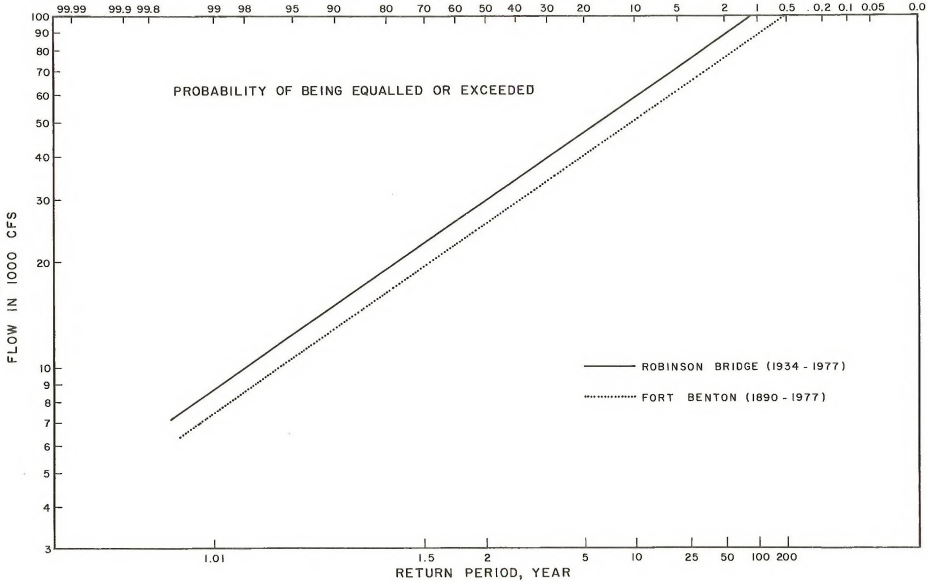
Reference:
U.S. Environmental Protection Agency, 1973. Proposed Criteria for Water Quality, Volume 1, pp. 344-351.

Appendix C

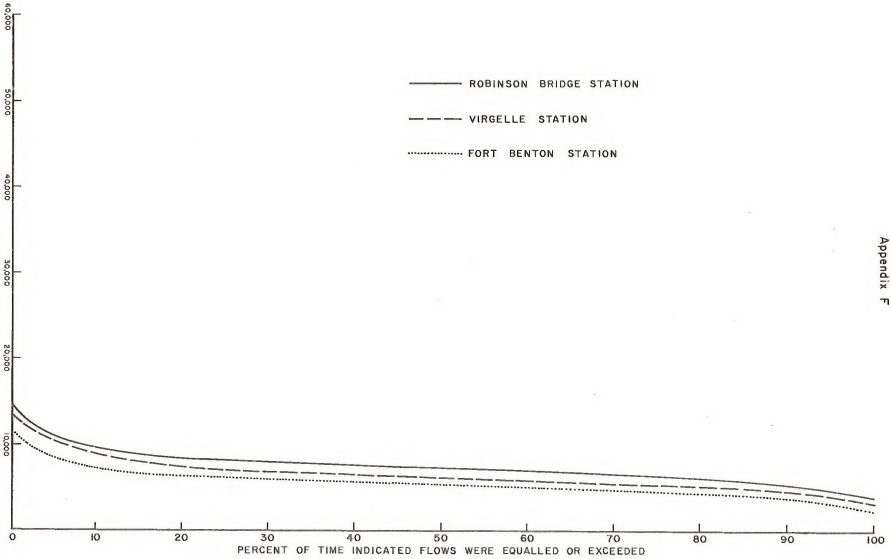
Range improvements needed to implement the grazing system for each AMP were kept to a minimum. Some AMPs did not require any additional improvements, others needed more extensive development. The asterisk indicates facilities that may be seen from the river. All the improvements listed are within the management corridor. The "P" indicates proposed plans and the "E" indicates existing plans.

Allotment Name & Management Status	Resource Area	Miles Fence	Res.	Pit Res.	Miles Pipeline	Remarks
- Ebersole Bottom to Deadman Rapids - Wild						
Pablo Rapids (P)	Havre	.5	-	-	-	
LeBarge Rock (P)	Judith	.75	-	-	-	
Flat Creek (P)	Judith	.5	-	-	.6*	
- Holmes Rapids to Leslie Point - Wild						
Gallatin Rapids (P)	Havre	.8*	-	-	-	3 short fences to the river
Iron City Island (P)	Judith	.4*	-	-	-	2 fences to the river
- Leslie Point to Magdall Homestead - Scenic						
River (E)	Judith	.2	-	-	-	includes one cattleguard
- Magdall Homestead to Cow Island - Wild						
Lost Ridge (P)	Havre	-	1	1	-	
Little Bullwacker (P)	Havre	-	2	-	-	

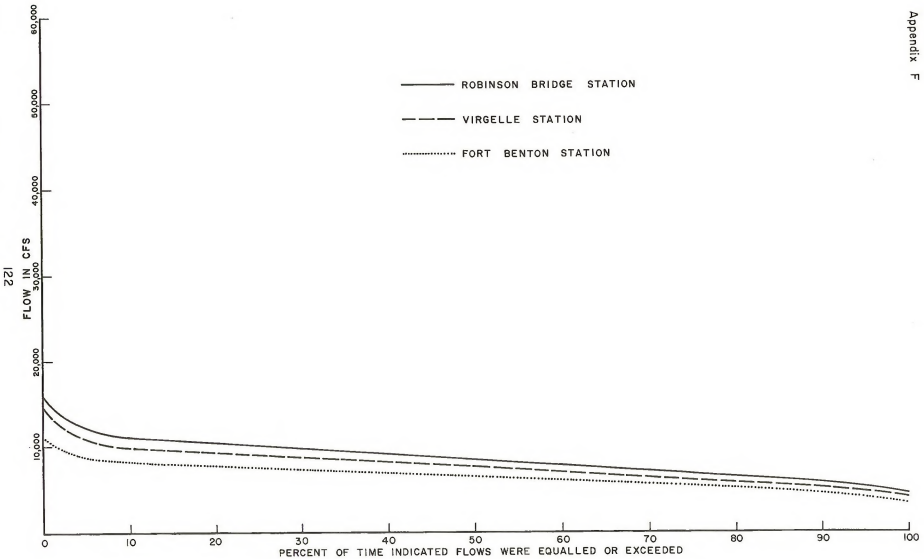
Station/ Month	Average High Temperature	Average Low Temperature	Average # Days Max. Temp. GE to 90° F	Average # Days Min. Temp. LE 32° F	Average Total Precip. (Inches)	Average Total Snowfall (inches)	Average Monthly Temperature
FORT BENTON							
May	86.9	26.9	0.28	3.14	2.26	0.30	55.2
June	92.2	36.4	1.92	0.17	3.06	0.00	62.2
July	98.8	41.8	7.64	0.00	1.26	0.00	69.9
August	98.3	39.2	6.90	0.02	1.30	0.00	68.1
September	91.4	27.8	1.28	3.21	1.17	0.32	57.7
LOMA							
May	88.0	30.0	0.88	3.88	2.09	0.33	54.6
June	94.1	35.7	3.37	0.18	2.74	0.00	62.9
July	101.5	41.2	16.11	0.00	1.19	0.00	70.7
August	101.0	37.4	11.30	0.03	1.40	0.00	68.8
September	93.7	27.8	2.57	4.03	0.82	0.43	57.6
ILIAD							
May	87.4	25.2	0.66	3.45	1.95	0.00	54.0
June	93.9	32.1	3.80	0.35	2.39	0.00	62.4
July	99.9	36.2	10.37	0.05	1.42	0.00	69.6
August	101.5	38.7	12.27	0.09	1.42	0.00	67.8
September	92.6	23.1	3.17	5.80	0.76	0.00	56.3
MOBRIDGE							
May	88.2	28.5	1.00	4.93	2.35	0.00	55.4
June	95.6	39.4	4.86	0.26	2.92	0.00	64.2
July	101.6	43.1	15.64	0.00	1.91	0.00	71.8
August	101.6	40.1	14.07	0.00	1.80	0.00	70.2
September	94.0	25.1	3.53	4.78	1.01	0.00	58.1



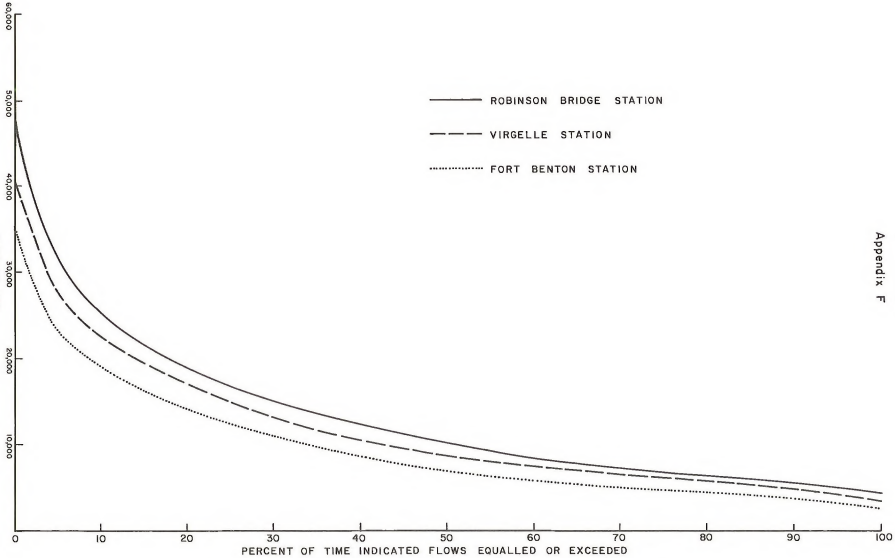
FLOOD FREQUENCY CURVES FOR THE MISSOURI RIVER
AT FORT BENTON AND ROBINSON BRIDGE



FLOW DURATION CURVES FOR THE MONTH OF SEPTEMBER AT THREE STATIONS ON THE UPPER MISSOURI RIVER (1958-1977)



FLOW DURATION CURVES FOR THE MONTH OF AUGUST AT THREE STATIONS ON THE UPPER MISSOURI RIVER (1958 - 1977)



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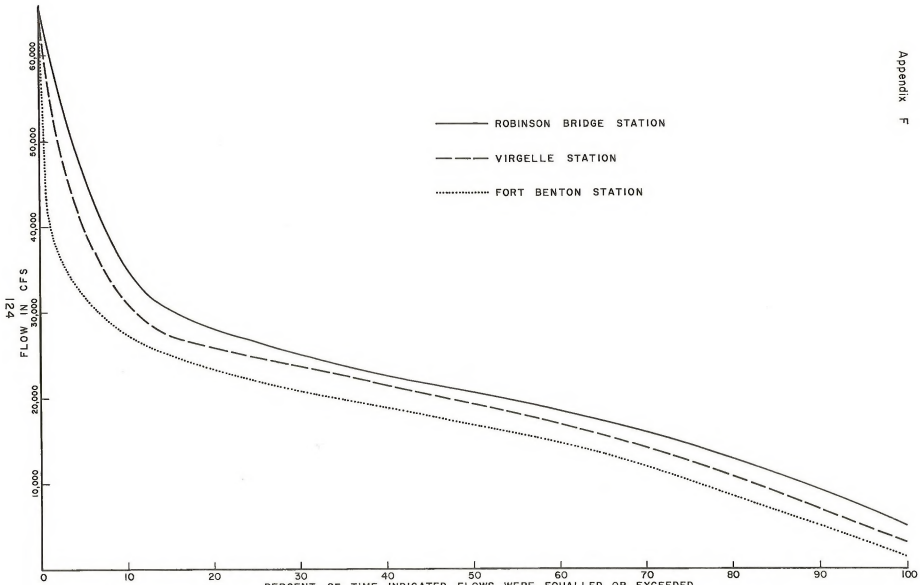

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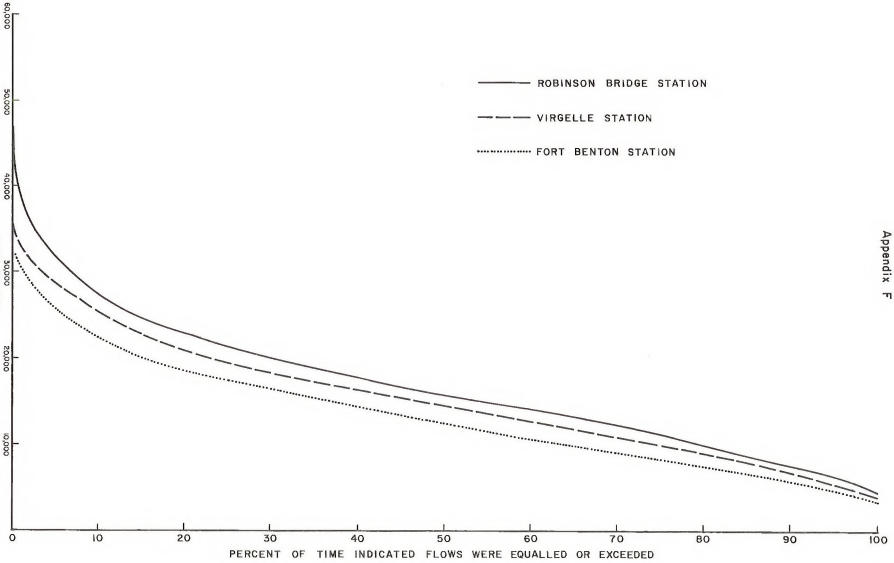
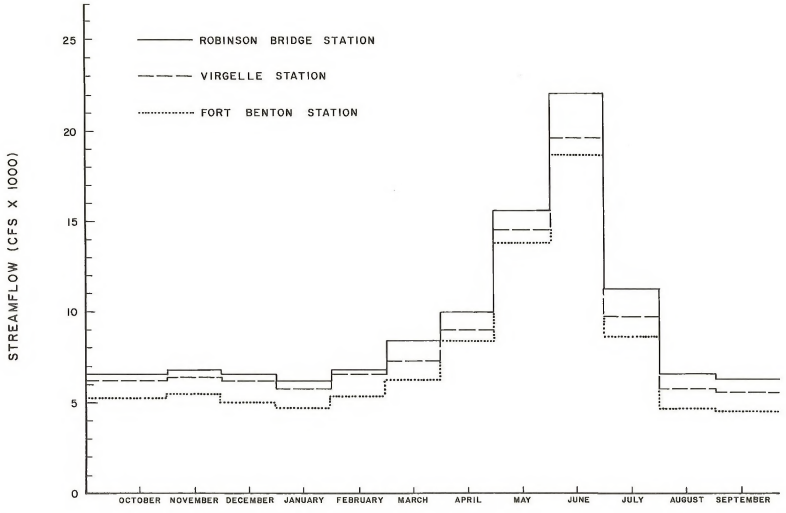
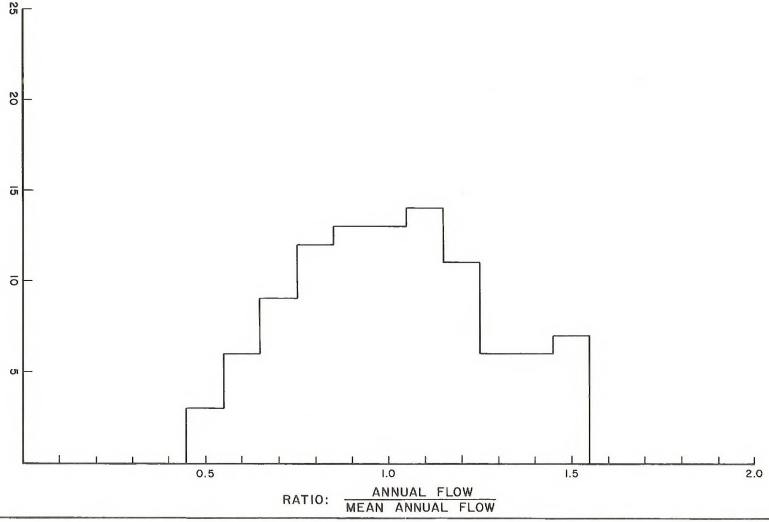


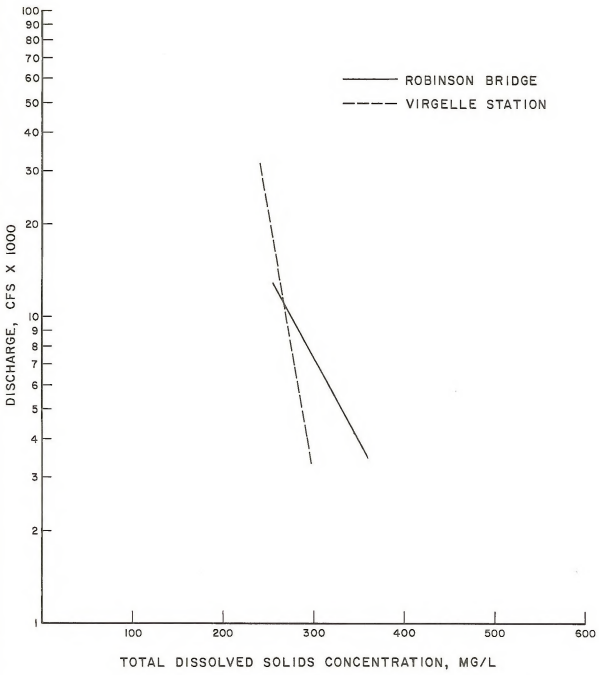
FLOW DURATION CURVES FOR THE MONTH OF MAY AT THREE STATIONS ON THE UPPER MISSOURI RIVER (1958 - 1977)



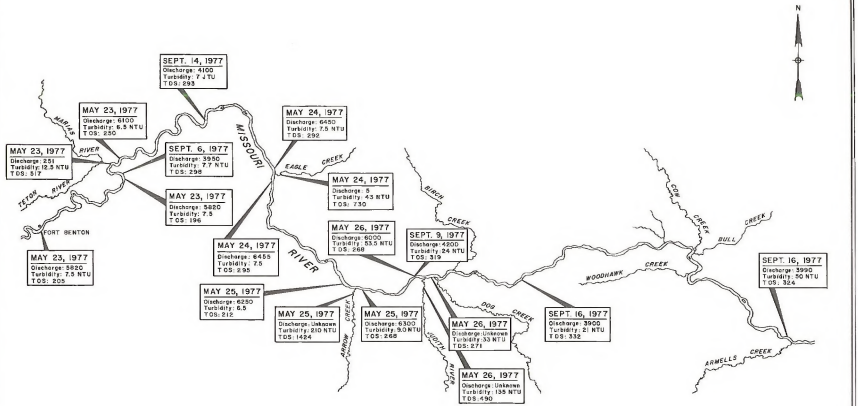
MEAN MONTHLY STREAMFLOW FOR STATIONS
ON THE UPPER MISSOURI RIVER



DISTRIBUTION OF ANNUAL STREAMFLOWS
FOR 83 YEARS OF RECORD AT FORT BENTON



VARIATION IN TOTAL DISSOLVED SOLIDS CONCENTRATION WITH DISCHARGE ON THE MISSOURI RIVER AT VIRGELLE AND ROBINSON BRIDGE



UPPER MISSOURI WILD AND SCENIC RIVER

MONTANA

PROFILE OF TURBIDITY AND TOTAL DISSOLVED SOLIDS

Scale Of Miles

Appendix I

United States
Department of the Interior
Bureau of Land Management

Engineering Properties of Soils
Measurements and Interpretations

Soil Name	Depth To		Hydrologic Soil Group	Shrink-swell Potential	Corrosivity	
	Bed Rock	Seasonal High Water Table (inches)			Uncoated Steel	Concrete
Glendive loam (flooded phase)	60"	floodplain	B	Low	High	Mod
Harlem clay loam (flooded phase)	60"	floodplain	C	High	High	Low
Havre loam (saline phase)	60"	floodplain	C	Low-Mod	High	Mod
Sand - gravel bar (unnamed)	60"	floodplain	A	VLow	High	Low

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

SOIL NAME	CLASS				LIMITING LAYER		EFFECTIVE ROOTING DEPTH (in.)	AVAILABLE WATER CAPACITY (in.)	PRECIPITATION (in.)	EROSION		COMPACTION HAZARD (Class)	FREQUENCY OF FLOODING	REACTION RANGE (pH)	FROST SUSCEPTIBILITY (Class)
	DEPTH	PERMEABILITY	RUNOFF	DRAINAGE	KIND	THICKNESS (in.)			Annual	CONDITION	SUSCEPTIBILITY (Class)				
Glendive loam (flooded phase)	VD	Mod-MRap	Med	Wed	---	60"+	11-19	MH	10-14	Mod	Severe	Slight	Ocal	6.6-9.0	Severe
Harlem clay loam (flooded phase)	VD	Slow-MSlow	Med	Wed	---	60"+	15-22	H	10-15	Mod	Severe	Severe	Ocal	7.4-9.0	Severe
Havre loam (saline phase)	VD	MSlow-Mod	Med	Wed	---	60"+	11-18	H	10-14	Mod	Severe	Severe	Rare	7.4-9.0	Severe
Sand - gravel bar (unnamed)	VS-D	Vrap	Pond, VSlow	POD	---	---	10-12-	VL	14-19	Severe	Severe	Slight	Seal	7.8-8.4	Severe

Ponds Soil Name	Degree of Limitation and Soil Features Affecting Shallow Excavations	Building Sites	Areas Camp	Picnic	Play	Paths/ Trails	Septic Tank Absorption	Land Scape Plantings
Glendive loam (flooded phase)	Severe-floods	Severe floods	Slight after June	Mod-dusty	Mod-dusty	Mod-dusty	Severe-floods	Mod pH
Harlem clay loam (flooded phase)	Severe-Too clayey, floods	Severe-shrink-swell, low strength	Mod - Too clayey	Mod - Too clayey	Mod - Too clayey	Mod - Too clayey	Severe - Percs slowly, floods	Mod pH
Havre loam (saline phase)	Mod-wetness	Mod - Med-low strength	Mod - MSlow - perm.	Slight	Slight	Slight	Severe-wetness	Severe - Saline
Sand - gravel bar (unnamed)	Severe - floods, sm. stones	Severe - floods	Severe - floods, sm. stones, lg. gravels	Severe - floods, sm. stones, lg. gravels	Severe - floods, sm. stones, lg. gravels	Severe - floods, sm. stones, lg. gravels	Severe - floods, sm. stones, lg. gravels	Severe - floods

Soil Name	Classification			Coarse Fraction (per cent)	Percentage Passing Sieve				Percent			
					Number				Liquid Limit (LL)	Plasti-City Index (PI)	Salinity MMHOS/CM	Bulk Density
	USDA	Unified	Aasho		4	10	40	200				
Glendive loam (flooded phase)	0-5"-fsl	SM,ML	A-4	0	100	100	70-85	40-55	20-30	NP-5	<4	<1.5-1.6
	5-11"-sil	ML	A-4	0	100	100	90-100	70-90	25-35	NP-10	<4	
	11-33"-l	ML	A-4	0	100	100	85-95	60-75	25-35	NP-10	<4	
	33-60"-fsl,lfs	SM	A-2, A-4	0	95-100	75-100	60-80	25-45	20-30	NP-5	2-8	
Harlem clay loam (flooded phase)	0-14"-cl,sicl	CL,CH	A-6 A-7	0	100	100	90-100	70-95	40-55	20-40	<4	
	14-36"-l,sicl	CL,CH	A-6,	0	100	100	85-100	60-95	35-45	15-20	<4	<1.5-1.6
	36-40"-lfs	SM-SC	A-2-4	0	100	100	70-85	25-45	20-30	NP-5	<4	
	40-60"-fal,	SM,ML	A-4	0	100	100	85-95	60-75	20-40	5-15	<8	
Havre loam (Saline phase)	0-8"-l	ML,CL-ML	A-4	0	100	100	85-95	60-75	20-30	NP-10	4-16	
	0-8"-sicl	CL	A-6	0	100	100	90-100	85-95	25-40	10-20	4-16	<1.5-1.6
	8-60"-l,fsl	ML	A-4	0	100	100	75-90	70-80	15-25	NP-5	4-16	
Sand-gravel bar (unnamed)	0-40"-Grv-S Cbv-S	GM,GP	A-1	15-75	20-40	10-20	5-15	0-5	---	NP	<2	---

Appendix J

Soil Surface Factors and Erosion Condition Classes for Sites on the Missouri River

Site	PSSF	ECC	FOSSF	FMSSF	Comments
Coal Banks (mile 42)	54	Moderate	55-60	35-40	Harlem soil series silt loam over clay, compaction is severe by recreation use.
Lower Little Sandy (mile 47.5)	38	Slight	45-50	35-40	Havre soil series, clay soils.
Upper Little Sandy (mile 46.6)	42	Moderate	40-45	25-30	Havre soil series, silt loam surface 6 inches.
White Rocks (mile 53.3)	44	Moderate	50-55	40-45	Havre soil series, silt loam soils, severe compaction by recreation use.
Eagle Creek (mile 56.0)	47	Moderate	45-50	45-50	Havre and Harlem soils, silt loam, good cover.
Dark Butte (mile 68.8)	55	Moderate	55-60	50-55	Havre soils, silt loam to clay textures.
Pablo (mile 73.0)	49	Moderate	45-50	45-50	Glendive soils, silt loam.
Lower Rolf Bottom (mile 80.3)	55	Moderate	55-60	50-55	Havre soils, silty clay loam.
Unnamed (mile 80.75)	55	Moderate	55-60	50-55	Havre soils, loam, textures.

PSSF - Present SSF
ECC - Erosion Condition Class
FOSSF - Future SSF without management (over next 5 years)
FMSSF - Future SSF with management (over next 5 years)

Appendix J

Soil Surface Factors and Erosion Condition Classes for Sites on the Missouri River

Site	PSSF	ECC	FOSSF	FMSSF	Comments
Lester Sluggett (mile 81.5)	56	Moderate	55-60	50-55	Havre soils, loams and silt loams.
Hole-in-the-Wall (mile 62.8)	32	Slight	35-40	25-30	Havre soils, loams and silt loams.
Slaughter River (mile 76.7)	40	Slight	35-40	35-40	Havre soils, clay to loam textures.
Judith Landing North (mile 88.5)	44	Moderate	55-60	35-40	Havre soils, silt loam textures, severe compaction by foot traffic.
Judith Landing South (mile 88.5)	44	Moderate	55-60	40-45	Havre soils, silt loams.
Iron City (mile 93.66)	59	Moderate	60-65	50-55	Glendive and Havre soils, silt loam to loam textures.
Lewis & Clark (mile 104.3)	54	Moderate	55-60	40-45	Havre soils loamy.
Greasewood (mile 109.6)	56	Moderate	55-60	50-55	Harlem soils, clay loam to silt loam textures.
Sturgeon Island (mile 119)	81	Severe	80-85	80-85	Sand and gravel bar, floods annually.
Cow Island (mile 126)	62	Critical	60-65	50-55	Glendive soils, loam and silt loam.

PSSF - Present SSF
ECC - Erosion Condition Class
FOSSF - Future SSF without management (next 5 years)
FMSSF - Future SSF with management (next 5 years)

Appendix K

MISSOURI RIVER LAND OWNERSHIP

Total: 131,839.74 Acres

Federal Government:	85,946.37 Acres	65.19%
State:	10,032.41 Acres	7.61%
Private:	35,860.96 Acres	27.20%
		100.00

Segments

Miles: 0-52 Recreational		
Total:	8,973.06 Acres	
Federal Government:	967.53 Acres	10.78%
State:	1,026.31 Acres	11.44%
Private:	6,979.22 Acres	77.78%
Miles: 52-84.5 Wild		
Total:	43,506.50 Acres	
Federal Government:	21,991.08 Acres	49.60%
State:	3,923.39 Acres	9.57%
Private:	17,592.03 Acres	40.83%
Miles: 84.5-92.3 Recreational		
Total:	10,194.83 Acres	
Federal Government:	3,814.78 Acres	37.42%
State:	1,152.39 Acres	11.30%
Private:	5,227.66 Acres	51.28%
Miles: 92.3-99.4 Wild		
Total:	9,244.97 Acres	
Federal Government:	7,553.84 Acres	81.71%
State:	600.00 Acres	6.49%
Private:	1,091.13 Acres	11.80%
Miles: 99.4-104.3 Scenic		
Total:	7,554.73 Acres	
Federal Government:	6,790.39 Acres	89.88%
State:	0.00 Acres	0.00%
Private:	764.34 Acres	10.12%
Miles: 104.3-128.8 Wild		
Total:	37,400.45 Acres	
Federal Government:	32,453.62 Acres	86.77%
State:	2,388.19 Acres	6.39%
Private:	2,558.64 Acres	6.84%
Miles: 128.8-149.0 Scenic		
Total:	14,965.20 Acres	
Federal Government:	12,375.13 Acres	82.69%
State:	942.13 Acres	6.30%
Private:	1,647.94 Acres	11.01%

Appendix K

MISSOURI RIVER LAND OWNERSHIP (SUMMARY)

Recreation

Federal Government:	4,782.31 Acres	24.95%
State:	2,178.70 Acres	11.37%
Private:	12,206.88 Acres	63.68%
Total:	19,167.89	100.00%

Wild

Federal Government:	61,998.54 Acres	68.77%
State:	6,911.58 Acres	7.67%
Private:	21,241.80 Acres	23.56%
Total:	90,151.92 Acres	100.00%

Scenic

Federal Government:	19,165.52 Acres	85.10%
State:	942.13 Acres	4.18%
Private:	2,412.28 Acres	10.72%
Total:	22,519.93 Acres	100.00%

MISSOURI RIVER SHORELINE OWNERSHIP

BANK	TOTAL	FEDERAL	%	STATE	%	PRIVATE	%
RECREATION		Bank to Bank		0-41.5 Miles			
North	43.23	4.46	10.3	.70	1.6	38.07	88.1
South	42.96	2.56	6.0	.78	1.8	39.62	92.2
Total	86.19	7.02	8.2	1.48	1.7	77.69	90.1
		Corridor		41.5-51.9 Miles			
North	10.46	1.16	11.1	.85	8.1	8.45	80.8
South	10.46	.47	4.5	0.00	0.0	9.99	95.5
Total	20.92	1.63	7.8	.85	4.1	18.44	88.1
		TOTAL		0-51.9 Miles			
North	53.69	5.62	10.5	1.55	2.9	46.52	86.6
South	53.42	3.03	5.7	.78	1.5	49.61	92.8
Total	107.11	8.65	8.1	2.33	2.2	96.13	89.7
WILD		White Rocks		51.9-84.5 Miles			
North	33.54	16.50	49.2	.89	2.7	16.15	48.1
South	33.52	11.12	33.2	5.35	16.0	17.05	50.8
Total	67.06	27.62	41.2	6.24	9.3	33.20	49.5
RECREATION		P.N. Ferry		84.5-92.2 Miles			
North	7.98	1.17	14.7	.77	9.6	6.04	75.7
South	7.97	2.83	35.6	0.00	0.0	5.14	64.4
Total	15.95	4.00	25.1	.77	4.8	11.18	70.1
WILD				92.2-99.5 Miles			
North	7.28	6.31	86.7	0.00	0.00	.97	13.3
South	7.32	3.84	52.5	0.00	0.00	3.48	47.5
Total	14.60	10.15	69.5	0.00	0.00	4.45	30.5
SCENIC		McClelland Ferry		99.5-104.3 Miles			
North	5.04	1.90	37.7	0.00	0.00	3.14	62.3
South	5.04	3.84	76.2	0.00	0.00	1.20	23.8
Total	10.08	5.74	56.9	0.00	0.00	4.34	43.1
WILD				104.3-128.8 Miles			
North	25.37	17.35	68.4	.89	3.5	7.13	28.1
South	25.06	22.12	88.3	.97	3.9	1.97	7.8
Total	50.43	39.47	78.3	1.86	3.7	9.10	18.0

Appendix K

MISSOURI RIVER SHORELINE OWNERSHIP

BANK	TOTAL	FEDERAL	%	STATE	%	PRIVATE	%
SCENIC		Corridor		128.8-138.8 Miles			
North	10.30	4.07	39.5	.81	7.9	5.42	52.6
South	10.23	3.49	34.1	1.16	11.3	5.58	54.6
Total	20.53	7.56	36.8	1.97	9.6	11.00	53.6
		Bank to Bank		138.8-149.0 Miles		CMR	
North	10.23	10.23	100.0	0.00	0.0	0.00	0.0
South	10.42	9.37	89.9	0.00	0.0	1.05	10.1
Total	20.65	19.60	94.9	0.00	0.0	1.05	5.1
		TOTAL-SCENIC		128.8-149.0 Miles			
North	20.53	14.30	69.7	.81	3.9	5.42	26.4
South	20.65	12.86	62.3	1.16	5.6	6.63	32.1
Total	41.18	27.16	66.0	1.97	4.8	12.05	29.2
TOTALS							
RECREATION							
North	61.67	6.79	11.0	2.32	3.8	52.56	85.2
South	61.39	5.86	9.5	.78	1.3	54.75	89.2
Total	123.06	12.65	10.3	3.10	2.5	107.31	87.2
WILD							
North	66.19	40.16	60.7	1.78	2.7	24.25	36.6
South	65.90	37.08	56.3	6.32	9.6	22.50	34.1
Total	132.09	77.24	58.5	8.10	6.1	46.75	35.4
SCENIC							
North	25.57	16.20	63.4	.81	3.2	8.56	33.4
South	25.69	16.70	65.0	1.16	4.5	7.83	30.5
Total	51.26	32.90	64.2	1.97	3.8	16.39	32.0
TOTAL SHORELINE							
North	153.43	63.15	41.2	4.91	3.2	85.37	55.6
South	152.98	59.64	39.0	8.26	5.4	85.08	55.6
Total	306.41	122.79	40.1	13.17	4.3	170.45	55.6

Appendix L

Range Condition of River Terraces and Bottoms by Allotment

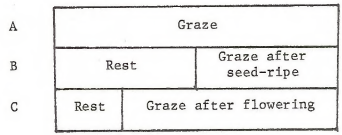
Allotment Name	Acres Federal Ex.	Good	Fair	Poor	Acres Other Ex.	Good	Fair	Poor	Remarks
White Rocks									River frontage is all unusable range
Labarge Rock						118			
Dark Butte	266				369				
Sheepshed Coulee		80				155			
Pablo Rapids		49				104			
Last Chance Bench		5				201			
Flat Creek		20				7			
Sneath Common	172	177			150	156			
PN									Not inventoried
Deadman Rapids		116				155			
Golf Bench									Information not available
Gallatin Rapids	45	1344			241	223			
Iron City Island		340				630			
Dauphin Rapids		259				265			
River		666				193			
Stultz		-				-			No river frontage
Blind Canyon		-				-			No river frontage
Lost Ridge	246				9				
Barnard Ridge		430				169			
Mattuscheck		173							AMP studies show upward trend .
Ervin Ridge		690							
Woodhawk		879				251			
Little Bullwhacker		213	41			30	119		
Cabin Creek									No river frontage
Antelope Creek	407	972			80	863			
Reed Coulee		35							
Demars		46				259			
Totals	1136	6494			849	3779	119		

Grand Total = 1985 Acres Good Condition; 10,273 Acres Fair; 119 Acres Poor Condition.

Total Acreage = 12,377A 83% Fair Condition; 16% Good Condition; 1% Poor Condition.

Appendix M

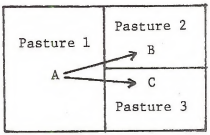
Typical Three Pasture Deferred Rotation Grazing System



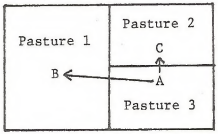
Treatment A - Graze for livestock production.

Treatment B - Rest for plant vigor until seed has ripened, then graze.

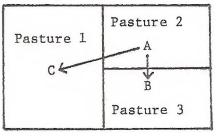
Treatment C - Rest for seedling establishment and continued plant vigor (flowering time), then graze.



Year 1



Year 2

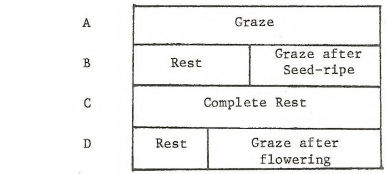


Year 3

Appendix M

Typical Four Pasture Rest Rotation Grazing System

May ⟵⟶ October

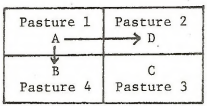


Treatment A - Graze for livestock production.

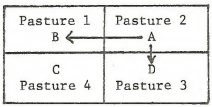
Treatment B - Rest for plant vigor until seed has ripened, then graze.

Treatment C - Complete rest for new seedling establishment and litter accumulation.

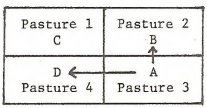
Treatment D - Rest for continued seedling establishment (flowering time), then graze.



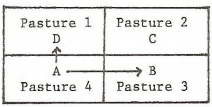
Year 1



Year 2



Year 3



Year 4

Appendix M

Grazing Management

The following is a summary of the Range Management Proposal from allotment management plans written for the Missouri Breaks Grazing Management Environmental Statement: abbreviations are as follows; P = proposed AMP, E = existing AMP, R = revised AMP, RR = rest rotation, DR = deferred rotation. Total Federal AUMs (animal unit months of forage) includes all Federal AUMs within an allotment, not just within the corridor. Many of the allotments extend a considerable distance outside the river corridor.

Resource Area	Allotment Name and Management Status	No.	Class	Season	Total Fed AUMs	Change* From Existing Situation	Grazing System
Havre	Dark Butte (P)	83	C	4/16-1/31	313	-35	River pasture deferred till 08/16
	Pablo Rapids(P)	60	C	6/1-8/31	105	-14	Modified 2 pasture DR
	Sneath Common(P)	70	C	6/16-11/13	283	-392	6 pasture DR
	Golf Bench(R)	170	C	4/16-12/13	986	-0-	RR(3) RR(4) DR(4)
	Deadman Rapids(P)	40	C	5/20-8/24	98	-1	2 pasture DR
	Gallatin Rapids (P)	65	C	5/10-10/27	229	-0-	2 seasonal & 3 pasture RR
	Dauphin Rapids(P)	76	C	6/01-10/15	108	7+	7 pasture DR
	Lost Ridge(P)	176	C	5/15-11/10	438	-52	2 pasture DR
	Barnard Ridge(P)	204	C	6/01-10/31	371	-61	1 pasture - 4 treatment RR
	Ervin Ridge (P)	224	C	6/01-10/15	846	-66	3 pasture RR
	Little Bullwhacker(P)	220 5	C H	4/1-12/31	1168	-389	5 pasture RR

Resource Area	Allotment Name and Management Status	No.	Class	Season	Total Fed AUMs	Change From Existing Situation	Grazing System
Phillips	Cabin Creek(R)	349	C	5/01-10/30			
		58	C	12/1-3/30	1084	-72	2 pasture DR
	Antelope Crk(R)	10	C	5/01-12/31			
		726	C	5/01-10/31			
		411	C	10/31-12/31			
					4284	-113	1 pasture Natural Rotation
Judith	White Rocks(P)	76	C	1.2 mo. between 6/01-9/15	72	-14	1 pasture DR
	Labarge Rocks(P)	65	C	6/1-1/6	170	-0-	3 pasture DR
	Sheepshed Coulee (P)	190	C	6/1-9/15	364	-0-	3 pasture deferrment
	Last Chance Bench (P)	Not Specified		11/15-3/15	147	+30	Winter season specified
	Flat Creek (P)	34	C	7/15-11/15	137	-24	2 pasture DR
	PN Ranch (E)	1470	C	5/1-			
		275	Y	11/15	1931	-0-	DR and RR
	Iron City Is. (P)	60	C	6/16-10/15	98	-0-	3 pasture DR
	Stultz (E)	123	C	5/1-11/30	500	-0-	5 pasture RR
	River (E)	150	C	5/16-10/31	534	-0-	3 pasture DR
	Mattuscheck(E)	238	C	6/1-10/31			
		5	H	3/1-2/28	737	-0-	4 pasture modified RR

Resource Area	Allotment Name and Management Status	No.	Class	Season	Total Fed AUMs	Change From Existing Situation	Grazing System
	Blind Canyon(P)	101	C	5/16-10/31	290	-0-	2 pasture DR
	Woodhawk(E)	744	Y				
		150	C				
		39	H	5/1-10/31	3192	-0-	3 pasture DR
	Reed Coulee(P)	161	C	7/1-8/31			
		181	C	9/1-10/31	510	-34	2 pasture DR
	Demars (E)	85	C	6/1-11/30	351	-0-	
TOTAL		7094			19,346	-1,230 AUMs	

* The change from the existing situation is a result of errors in grazing administration, changes in allotment boundaries, subtraction of unsuitable acreage (generally areas with over 50 percent slope) from the carrying capacity, and reductions resulting from deteriorating resource conditions.

Those AUMs which were eliminated due to deteriorating resource conditions were put on a temporary nonrenewable basis and after a certain amount of improvement has occurred (site specific to individual allotment management plans) some increases may be added to the carrying capacity. Individuals desiring more information should consult the Missouri Breaks Grazing Environmental Impact Statement. The Draft copy is due to be released January 1979.

There are twelve (12) grazing leases on which no intensive management is planned. This type of management is a minimum management level. Because of small acreage and limited public lands versus private lands, these lease areas have been licensed for the carrying capacity of the federal lands with no control in season-of-use on numbers of livestock in many cases. These areas were determined to be not suited for allotment management plans in the Missouri River Breaks EIS in the case of the Judith Resource Area, and fell outside the EIS boundary on the north side (Havre Resource Area). The grazing authorizations for these lands will continue as follows: (Federal Acres and AUMs are for entire lease.)

Resource	Operator Name	Acres Leased	No.	Class	Season	Federal AUMs
Havre	Blazek, Edward J.	335.86	7	C	3/1-2/28	90
	Darlington, Kenneth	1001.72	4	C	3/1-2/28	54
	Lanning, Wilbur	184.65	3	C	3/1-2/28	42
	Osterman, Henry	160	3	C	3/1-2/28	33
	Knottnerus, Bros.	156.16	4	C	3/1-2/28	53
Judith	ABN Ranch	236.93	6	C	3/1-2/28	73
	Bell, C.H.	800.00	29	C	6/1-9/30	98
	Clark, G.B.	160	Not Specified	C	6/1-10/31	23
	Dammel, Thomas	507.19	60	C	6/1-9/30	72
	Fultz, Wilbur O.	1173.97	14	C	3/1-2/28	172
	Hicks & Sons, Inc.	819.86	19	C	5/16-11/15	104
	Quenell, Francis W.	440.00	4	C	3/1-2/28	51

Appendix N

ENVIRONMENTAL ASSESSMENT

I. Purpose

The National Environmental Policy Act of 1969 (P.L. 91-190) requires that an environmental impact study be prepared for all major federal actions which could have a significant effect upon the environment.

The environmental impacts of a proposed Upper Missouri Wild and Scenic River were investigated by the Bureau of Outdoor Recreation in 1975. A final environmental impact statement was approved in February, 1978. This statement fulfilled the requirements of the National Environmental Policy Act with the exception of differences which are a result of provisions in the Upper Missouri River Wild and Scenic River Act (P.L. 94-486). Those differences and the resultant environmental impacts are addressed in this assessment. Those differences are as follows:

1. River Area Designation

The Bureau of Outdoor Recreation recommended that a 128 mile river segment from Coal Banks Landing to the old townsite of Rocky Point be included in the National Wild and Scenic Rivers System. Public Law 94-486 excluded the 21 mile river segment from the Fred Robinson Bridge to Rocky Point (included two primitive campsites) and added a 42 mile segment from Fort Benton to Coal Banks Landing. Federal jurisdiction in the initial 42 mile segment is limited to the river and its bed except for needed campsites, historic sites or public access. The river area designated a component of the National Wild

and Scenic Rivers System by P.L. 94-486 is 149 miles in length - an increase of 21 miles over the Bureau of Outdoor Recreation proposal.

Environmental Impact of Proposed Actions

Since federal jurisdiction is limited to the river and its bed except for needed campsites, historic sites or public access in the first 42 miles of river, economic impact to adjacent landowners and the local economy, will be minimized. This management plan proposes that a minimum of six privately-owned tracts of land be acquired for overnight campsite purposes in this river segment. A number of sites have been identified from which the six tracts will be selected. Size of the sites will vary on a site-specific basis. In-lieu of tax payments will be made by the Bureau of Land Management subject to the provisions of P.L. 94-565 (90 Stat. 2662), to compensate the local tax base for sites which are acquired by the federal government. The two primitive campsites between the Fred Robinson Bridge and Rocky Point discussed in the BOR statement will not be identified as such and little if any environmental impact will occur to these sites as a result of this change.

This plan also proposes that two interpretive features be constructed on land which is currently in private ownership and that a day use area be developed on land to be acquired from private interests in this river segment. These proposals

will involve approximately 78 acres of privately-owned property. In lieu of tax payments will be made by the BLM if the selected lands are acquired (as provided by P.L. 94-565).

The inclusion of the river segment from Fort Benton to Coal Banks Landing in the national system will direct user traffic to the community of Fort Benton and those tracts of land selected for public use in the initial 42 miles of river. Such use will occur on a controlled, managed basis and the impact on the environment should be less than that which is currently occurring without river management.

2. River Classification

The Bureau of Outdoor Recreation proposed that 72 miles of river be classified as wild, that 39 miles be classified scenic and 17 miles be classified as recreational from the total 128 mile segment. This management plan proposes that 64 miles of river be established in a wild river classification, 26 miles as scenic and 59 miles as recreational (see map entitled Missouri Wild and Scenic River). Acceptance of this plan will establish 8 fewer miles of wild river classification, 13 miles less in a scenic river classification, and 42 miles more recreational river classification.

Environmental Impact of Proposed Action

A reduction in river mileage of the more restrictive classifications (wild and scenic) may permit more activities to occur which could have an adverse effect on the natural environment over a total of 22 miles of river. All such actions subject to BLM jurisdiction, will be evaluated by site specific environmental assessments prior to making final decisions on whether or not to proceed with the project.

The initial 42 miles of river between Fort Benton and Coal Banks Landing not included in the BOR proposal will be classified as a recreational river segment. This classification is the least restrictive of the three river classifications.

Local zoning ordinances will be encouraged to reduce or eliminate undesirable developments on lands adjacent to, and within view of the Missouri River. If such zoning ordinances can be effected, a reduction in potential environmental impact can be achieved in this area as a result of inclusion in the national system.

3. Management Area Size

The Bureau of Outdoor Recreation environmental study recommended that a rim to rim boundary be established for the 128 mile management area. This proposal included a total of 147,800 acres of land. The land ownership pattern was determined to be as follows:

Federal:	101,500 Acres
State:	10,300 Acres
Private:	36,000 Acres

Because of the direction of Congress as defined in P.L. 94-486, this plan will establish a rim to rim boundary for 107 miles of the 149 mile nationally designated river from Coal Banks Landing to the western boundary of the C.M. Russell National Wildlife Refuge. The management area consists of a total of 131,839 acres of land with a land ownership pattern as follows:

Federal:	85,946 Acres
State:	10,032 Acres
Private:	35,860 Acres

Environmental Impact of Proposed Action

A total of 15,554 acres of federally owned property was omitted from the river management area by passage of P.L. 94-486. This land is within the C.M. Russell National Wildlife Refuge, under the administrative authority of the U.S. Fish and Wildlife Service. With the exception of two areas which were recommended by BOR to be designated as primitive campsites most of the excluded acreage would have been and are now subjected to the U.S. Fish and Wildlife Service's planning processes and managed in much the same manner as it is expected to be managed in the future. Less recreational use will occur in the 21 mile river segment between the Fred Robinson Bridge and Rocky Point which was excluded by the final passage of the Missouri River bill. Although it can be anticipated that many river excursions would have terminated at the Fred Robinson Bridge where improved access is assured, an undetermined

number of recreationists would have continued on to Rocky Point if that segment of river had been included in the national system. If user demands had dictated, road access would have had to be improved into the Rocky Point area. Any impacts created by this designation are eliminated by P.L. 94-486.

4. Land Acquisition

The Bureau of Outdoor Recreation study recommended that 6,100 acres of privately owned property included in the management area be considered for fee acquisition and that 29,900 acres of scenic easements on privately-owned property be acquired. This plan reflects a minimal impact on privately-owned property within the management area. Eight areas comprising 570 acres of privately owned property are specifically identified for fee acquisition. A scenic easement consisting of 100 acres is recommended for archeological preservation and interpretive purposes. Another 200 acre scenic easement is recommended for the area adjacent to the Hole-in-the-Wall landmark. Fourteen campsites, 7 historically important areas, 2 water well developments and 1 major archeological site are proposed for either fee or easement acquisition. Acreage determinations were not made for these sites pending negotiations with landowners. The sum total of these proposals will involve considerably less privately-owned property than proposed in the BOR environmental statement. Other tracts of privately-owned property not currently identified may be acquired as needed or on the basis of availability.

Environmental Impact of Proposed Action

An acquisition package of less than the total acreage proposed in the BOR environmental statement precludes federal management controls on the omitted lands. River users will be directed to identified public lands through management controls and little if any environmental impact is expected on the privately owned lands from this source. Changes brought about by private landowners will be reviewed from the standpoint of effect on wild and scenic river values. Legal means will be pursued to mitigate or eliminate environmental impacts on a site specific basis where such changes could cause harmful or undesirable environmental impacts.

5. River Administration

The BOR environmental statement proposed that the management plan for the Upper Missouri River be prepared by the Bureau of Land Management and U.S. Fish and Wildlife Service in cooperation with other local, state, and federal agencies.

Public Law 94-486 established the Bureau of Land Management as the administering federal agency for the wild and scenic river. Section 203(g)(2) provides that the National Park Service be responsible for the construction and management of any visitor facility in or near Fort Benton.

Environmental Impact of Action

Visitation at the community of Fort Benton is expected to increase if the Park Service visitor facility is constructed. River use is expected to increase at a minimal rate of 35 percent to 40 percent annually on the basis of recent historical use. Annual use increases could accelerate at an undetermined rate if a visitor interpretive facility is constructed in Fort Benton.

Administrative personnel and management controls will be kept at levels commensurate with visitor numbers. No major environmental impacts are anticipated due to the administrative authority established by Public Law 94-486.

6. Carrying Capacity

The Bureau of Outdoor Recreation estimated that the resource base was capable of supporting a recreation use level of 465 individuals per day within a 128 mile river segment.

The Bureau of Land Management's carrying capacity determination of 444 individuals per day is based on a campsite inventory within a 107 mile river segment.

Environmental Impact of Proposed Action

The resource base will be closely monitored to determine effects of recreational use. Carrying capacity determinations may be decreased if the monitoring program indicates that environmental damage is occurring.

Appendix N

Future Actions and Public Review

All Bureau of Land Management actions which are a result of administrative or visitor needs will be preceded by site specific environmental assessments prior to such actions taking place.

Copies of the final environmental statement prepared by the Bureau of Outdoor Recreation are on file in the Lewistown, Montana BLM District Office and are available for inspection by the public.

PUBLIC LAW 94-486 -- OCT 12, 1976
Public Law 94-486
94th Congress

An Act

To Amend the Wild & Scenic Rivers Act, & for other purposes. Oct. 12,1976 (S. 1506)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, Wild and Scenic Rivers Act Amendments.

TITLE I -- FLATHEAD, MONTANA

Sec. 101. Section 3(a) of the Wild and Scenic Rivers Act (82 Stat. 906; 16 U.S.C. 1271 et seq.) is amended by adding the following new paragraph at the end thereof: 16 USC 1274.

"(13) FLATHEAD, MONTANA -- The North Fork from the Canadian border downstream to its confluence with the Middle Fork; the Middle Fork from its headwaters to its confluence to the South Fork; and the South Fork from its origin to the Hungry Horse Reservoir, as generally depicted on the map entitled "Proposed Flathead Wild and Scenic River Boundary Location' dated February 1976; to be administered by agencies of the Departments of the Interior and Agriculture as agreed upon by the Secretaries of such Departments or as directed by the President. Action required to be taken under subsection (b) of this section shall be taken within one year from the date of enactment of this paragraph. For the purposes of this river, there are authorized to be appropriated not more than $6,719,000 for the acquisition of lands and interests in lands. No funds authorized to be appropriated pursuant to this paragraph shall be available prior to October 1, 1977." Appropriation Authorization.

TITLE II -- MISSOURI, MONTANA

Sec. 201. Section 3(a) of the Act is further amended by adding at the end thereof the following new paragraph:

"(14) MISSOURI, MONTANA -- The segment from Fort Benton one hundred and forty-nine miles downstream to Robinson Bridge, as generally depicted on the boundary map entitled 'Missouri Breaks Freeflowing River Proposal,' dated October 1975, to be administered by the Secretary of the Interior. For the purposes of this river, there are authorized to be appropriated not more than $1,800,000 for the acquisition of lands and interests in lands. No funds authorized to be appropriated pursuant to this paragraph shall be available prior to October 1, 1977." Appropriation Authorization.

Consultation. 16 USC 1274. Note.

Sec. 202. After consultation with the State and local governments and the interested public, the Secretary shall, pursuant to section 3(b) of the Wild and Scenic Rivers Act, and within one year of enactment of this Act --

(1) establish detailed boundaries of the river segment designated as a component of the National Wild and Scenic Rivers System pursuant to section 1 of this Act (hereinafter referred to as the "river area"): Provided, That the boundaries of the portion of the river area from Fort Benton to Coal Banks Landing and the portion of the river area within the boundaries of the Charles M. Russell National Wildlife Range shall be drawn to include only the river and its bed and exclude all adjacent land except significant historic sites and such campsites and access points as are deemed necessary by the Secretary, and to which the Secretary finds no reasonable alternative, as set forth in the management plan required pursuant to clause (2) of this section; and

16 USC 1273.

(2) determine, in accordance with the guidelines in section 2(b) of the Wild and Scenic Rivers Act, which of the three classes -- wild river, scenic river, or recreation river -- best fit portions of the river segment, designate such portions in such classes, and prepare a management plan for the river area in accordance with such designation.

Management. 16 USC 1274 Note. 16 USCS 1271 Note.

Sec. 203. (a) The Secretary of the Interior (hereinafter referred to as the "Secretary") shall manage the river area pursuant to the provisions of this Act and the Wild and Scenic Rivers Act, and in accordance with the provisions of the Taylor Grazing Act (48 Stat. 1269), as amended (43 U.S.C. 315), under principles of multiple use and sustained yield, and with any other authorities available to him for the management and conservation of natural resources and the protection and enhancement of the environment, where such Act, principles, and authorities are consistent with the purposes and provisions of this Act and the Wild and Scenic Rivers Act.

Land acquisition. 16 USC 1277

(b)(1) The Secretary may acquire land and interests in land only in accordance with the provisions of this Act and the Wild and Scenic Rivers Act and the limitations contained in section 6 of that Act and only: (A) at Fort Benton for the visitor facility as provided in sub-section (g)(2) of this section; (B) at the site of Fort McKenzie; (C) in that portion of the river area downstream from Fort Benton to Coal Banks Landing for historic sites, campsites, and access points in accordance with section 202 (1) of this Act; and (D) in that portion of the river area downstream

from Coal Banks Landing so as to provide, wherever practicable and necessary for the purposes of this Act and the Wild and Scenic Rivers Act, rim-to-rim protection for such portion.

Condemnation.

(2) In accordance with section 6(b) of the Wild and Scenic Rivers Act, the Secretary shall not acquire fee title to any lands by condemnation under the authority of that Act or this Act, except that the Secretary may use condemnation when necessary and within the limitations on acquisition set forth in clause (1) of this subsection to clear title, acquire scenic easements, or acquire such other easements as are reasonably necessary to give the public access to the river segment within the river area and to permit its members to traverse the length of said river area or of selected portions thereof.

Development.

(3) The Secretary shall, to the extent feasible, give priority in expenditure of funds pursuant to this Act for the acquisition and development of campsites and historic sites, including the site of the visitor center at Fort Benton and the site of Fort McKenzie.

Easements.

(c) Consistent with the provisions of this Act and the Wild and Scenic Rivers Act, the Secretary may issue easements, licenses, or permits for rights-of-way through, over, or under the lands in Federal ownership within the river area, or for the use of such lands on such terms and conditions as are in accordance with the provisions of this Act, the Wild and Scenic Rivers Act, and other applicable law.

Bridge construction.

(d) The Secretary is authorized to permit the construction of a bridge across the river in the general vicinity of the community of Winifred, Montana, in order to accommodate the flow of north-south traffic. Such construction shall be in accordance with a plan which is mutually acceptable to the Secretary and State and local highway officials, and which is consistent with the purposes of this Act and the Wild and Scenic Rivers Act.

Pumping facilities and associated pipelines.

(e) To the extent and in a manner consistent with the purposes of the Wild and Scenic Rivers Act the Secretary shall permit such pumping facilities and associated pipelines as may be necessary to assure the continuation of an adequate supply of water from the Missouri River to the owners of lands adjacent to the river and for future agricultural use outside the river corridor. The Secretary is authorized to permit such pumping facilities and associated pipelines for use for fish, wildlife, and recreational uses outside the river corridor.

(f) The Secretary shall permit hunting and fishing in the river area in accordance with applicable Federal and State laws, except that he may designate zones where, and periods when, no hunting or fishing shall be permitted for reasons of public safety or administration. Hunting and fishing.

(g)(1) The Secretary, acting through the Bureau of Land Management, shall exercise management responsibilities in the river area for:

(A) the grazing of livestock;
(B) the application of the United States mining and mineral leasing laws;
(C) the management of fish and wildlife habitat;
(D) the diversion and use of water for agricultural and domestic purposes;
(E) the acquisition of lands and interests therein;
(F) the administration of public recreational uses of, and any historic sites and campsites in, the river area; and
(G) all other management responsibilities except those set forth in paragraph (2) of this subsection.

(2) The Secretary, acting through the National Park Service, shall be responsible for the construction, operation, and management of any visitor facility in or near Fort Benton which is found necessary in accordance with the management plan developed pursuant to section 202 and the provision, at such facility, of interpretive services for the historic, archeological, scenic, natural, and fish and wildlife resources of the area. Visitor facility, construction.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 94-1657 accompanying H.R. 15422 (Comm. on Interior and Insular Affairs).
SENATE REPORT No. 94-502 (Comm. on Interior and Insular Affairs).
CONGRESSIONAL RECORD:
Vol 121 (1975): Dec. 4, considered and passed Senate.
Vol 122 (1976): Sept. 27, considered and passed House, amended in lieu of H.R. 15422.
Sept. 28, Senate concurred in House amendments.

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