

CHAPTER 3

AFFECTED ENVIRONMENT

Introduction

Chapter 3 contains a description of the physical, biological, cultural, economic and social conditions of the Upper Missouri River Breaks National Monument (Monument). Most of this information is summarized from the Analysis of the Management Situation (BLM 2003b), which is available for review at the Lewistown Field Office. The affected environment serves as the baseline of existing conditions from which the impacts of the alternatives may be analyzed.

Critical Elements

The BLM considers the 14 items listed below as critical elements of the human environment that are subject to requirements specified in statute, regulation, or executive order and must be considered in all environmental analyses. Thirteen of these elements are addressed under the pertinent sections of Chapter 3 (as noted beside each critical element), and if relevant, again in Chapter 4.

The critical element Wastes, Hazardous or Solid is addressed through the appropriate laws and regulations regarding hazardous materials. Unauthorized storage, treatment, or disposal of hazardous waste on BLM land is prohibited and environmental conditions are protected as a result of hazardous materials management. Any authorized uses would adhere to federal and state requirements to reduce or eliminate impacts. Procedures in place to address unauthorized use and accidental events minimize to the extent possible public exposure and environmental impacts.

Air Quality

Air quality is regarded as good mainly due to the few industries and homes located in the area. No air quality monitoring sites currently exist.

A planning and management process, Prevention of Significant Deterioration (PSD), was introduced as part of the 1977 Amendments to The Clean Air Act. These PSD requirements set limits for increases in ambient pollution levels and established a system for preconstruction review of new major sources. Three PSD classes have been established. Class I allows very small increases in pollution and is designed for pristine areas where almost any deterioration would be significant; Class II allows somewhat larger increases which allow for moderate, well-controlled growth; and Class III allows the air quality to “deteriorate” more with considerable increases in pollutant levels. The State of Montana determines the class. The Monument is within a Class II designation. [Appendix F](#) lists the federal and Montana air quality standards.

Climate

The climate is semiarid continental. It is marked by cold winters, warm to rarely hot summers, 12 to 14 inches of precipitation annually, winds primarily from the west, and abundant sunshine.

Average annual precipitation ranges from less than 12 inches in the eastern portion of the Monument to 14 inches in the western portions of the Monument. Snow on the

<i>Critical Element</i>	<i>Chapter 3 Section</i>
• Air Quality	Air Quality
• Areas of Critical Environmental Concern	Special Designations
• Cultural Resources	Cultural Resources
• Environmental Justice	Social
• Farm Lands	Soils
• Floodplains	Vegetation – Riparian
• Invasive, Non-native Species	Vegetation – Noxious and Invasive Plants
• Native American Religious Concerns	Cultural Resources
• Threatened or Endangered Species	Fish and Wildlife; Vegetation – Native Plants
• Wastes, Hazardous or Solid	see text above
• Water Quality – Drinking/Ground	Water Quality
• Wetlands/Riparian Zones	Vegetation – Riparian
• Wild and Scenic Rivers	Special Designations
• Wilderness	Special Designations

plains more than 12 inches deep is uncommon but not rare. Snow generally falls between November and April, although traces have been reported at Lewistown (south of the Monument) in July and August.

Average precipitation recorded at weather stations in and adjacent to the Monument shows rainfall is concentrated in the period from April through June. Precipitation from July through September is characterized by localized intense thunderstorms that can drop more than an inch of rain or hail on a small area in a few minutes. Low humidity, high temperatures, and moderate-to-strong winds cause rapid loss of soil moisture.

Winter temperatures may be as low as -40° F for short periods, but the January mean monthly temperature is around 15° F. Summer temperatures as high as 110° F have been recorded, but the July mean monthly temperature is about 70° F. Temperatures may fluctuate widely during the course of a single day in either winter or summer, and local temperatures may be several degrees different than the average. Growing seasons, defined as the times between the last frost in spring and the first fall frost (temperatures of 32° F), range from 104 to 132 days. The Breaks are subject to intense lightning storms from July through September, often resulting in wildfires.

Cultural Resources

Prehistoric Overview

Based on archaeological evidence from the surrounding northwestern plains, it is believed that Ice Age hunters arrived in the region about 12,000 years ago in search of big game such as the now-extinct mammoth and giant bison. The chief weapon of the hunters was a thrusting spear tipped with a large stone point. Later, about 8,000 years ago, their descendants used an atlatl, or throwing stick, and a short spear tipped with a smaller stone point than that used previously. Big game animals remained important, but smaller species were also taken along with a variety of wild plant foods. By about 1,500 years ago, bow-and-arrow technology reached the plains, as did the manufacture of pottery.

The prehistoric cultures of the northwestern plains region were organized into small groups of hunter-gatherers, these cultures were largely dependent upon the naturally occurring resources of their environment. Because of environmental and technological limitations, little or no food production was practiced. Subsistence was oriented to resource availability, and campsites were generally located near important, exploitable resources. As the most important resource was the highly nomadic bison, these groups were highly mobile in their settlement patterns.

Near the end of the prehistoric period, about A.D. 1700-1750, horses were acquired on the northern plains. The use of horses as a means of transportation and food procurement radically changed the subsistence pattern of the region's inhabitants. No longer were they dependent on the territory in which they lived to survive; the horse allowed them the mobility to exploit new territories and to be more efficient at that exploitation. Thus, even the marginal hunting and gathering cultures evolved into specialized horse-mounted bison hunters by A.D. 1800.

To the first Euro-American visitors, the native groups of the region shared many cultural traits. These traits included high mobility, dependence on horse-mounted bison hunting, similar material culture and religious practices, and a common sign language in spite of many spoken languages and dialects. The Indian tribes inhabiting the region during the 19th century included the Piegan (Blackfeet), Gros Ventre (Atsina), River Crow, and Assiniboin. Frequent visitors to the Monument area also included the Mountain Crow, Shoshoni, Flathead and Nez Perce. Tribes not resident to the area passed through on buffalo hunts or war parties.

Monument lands contain 115 known prehistoric sites. These prehistoric sites include surface artifact scatters, buried habitation sites, tipi rings and buffalo hunting features.

Given the relative size of the Monument (375,000 acres) it does not appear to have many prehistoric sites. Even though only a small fraction of the Monument has been systematically inventoried for cultural sites, this low density should be expected. Most of the known cultural sites are within a fairly narrow corridor including the Upper Missouri National Wild and Scenic River (UMNWSR). Not surprisingly, relatively few sites are found in the steep, dry uplands which comprise a large portion of the Monument.

Historic Overview

Recorded history in the area begins with the written records of the early 19th century explorers of European and American origin. The Lewis and Clark expedition camped at numerous locations along the Missouri River in 1805 and 1806. The expedition also described for the first time a large number of the plants and animals found in the region.

Organized fur traders of the Rocky Mountain Fur Company, American Fur Company, and smaller outfits followed the Lewis and Clark expedition into the Missouri River country in the early 1800s. After 1829, the year the American Fur Company established Fort Union at the mouth of the Yellowstone River, several trading posts or forts were built in or near the Monument area, including Fort Piegan near the mouth of the Marias River; Fort

McKenzie; Fort Campbell and Fort Lewis near the present city of Fort Benton; and Fort Chardon at the mouth of the Judith River.

By the 1850s, the heyday of the fur trade was beginning to fade due to changes in world textile markets and the scarcity of certain fur-bearing animals in the North American west. However, buffalo hides, whiskey, and Indian annuities soon replaced beaver skins as the main items of trade in the Missouri River country. In addition to the American Fur Company, a number of trading companies began operating out of Fort Benton during this time, including the firms of I.G. Baker Company and T.C. Power and Bros. To reduce potential conflicts between traders and other immigrants and the American Indian community, the United States established a treaty with various tribes in the area in 1855 (i.e., the 1855 Stevens Blackfeet or Lame Bull Treaty).

Steamboats, which had been in use on the lower Missouri River for twenty years, were finally able to reach Fort Benton in 1859 due to the development of shallow draft vessels. The establishment of a port at Fort Benton was one of the most important historic events for central and northern Montana because almost all immigration, commerce, and communication to and from the outside world came through there.

The influx of fur traders, hide hunters, gold seekers, businessmen, and settlers into the region eventually caused problems with the native tribes. During the mid-1800s, Blackfeet, Gros Ventre, and Sioux war parties raided outlying settlements and wagon trains with considerable frequency. In order to quell the white settlers' fears about Indian attacks, military posts were established at Camp Cooke near the mouth of the Judith River in 1866 and at Fort Maginnis near Lewistown in 1880. Army garrisons were also occasionally stationed at Indian agencies, trading posts, and steamboat landings.

In September 1877, the Nez Perce crossed the Missouri River near Cow Island Landing on their flight from the U.S. Army under the command of General Howard. The skirmish at Cow Island on September 23 was the final encounter before their eventual surrender at the Bearpaw Battlefield.

The construction of James J. Hill's St. Paul, Minneapolis and Manitoba Railroad across the HiLine in 1887 changed the entire character of the region. The completion of the Montana Central Railroad and subsequent merger with Hill's company to form the Great Northern Railway in 1889 virtually eliminated steamboat traffic on the Missouri River. The last steamboat traffic between Bismarck, North Dakota and Fort Benton occurred in 1891.

In 1888, Congress ratified a treaty creating three reservations for the region's Indian inhabitants (Fort Peck, Fort

Belknap, and Blackfeet Indian Reservations) and ceding 17.5 million acres back to the U.S. Government.

A number of developments followed the coming of the railroad and ushered in the homestead boom of 1910-1918. These included the availability of larger homestead tracts, new dryland farming techniques, new mechanized farm equipment and a mammoth promotional campaign by the railroad companies. Homesteaders came by the thousands and the region was quickly settled by Germans and Scandinavians from the Midwest, as well as by eastern European immigrants like Bohemians and Yugoslavs. Times were good during the boom period because the climate was abnormally favorable and the war in Europe kept the demand and prices for farm products high. However, by the end of World War I, a severe drought had begun and food prices had fallen drastically. These conditions lasted for several years and by 1925, one out of every two homesteaders had lost or abandoned his farm and half of the banks in the region had failed.

Beginning in the late 1920s, a canner horse industry emerged in the Missouri River Breaks according to Robert Eigell (1987). Meat packers would pay \$5 a head for horses delivered to the railroad shipping pens (Eigell, R. 1987, 167). While not profitable at this price, it gave rise to the canner horse industry.

During the Great Depression, the U.S. Government provided relief to the residents of the region in a variety of ways. Under the Work Projects Administration, federal funds were available for improving community infrastructure as well as more ambitious projects such as the construction of the Fort Peck dam, which is east of the Monument.

Forty-four known cultural sites date to the historic period; that is, after 1805, but prior to World War II. Most of these sites are related to early agriculture and settlement, but early transportation and the military are also represented.

Previous consultation with tribes indicates that they attach value to the Monument and use certain areas for religious and cultural purposes. At this time, consultation has not resulted in a long list of discrete areas used for traditional purposes; however, in addition to specific areas that have been identified as traditional cultural properties, we know that tribes generally regard certain types of archaeological sites as having cultural and religious significance. These include vision quest sites, monumental/anthropomorphic/zoomorphic rock features, rock art sites, burials, habitation sites with special purpose ceremonial structures, and ceremonial and/or dance grounds.

Oral histories from long-term residents of the Breaks were recorded in 2003-2004. This local perspective of early agriculture in the Breaks was directed at preserving firsthand accounts of a lifestyle now gone. These firsthand

accounts are an interpretive resource for explaining this aspect of the Breaks heritage and address a preservation concern raised during public scoping.

Fish and Wildlife

The wildlife species within the Monument are diverse, abundant and widespread. Of the species known to occur in the area pre-settlement, only the grizzly bear, grey wolf, bison and black-footed ferret no longer occur in the Monument. The variety of vegetation along the river and its associated areas provides habitat for the diverse wildlife population. More than 60 mammals, 233 species of birds and 20 species of amphibians and reptiles inhabit these areas. The river itself is home to 48 species of fish ranging from the half-ounce minnow to the 140 pound paddlefish.

Mammals: The area between the river’s edge and the mixed forested, sagebrush steppe and agricultural land along the canyon rims provides valuable habitat for several species of mammals. Probably the most significant of these mammals are the special status black-tailed prairie dog and five big game animals: bighorn sheep, elk, mule deer, whitetail deer and pronghorn antelope. The canyon areas also provide habitat for predator species. Mountain lions appear to be doing well in the Breaks portions of the corridor.

Birds: Of the 233 species of birds that inhabit the corridor, the bald eagle is on the threatened and endangered list and 23 additional bird species have been designated sensitive species by the Montana BLM in cooperation with the Montana Natural Heritage program. The cliff faces provide perching and nesting habitat for many raptors and other birds. The more significant and abundant of the cliff nesters (golden eagle, prairie falcon, sparrow hawk, and Canada geese) are using some of the cliffs adjacent to water to nest in. Four species of upland game birds are present in the corridor: gray partridge, sharp-tailed grouse, sage-grouse and ringnecked pheasant.

Fish: Forty-eight species of fish are found in this area of the Missouri River and its tributaries. Of these, the pallid sturgeon is on the threatened and endangered list and five are considered to be special status species: blue sucker, paddlefish, sauger, sicklefin chub, and sturgeon chub. Walleye, channel catfish, and shovelnose sturgeon are also present.

See [Appendix L.2](#) for a complete list of fish, wildlife, herptofauna and avian species found within the Monument.

Several important management species occur within the Monument. They are described below.

Elk

The distribution of elk in Montana changed following settlement by the white man. Early accounts of trappers and explorers indicate that elk were found in all parts of the state with the exception of northwestern Montana. Following settlement, elk numbers decreased and by the turn of the century only small remnant herds of elk remained in the mountainous areas of Montana and in Yellowstone National Park. Elk were eliminated from eastern Montana. Elk distribution today is the result of transplant efforts and big game management.

Elk were reintroduced to the Missouri River Breaks near the Fred Robinson Bridge in 1951. Thirty-one animals were transplanted from Yellowstone National Park. The population increase and expansion into unoccupied habitat has occurred west to the McClelland-Stafford Ferry, and the Bears Paw herd has moved as far south as the Stafford Wilderness Study Area during severe winters.

Elk are scattered throughout the less rugged habitat within the Monument, generally concentrating in areas with good-to-excellent range condition and adequate water sources. Elk typically use woody draws consisting of ponderosa pine and juniper adjacent to sagebrush/grassland habitat for security and winter cover. Riparian bottoms are used in conjunction with upland areas for forage and security purposes. These bottoms become increasingly important during drought periods when upland reservoirs are dry. Current counts by Montana Fish, Wildlife & Parks estimate 100+ elk on the north side of the river, and 300+ on the south side, within the Monument. Numbers can fluctuate as elk migrate freely between the Bears Paw Mountains and the Missouri River Breaks on the north side of the river, and between the CMR refuge and the Monument on the south side of the river, but are generally believed to be expanding their range. Acres of elk distribution within the Monument are shown in Table 3.1 and displayed on [Map E](#). Acres of elk winter range are shown in Table 3.1 and displayed on [Map F](#).

**Table 3.1
Wildlife Distribution**

<i>Species</i>	<i>Acres</i>
Elk Distribution	226,185
Elk and Deer Winter Range	231,885
Antelope Crucial Winter Range	26,700
Bighorn Sheep Distribution	134,639
Bighorn Sheep Lambing Areas	49,193
Sage-Grouse Crucial Winter Habitat	6,866
Prairie Dog Towns	507

Deer

Mule deer are the most numerous big game species within the Monument. Mackie (1965) described in detail key mule deer ranges within the Breaks, including the ponderosa pine/juniper type on moderate-to-steep slopes and the sage/wheatgrass type on small ridge tops and along margins of more extensive ridges. Key habitat in the remaining prairie lands is found primarily along intermittent streams and/or rough Breaks.

Deer in the Breaks are essentially non-migratory; however, they do concentrate on south and southwest facing open slopes and ridge tops during the winter. During winters of heavy snowfall, sagebrush is often the only available forage plant and becomes crucial to the survival of many deer herds. Escape and thermal cover are also important in maintaining deer populations; without sufficient cover, fawns are easily susceptible to predators and adverse weather.

Whitetail deer are less common within the Monument, but utilize riparian areas along the Missouri River and major tributaries year round.

Acres of deer winter range are shown in Table 3.1 and displayed on [Map F](#).

Antelope

The pronghorn antelope population was estimated at 2.5 million at its peak before settlement of Montana. Populations have since declined. This can be attributed to disturbance of preferred habitat by human activities.

Habitat frequented by pronghorn antelope varies with the season. Antelope currently occur within the Monument in small numbers year around, primarily in the sagebrush/grassland habitats. The sagebrush ridges and the transition areas between sagebrush and ponderosa pine/juniper provide crucial winter habitat during harsh winter weather, including deep snow and very cold, windy weather. These areas provide protection from the weather and food where snow has blown clear. Herds from 50-300 animals can congregate in these areas during this high stress period.

Acres of antelope crucial winter range are shown in Table 3.1 and displayed on [Map G](#).

Rocky Mountain Bighorn Sheep

When Lewis and Clark first explored the Missouri River, they noted that populations of Audubon's bighorn sheep (*Ovis canadensis auduboni*) in prairies and breaks along the river in what is now Montana (Buechner 1960) were abundant. This sub-species was driven to extinction in the early

1900s by overhunting, disease, and competition from domestic livestock (Geist 1971).

Distribution of bighorn sheep in Montana has now been extended due to live trapping and transplanting to suitable areas they previously occupied. Management agencies began using translocations to return bighorn sheep to parts of their historic range as early as the 1930s (Bleich, et al. 1990, Dunn 1996).

In 1980, 28 Rocky Mountain bighorn sheep from the Sun River area in Montana were again relocated to the McClelland-Stafford Ferry area of Fergus County. The population introduced at the McClelland-Stafford Ferry area has since grown and pioneered areas that include both sides of the Missouri River. In August 2004, this population had a minimum of 833 animals: 386 north of the Missouri River and 447 on the south side. The population appears to be healthy and expanding. Acres of bighorn sheep distribution are shown in Table 3.1 and displayed on [Map H](#). Total acreage for the bighorn sheep lambing areas is also shown in Table 3.1 and displayed on [Map I](#).

Great Blue Heron

Great blue herons are colonial nesters which nest and raise their broods in rookeries. This species will return to the same rookery year to year. Nesting herons are sensitive to human disturbance, which may cause them to abandon their eggs or young. Historical data cites at least two rookeries on the Missouri River, but these have been abandoned in recent years.

Fishes

Forty-eight species of fish reside in the Missouri River and its tributaries. The pallid sturgeon is endangered and five other species are considered to be special status species: blue sucker, paddlefish, sauger, sicklefin chub, and sturgeon chub.

Herptofauna

Reptiles and amphibians (collectively referred to as "herptiles" or "herptofauna") are sensitive to habitat conditions and changes, as well as changes in wildlife community composition and abundance.

Reptiles and amphibians serve as valuable bioindicators of ecosystem health (Lind 1996). Some amphibian populations in Montana have recently undergone, or are currently undergoing declines and extinctions (Carey 1993, Reichel and Flath 1995). Direct and indirect impacts from a variety of human activities may affect the viability of reptile and amphibian populations in Montana (Joslin and Youmans 1999).

The tiger salamander is the only salamander occurring in the Monument. The woodhouse toad, western chorus frog, and the northern leopard frog all occur in the area. Of concern are the northern leopard frog populations, which appear to be in a sharp decline. Spiny soft-shell and snapping turtles occur and are listed as sensitive species. There is concern that concentration of livestock in soft-shell turtle nesting areas may impact nesting success. The short-horned lizard is also known to be present. Other species could be present within the Monument, but extensive surveys have not been done.

Special Status Species

Special status species include sensitive, state-listed, and federally proposed, listed, and candidate species. See [Appendix L.2](#) for a listing of threatened, endangered or candidate species, and BLM designated sensitive species within the Monument.

BLM sensitive species are those designated as sensitive by a BLM State Director, usually in cooperation with the state agency responsible for managing the species and state natural heritage programs. Sensitive species are those species that: (1) could become endangered or extinct from a state, or within a significant portion of its distribution; (2) are under status review by the U.S. Fish and Wildlife Service (USFWS); (3) are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution; (4) are undergoing significant current or predicted downward trends in population or density such that federally listed, proposed, candidate, or state-listed status may become necessary; (5) typically have small and widely dispersed populations; (6) inhabit ecological refugia or other specialized or unique habitats; or (7) are state-listed but which may be better conserved through application of BLM sensitive species status.

State-listed species of special concern are listed by a state in a category implying, but not limited to, potential endangerment or extinction and listing is by either legislation or regulation.

Proposed species are species that have been officially proposed for listing as threatened or endangered by the Secretary of the Interior and a proposed rule has been published in the Federal Register. Candidate species are designated as candidates for listing as threatened or endangered by the USFWS and have been published in the Federal Register. Listed species are those listed as threatened or endangered by the Secretary of the Interior under the provisions of the Endangered Species Act, and a final rule for the listing has been published in the Federal Register.

Greater Sage-Grouse (Sensitive Species)

Greater sage-grouse have decreased in numbers but still inhabit the areas they have occupied for decades. Grouse populations in marginal areas of their range have been drastically reduced or eliminated. Sage-grouse are closely associated with sagebrush. In areas where sagebrush has been eliminated, the sage-grouse has also been eliminated.

Sage-grouse, which are considered sensitive and a species of potential concern, have decreased in numbers throughout their range (Montana Sage Grouse Work Group 2005); however, in many areas outside the Monument sage-grouse populations have stabilized or increased in recent years. Faltering sage-grouse populations can be attributed to a number of different factors. Habitat fragmentation and habitat condition are the primary factors which the BLM can manage or manipulate.

In eastern Montana, where close interspersed of wintering, nesting, and brood-rearing habitat rarely requires large seasonal movements, sage-grouse are essentially non-migratory. The importance of sagebrush to sage-grouse is well documented. The seasonal habitats listed below are important for survival of sage-grouse (Montana Sage Grouse Work Group 2005).

Breeding Habitat

Strutting grounds, or leks, where breeding actually occurs, are key activity areas and most often consist of clearings surrounded by sagebrush cover. Findings from research in central Montana reported a sagebrush canopy cover at feeding and loafing sites near leks of 20% to 50% with an average of 32%.

Nesting Habitat

Sage-grouse invariably prefer sagebrush for nesting cover, and quality of nesting cover directly influences nest success. Successful nesting requires concealment provided by a combination of shrub and residual grass cover. Sage-grouse most frequently select nesting cover with a sagebrush canopy of 15% to 31%. Research findings in central Montana suggest that about 67% of nests occur within 2 miles of a lek (Montana Sage Grouse Work Group 2005). A recent and as yet unpublished graduate study in northcentral Montana by Brendan Moynahan (2004, University of Montana) suggests that 60% of nesting occurs three miles or more from breeding leks (Moynahan, B. Personal communication).

Although only two known leks occur on BLM land in the Monument, 11 leks are located within 2 miles of the

Monument and therefore, may include potential nesting areas on BLM land.

Brood-Rearing Habitat

Research in central Montana indicated that sage-grouse broods prefer relatively open stands of sagebrush during summer, generally with a canopy ranging from 1% to 25%. As palatability of forbs declines, sage-grouse move to moist areas that still support succulent vegetation.

Winter Habitat

Sage-grouse generally select relatively tall and large expanses of dense sagebrush during winter. Wintering areas in central Montana include sagebrush stands on relatively flat sites with a 10% to 30% sagebrush canopy coverage with a normal height relative to site potential. Areas exceeding 30% may provide important habitat during deep snow events (Montana Sage Grouse Work Group 2005). Table 3.1 shows total acres of crucial winter habitat. The areas are displayed on [Map J](#).

Black-Tailed Prairie Dog (Sensitive Species)

Lewis and Clark, while on their famous journey up the Missouri River in 1804, noted that this “wild dog of the prairie ... appears here in infinite numbers.” In the past, poisoning and loss of habitat reduced most prairie dog colonies to small, fragmented colonies. Together with plague, continued poisoning and unregulated shooting, the destruction and adverse modification of habitat may act upon fragmented populations to threaten the continued existence of the species.

In February 2004, the USFWS concluded that this species does not warrant listing under the Endangered Species Act. Several small prairie dog towns occur within the Monument. Total acreage for prairie dog towns is shown in Table 3.1.

Since 2002, the shooting of black-tailed prairie dogs occupying BLM land within the State of Montana is closed during the months of March, April and May. This seasonal prairie dog shooting closure does not apply to state or private lands.

Bald Eagle (Threatened Species)

Status and Distribution

In 1978, the USFWS designated the bald eagle an endangered species. The bald eagle was reclassified as a threatened species in 1995.

Life History and Habitat Requirements

Nest building, courtship and egg-laying usually take place in February through the middle of April. Hatching and rearing of young generally takes place from early May to mid-August. Fledging generally occurs from mid-June through mid-August. (BOR 1994).

Nests are generally located in forest stands larger than 3 acres with a moderately open canopy. Nests are generally located within 1.6 kilometers (one mile) of bodies of water that are generally at least 32 hectares (80 acres) in size. Territories and nests are usually used repeatedly, some for over 80 years (Magaddino 1989).

Wintering habitat includes perching and roosting sites located near open water or in areas with ample carrion (e.g., big game winter range). These sites are not as sensitive to human disturbance as nest sites; however, continual disturbance in wintering areas may result in displacement.

Reasons for Decline

Declines in bald eagle populations have been linked to poisoning, human disturbance, loss of nest trees (cottonwoods), shooting, and use of the pesticide DDT.

Occurrence

Three active bald eagle nests are known to occur. The Evans Bend nest site is located approximately 11 kilometers (7 miles) downstream of Fort Benton; the Loma nest site is approximately 1.6 kilometers (1 mile) southeast of the town of Loma; and the Little Sandy nest site is located approximately 5 kilometers (3 miles) downstream of Coal Banks Landing (BLM 1986a). A fourth nest was initiated in 2004 at the confluence of the Judith and Missouri Rivers, but failed before fledging occurred. Suitable habitat may exist to support additional bald eagle nests on the river, but as cottonwood galleries age and are not replaced, additional nesting sites may be limited or reduced in the future. In addition to the active nest territory, eagles are known to winter in the Monument, feeding primarily on fish, carrion and waterfowl.

Pallid Sturgeon (Endangered Species)

Status and Distribution

The USFWS listed the pallid sturgeon as an endangered species in 1990. The current distribution of the pallid sturgeon in Montana includes the Missouri River between the mouth of the Marias River and Fort Peck Reservoir. Populations in Montana are comprised entirely of old, large fish, as there is no evidence of successful reproduction in at

least 25 years (Gardner 2002). The Missouri River population is thought to be comprised of only 50 adult fish and a small number of young hatchery-reared individuals (Gardner 2002). Information is not available to indicate distribution in Arrow Creek.

Life History and Habitat Requirements

The preferred habitat of the pallid sturgeon is the bottom of large, swift, turbid, relatively warm, free-flowing rivers (USFWS 1993a; Aderhold 1996).

Reasons for Decline

The construction of dams on the Missouri River is believed to be the primary cause of the pallid sturgeon's decline. Pallid sturgeon recovery is in its initial stages and consists of protection of the gene pool by stocking hatchery-reared fish and re-creating the important spring pulse of the Marias River, an important tributary. Many of these fish still reach sexual maturity, but no evidence of successful reproduction has been documented since monitoring of the pallid sturgeon began in 1990 (USFWS 1993a).

Geology

The Monument is a triangular wedge of land lying between three island mountain ranges. At the north apex of the triangle is the Bears Paw Mountain Range, on the east side are the Little Rocky Mountains, and to the west side are the Highwood Mountains. All of these ranges are places where magma rose up from the mantle penetrating a 2-mile thick layer of sedimentary rocks at various times during the Tertiary period. Figure 3.1 is a geologic map of northcentral Montana.

Figure 3.2 shows the sedimentary formations exposed along the Missouri River channel, which is the central geographic feature of the Monument. The Little Rocky Mountains are made up of plutonic igneous rock types while both the Bears Paw and Highwood ranges resulted from volcanic eruptions forming fine grained rocks near, or on the surface. The Bears Paw Mountains were covered by extensive heavy basalt layers. Over time, these slid away from the uplift deforming the near surface sedimentary rocks. The Bears Paw Mountain Arch is surrounded by a jumble of tilted sections of rocks that are covered with slightly younger volcanics. Between the Highwood and Bears Paw Mountains sedimentary rocks are tilted and shot through by radiating dikes that, when eroded, form spires and walls of dark igneous rock that contrast with the lighter sedimentary layers they intrude. The gravity sliding produced a lot of the thrust faulting that formed the structural traps for natural gas that is discussed in the oil and gas section of this chapter.

Following the mountain building events, the volcanic cones and much of the sedimentary rocks surrounding the Bears Paw Mountains were stripped away by erosion. Pediment and terrace deposits were formed in the foothills from the eroded material. During the last glacial age (50,000 to 10,000 years ago) continental ice sheets descending from the north were deflected east and west by the Bears Paw Mountains. The ice dammed the northward flow of the Missouri River and resulted in the formation of a new channel draining to the east into the Musselshell Valley and thence south to the Gulf of Mexico. It is this younger portion of the Missouri River channel that forms the area known as the Missouri Breaks.

Caves and Karst Resources

The Federal Cave Resources Protection Act of 1988 requires the BLM to document any cave or karst resources on BLM land. The geology within the Monument does not lend itself to the formation of caves, and there are no known sites within the Monument.

Locatable Minerals

Mineralization has been found associated with the veins and fracture zones near the margins of igneous dikes and intrusions. Over the years, the U.S. Geological Survey and the former U.S. Bureau of Mines examined various prospects and reported finding deposits that contain values for copper, lead, zinc, zeolites, uranium, niobium, zirconium, thorium, titanium, sulfur, tantalum, beryllium, lanthium, cerlum and vermiculite. These occurrences are estimated to be unrecoverable and marginal in value. Minor amounts of placer gold were discovered in gravel beds of coulees flowing out of the mountain areas. These were soon depleted and abandoned.

Some unique exposed igneous intrusions are up to a city block in size. The rock type resembles the material associated with the diamond-bearing kimberlite diatremes found in Africa and other places in the world. True kimberlite was found in Phillips County, but no diamonds have been discovered. Diamonds are extremely rare in outcrops of kimberlite. Sixty-three lode claims are located on these features (see diatremes on Figure 3.1). Surface sampling for indicator minerals of potential diamond-bearing zones and geophysical mapping have been conducted at these claims over the years, but no drilling or bulk sampling has been conducted. A recent discovery of diamonds in the Northwest Territory of Canada has increased interest in these deposits; however, any future plans to further explore the potential of these claims would be subject to the adjudication of valid existing rights that existed before the Proclamation date. No production of hardrock minerals is presently occurring. Table 3.2 lists unpatented mining claim locations.

Figure 3.1
Geology of Northcentral Montana

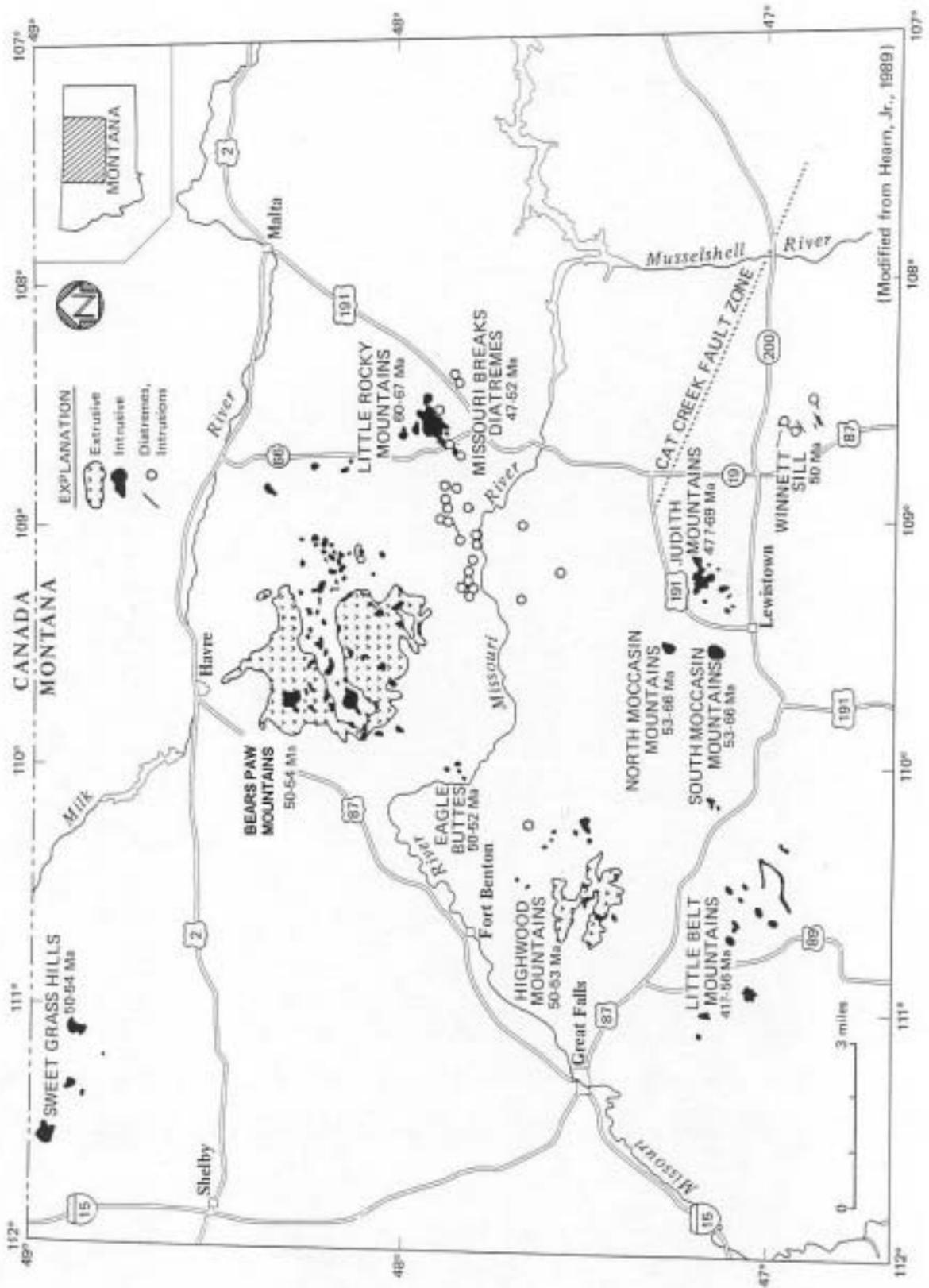


Figure 3.2
Geologic Formations

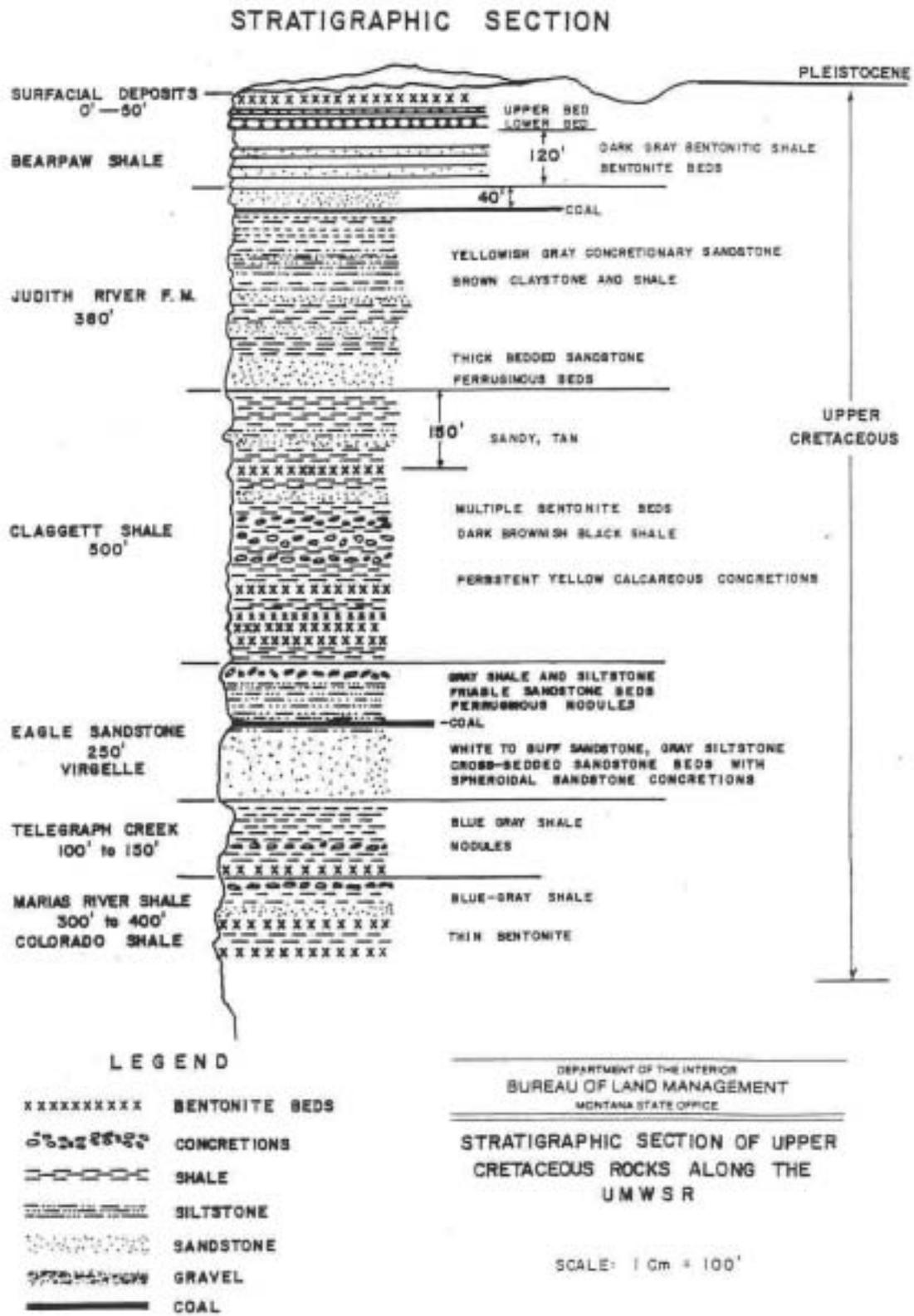


Table 3.2 Unpatented Mining Claims	
<i>General Location of Claims</i>	<i>Number of Claims</i>
Blaine County	
T24NR19E	10
T24NR20E	25
T24NR21E	10
T24NR22E	5
T25NR21E	3
T25NR22E	2
Phillips County	
T24NR22E	1
T24NR23E	7
Total	63

Source: (BLM 2004b)

Solid Leaseable Minerals (Bentonite, Expandable Clay, Coal)

Three formations are known to carry thick layers of bentonite in the area: the Colorado, Claggett, and Bearpaw Shales (Figure 3.2). Near the top of the Colorado Shale, bentonite has been exposed in the Bears Paw Mountains. The beds are located in the Marias River Formation and range upward to 18 inches thick. The younger Claggett Shale Formation also contains bentonite beds in the lower one-fifth of the formation. Similarly, these have a maximum thickness of 18 inches. The youngest formation, Bearpaw Shale, contains bentonite beds in the lower one-third of the 1000-foot section. Exposures of bentonite are found along Sand Creek in Section 5, T25N R17E. In the Al's Creek area in Section 32, T26N R20E, several beds appear to be at least 2 feet thick.

No bentonite mining activity is presently occurring in the area. Locally, bentonite has probably been mined to line canals, stock ponds and reservoirs in the area. No leases or mining claims exist for these deposits.

Generally, expandable clay was found to occur throughout the area in the Bearpaw Shale Formation, and ceramic and brick clay in the Judith River Formation. The same area as that for bentonite may be considered an area for expandable clay (lightweight aggregate); also, the same area as that for coal (Judith River Formation) may be considered for brick and ceramic clay (Figure 3.2).

Coal occurs in the sedimentary rocks of the Upper Cretaceous Eagle, Judith River and Hell Creek Formations, and in the Fort Union Formation of Tertiary age. The most continuous beds are found in the Fort Union Formation, which does not exist in the Monument.

During the steamboat era, and later when numerous homesteads were located on these lands, some small underground coal mines were developed to satisfy fuel needs. These were all abandoned by the 1930s and no coal activity is present today. The limited reserves of this area, combined with high transportation costs and abundance of higher BTU-content coals in the Powder River Basin, Fort Union Basin and Alberta, Canada, make it appear very unlikely that this area will be of any competitive interest in the future.

Saleable Minerals (Sand and Gravel and Quarry Rock)

Supplies of sand and gravel can be found in the area from deposits of water-worked till, in stream gravels and river terraces, and in glacial deposit features, eskers and kames. No active pits or quarry sites currently exist.

Paleontology

The Cretaceous age sediments exposed along the Missouri River Breaks are both marine and terrestrial sediments that contain fossil remains ranging from large vertebrates to extensive shell beds. Several publications on these specimens attest to the importance of the area.

The first dinosaur bones described from North America were collected from the region by a government survey in the mid-1800s. Most of the specimens were transported downriver on steamboats and eventually shipped overseas and are now housed in European museums.

More recent researchers broadened their focus to include a variety of fossil groups. For example, during the 1970s the Missouri River Breaks hosted researchers interested in mammal and shark systematics and evolution. In 1984 and 1985, a paleontological inventory was conducted in the UMNWSR. The results of that inventory identified several sites where terrestrial bone beds and marine fossil remains occur. The area surrounding the river inside the Monument has not been inventoried. These lands have high potential to yield significant finds of both terrestrial and marine fossil assemblages.

Soils

Soils developed primarily from sedimentary bedrock (approximately 70%) that was deposited during the Upper

Cretaceous periods and from lesser amounts of glacial till (approximately 5%) and mixed alluvium (approximately 25%). Soils are generally fine textured, well drained and slowly permeable. Landforms range from broad rolling ridges to steep (20% to 60% slope) or very steep (>45% slope) dissected valley walls. These sedimentary break landforms were formed as a result of the Missouri River being rerouted by continental glacial activity during the Pleistocene Epoch.

Detailed soil surveys have been published by the Natural Resources Conservation Service (NRCS) for Blaine-Soil Survey Area (SSA) 608 (USDA-NRCS, 1986), Choteau-SSA 615 (USDA-NRCS, 2003), Fergus-SSA 027 (USDA-NRCS, 1988) and Phillips-SSA 641 (USDA-NRCS, 2004). These soil surveys were performed by the NRCS according to National Cooperative Soil Survey standards and were done at the second and third order of detail. Pertinent information for review and analysis is from the published Soil Surveys and the National Soils Information System (NASIS) database for the area. For each soil mapping unit, interpretive ratings and soil characteristics are provided that can be used for general land-use planning and management. Soil investigations should be done at the site-specific level to determine the suitability of soils at specific locations.

[Appendix M](#) lists the Soil Survey Geographic (SSURGO) soil mapping units on BLM lands, including acreages. The soils map is available on the BLM website at http://www.blm.gov/nhp/spotlight/state_info/planning.htm. For each soil series, general soil characteristics and associated ecological sites are listed. Those series with severe water or wind erosion hazards, hydric soil or prime farmland soil are noted on the table.

Severe water erosion hazards for each Soil Mapping Unit (SMU) were identified using the k-factor, T factor, permeability and slope percentage assigned to each SMU. These values are available in the soil characteristic tables in the soil surveys, published by the NRCS. The k-factor is the soil erodibility factor which quantifies the susceptibility of erosion. The T factor is the maximum average rate of erosion at which the quality of a soil as a medium for plant growth can be maintained. The rate is in $\text{tons} \cdot \text{acre}^{-1} \cdot \text{year}^{-1}$. SMUs with a k-factor of .32 and greater and slopes greater than 15% are considered to be susceptible to water erosion when soils are devoid of vegetation and bare. Using these criteria, there are approximately 309,320 acres, or approximately 83%, identified as being susceptible to severe erosion on BLM land.

Severe wind erosion hazards for each SMU were identified by using the Wind Erodibility Group (WEG) assigned to each SMU. WEG is a grouping of soils that have similar properties affecting their resistance to soil blowing. Soil texture, organic matter content, calcium carbonate percent-

age, fragment content and aggregate stability are the most important properties with respect to soil blowing. There are nine groupings: 1, 2, 3, 4, 4L, 5, 6, 7 and 8. The lower the number, the greater the risk of wind erosion. These groupings are also available in the soil characteristic tables in the Soil Surveys, published by the NRCS. SMUs with a WEG of 4L and less are considered susceptible to wind erosion. Wind erosion increases when vegetation is removed and soils are bare.

Sedimentary Soils

Sedimentary soils developed in clayey, calcareous or acid shales, siltstones and sandstones of the Bearpaw, Judith River, Clagget and Eagle Sandstone Formations. These soils are fine textured, high in smectitic 2:1 clays, and very shallow (<10 inches) to moderately deep (20 to 40 inches). Where high sandstone ridges occur, soils are loamy or sandy. These sedimentary soils are highly erosive because of their steep to very steep (20% to 65%) slopes and extreme physical properties such as high clay content, slow permeability, very high surface runoff, relatively shallow depth to bedrock and sparse vegetative ground cover. Soils are generally low in organic matter and high in sodium and soluble salts.

Active geologic erosion is observed throughout the Monument. This process can be accelerated by surface disturbance, especially on steep and very steep slopes when the protective vegetative cover is removed. Soil erosion is a natural process that occurs on all land surfaces. Soil erosion should only be viewed as detrimental when the rate of erosion decreases site productivity or when water quality is degraded. Mass soil movement is also a naturally occurring process; it too can be accelerated by surface-disturbing activities (cutting roads into hillsides dominated by clays over shale). Soil rutting and compaction become severe during moist and wet soil conditions. Rutting hazards are high due to the low soil strengths.

Glacial Till Soils

These soils are located on nearly level to rolling (1% to 15%) slopes and are typically very deep (>60 inches). Textures are loamy to clayey. Erosion is slight to moderate due to the relatively gentle rolling topography, short slope lengths and prominence of dense sod-forming vegetation. When disturbed, water and wind erosion hazards increase.

Alluvial Soils

These soils are on nearly level to undulating (0% to 8%) slopes along floodplains, stream terraces, alluvial fans and footslopes. They are important because of their high vegetative production potential. Soil properties are variable and can differ over short distances. These soils range

from sandy to clayey, poorly drained to well-drained, and slightly to severely erosive. Erosion increases when soils are compacted and vegetative cover is disturbed. Hydric soils exist, although they are not extensive. Hydric soils are defined as soils that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil (Federal Register, 1994).

Prime Farmland

The BLM land includes 2,319 acres of prime farmland soil mapping units (designated by the USDA-NRCS). Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks. Its soils are permeable to water and air. Prime farmland is not excessively eroded or saturated with water for long periods of time, and it either does not flood frequently during the growing season or is protected from flooding (USDA-NRCS, 2003).

Sedimentation

Natural geologic erosion is accelerated when a geomorphic threshold is exceeded. The threshold most often exceeded is destruction of vegetation/ground cover. The Missouri River above Fort Peck dam drains the entire Breaks region. Sediment studies conducted in Fort Peck reservoir revealed a 298% increase in average annual sediment load over the past thirty years (Corps of Engineers 1989). The increase may be an indication that the vegetation/ground cover threshold is being exceeded. Though the Monument is only a small fraction of the watershed that drains into Fort Peck reservoir, it is still a highly erosive landscape that can be contributing to sedimentation of the Missouri River and Fort Peck reservoir.

Vegetation – Native Plants

Vegetation is a mixture of communities from the northern prairies and plains to the badland Breaks. Variability in geology, topography, soils, and effective precipitation lead to a complex mosaic of different vegetation communities and transitions between communities. In addition, influences of fire (or lack of fire), animal populations, and management practices have led to varying successional levels within plant communities.

Forest and Woodlands

The four main forest types are: Douglas-fir, juniper, ponderosa pine and mixed hardwoods.

Douglas-fir is commonly found on the cooler and wetter aspects (northerly and easterly).

The juniper forests are found mostly on dry, rocky sites.

The ponderosa pine forest exists in scattered pockets throughout the Monument on all aspects and elevations. These forests are considered more savanna types, rather than open forest, with the break point being sites that are not capable of producing at least 25% canopy coverage.

The mixed hardwoods, known as riparian forests, are characterized with stands of cottonwoods, aspen, chokecherry and box elder. See the Vegetation - Riparian section of this chapter for a more complete description of riparian communities.

Rangelands

Badlands

Much of the Monument consists of badlands and Breaks. The Breaks consist of steep, rugged topography interspersed with benches and rolling hills. Badlands support little vegetation because of steep terrain, shale and rock outcroppings, and the abundance of heavy clays.

Grassland Communities

Grassland communities are found on a variety of sites. Common species include western and thickspike wheatgrass, needle-and-thread grass, bluebunch wheatgrass, green needle grass, Sandberg bluegrass, plains reed grass, inland salt grass, blue grama, prairie junegrass, and threadleaf sedge.

Sagebrush/Grassland

Sagebrush/grassland communities occur throughout the Monument on ridges and slopes. The conspicuous species is Wyoming big sagebrush with wheatgrasses, but also include silver sagebrush, rabbit brush, needle grasses, blue grama, fringed sagewort and other mixed prairie species. These communities are in various successional stages from influences of wildlife, livestock, fire (or lack of), and human activities. They account for most of the forage resources that wildlife and livestock use.

Other adapted shrubland communities occur in areas where particular site characteristics are present.

Where soils are of better quality and soil moisture conditions are favorable, woody draw shrubland communities exist. These communities include chokecherry, currant, buffalo berry, and snowberry. These communities are particularly important to wildlife species.

Crops

The farming of crops is authorized in three locations on BLM land. Under a special use permit, some farming occurs on approximately 650 acres of 1,300 acres acquired by BLM in the Loma area that is part of an upland bird project. In the benchlands upriver from Steamboat Rock and outside of the UMNWSR, some old agricultural trespass has occurred (approximately 100 acres) on BLM land. This area is being prepared for re-establishment of perennial native species. At the James Kipp Recreation Area, 45 acres are farmed as part of a weed management program. With these exceptions, no farming occurs on BLM land.

Standards for Rangeland Health, especially Standards 1, 2 and 5, directly correlate to vegetation. A detailed description of the Standards for Rangeland Health is found in [Appendix H](#).

Threatened, Endangered, and Sensitive Plant Species

No populations of federally listed plant species are found in the Monument. However the Montana Natural Heritage Program lists hot spring phacelia (*Phacelia thermalis*), subterranean Indian breadroot (*Pediomelum hypogaeum*) and persistent-sepal yellow-crest (*Rorippa calycina*) as plant species of concern in the area of the Monument.

Vegetation – Riparian

Wetlands are transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following attributes: (1) at least periodically, the land predominantly supports hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season each year (BLM 1986b).

Riparian areas are those areas within wetlands geographically delineated by distinctive resource values and characteristics that are comprised of aquatic and riparian ecosystems. Riparian areas may be associated with lakes, reservoirs, estuaries, potholes, springs, bogs, wet meadows, and ephemeral, intermittent, or perennial streams. Hansen (1989) described approximately 8,000 acres of riparian

habitat existing along the Missouri River in the Monument area.

Vegetative species common to riparian areas vary widely from site to site. [Appendix N](#) lists the more common species which occur in riparian areas.

Riparian communities along the perennial drainages and larger intermittent streams are often dominated by cottonwood and willow with occasional stands of green ash and box elder. The understory often consists of woody plants such as chokecherry, buffalo berry, sumac, currant, grasses, and forbs. The higher terraces adjacent to the floodplains are often dominated by silver sage or greasewood with a grass understory.

Many of the wildlife species found in the Monument area spend part or all of their life cycle in these riparian areas (Hansen, 1989). Riparian areas also protect the soil from erosion and trap runoff to release later as streamflow. Their importance cannot be overemphasized.

Vegetation within riparian areas is utilized mainly by livestock, mule deer, whitetail deer, elk, and ringnecked pheasants. This vegetation type is the primary habitat on BLM land for whitetail deer, mourning doves, and pheasants due to its dense understory. These riparian areas are extremely important for neo-tropical and other migratory birds (Scott, et al., 2003). Many migratory birds are present in this type. In fact, a wider diversity of non-game species occurs within this vegetation type than in any other.

The riparian areas generally are not meeting BLM's goals of proper functioning condition. Riparian areas along the Missouri River are being impacted by flow regulation from upstream dams and continuous hot season grazing. Riparian areas on the tributaries to the Missouri River are being impacted by irrigation withdrawals and continuous hot season grazing. Riparian areas that are affected by upstream dams and irrigation diversions outside the Monument may never be able to achieve proper functioning condition.

Recent studies by the U.S. Geological Survey (Scott and Auble, 2002 and Scott and Auble, 1998) and Hansen (1989) show a significant lack of regeneration of cottonwood, willow, and understory species on the Missouri River. From Coal Banks Landing to Woodhawk Campground, no sapling or pole stage cottonwoods occur on BLM land bordering the Missouri River except on islands. These studies indicate the major factors affecting regeneration are flow manipulation by upstream dams on the Missouri River and continuous hot season use by livestock.

Hansen (1989) suggests that one acre of seedling/sapling/pole stage cottonwood trees be present for every acre of mature trees to maintain the current status of mature trees.

Less than this one-to-one ratio indicates that if current trends continue, there will be a reduction in the acres of mature cottonwoods in the future. On all land (BLM, state and private) in the wild and scenic segments of the Missouri River, there are presently 4,450 acres of seedling/sapling/pole cottonwoods and 5,893 acres of mature cottonwoods. On just the BLM land in this stretch, the ratio of replacement cottonwoods to mature cottonwoods appears to meet the criteria of the one-to-one ratio. However, the reach of the Missouri River from mile 41 to mile 127 has no sapling/pole stage cottonwoods except on islands.

This discussion examines the current status of cottonwoods on the wild and scenic segments of the Missouri River. It does not consider the acres of cottonwoods removed by past practices such as agriculture, intense grazing, or wood cutting. Therefore, the total acres of cottonwoods currently found along the Missouri River represents a fraction of what would be there if these past human-induced disturbances had not occurred. Hansen (1989) estimates that approximately 50% of the acres occupied by cottonwoods at the time of the Lewis and Clark Expedition are now gone.

Vegetation – Noxious and Invasive Plants

The Monument has seen a significant increase in the amount and distribution of noxious weeds and invasive plants along the Missouri River and many of its major tributaries in the past two decades. Efforts to control noxious weeds along the river have included herbicide treatments, hand pulling, and prescribed fire treatments used to increase the effectiveness of herbicides and enhance the establishment of biocontrol agents, which have been released to control a wide variety of weed species.

From 1999 to 2002, the BLM surveyed the UMNWSR and found that every river bottom has at least one noxious or invasive plant established. In total 19 noxious/invasive plant species occupy over 550 acres. The noxious and invasive weeds map is available on the BLM website at http://www.blm.gov/nhp/spotlight/state_info/planning.htm.

River bottoms and cut banks contain the majority of infested acres. This is attributed to the many natural disturbances common with river systems such as: flooding, ice jams/scouring, and fluctuating surface water levels. These areas are also well used by livestock, wildlife, and people that can potentially create additional disturbance and/or supply noxious/invasive plant seed from other areas.

All of the recreational use areas within the UMNWSR are infested with at least three species of noxious/invasive plants. These areas are at further risk with the potential for movement of seed and plant material from site to site in the clothing, gear, and pet fur of the many visitors to these sites.

The potential for the introduction of noxious/invasive species that are not currently present is also greater at these sites due to human activities. See [Appendix O](#) for a list of noxious/invasive plant species at recreation sites.

Although documented infestations occur in a few areas, most of the upland areas are relatively free of noxious/invasive plants. Areas in these off-river sites that would be most at risk for invasion or may currently be infested are: roads, trails, wildlife/livestock gathering areas, riparian areas associated with springs or non-perennial streams, areas that see measurable recreational use and any areas experiencing natural or manmade disturbance.

All six of the Wilderness Study Areas (WSAs) have infestations of several species of noxious/invasive plants. Most of these infestations are along areas near the Missouri River. Upland portions of these areas are monitored regularly as required by the Interim Management Policy and Guidelines for Lands Under Wilderness Review (BLM Handbook H-8550-1).

Many non-native plant species occur and are commonplace across the State of Montana. Many of these species are considered naturalized plant species. These species have a very wide distribution in the United States and some are found throughout the world. Most of these plants have undesirable qualities, but are so widespread that they are tolerated in most management practices. Some examples include yellow sweet clover, Kentucky bluegrass, timothy, smooth brome, crested wheatgrass, and Kochia.

Visual Resources

The original inventory of visual resources was completed in two phases. The area mostly south of the Missouri River was done in 1979 with the Missouri Breaks Environmental Impact Statement (EIS) (BLM 1979). The visual data for the remaining area north of the Missouri River was associated with the Prairie Potholes EIS project in 1982 (BLM 1982). Both of these projects were located within what was formerly the Lewistown District Office.

The inventory was undertaken to evaluate the visual characteristics of land, water surface, vegetation, and structures which provided the subsequent delineation of scenic quality, sensitivity to changes in the visual landscape, and distance zones. These three categories were factored together in a matrix (BLM Manual 8410) to determine Visual Resource Management (VRM) Classes I through IV for individual geographical areas. The VRM Class I areas are the most restrictive and Class IV areas are the least restrictive. Table 3.3 shows the total acres for each class.

A new visual resource inventory for the VRM Class III and IV areas in the Monument was completed in 2004. This

new inventory is addressed in Chapter 2 through alternatives for changing the current VRM classes.

<i>VRM Class</i>	<i>Acres</i>
Class I	61,700
Class II	118,800
Class III	8,200
Class IV	186,300

VRM Class I

The VRM Class I areas include the wild segments of the Missouri River. A VRM Class I rating is intended to preserve the existing character of the landscape. It provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention to the casual observer.

This visual category includes 61,700 acres, or 16% of the BLM land. It includes the Bodmer¹ cultural landscape areas in the UMNWSR.

VRM Class II

The VRM Class II areas are associated with the Scenic and Recreational segments of the Missouri River, the lower portions of the Arrow Creek and Judith River watersheds, Black Coulee west of Ragland Bench, and the six WSAs (Dog Creek South, Stafford, Ervin Ridge, Woodhawk, Cow Creek, and Antelope Creek). The VRM Class II rating is intended to retain the existing character of the landscape. Management activities may be seen but should not attract the attention of the casual observer (viewer). The level of change to the characteristic landscape should be low. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the landscape.

This visual category includes 118,800 acres, or 32% of the BLM land.

VRM Class III

The VRM Class III areas are found in the uplands portion of the Monument. This rating is intended to partially retain the existing character of the landscape. Management activities may attract attention but should not dominate the view of the casual observer. The level of change to the characteristic landscape should be moderate. These changes should repeat the basic elements found in the predominant natural features of the area.

This visual category includes 8,200 acres, or 2% of the BLM land.

VRM Class IV

The VRM Class IV areas are also found primarily in the uplands portion of the Monument. This rating provides for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention.

This visual category includes 186,300 acres, or 50% of the BLM land.

Water

Ground Water

Ground water occurs in unconsolidated materials (alluvium, glacial outwash, or terrace deposits) and in consolidated rocks such as sandstones, shaley sandstones, coal, limestone, or igneous rocks.

Most of the BLM land along Arrow Creek and the Judith River lies above the floodplains on the Cretaceous age shales. No shallow aquifers are present for ground water development.

The Missouri River in the Monument area is a young river system in geologic terms. Floodplains are poorly developed or absent, reducing potential for ground water development. The adjacent Breaks are in the Bearpaw shale. The Bearpaw shale contains thin, widely scattered and isolated

¹ Karl Bodmer accompanied the expedition of Prince Maximilian in 1832-34 to gather information about lands acquired in the Louisiana Purchase and its people. Bodmer's role was to record the journey through illustrative drawings of the sites and people encountered along the way. The Bodmer landscapes are fan-shaped viewsheds associated with the illustrative drawings. The expedition traveled upstream on the Missouri River from St. Louis to Fort McKenzie (located between present-day Loma and Fort Benton, Montana).

sandstone stringers. Yields are seldom large enough for well development (less than 2 gallons per minute (gpm)), but several small springs and seeps do occur in the deeply incised drainages. Water quality is poor, with total dissolved solids (TDS) generally too high for domestic or livestock use.

The Breaks region is underlain by the Judith River and Eagle sandstones. Depths from the surface to these aquifers range from 700 to 2,500 feet. Most wells in these formations flow at the surface yielding 2 to 60 gpm. Water quality is suitable for livestock but generally not for domestic use.

Occasionally, aquifers are present at the contact between terrace gravel deposits and the underlying Bearpaw shale. These aquifers usually appear as low yield springs and seeps (less than 2 gpm) on hillsides above drainages. Water quality is generally suitable for livestock but not for domestic use.

No other shallow aquifers (less than 500 feet) exist.

Surface Water

Streamflow volumes differ greatly. Flows in all unregulated streams have large seasonal variations, with the largest flows generally occurring during the spring or early summer as a result of snowmelt and rainstorms. The Missouri and Judith Rivers are the only perennial streams in the Monument. Table 3.4 lists the perennial and intermittent streams. Numerous ephemeral streams also exist but flow only in response to snowmelt or intense summer storms.

Peak flows on prairie streams from snowmelt occur in March or April. Larger peak flows on small drainages can occur from intense summer thunderstorms, but generally not on an annual basis. Summer rainstorms can result in short intervals of increased streamflow during June through August.

During winter, streamflow in prairie streams is greatly reduced or absent as a result of little ground water inflow and ice formation.

Most precipitation is transpired, evaporated, added to soil moisture, or added to the supply of ground water. Average annual runoff is approximately 0.5 inches. Average annual precipitation ranges from 12 inches in the eastern part of the Monument to 14 inches in the western portion of the Monument (SCS 1977).

Surface water quality is variable depending on the geologic formations through which the water has passed and the volume of flow in the stream. Dissolved solids are derived primarily by the leaching of soluble minerals from soils and geologic formations underlying the drainage basin. The dissolved solids are composed largely of the cations calcium, magnesium, and sodium, and the anions bicarbonate, sulfate, and chloride.

Variations in the dissolved-solids concentration and composition in streams result primarily from changes in the amount and source of streamflow. During low flows, water in the streams is derived mostly from ground water sources and will reflect the dissolved-solids concentration and water type of contributing aquifers. During high flows, most of the water entering the streams is from precipitation

Table 3.4
Perennial and Intermittent Streams

<i>Name</i>	<i>Stream Status</i>	<i>Total Miles</i>	<i>No. Miles on BLM Land</i>	<i>Percentage on BLM Land</i>
Judith River	Perennial	10.4	0.4	4%
Missouri River	Perennial	149	68	46%
Antelope Creek	Intermittent	14	6	40%
Arrow Creek	Intermittent	18	1.3	7%
Bull Creek	Intermittent	15	14	91%
Bullwhacker Creek	Intermittent	21	21	100%
Cow Creek	Intermittent	32	9.5	30%
Dog Creek	Intermittent	7	2	29%
Squaw Creek	Intermittent	10	10	100%
Woodhawk	Intermittent	13	12	98%

runoff. The relatively short period of time that the runoff is in contact with the soils of the basin provides little opportunity for the dissolution of minerals. Consequently, the increased volume of water during high flows reduces the dissolved solids concentration by dilution.

In addition to streamflow variability and geology, other factors that affect the dissolved solids concentration of a stream include irrigation return flows, saline seeps, and water losses from evapotranspiration. Dissolved solids concentrations during low flow range from 1,500 to 3,500 milligrams per liter (mg/l). At high flows, concentrations range from 500 to 1,300 mg/l. The predominant ion in these prairie streams is sodium sulfate.

Streams in the Monument area normally exhibit a pH between 6.5 and 8.5, typical of well-buffered natural waters. Most streams have generally large alkalinities, which provide a buffering capacity that prevents large changes in pH from persisting far downstream. Because of the near-neutral pH, concentrations of dissolved trace elements rarely exceed water quality standards.

Water Rights

The BLM will apply for water rights to water sources on BLM land under the same regulations as all other appropriators. The State of Montana began adjudicating water rights in the early 1980s. The BLM filed claims on all existing water developments and natural sources (springs, pot holes, lakes, etc.) occurring on BLM land. Table 3.5 lists water developments by type and quantity.

<i>Description</i>	<i>Quantity</i>
Pipeline (miles)	35
Reservoirs	95
Springs	4
Stock Tanks	32
Water Savers/Catchments	14
Wells	7

The BLM and the State of Montana entered into a compact for instream flow reservations on the 149-mile stretch of the Missouri River that comprises the UMNWSR. The compact recognized all valid, existing rights prior to December 31, 1987 and created an “available water supply,” which is the volume of surface and ground waters available to meet the state’s projected demands. All depletions from appropriations completed after December 31, 1987, shall be

subtracted from the available water supply. The state will not subtract from the available water supply groundwater uses of 35 gpm or less, not to exceed 10 acre-feet per year, and surface water appropriations of 35 gpm or less, not to exceed 10 acre-feet per year for domestic use.

The Monument Proclamation establishes a reserved water right for the Judith River and Arrow Creek. The BLM is currently developing a strategy to address the reservation. The reserved water rights process generally takes several years to complete. The reservation process will not be completed within the time frame of this plan.

Water Quality Impaired Streams – 303(d) List of Impaired Streams

The Environmental Protection Agency, in administering the Clean Water Act, requires all states to identify rivers, streams, lakes, and wetlands where beneficial uses are impaired or threatened by human activity, and to schedule those waters for development of water quality restoration plans. This process is known as the Total Maximum Daily Load (TMDL) process. Table 3.6 lists the impaired streams within the Monument that are on the Montana Department of Environmental Quality (DEQ) 2002 Draft 303(d) list.

Forest Resources

Forest Types

Four main forest types exist throughout the Monument area: ponderosa pine, Douglas-fir, juniper, and mixed hardwoods.

The ponderosa pine forest exists in scattered pockets on all aspects and elevations. Its ability to survive in this harsh environment is due, in part, to an aggressive tap root system. These forests are considered more “savanna” types rather than open forest, with the break point being sites that are not capable of producing at least 25% canopy coverage.

The Douglas-fir type is commonly found on the cooler and wetter aspects (northerly and easterly). The Monument area represents some of the driest sites that are still capable of growing Douglas-fir. Trees that do survive are very slow growing and short in comparison to Douglas-fir that occurs in mountainous regions of central Montana.

The juniper forests are found mostly on dry, rocky sites. These stands are not capable of producing 20 cubic feet per acre per year of wood fiber and, therefore, are not typically thought of as coniferous forests by themselves. They commonly occur with the ponderosa pine and Douglas-fir forests.

**Table 3.6
Water Quality Impaired Streams**

<i>Water Body</i>	<i>Probable Impaired Use</i>	<i>Probable Cause</i>	<i>Probable Source</i>
Armells Creek	Aquatic life support	Metals, pH	Resource extraction, subsurface mining
Arrow Creek	Aquatic life support, recreation, warm water fishery, drinking water supply, swimmable, agriculture	Flow alteration, nutrients, other inorganics, salinity/TDS/chlorides	Agriculture, irrigation, natural
Bullwhacker Creek	Recreation, warm water fishery, drinking water supply, agriculture	Salinity/TDS/chlorides, suspended solids	Agriculture, natural
Coffee Creek	Aquatic life support, warm water fishery, agriculture, drinking water supply	Nutrients, other inorganics, salinity/TDS/chlorides	Agriculture, natural
Dog Creek	Drinking water supply, agriculture	Other inorganics, salinity/TDS/chlorides	Agriculture, natural
Eagle Creek	Warm water fishery, aquatic life support, cold water fishery	Flow alteration, siltation	Agriculture, irrigation, range land
Fargo Coulee	Aquatic life support	Other habitat alterations	Agriculture, range land
Judith River	Aquatic life support, cold water fishery	Nutrients, siltation, suspended solids, other habitat alterations	Agriculture, irrigation, range land, silviculture
Missouri River	Warm water fishery, aquatic life support	Nutrients, other inorganics, pathogens, salinity/TDS/chlorides, suspended solids	Agriculture, irrigation, streambank modification
Sourdough Creek	Warm water fishery, aquatic life support	Other habitat alterations	Agriculture, range land
Two Calf Creek	Warm water fishery, agriculture, recreation, drinking water supply	Metals, nutrients, salinity/TDS/chlorides, suspended solids	Domestic waste water lagoon, natural

The mixed hardwoods, known as riparian forests, are characterized with stands of cottonwoods, aspen, chokecherry and box elder. These forests tend to be along the main river bottoms and wetter drainages feeding into the Missouri River. Disturbance is common in these forests due to a high site index leading to greater growth potential for all plants. The truly undisturbed sites exist mainly on islands that have not experienced recent fire.

State of Montana Forested Land

The Montana Department of Natural Resources and Conservation (DNRC) conducted an inventory on approximately 8,200 acres of state-owned forested land that falls within the Monument (BLM 2003b). Considering the random nature of the forested portions of state and BLM land, this inventory serves as an adequate random sampling of forested acres for BLM land.

Lands and Realty

The Monument contains those lands in north Fergus County adjacent to the Missouri River including the Armells Creek and Judith River drainages; southeast Chouteau County along the Missouri River and Arrow Creek drainages; south Blaine County along the Missouri River as well as the Lone Tree Bench, Cow Creek and Bullwhacker drainages; and southwest Phillips County including the Cabin Creek, Bull Creek and Antelope Creek drainages. The majority of the large blocks of BLM land are east of the Hole-in-the-Wall area and along Arrow Creek. At about the Ervin Ridge area, the BLM land is concentrated over a much wider area, especially on the north side of the river where it extends beyond the river over 15 miles in places. Land ownership in the Monument area is comprised of federal, state and private land (Table 3.7). The BLM has no jurisdiction over state or private land and these lands are not part of the Monument. Access in and to this area is dependent on the weather as roads can be impassable when it rains.

Access

Access to and within the Monument is provided to the public and private landowners alike by means of BLM roads, BLM easements across private land, state highways, and county roads. In addition, some private landowners have applied for and received rights-of-way (ROWs) across BLM land where needed to access their private land.

The 25 ROWs that currently exist are for roads and highways, electric lines, telephone lines, oil and gas pipelines, a communication site, and water-related facilities such as dams and ditches. See [Appendix P](#) for a list of the ROWs.

Land Ownership Adjustment

Since the UMNWSR was designated a Wild and Scenic River in 1976, over 6,800 acres of privately owned land and interest in land (conservation easements) have been purchased from willing sellers using the Land and Water

Conservation Fund. This Fund and land exchanges continue to be viable options for consolidating BLM land within the Monument.

Livestock Grazing

Currently, 93 livestock operators are licensed to graze within the Monument. These operators use 116 allotments and harvest about 38,000 Animal Unit Months (AUMs) of forage annually ([Appendix Q](#)). Cattle are the most prevalent class of livestock, although horses also graze some BLM land. Permitted horse use levels are very small in comparison to permitted cattle use.

A wide range of management approaches are practiced among the permittees that graze livestock. Some grazing permits are held by producers that are primarily involved in farming. In these cases, livestock are often grazed on BLM land during the summer and on private land stubble fields in the fall and winter. In some cases, small isolated tracts of BLM land are grazed in conjunction with private land because the intermingled land ownership pattern and terrain make it difficult to manage the BLM land separately from private land. In other cases, large blocks of BLM land are authorized to producers that are primarily involved in ranching. The larger blocks are usually managed under a grazing prescription that is outlined in a watershed plan or an allotment management plan that include private and state land and BLM land inside and outside of the Monument.

In 1997, an Environmental Impact Statement was written to implement Standards for Rangeland Health and Guidelines for Livestock Grazing Management. These Standards and Guidelines ([Appendix H](#)) were developed with assistance from the Central Montana Resource Advisory Council, local ranchers, and Montana State University. The Standards are ecologically based and focus on the structure, function, and health of the entire rangeland ecosystem. The Standards are divided into five categories: upland, riparian, water quality, air quality, and biodiversity (BLM 1997). Prior to the development of Standards for Rangeland Health,

Table 3.7
Land Ownership in the Monument Area

<i>Surface Ownership</i>	<i>Blaine County Acres</i>	<i>Chouteau County Acres</i>	<i>Fergus County Acres</i>	<i>Phillips County Acres</i>	<i>Total Acres</i>
Monument	150,239	40,386	131,355	52,683	374,663
State	9,509	5,146	20,823	3,304	38,782
Private	9,310	25,807	40,852	3,777	79,746
Total	169,058	71,339	193,030	59,764	493,191

rangeland management specialists focused primary on plant species composition and soil surface characteristics to determine rangeland condition.

Guidelines for Livestock Grazing Management describe grazing management methods and practices that are essential to the proper management of livestock on BLM land. In many ways, the guidelines are similar in approach to the Best Management Practices (BMP) developed by the State of Montana for various activities. A detailed description of the Guidelines for Livestock Grazing Management can be found in [Appendix H](#).

Beginning in 1997, the BLM began assessing Standards for Rangeland Health and implementing guidelines for livestock grazing on a watershed basis in the Monument area. Eight watershed and grazing permit renewal areas were delineated and are in various stages of implementation. The rate of response to implementation actions prescribed in the plans varies depending on several variables including: site potential, off-site influences, weather, timeliness of project installation (when needed), livestock grazing, effectiveness of weed control measures, wildlife use, recreation use, etc. Where management actions have been implemented that address causal factors to improve riparian community health, success generally occurs fairly rapidly as is demonstrated in the photographs below for the Woodhawk Allotment. However, where causal factors are outside of direct management controls, progress may not be rapid or permanent. Progress in the uplands can be variable and take several years to validate. This can depend on weather, site potential and whether the management action is affecting the cause(s) of not realizing a management goal. Continued monitoring and adjustments made through an adaptive management strategy are the means of measuring success of management. There have been successes in terms of riparian community management on the Missouri River and more are yet to be realized as implementation proceeds. Upland resource values are being maintained and as implementation moves forward modest improvements in resource values are anticipated.

All allotments have been assessed for rangeland health. The watershed plans that have been written to improve rangeland health include:

- Woodhawk Watershed Plan (1998)
- Two Calf Watershed Plan (1998)
- Armells Creek Watershed Plan (2000)
- Beauchamp Watershed Plan (2001)
- Upper Missouri Watershed Plan (2002)
- Loma/Vimy Ridge Watershed Plan (2002)
- Arrow Creek/Upper River/Whiskey Ridge Landscape Watershed Plan (2004)
- Bears Paw to Breaks Implementation Plan (2005)



Site 7a 1997



Site 7b 2002

Woodhawk Allotment

Minerals – Oil and Gas

The oil and gas Monument study area lies at the southeastern extent of the Bearpaw Uplift in northcentral Montana (Figure 3.3 and [Map 2-Side A](#)). The area contains roughly 465 square miles in the Bullwhacker and Chimney Butte/Al's Creek Drainage areas including the existing oil and gas leases.

[Appendix K](#) and its attachments contain a great deal of information about oil and gas resources, both inside and outside of the Monument. Natural gas development outside of the Monument is a part of the larger oil and gas resource description. However, because of the volume, detail and supportive nature of much of this information it is better suited as an appendix item than in this section.

The 43 leases in the Monument were issued between 1967 and 1999. Twenty-six of the leases, which were issued on or prior to September 1, 1971, have no specific lease stipulations other than the standard lease terms and condi-

tions (Appendix K.1). The remaining 17 leases have some lease stipulations and the standard lease terms and conditions.

Until March 20, 1968, only two wells were drilled in or near the study area. A combination of factors impeded exploration efforts until the late 1960s. With the price of natural gas at 10¢/MCF, a lack of infrastructure in the area (roads and pipelines), and the region being mostly unexplored, natural gas remained undeveloped up until the early 1970s.

The study area is mostly within three producing fields known as the Leroy, Sherard and Sawtooth Mountain Gas Fields (Figure 3.3). Over the past 30 years, steadily rising natural gas prices have resulted in increased exploration and development; resulting in 139 wells being drilled in the Monument. See the inset box on the following page showing historical activity in these fields.

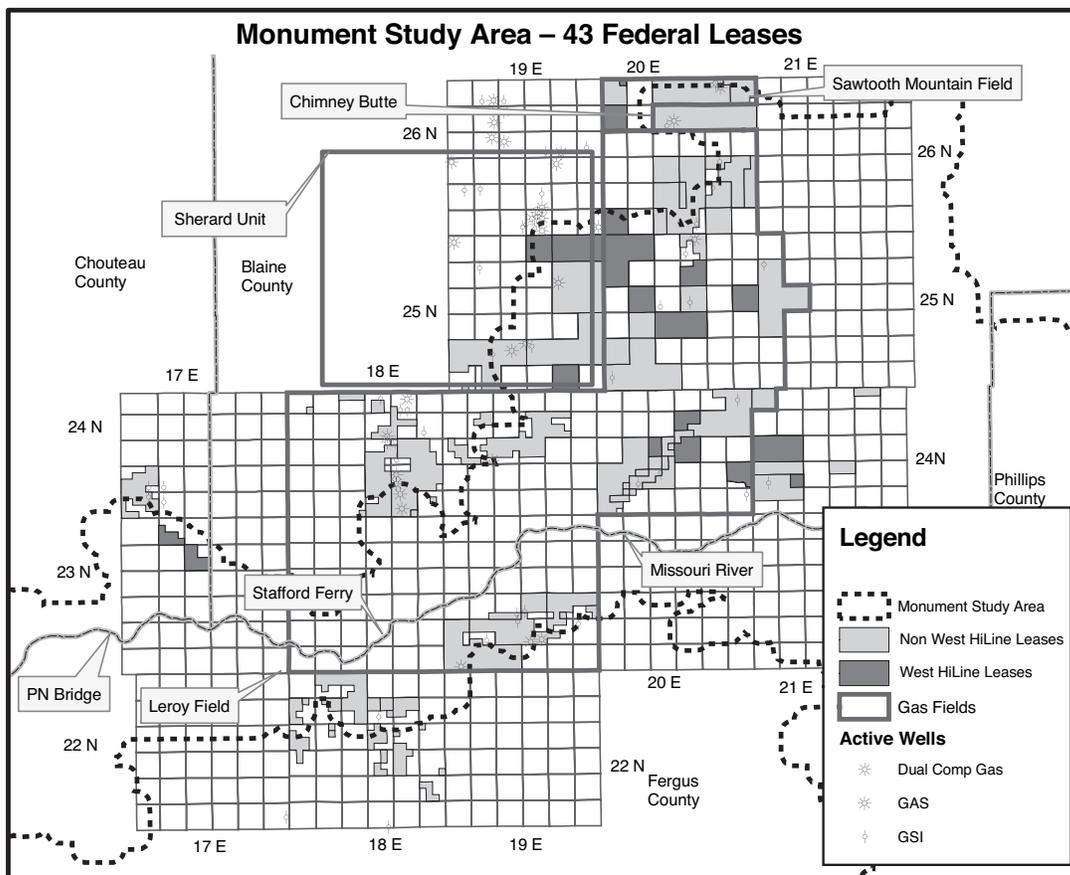
Three administrative instruments allow oil and gas exploration and development to occur in the Monument: the Oil and Gas Lease, the Communitization Agreement, and the Unit Agreement. The Monument currently includes 43 federal oil and gas leases. There are another three state oil

and gas leases in the area. These leases include 42,805 acres of federal minerals and 1,918 acres of state minerals (Appendix K.3). These leases can occur in a non-contiguous manner where the tracts of land are separated by some distance, and in some cases, the distance can be a matter of 4 to 5 miles. The majority of the leases (92%) are north of the Missouri River in Blaine County, and the remainder lie in Fergus and Chouteau Counties (5% and 3% respectively). None of the existing federal leases are within Phillips County.

The federal leases were issued under ten-year lease terms. Of the 43 leases in the Monument, 13 are within their primary ten-year term and the other 30 are held in their extended term by either allocated or actual production. Lease suspensions can also play an important role with the life of some of the leases. Of the 12 West HiLine leases, nine are currently under lease suspension until the Monument Resource Management Plan is finished and three are also under lease suspension pending a lawsuit.

Because there will be no future leasing within the Monument and the leases in the Monument will eventually terminate or expire, oil and gas leasing within the Monu-

Figure 3.3
Monument Study Area



Historical Natural Gas Exploration and Development in the Monument					
<i>Natural Gas Wells</i>	<i>Leroy Gas Field</i>	<i>Sawtooth Mountain Gas Field</i>	<i>Sherard Unit Area</i>	<i>Outside of Existing Fields</i>	<i>Total</i>
Drilled	42	2	12	83	139
Dry Holes (Abandoned)	29	2	9	82	122
Completed	13	0	3	1	17
Production	12	0	3	0	15
Shut-In without Pipeline	1	0	0	1	2
Completed Wells Plugged	5	0	0	0	5
Completed Wells Active	8	0	3	1	12
Production (BCF)	2.2	0	3.9	0	6.1

ment will eventually cease to exist. Once gas wells become depleted on the leases or agreements, the wells will be plugged and abandoned and the leases could terminate if no other wells were drilled on the leases. However, until the last productive well ceases to exist, the 43 lease(s) continue to have valid existing rights.

Since private land (surface and mineral ownership) is adjacent to the Monument, the likelihood of private oil and gas leases exists. The management of the federal surface or minerals largely has no bearing on activity on state or private minerals other than the authorization of future right-of-ways. With leasing closed within the Monument, this could indirectly affect the state and private mineral estates because of the removal of lands as a whole from the potential land base.

Leases can also be part of a Communitization Agreement (CA) and/or Unit Agreement. A CA is an agreement that provides an administrative method to develop the gas resources. CAs combine two or more mineral leases (federal, state and private) in order to have sufficient acreage to comply with the spacing required to drill and or produce a well. A CA is formed when a federal lease cannot be independently developed in conformity with an established spacing pattern.

Currently, there are 11 CAs within or straddling the Monument. Another 10 CAs lie outside of the Monument, yet are common to the Monument because a portion of the lease is common to both the CA and the Monument. [Appendix](#) item K.2 provides more information about the spacing requirements in these CAs.

In addition to leases contained in the CAs, two federal leases are also located in a Unit Agreement within the Monument known as the Sherard Eagle Participating Area (PA) "E." This unit PA was formed after the discovery of

a geologic feature in 1974. The 1,280-acre PA currently contains three active wells located within the Monument producing from the Eagle Formation.

Geology - Oil and Gas

The Bearpaw Uplift in northcentral Montana was formed by igneous activity which commenced in the late Cretaceous Period and extended into the early Tertiary Period (Eocene Epoch). A large mass of igneous material was intruded into sediments at the top of the Cretaceous Colorado Group. This action caused a doming effect of the overlying younger sediments on an elevational scale of thousands of feet. Concurrent with this doming effect on late Cretaceous strata was the eruption and deposition of thousands of feet of volcanic rocks in the form of lava flows and volcanic clastics. As a result of being uplifted, the late Cretaceous sediments were subject to extensive erosion, as well as being subsequently buried by the widespread deposition of volcanics.

Within the early Tertiary, a dramatic change came to the Bearpaw Uplift. Whether it was one titanic explosive event or a series of related events, the forces that caused the doming of the Bearpaw Uplift were suddenly removed by an enormous eruption, and the central portion of the Bearpaw Uplift collapsed. This collapse caused a wide variety of structural features, most of them fault-related. Just like a broken plate of glass, the Bearpaw Uplift broke into a mosaic of randomly oriented individual fault blocks where each fault block can have its own unique orientation and as a result can create its own separate gas trap/reservoir. Other tectonic features included gravity detachment blocks which slid away from the center of the dome.

Scattered through a circular zone 20 to 30 miles wide on the plains surrounding the Bears Paw Mountains are long, sharp, narrow, anticlinal folds (perhaps 100 or more),

usually cut near their crests by steeply dipping reverse faults. Strike of the folds and faults is peripheral to the circular mountain area. In cross-section, the folds and faults appear to have been caused by nearly horizontal thrusts outward from the mountains. The length of the folds differs greatly, but they average about 10 miles. Between folds, upper Cretaceous strata lie nearly horizontal and apparently undisturbed. The faults and folds and other structural features mapped at the surface are essentially “rootless” as they disappear within the sediments of the upper Colorado Shale. Nonetheless, the intensive faulting which affects the Eagle and Judith River sands provides an effective trap for the gas now produced from hundreds of wells within the Bearpaw Uplift.

The source rocks for the Cretaceous gas in this area are probably the kerogen-enriched black shales found in the Colorado Group. The effective upper seals for the Judith River and Eagle reservoirs are provided by the overlying Bearpaw Shale and Claggett Shale Formations respectively (Figure 3.2). The Bearpaw Shale has an average thickness of 1,300 feet where the Claggett Shale Formation has a thickness of at least 500 feet. Without question these source rocks have been buried deeply enough to generate hydrocarbons appropriate to their thermal maturity. Migration of hydrocarbons, in this case natural gas, would most likely occur along fracture planes developed within the Cretaceous shales and sandstones.

Leroy Gas Field

The majority of the existing federal leases lie within the Leroy Gas Field which was discovered in November 1968. The field as a whole is not one contiguous productive unit. Rather, it is made up of numerous discrete fault blocks that provide a series of reservoirs which have trapped gas within the subsurface strata. Each reservoir/trap in the Leroy Gas Field is unique (depth, reservoir pressure, pay thickness, porosity, water saturation, orientation, and gas/water content or extent); however, the reservoirs are common to one another since the majority of the wells produce from the upper Cretaceous Eagle Formation.

The Eagle Formation remains the primary target in the Leroy Gas Field for future exploration because of its relatively shallow depths (1,700 feet) and the chance of discovering additional gas-charged fault blocks. The Eagle Formation is composed of three distinct rock units. Depending on the structural orientation of the fault blocks within the Leroy Gas Field, the middle unit of the Eagle Formation is likely the most prolific formation to trap gas; however, if the conditions exist, the Virgelle Member (the lowermost unit of sandstone rock within the Eagle Formation) also can contain gas. The productive intervals can range from 4 to 60 feet thick.

The Judith River Formation (a shallower upper Cretaceous interval) can also be considered a target for development; however, unless there is a major gas discovery in the Judith River Formation, it will remain a secondary target for development. Future development of the Judith River Formation will likely be a result of searching for gas in the deeper Eagle Formation.

There are eight active wells in the Leroy Gas field. See the inset box showing current natural gas activity in the Monument.

Sawtooth Mountain Gas Field

The Sawtooth Mountain Gas Field lies at the very northern edge of the Monument. It is common to the Monument because two federal leases overlap the Monument and the Sawtooth Mountain Gas Field. Currently, no active Monument wells are within the Sawtooth Mountain Gas Field. The geologic characteristics of the Sawtooth Mountain Gas Field are similar in nature to those of the Leroy Gas Field.

Sherard Unit Area

The geologic characteristics of the Sherard Unit Area in the Monument are similar in nature to those of the Leroy Gas Field as a relatively short distance separates the fields. The first successful Sherard well was drilled in December 1974 and continues to produce.

Current Natural Gas Activity in the Monument					
<i>Natural Gas Wells</i>	<i>Leroy Gas Field</i>	<i>Sawtooth Mountain Gas Field</i>	<i>Sherard Unit Area</i>	<i>Outside of Existing Fields</i>	<i>Total</i>
Active Wells	8	0	3	1	12
Currently Producing	2	0	2	0	4
Shut-In with Pipeline	5	0	1	0	6
Shut-In without Pipeline	1	0	0	1	2

The leases within the Sherard Unit Area were mostly developed within the Sherard Exploratory Unit. An exploratory unit is an agreement or plan for development and operation which provides for the recovery of oil and/or gas as a single consolidated entity, without regard to separate ownerships, and allows for the allocation of costs and benefits on a basis as defined in the agreement or plan.

There are three active wells in the Sherard Unit. See the inset box on the previous page showing current natural gas activity in the Monument.

Wells Outside Field Boundaries

There is one other well in the Monument that is not in a defined gas field or unit area. It is just east of the Leroy Gas Field and is shut in waiting on a pipeline. See the inset box on the previous page showing current natural gas activity in the Monument.

Existing Infrastructure – Oil and Gas

With the exception of county roads, an estimated 13 miles of access roads in the Monument service 12 federal, 1 state, and 1 private well. Many of the access roads are resource roads (two-track type roads) that allow well service vehicles and company personnel to visit the wells and facilities on a scheduled basis. The resource roads are not all-weather type surfaces and operators use judgment as to when the roads are passable.

Pipelines in the Monument service 10 federal and one state well. The estimated length of pipelines supporting the 11 wells is 31.1 miles. The existing pipelines do not always follow access roads. It is estimated that a quarter of the length of pipelines follows access roads. See Table 3.8 for the pipelines within the Monument study area that not only service the 10 federal wells in the Monument but also service another 19 wells outside the Monument, which are part of the overall natural gas system in the area.

The infrastructure related to natural gas surface operations, other than the access roads and pipelines, includes the following items:

- meter shed (8 ft long x 8 ft tall x 5 ft wide) (Figure 3.4);
- well head (can be enclosed within the meter shed depending on the operation) (Figure 3.5);
- gas meter run (enclosed within the meter shed) (Figure 3.6);
- glycol barrel (can be enclosed within the meter shed);
- small water separator (normally enclosed within the meter shed depending on the well and the operation);
- water pit sized depending on the operation, but can range from 20 ft x 20 ft x 8 ft to 40 ft x 40 ft x 10 ft); and
- gas compressor. (Compressors typically do not accompany each well. Depending on the operation and

the size of the compressor, one gas compressor could service 8-12 wells. Currently, no gas compressors are located within the Monument study area; however, a skid-mounted 42 HP compressor has been approved by the State of Montana on the David Kincaid No. 1 private well (the compressor has not been installed as of this document.)

Figure 3.4 – Meter Shed



Figure 3.5 – Well Head Only



Figure 3.6 – Meter Run within Meter Shed



**Table 3.8
Pipelines within the Monument Study Area**

<i>Pipeline Section</i>	<i>Wells Serviced by Pipelines</i>	<i>Pipeline Length</i>
Butch Camp	Fed No 1-7*	4.8 miles (4.6 miles of ROW)
Johnson/Irvin Ridge	Fed 29-15*	8.5 miles (8.0 miles of ROW)
North Leroy	Fed 23-26-20, Fed 21X-26	0.4 miles (0.0 miles of ROW)
Robinson/N. Bullwhacker	Fed No 1-12*, Fed No 15-1, David Kincaid No 1, Fed No 31-3*, State No 1, Fed No 34-1	12.9 miles (9.1 miles of ROW)
Sawtooth	Fed 1-2, US 9-9, Fed 15-9	0.7 miles (0.0 miles of ROW)
Sherard "E" PA	US 4-27*, US 6-28*, US 28-1*	2.5 miles (1.6 miles of ROW)
Sherard/Northwest Leroy	Fed 11-25-19, US 29-10, 34-15, State 36-26-19	3.5 miles (2.1 miles of ROW)
Southeast Leroy	Fed No P21-23-19N, Fed No N27-23-19B, Fed No A28-23-19N, Fed No 31-23-19, Osburnsen 29-23-19, Fed L22-23-19N*	12.6 miles (8.7 miles of ROW)
W. Bullwhacker	Fed No 31-25-20*	5.1 miles (4.5 miles of ROW)
W. Coal Ridge	Fed No 35-24-18A*, Fed No 35-24	1.3 mile (0.3 miles of ROW)
Total	29 wells	52.2 miles (39.1 miles of ROW)

* Monument well (10 wells). Another 19 wells are outside the Monument but are serviced by the overall natural gas pipeline system in the area.

Recreation

The recreation resources of the Monument are diverse in nature and provide an expanse of opportunities ranging from camping in developed campgrounds to camping in widely dispersed primitive campsites; from taking an up-land vehicle tour on a Back Country Byway to taking a float trip down the Missouri River; and from hunting elk in the Breaks to hunting pheasants on river islands. Recreation resources are rich and diverse and provide opportunities for most every type of interest.

Benefits derived from these opportunities are also diverse. Local gateway communities gain economic benefit from a local, regional and national base of visitors. Likewise, visitors benefit from association with the friendly rural lifestyle and slower pace of central Montana's small communities. Another current benefit is the freedom to access public lands within the Monument and have the ability to choose from a variety of high quality opportunities and experiences. Educational benefits are also prevalent. The BLM Fort Benton Visitor Contact station strives to provide educational opportunities to those visiting the Monument. In addition, the BLM web site, a newly revised boater guide and numerous brochures provide the public an opportunity to learn more about the natural and cultural history of the Monument.

Much of the area is remote and spectacular landforms remain essentially unchanged. Settings vary from riparian corridors to the rolling pine and juniper-covered slopes of the Breaks to expanses of sagebrush flatlands. The contrast and diversity provide for a plentiful wildlife population, numerous recreational opportunities, livestock grazing and multiple use activities. Flowing through the heart of the Monument is the Missouri River. Many of the resources and geologic features described by Lewis and Clark during their epic 1805-06 journeys on the river remain virtually unchanged. A boater on the Missouri River may pass cattle grazing operations, or the remains of old homesteads, but visually they find little has changed in 200 years.

Recreation Management Areas

Four recreation management areas (RMAs) are currently within the Monument (the RMAs are being considered for change under the Visitor Use, Services and Infrastructure section of the Alternatives in Chapter 2). The RMAs do not follow a legal boundary. They are simply areas delineated for specific recreation management focus. The RMAs fall into two categories: Special and Extensive.

A Special Recreation Management Area (SRMA) is an area where a commitment of BLM staffing and funding has been made, within the parameters of multiple use, to provide

opportunities for specific recreation activities and experiences on a sustained yield basis. An Extensive RMA is an area where recreation management is only one of several management objectives and where limited commitment of BLM staffing and funding for recreation is required. Extensive RMAs tend toward dispersed recreation opportunities with less development.

South Phillips Special Recreation Management Area – About 48,000 acres of the South Phillips SRMA are located in Phillips County. This SRMA provides hunting, fishing, scenic and wildlife viewing and pleasure driving opportunities.

Judith Extensive Recreation Management Area – The Judith RMA includes about 105,000 acres of BLM land in Fergus and Chouteau Counties. This is an extensive RMA which provides dispersed and unstructured recreational activities.

Within this RMA is the Judith River, which provides float boating, hunting, fishing, scenic and wildlife viewing and camping opportunities. The Judith River was evaluated for Wild and Scenic River status and a 27.1 mile segment was studied and found eligible but not suitable for Wild and Scenic River status (BLM 1994b).

North Missouri Breaks Special Recreation Management Area – The North Missouri Breaks SRMA includes about 133,000 acres of BLM land in Chouteau and Blaine Counties.

Upper Missouri River Special Recreation Management Area – The Upper Missouri River SRMA includes about 89,000 acres of BLM land. This SRMA includes the Upper Missouri National Wild and Scenic River.

Upper Missouri River

The dominant recreation resource within the Monument is the 149-mile Upper Missouri National Wild and Scenic River. Each year approximately 6,000 boaters take trips of various lengths ranging from 1 to 10 days and participate in a range of activities using a variety of non-motorized and motorized craft.

Access Points

Major access points to the river include the Chouteau County Fairgrounds Campground and Canoe Launch above Fort Benton, Fort Benton powerboat ramp, Coal Banks Landing, Judith Landing and James Kipp Recreation Area. Lesser-used points include Wood Bottom (Loma), Virgelle Ferry and McClelland-Stafford Ferry. Private land access points also exist.

Developed Sites

Developed sites on the UMNWSR include Level 1, 2 and 3 sites. Dispersed camping opportunities are considered Level 4. For a description of Levels 1-4, see the River Recreation Facilities inset.

The following public sites and facilities support recreation activities taking place in the UMNWSR. The sites are listed geographically in downstream order, beginning at Fort Benton and ending at the James Kipp Recreation Area. The only developed site where fees are currently charged is the James Kipp Recreation Area where a \$6.00 per vehicle fee is charged for overnight camping. Other Level 1 sites could qualify as expanded amenity fee sites based on guidelines established by the FLREA.

Fort Benton Visitor Contact Station is staffed by volunteers and operated seven days a week from May 1 through September 15. Visitors can obtain information related to recreation opportunities within the Monument. The contact station will be closed in 2006 and will be replaced by the new Upper Missouri River Breaks National Monument Interpretive Center. The new interpretive center will provide opportunities to expand visitors' knowledge about the wide array of special places and resources found within the Monument. The new interpretive center will qualify as a standard amenity fee site.

Evans Bend (river mile 5.7) is a primitive boat camp with a metal fire ring.

Senieurs Reach (river mile 16.2) is a primitive boat camp with a metal fire ring.

Black Bluff Rapids (river mile 19.2) is a primitive boat camp with a metal fire ring.

Wood Bottom (river mile 20.3) is a developed public access site with a gravel parking area, vault toilet, and informal boat ramp.

Decision Point Interpretive Trail is a developed public access site with a gravel parking area, interpretive kiosk, and interpretive signs on a short hiking trail.

Coal Banks Landing (river mile 41.5) is a developed public access site and campground with tent and RV camping, 13 picnic tables, 9 fire rings, 2 vault toilets, 2 parking areas, a concrete boat ramp, and a volunteer host contact station. Coal Banks Landing is the primary launch point for visitors who boat on the Missouri River. Reconstruction of the site is planned but not currently scheduled. Reconstruction will include a new potable water system, irrigated lawns, shade shelters, a new log building check-in center, and additional native landscaping and windbreaks.

River Recreation Facilities

Level 1 – Developed public access sites. These sites are accessible by road with a full range of developments that could include parking lots, boat ramps, vault toilets, campsites for tents and RVs and picnic facilities. These sites include the Chouteau County Fairgrounds Campground and Canoe Launch, Decision Point Interpretive Trail, Wood Bottom, Coal Banks Landing, Judith Landing, Lower Woodhawk and the James Kipp Recreation Area.

Level 2 – Developed boat camps. These sites are accessible to the public only by boat. The sites could include vault toilets, metal fire rings and occasionally open-air shelters. They include Little Sandy, Eagle Creek, Hole-in-the-Wall and Slaughter River. BLM has administrative road access to these sites.

Level 3 – Primitive boat camps. These sites are accessible only by boat and could contain a metal fire ring. There are no other developments. These sites include Evans Bend, Senieurs Reach, Black Bluff Rapids, Dark Butte, Pablo Rapids, The Wall, McGarry Bar, Gist Bottom, Cow Island, Upper and Middle Woodhawk and Hideaway.

Level 4 – Dispersed camping opportunities. In addition to the developed sites described above, camping is permissible on any of the 90,000 acres of BLM land adjacent to the river. The absence of development allows opportunities for those seeking a completely primitive experience.

Little Sandy (river mile 46.7) is a developed boat camp with a vault toilet and 2 metal fire rings. An administrative road provides access to the site for the purpose of facility maintenance.

Eagle Creek (river mile 55.7) is a developed boat camp with 2 vault toilets and 5 metal fire rings. Eagle Creek, located on private land, is part of a recreation easement purchased by the BLM. An administrative road provides access for the purpose of facility maintenance.

Hole-in-the-Wall (river mile 62.9) is a developed boat camp within a fenced enclosure with 2 vault toilets, 5 metal fire rings, and 2 shade shelters constructed of wood. The site has a non-potable well with a hand pump used to irrigate cottonwood and green ash plantings.

Dark Butte (river mile 68.8) is a primitive boat camp with 2 metal fire rings and 2 composting toilets.

Pablo Rapids (river mile 72.8) is a primitive boat camp within an electric fence enclosure. The site has one metal fire ring and a solar panel that supplies power to the fence and power to irrigate cottonwood and green ash plantings.

Slaughter River (river mile 76.8) is a developed boat camp within a fenced enclosure. The site has 2 vault toilets, one shade shelter constructed of wood and 5 fire rings.

The Wall (river mile 81.2) is a primitive boat camp within an electric fence enclosure. The site has one metal fire ring and a solar panel that provides power to the fence and power to irrigate cottonwood and green ash plantings.

Judith Landing (river mile 88.5) is a developed public access site and campground with a concrete boat ramp, 2 vault toilets, a volunteer host contact station, 11 picnic tables and 9 fire rings.

McGarry Bar (river mile 103.1) is a primitive boat camp with one metal fire ring.

Gist Bottom (river mile 122.4) is a primitive boat camp with one metal fire ring.

Cow Island (river mile 125.6) is a primitive boat camp with 2 wooden outhouses.

Upper Woodhawk (river mile 129.5) is a primitive boat camp with one metal fire ring.

Middle Woodhawk (river mile 130) is a primitive boat camp with one metal fire ring.

Lower Woodhawk (river mile 131) is a developed public access site and campground with 2 picnic tables, 2 fire rings, and one vault toilet.

Hideaway (river mile 136.2) is a primitive boat camp with 2 metal fire rings.

James Kipp Recreation Area (river mile 149) is a developed public access site and campground. Kipp is an expanded amenity fee area with 34 tent and RV camping sites with picnic tables and fire rings, gravel access roads, 8 vault toilets, a concrete boat ramp, RV dump station, volunteer host contact station, interpretive kiosk, and a metal maintenance building.

Sunshine Ridge Overlook is an undeveloped scenic viewing site.

Undeveloped Sites

Undeveloped sites are Level 4 opportunities which exist on BLM land along the Missouri River. Many of these are very popular sites where a rock fire ring and trampling of vegetation denote recreational use. Approximately 119 sites either have rock fire rings or have been identified as potentially suitable for camping. Undeveloped sites provide opportunities for those seeking a primitive camping experience. These sites are generally well dispersed, less

crowded and offer small groups a quiet alternative away from developed sites where concentrated use may occur.

Visitor Activities

Boating with associated camping and exploring is the predominant use of the UMNWSR and occurs primarily between June and August (Burchfield and Moisey 2000). A typical trip on the Missouri River consists of a group of 6 people in canoes or kayaks paddling and camping three nights and four days from Coal Banks Landing to Judith Landing (river mile 41.3 to 88.5). The majority of overnight camping is accounted for in the White Cliffs section at the Eagle Creek, Slaughter River, Coal Banks Landing, and Hole-in-the-Wall campsites. Other campsites located within this area and having similar levels of development, such as Little Sandy or Dark Butte, are only lightly used. Sites from Judith Landing downriver are also noticeably less used (Burchfield and Moisey 2000).

The shoulder seasons in May and September receive fewer visitors. In April and May, anglers are active, and from September through November hunters become the primary user group and access the corridor from the rim by vehicle and the bottomlands by boat (Burchfield and Moisey 2000).

Hunting is widely dispersed over the UMNWSR, but a significant portion occurs between Judith Landing and the James Kipp Recreation Area, and between Fort Benton and Coal Banks Landing during the big game and upland game hunting season.

Hiking, hunting and sightseeing are popular activities along several segments of the UMNWSR, and they are particularly popular among floaters who can supplement their time on the water with exploratory day hikes near campgrounds or picnic sites. Some areas are attractive for non-technical climbs, such as the Hole-in-the-Wall formation, which has an informal trail leading from the minimally developed Hole-in-the-Wall campground. Data for off-site uses has not been collected in the past (Burchfield and Moisey 2000). No designated/managed trails are located along the UMNWSR, but hiking and exploring among the geologic formations is a popular activity.

Characteristics of Visitor Use

Visitor use data is collected throughout the year by means of boater registration. From May 1 through September 30 volunteer hosts and a seasonal workforce support the collection effort by registering boaters at their put-in point. During the shoulder season, data collection efforts rely on boaters self-registering prior to launch.

Information collected on boater registration forms is analyzed and compiled to provide statistics about certain visitor use patterns and characteristics. Statistics and infor-

mation are compiled in the following categories: number of boaters, number of groups and related group size statistics, number of residents and non-residents, busiest and slowest launch days, seasonal visitor use distribution, percent of motorized and non-motorized craft, percent of use occurring in each of the three river segments, and percent of use by group type.

The majority of use on the Missouri River occurs in the summer months between June and August. The busiest portion of the season is from June 15 to August 1. However, recreation along the UMNWSR in the spring and fall, particularly during hunting season, is also important to visitors. Data on visitor use are only collected in the summer months, so it is difficult to estimate year-round use levels (Burchfield and Moisey 2000).

Number of Boaters

Historically, use increased from 2,060 registered boaters in 1975 to 3,256 in 1997. In 1998, the BLM stationed full-time hosts at each major access point on the river to assist boaters with trip registration. During that same year *Undaunted Courage* by Stephen Ambrose was published and recorded use levels increased to 4,339 visitors. Use took another large jump in 1999 to 5,442, but since then has been relatively flat, ranging between 5,442 and 6,034 visitors. Use from 1975 through 2004 is reflected in Figure 3.7.

Number of Groups and Related Group Size Statistics

Group size ranges from 1 to 50 people. Six people per group is the average size. In 2004, a total of 1,069 groups registered to launch on the river. Of the 1,069 groups, 96.5% (1,036 groups) were groups of 20 people or less and accounted for 5,001 of the total registered boaters. The other 3.5% of the groups (33 groups) were groups larger than 20 people and accounted for 16.5% of the total visitor use, or 992 registered boaters. Analysis of 2002 and 2003 group size data provides numbers consistent with 2004 figures. Refer to Table 3.9 for general group size data.

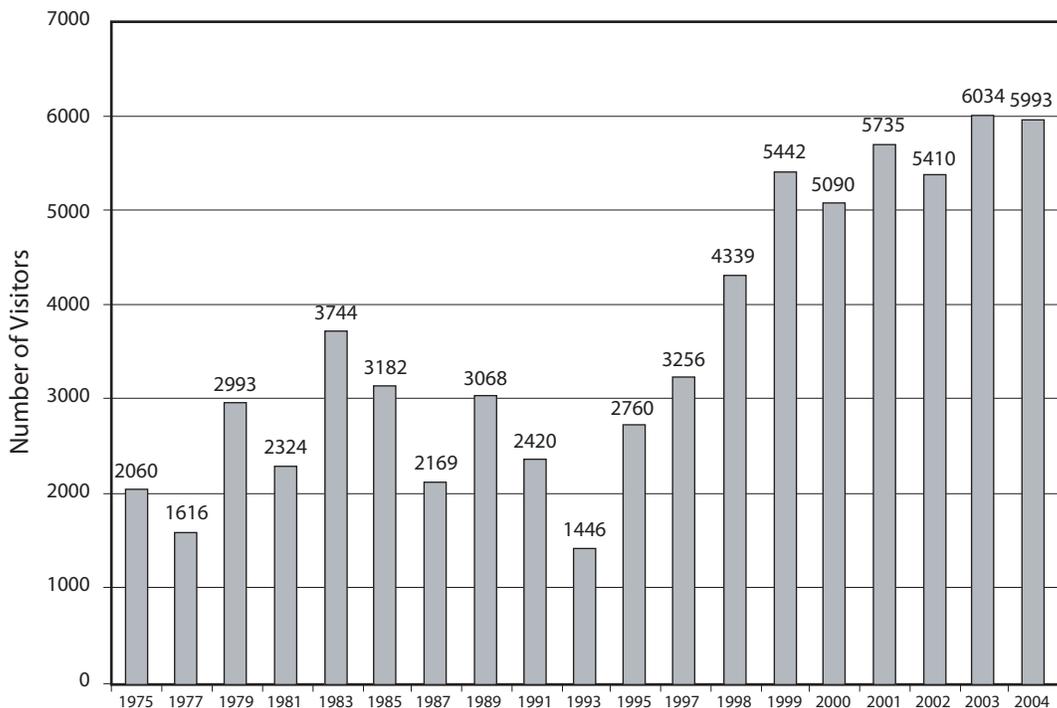
Residency

In 2002, resident and non-residents boaters were evenly divided. In 2003 and 2004, non-residents boaters were the slight majority. See Table 3.9 for 2002-2004 residency data.

Busiest Launch Days

The busiest launch days are generally Sunday and Monday. Boaters typically use the weekend to travel from their home base, and then launch on Sunday or Monday. On an average trip, boaters would complete their trip during the week and then use the following weekend to return home. See Table 3.9 for 2002-2004 busiest launch days.

**Figure 3.7
Historic Visitor Use on Upper Missouri River
1975-2004**



Source: BLM Boater Registration Data

<i>Year</i>	<i>Total Use</i>	<i>Total # of Groups</i>	<i>Avg. Group Size</i>	<i>Montana Residents (Percent)</i>	<i>Busiest Launch Days</i>	<i>Slowest Launch Days</i>	<i>Busiest Month</i>
2002	5,410	889	6.1	51	Sun/Mon	Wed/Thurs	July (32%)
2003	6,034	992	6.1	45	Sun/Tues	Wed/Thurs	July (31%)
2004	5,993	1,069	5.6	46	Sun/Mon	Fri/Sat	July (29%)

Source: BLM Boater Registration Data

Seasonal Visitor Use Distribution

The period from June 15 to August 1 is the busiest portion of the boater season. Figure 3.8 shows 2004 visitor use in weekly increments. The busiest week of the season is generally the third or fourth week of June. In 2004, 51% of total annual visitor use occurred between June 15 and August 1. In 2002 and 2003, 52% of the total annual use occurred during this timeframe.

River Segment Visitor Use Distribution

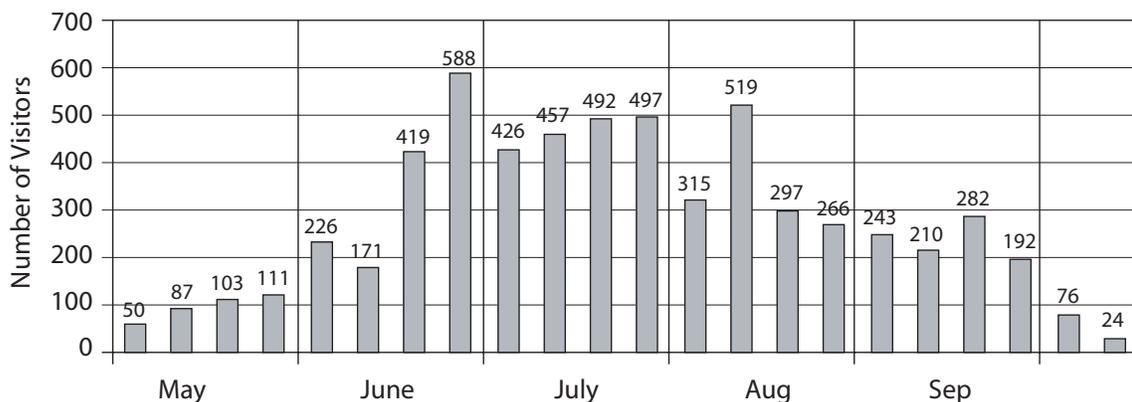
The river can be viewed as three distinct segments. The upper segment extends from Fort Benton to Coal Banks Landing, or river miles 0 to 41.5. The White Cliffs segment extends from Coal Banks Landing to Judith Landing, or river miles 41.5 to 88.5. And the lower segment extends from Judith Landing to the James Kipp Recreation Area, or

river miles 88.5 to 149. In 2004, 84% of all registered boaters traveled through the White Cliffs segment of the river. Sixteen percent traveled through the upper segment, and 28% through the lower segment. See Table 3.10 for 2002-2004 percentages.

<i>Year</i>	<i>Upper</i>	<i>White Cliffs</i>	<i>Lower</i>
2002	16%	84%	28%
2003	22%	78%	22%
2004	21%	78%	22%

Source: BLM Boater Registration Data

**Figure 3.8
Upper Missouri River Visitor Use Distribution by Week
May-September 2004**



Source: BLM Boater Registration Data

Watercraft Use

A canoe is the preferred means of transportation on the river. Boaters also use kayaks, rafts, drift boats and a variety of motorized watercraft. Any boat (canoe, raft, jon boat, etc.) launched with a motor is considered a motorized watercraft. In 2004, 10% of all boats launched were motorized crafts. In 2002 and 2003, motorized craft accounted for 8% and 7% of all craft, respectively. See Table 3.11 for a summary of motorized and non-motorized watercraft use.

<i>Year</i>	<i>Total Craft</i>	<i>Motorized</i>	<i>Non- Motorized</i>
2002	2,613	198 (8%)	2,415 (92%)
2003	2,778	202 (7%)	2,576 (93%)
2004	2,772	288 (10%)	2,484 (90%)

Source: BLM Boater Registration Data

Group Types

In 2002, 2003 and 2004, visitor registration forms requested boaters identify a user category. Users were separated as guided, organized and private groups. Guided groups were those traveling with a BLM-authorized commercial outfitter. Organized groups were church groups, Boy Scouts, college and university groups, or any other type of formally organized group of users. Private boaters were individuals or groups of individuals that had no formal organized structure and typically were composed of friends and family floating the river. See Table 3.12 for a breakdown of 2002-2004 visitors by group type.

<i>Year</i>	<i>Commercial</i>	<i>Organized</i>	<i>Private</i>
2002	24%	17%	59%
2003	27%	15%	58%
2004	31%	16%	53%

Source: BLM Boater Registration Data

Commercial River Use

Commercial outfitters have provided visitor services since prior to the Upper Missouri National Wild and Scenic River designation in 1978. Commercial permits are limited by a moratorium to 23 for the Missouri River between Fort Benton and the James Kipp Recreation Area and must be authorized/permited by the BLM. The moratorium capped Special Recreation Permits (SRPs) at the number issued in 1999. Commercial permittees included as part of the moratorium permits are allowed unlimited trips. In 2004, eight "one-time" commercial permits were also issued. One-time permits authorize groups meeting the definition of commercial to take one trip per season on the Missouri River. Commercial trips are an integral part of the visitor use pattern and in 2004 comprised 31% of total river use. Figure 3.9 compares commercial visitor use to overall visitor use from 1997 through 2004.

Vendor permits are issued for support services on the river. In 2004, two vending permits were issued to shuttle companies who support river trip activities by shuttling vehicles from put-in points to take-out points. Many of the 23 commercial users also perform shuttle services within the context of their commercial river guiding operations.

In addition to commercial services tied directly to boating activities, the BLM also authorizes permits for commercial tours in the uplands adjacent to the UMNWSR. In 2004, the BLM issued a permit for guided horse rides, a permit for guided hikes and a permit for vehicle tours.

Special Recreation Permits are also required for all non-commercial special activities occurring in the UMNWSR. Presently, the only non-commercial permit issued to an organized group is for a Lewis and Clark encampment at the James Kipp Recreation Area each year.

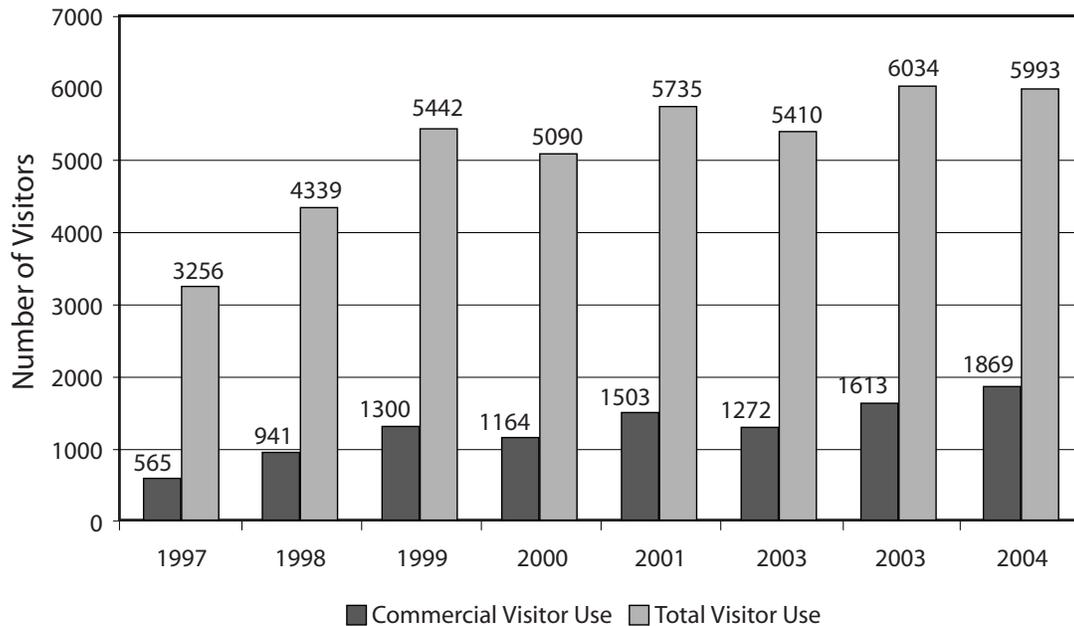
Uplands

Developed sites in the uplands include Level 1, 2 and 3 sites. Dispersed camping opportunities are considered Level 4. For a description of Levels 1-4, see the Upland Recreation Facilities inset.

Most of the upland recreation activity is big game hunting for mule deer and elk. It is not uncommon for hunters to come to the area and camp out for extended weekends and, occasionally, for a week at a time. The Bullwhacker area is a destination hunting location for residents and non-residents alike because of the block of BLM land.

Hiking, which occurs mostly in the summer, has been increasing in all seasons. Hiking activity can be extended day trips, but until recently, most amounted to day hikes from existing roads or trails where camping occurs on

Figure 3.9
Comparison of Commercial and Total Upper Missouri River Visitor Use
1997-2004



The 2004 commercial total includes one-time commercial use numbers. Previous years do not. One-time use accounted for 125 visitors in 2004, or an additional 2% of overall use.

Source: BLM Boater Registration Data

undeveloped sites. No organized hiking trail network exists, which is one of the attractions of the area—providing a “search and discover” experience. Other attractions are historic sites, scenery, wildlife viewing, and solitude.

Motor touring/sightseeing is becoming more common in the summer season, especially on the Missouri Breaks Back Country Byway. Other attractions include the Spencer Road Overlook on the Nez Perce National Historic Trail, Snake Point Overlook on the Lewis and Clark National Historic Trail, and the Gilmore Cabin.

A few reservoirs have been planted with fish and will be small sport fisheries for the useful life of the reservoirs. This includes Butch Reservoir and Gazob Reservoir.

Private pilots occasionally use remote backcountry airstrips in the Monument for day stopovers with short day hikes.

Christmas tree cutting is an occasional recreation activity in the Bullwhacker and Cow Creek areas.

Fourteen commercial outfitters (hunting) receive an SRP to operate on an annual basis. No limits are placed on the number of SRPs issued or the number of trips per operator.

Upland Recreation Facilities

Level 1 – Developed public access sites. Recreation sites where a high level of infrastructure development could include campsites, parking lots, vault toilets, interpretive signs, campground host facilities, tree plantings, picnic tables, waste facilities and other infrastructure improvements that accommodate the transition from highway to collector roads. Sites would be marked on a map. An example of a Level 1 site is James Kipp Recreation Area on the river.

Level 2 – Developed upland sites. Campsites, trailheads, scenic overlooks and reservoirs where moderate levels of infrastructure development could include metal fire rings, vault toilets, and improved gravel parking areas. Interpretive signs and information boards may be present but would be much less obtrusive than at Level 1 sites and would blend well with natural surroundings. Sites would be marked on a map. Examples of Level 2 sites are FR Reservoir, Butch Reservoir, Spencer Road Overlook, Gazob Reservoir, Gilmore Cabin, Snake Point Overlook and Sunshine Ridge Overlook.

Level 3 – Primitive campsites. Pull-out sites immediately adjacent to a resource road that could contain a fire ring and minimal signing, but no other infrastructure.

Level 4 – Dispersed camping opportunities. This would be the utilization of public land in a natural state for dispersed, undeveloped camping. These areas may be accessible by motorized or non-motorized travel. There would be no infrastructure in these areas.

Historically, between one and five non-commercial permits are issued annually for organized group recreation activities (e.g., Nez Perce trail ride). No limits are placed on the number of non-commercial permits issued.

Transportation

A motorized travel and transportation system currently exists to provide resource management and visitor services needs to and/or within the Monument. The travel plan inventory that was conducted in 2002 and 2003 pertains to all modes of transportation from aircraft to motorized vehicles including ATVs/motorbikes. The inventory identified: a) existing small aircraft landing strips, b) existing transportation routes and related facilities including cattleguards and culverts, c) length of route, d) whether the existing or designated route is improved or unimproved, e) type of road surface (aggregate or soil), f) double lane, single lane or two-track, and g) destination (end point) associated with the route.

BLM Roads

A road is a linear route segment that can be created by the passage of vehicles (two-track); constructed; improved; or maintained for motorized travel. The following specifications were used to determine which routes would be inventoried for the Monument transportation plan database:

Motorized travel is not considered cross-country (off-road) on BLM land when:

- The motorized vehicle uses constructed roads that are maintained by the BLM. Constructed roads are often characterized with cut and fill slopes.
- The motorized vehicle use is clearly evident two-track routes with regular travel and continuous passage of motorized vehicles over a period of years. A two-track is where perennial vegetation is devoid or scarce, or where wheel tracks are continuous depressions in the soil yet evident to the casual observer and are vegetated.

Roads Inventory

A two-person seasonal inventory crew collected data on 436 miles of BLM roads (a total of 759 miles for all roads) during the summer of 2002 for the east half of the Monument, and another seasonal crew collected additional information on 44 miles of BLM roads (a total of 81 miles for all roads) in the west half. Information on another 114 miles of BLM roads was obtained from existing data. A GPS Trimble unit with satellite connections was used to document the road data. A map showing the existing road system is available on the BLM website at http://www.blm.gov/nhp/spotlight/state_info/planning.htm.

BLM Road Classifications

BLM roads are classified into three categories: collector roads, local roads, and resource roads (BLM Manual 9113). Resource roads include the unimproved or 2-track routes and account for the majority of the roads inventoried within the Monument. The definition for each type of road is stated below.

Collector Roads

These Bureau roads normally provide primary access to large blocks of land, and connect with or are extensions of a public road system. Collector roads accommodate mixed traffic and serve many uses. They generally receive the highest volume of traffic of all the roads in the Bureau road system. User cost, safety, comfort, and travel time are primary road management considerations. Collector roads usually require application of the highest standards used by the Bureau. As a result, they have the potential for creating substantial environmental impacts and often require complex mitigation procedures. See Chapter 2 for a list of designated BLM collector roads and assigned maintenance levels.

Local Roads

These Bureau roads normally serve a smaller area than collectors, and connect to collectors or a public road system. Local roads receive lower volumes, carry fewer traffic types, and generally serve fewer uses. User cost, comfort, and travel time are secondary to construction and maintenance cost considerations. Low volume local roads in mountainous terrain, where operating speed is reduced by effect of terrain, may be single-lane roads with turnouts. Environmental impacts are reduced as steeper grades, sharper curves, and lower design speeds than would be permissible on collector roads are allowable. See Chapter 2 for a list of designated BLM local roads and assigned maintenance levels.

Resource Roads

These Bureau roads normally are spur roads that provide point access and connect to local or collector roads. They carry very low volume and accommodate only one or two types of use. Use restrictions are applied to prevent conflicts between users needing the road and users attracted to the road. The location and design of these roads are governed by environmental compatibility and minimizing Bureau costs, with minimal consideration for user cost, comfort, or travel time. See Chapter 2 for a list of designated BLM resource roads and assigned maintenance levels.

BLM Road Maintenance Levels

Every BLM road in the Facilities Inventory and Maintenance Management System (FIMMS) is assigned a maintenance level from Level 1 to Level 5, as described below. See Chapter 2 for a list of BLM roads and assigned maintenance levels.

Level 1 – This level is assigned to roads where minimum maintenance is required to protect adjacent lands and resource values. These roads are no longer needed and are closed to traffic. The objective is to remove these roads from the transportation system.

Level 2 – This level is assigned to roads where the management objectives require the road to be opened for limited administrative traffic. Typically, these roads are passable by high-clearance vehicles.

Level 3 – This level is assigned to roads where management objectives require the road to be open seasonally or year-round for commercial, recreation, or high volume administrative access. Typically, these roads are natural or aggregate surfaced, but may include low use bituminous surfaced roads. These roads have defined cross sections with drainage structures (e.g., rolling dips, culverts, or ditches). These roads may be negotiated by passenger cars traveling at prudent speeds. User comfort and convenience are not considered a high priority.

Level 4 – This level is assigned to roads where management objectives require the road to be open all year (except may be closed or have limited access due to snow conditions)

and to connect major administrative features (recreation sites, local road systems, administrative sites, etc.) to county, state, or federal roads. Typically, these roads are single or double lane, aggregate or bituminous surface, with a higher volume of commercial and recreational traffic than administrative traffic.

Level 5 – This level is assigned to roads where management objectives require the road to be open all year and are the highest traffic volume roads of the transportation system.

Montana Department of Natural Resources and Conservation (DNRC) Roads (State Land)

Seven segments of state land roads are designated open for motorized travel. These provide public access along five BLM roads: Bullwhacker, Antelope Ridge, Duvall Trail, Middle Two Calf spur, and Middleton. Also, BLM has five easements from DNRC that provide public access along three BLM roads: Middle Two Calf, Woodhawk Trail and Butch Camp. Another easement provides access for the Cow Island road north of the Monument.

County Roads

The county commissioners for Blaine, Chouteau, Fergus, and Phillips Counties have identified county roads that provide public access routes to or within the Monument (Table 3.13) along with documentation to verify the designations.

<i>Blaine County</i>	<i>Chouteau County</i>	<i>Fergus County</i>	<i>Phillips County</i>
Birdtail Road Cow Island Road Lloyd Road Power Plant Ferry Road	Butte View Road Clear Lake Road Eagleton Road Eight Mile Bench Road Flat Creek Road Gardiner Road Graceville Road Hopp Road Judith Landing Road Loma Bridge Road Panton Road Rowe Bench Road Sheep Coulee Road Twin Lakes Road Virgelle Ferry Road White Rocks Road	DY Trail Knox Ridge Road McClelland-Stafford Ferry Road PN Road Whiskey Ridge Road	Bull Creek Road Power Plant Ferry Road

U.S. Fish and Wildlife Service Roads

The routes for the Charles M. Russell National Wildlife Refuge include the Knox Ridge Road (segment #209) westward from the James Kipp Recreation Area (U.S. Highway 191) to the Monument; the Lower Two Calf Road (segment #307), which provides access to the Missouri Breaks Back Country Byway route along the UMNWSR; and the Mitchell Crossing Road (segment #850) which provides access to Armells Creek and Fargo Coulee in the southeast portion of the Monument.

Fort Belknap Indian Reservation

The route on the Fort Belknap Reservation includes the Hays East Road to U.S. Highway 191 near Hays/Lodgepole.

State Highways

These routes include U.S. 87 on the west end, Montana Secondary 236 in the middle, and U.S. 191 on the east end of the Monument area.

Easements Providing Access to and Within the Monument

The BLM holds easements for public access across state and private land as shown in Table 3.14.

Aviation

Ten backcountry airstrips are located on BLM land within the east half of the Monument. A map showing the location of the airstrips is available on the BLM website at http://www.blm.gov/nhp/spotlight/state_info/planning.htm. Eight small aircraft landing strips have been identified on the north side of the Missouri River in Blaine County:

- Black Butte North
- Black Butte South
- Bullwhacker
- Cow Creek
- Ervin Ridge
- Left Coulee
- Log Cabin
- Roadside

The other two are located on the south side of the Missouri River in Fergus County:

- Knox Ridge
- Woodhawk

Fire

Wildland Fire Ecology

The landform is a series of drainages and ridges running mostly north to south. The area is made up of rolling upland plateaus known locally as benches, with moderate to deeply incised canyons. Native vegetation is primarily sagebrush and grasslands on the plateaus, changing to ponderosa pine, Douglas-fir and juniper forests on the canyon slopes. Riparian shrubs and cottonwood trees are found along the Missouri River and in the drainage bottoms throughout the area. Some of the private uplands are in annual cereal crop production, some are in the Conservation Reserve Program maintaining an undisturbed cover of perennial grass, and the remainder is native rangelands.

The entire Breaks area is a fire-adapted ecosystem. For a period of time every year, usually from late May to late July, wet thunderstorms are a regular occurrence and lightning sparks numerous fires. In most cases, these fires remain small due to the moisture present in the thunderstorms and the green vegetation during the late spring and early summer months. The fires that do grow to a larger size (usually less than 500 acres) start in the timbered areas of the Breaks. The larger size fires result from a combination of fuel buildup, drought conditions, and high winds after ignition.

Lightning fires alone do not account for the widespread occurrence of fire and the fire-adapted nature of the vegetation in the Monument area. A growing body of research suggests that for over 10,000 years the vegetation in the northern Great Plains and the Monument area was maintained and manipulated by American Indians' deliberate use of fire (the historical equivalent of prescribed fire). Of the American Indian tribes that frequented the Monument area, Williams (2002) documents deliberate fire use among the Shoshone, Blackfeet, Assiniboine, and Gros Ventre. Early settlers observed Indians setting fires in the Shonkin Creek area (Geraldine Historical Society 1976). The season for these pre-settlement prescribed fires was usually during periods of vegetative dormancy between mid-September and mid-May, and outside the lightning fire season, after late July (Kay 1994). Some post-settlement burning occurred in the late 1800s or early 1900s for land clearing or to improve range forage. Since the early 1900s the deliberate use of fire to maintain desired vegetation and wildlife habitat has been almost non-existent in the Monument area.

Wildland Fire History

Fire history for this area is based on vegetation types in the non-forested areas and fire scar data and tree age classes in the timbered areas. Based on analysis of the Fergus Tri-

**Table 3.14
BLM-Held Easements**

<i>Serial#</i>	<i>Road Name</i>	<i>Legal Description</i>	<i>Grantor</i>
M20515	Middle Two Calf	T22NR21E sec. 13: NENE	Montana
M20516	Middle Two Calf	T22NR21E, sec. 12: S2SE	Montana
M20517	Middle Two Calf	T22NR22E, sec. 16: S2SW	Montana
M78843	Cow Island	T26NR19E, sec. 36: N2, SE	Montana
M79484	Butch Camp	T26NR20E, sec. 36: SWSW	Montana
M79681	Woodhawk Trail	T23NR21E, sec. 16: E2	Montana
M07905	Knox Ridge	T21NR21E, sec. 7: Lot 2, SENW	Browning
M07906	Knox Ridge	T21NR21E, sec. 7: Lot 3, SW	Lusted
M07929	Knox Ridge	T21NR22E, sec. 9: S2SW	Bachhuber
M07931	Knox Ridge	T21NR22E, sec. 9: S2SE sec. 10: SWSW	Spears, et al.
M07933	Knox Ridge	T21NR21E, sec. 7: N2NE, NENW sec. 8: NWNE, N2NW sec. 10: NWNW, S2NW, NESW sec. 13: Lot 2, S2NE sec. 14: N2N2 T21NR22E, sec. 8: SESE sec. 10: SESW, S2SE sec. 11: S2SW, N2SE, SWSE sec. 17: NENW, S2NW, NWSW sec. 18: S2N2, NESE	Ward
M07934	Knox Ridge	T21NR21E, sec. 10: NWSE, E2SE sec. 15: NENE	Smith, et al.
M10444	Woodhawk Trail	T23NR21E, sec. 28: SWSW sec. 29: SESE sec. 32: NENE	Arthur
M77581	Cow Creek Crossing	T25NR21E, sec. 5: Lot 1, 2, SWNE T26NR21E, sec. 28: SESW sec. 33: W2NW, NWSW	Liddle
M77582	Coal Mine Coulee	T26NR19E, sec. 34: S2SE sec. 35: S2, SENE T26NR20E, sec. 34: E2SW, S2SE	Robinson, et al.
M78473	Woodhawk	T23NR21E, sec. 28: N2SW, SENW	Peterson

angle and Armells Creek areas (Balison 2002), the beginning of noticeable settlement and active fire suppression was 1911. During the pre-settlement period from 1841-1911, the average fire frequency interval was 7.7 years. The range of actual fire occurrence for this period runs from 2 to 29 years. Most of the fires recorded were low intensity surface fires that killed few trees as multiple fire scars were

common and the majority of trees were established in the 1860s.

Current fire history is based on fire reports from 1980 to 2003. During this period, the BLM and cooperating agencies have responded to 134 lightning fires and 10 human-caused fires that burned a total of 6,551 acres. The majority of the reported fires occurred in the timber/grass fuel type.

Fire Hazard

Fire could be beneficial in much of this area by regenerating decadent shrubs, reducing the encroachment of juniper into grasslands and forest understory, and reducing the density of ponderosa pine and Douglas-fir in timbered areas. Restoration of the pre-settlement fire regime would improve ecosystem health and resilience; however, unplanned fire under uncontrolled conditions in certain areas could threaten structures on private and BLM land and could result in negative impacts to wildlife habitat and vegetation. Areas of heavy fuel loading such as timbered coulees and brushy draws that have been without fire for 50 to 80 years are most vulnerable to negative impacts from uncontrolled fires.

Wildland-Rural Intermix

Rural intermix sites consist mainly of scattered ranches and recreation areas along the Missouri River. Private ranches are located adjacent to BLM land. Vegetation consists of grass and sagebrush with scattered pockets of timber and croplands near most ranches. Recreation sites along the Missouri River include the Richard Wood Watchable Wildlife Area, Coal Banks Landing, Judith Landing, McClelland-Stafford Ferry, and James Kipp Recreation Area.

Special Designations

Upper Missouri National Wild and Scenic River

The Missouri River supported periods of exploration, fur trade, steamboat navigation, military activity, early settlement, development of the livestock and farming industries, homesteading, and today provides a great deal of recreation. The scenery along the river is interesting and varied, changing from a broad valley rich in riparian vegetation below Fort Benton, to the unique and beautiful White Cliffs below Coal Banks Landing, to the sharply carved and rugged badlands below Judith Landing, to the rolling pine and juniper covered slopes of the Breaks below Cow Creek. These contrasting habitats also provide for a diverse and plentiful wildlife population.

Boating the Missouri River just for the sake of being on the water occurs, but the beauty and the solitude along the route are highly important to many visitors. For the history buff, the river is an avenue into the past, providing the opportunity to visit the sites of prehistoric and historic events to try to imagine how it was and much of the attention focused on the Missouri River results from its long and colorful history. For the wildlife enthusiast, especially the bird watcher, the river is a living museum of natural history. For those

interested in geology, the river has exposed a fascinating display of Cretaceous age formations and the effects of more recent faulting and volcanic eruptions. Subsequent erosion has created a unique array of strangely beautiful land forms.

The river valley's unique beauty and abundant wildlife have been noted ever since the Lewis and Clark expedition passed through here in 1805. In our modern, urbanized, high tech society, the area's pristine scenery and opportunities for solitude and recreation in an unconfined setting are extremely important values.

Formal recognition of the Missouri River's significant recreational values was first provided by the State of Montana in 1966, when it was designated a component of the Montana Recreation Waterway System. The importance of these values was confirmed in 1976 when the National Wild and Scenic Rivers Act, as amended by Public Law 94-486 (90 Stat. 2327), incorporated the 149-mile segment of the Missouri River from Fort Benton downstream to the Fred Robinson Bridge within the National Wild and Scenic River System.

As required by Congress, the BLM completed a management plan (BLM 1978 and 1993) which established boundaries; designated portions of the river as wild, scenic or recreational; and developed management guidelines. The boundaries were established as rim-to-rim (or the area seen from the river), except for the portions between Fort Benton and Coal Banks Landing (river mile 1 to 41.3), and within the Charles M. Russell National Wildlife Refuge (river mile 138.8 to 149), where a bank-to-bank boundary was established by Congress. The various portions of the river were designated as outlined in Table 3.15.

A unique provision of the Act (P.L. 94-486) was that the Missouri River also be managed 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 as long as this management stays consistent with the provisions of this Act (P.L. 94-486) and the Wild and Scenic Rivers Act (P.L. 90-542). Management of the Missouri River is currently guided by the Upper Missouri National Wild and Scenic River Plan (1993). The plan will be updated after this RMP/EIS is finalized.

In 1978, the Lewis and Clark National Historic Trail was designated. The Missouri River is recognized as a premier component of that system. The expedition spent the better part of 21 days along this segment of the Missouri River during the outbound trek (including more than a week at the Marias River campsite), and Captain Lewis spent an additional four days here during the return trip. Twelve of their outbound campsites have been carefully located as have three of the return campsites. Nowhere else along the route of the "Corps of Discovery" are the opportunities better for

**Table 3.15
Management Classifications and Boundaries for the
Upper Missouri National Wild and Scenic River**

<i>River Miles</i>	<i>Place Name</i>	<i>Length (Miles)</i>	<i>Management Classification</i>	<i>Management Boundary</i>
1 to 41.3	Fort Benton to Coal Banks Landing	41.3	Recreational	Bank-to-Bank
41.3 to 52	Coal Banks Landing to Ebersole Bottom	10.7	Recreational	Rim-to-Rim
52 to 85	Ebersole Bottom to Deadman's Rapids	33	Wild	Rim-to-Rim
85 to 92	Deadman's Rapids to Holmes Rapids	7	Recreational	Rim-to-Rim
92 to 99	Holmes Rapids to Leslie Point	7	Wild	Rim-to-Rim
99 to 104	Leslie Point to Magdall Homestead	5	Scenic	Rim-to-Rim
104 to 128	Magdall Homestead to Cow Island	24	Wild	Rim-to-Rim
128 to 138.8	Cow Island to Grand Island	10.8	Scenic	Rim-to-Rim
138.8 to 149	Grand Island to Fred Robinson Bridge	10.2	Scenic	Bank-to-Bank

The Wild and Scenic Rivers Act, Section 2(b) defines the classifications of wild, scenic and recreational as follows:

- Wild:** Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- Scenic:** Those rivers or sections of rivers that are free of impoundments, with shorelines or watershed still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- Recreational:** Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

reading the journals of Lewis and Clark and experiencing the scenes that are described. The magnitude of the undertaking, the stature of the men, and the quality of their work take on new meaning in this little-changed setting.

There are now 274 identified archaeological sites along the river, and 90% of the BLM land within the UMNWSR remains to be inventoried. These sites include tipi rings, drive lines and rock cairns along the rims and butchering, processing and camping sites across the river terraces. Sites along the rims are often fully exposed, while terrace sites are usually buried. These sites date from 10,000 years ago, and several of them have proven to be very significant. Two major archaeological sites, Holmes Terrace and Lost Terrace, have been excavated, greatly adding to the database from which to develop visitor information and interpretation. Both man and the meandering nature of the river are having serious impacts on these sites.

A total of 102 historic sites relate to the fur trade, steamboat era, early settlement and homestead days. Interpretive projects have been implemented and stabilizations attempted in an effort to help protect these resources for the benefit and enjoyment of present and future generations.

Most of the known paleontological resources in the planning area have been located along the river. BLM surveys in 1983/84 between Judith Landing and U.S. Highway 191 identified 104 sites in the Judith River Formation. These sites varied from incomplete dinosaur skeletons, to diverse invertebrates, to “wash” sites consisting of small teeth, scales, vertebra and similar materials.

Wild and Scenic Rivers

Appendix I lists the streams that were assessed for Free-Flowing and Outstanding Remarkable Values. The BLM will adhere to Sections 1(b) and 16(b) of the Wild and Scenic Rivers Act when determining eligibility.

Wilderness Study Areas

Antelope Creek

The Antelope Creek Wilderness Study Area (WSA) is located on the north side of the Missouri River in Phillips County and contains 12,350 acres of BLM land. It is contiguous on its south side with the Charles M. Russell

National Wildlife Refuge (CMR). This WSA is bounded on the north by Fortress Butte, Hideaway Ridge and the Bull Creek Road, and private, state and BLM land; on the west by the Power Plant Ferry Road; on the south by the Missouri River, CMR and private land; and on the east by private land lying adjacent to U.S. Highway 191.

The unit has typical river Breaks topography with steep, highly eroded coulees formed by tributaries that drop toward the Missouri River. Most of the unit is barren or sparsely vegetated. Where slopes and soil allow, vegetation usually includes short prairie grasses, sagebrush and greasewood. Juniper, ponderosa pine, lodgepole pine and Douglas-fir grow along the coulees, covering about 20-30% of the area. An occasional cottonwood can be found there or along the river.

The rough terrain of Antelope Creek has restricted most manmade features to ridge tops where 12 vehicle ways have provided vehicle access to the WSA. These ways are dispersed throughout, with several radiating out from the eastern boundary of the WSA. The WSA contains one reservoir which creates no impact on the apparent naturalness of the WSA.

The few developments in the WSA are used to facilitate livestock grazing and provide hunting access, and would not require substantial rehabilitation if the area became wilderness. The vehicle ways on ridges, used mainly for seasonal hunting or sightseeing, would revegetate from lack of use.

The Antelope Creek WSA has outstanding opportunities for solitude. The rugged terrain, characterized by a number of parallel drainages opening to the Missouri River, screens most activities that may occur on nearby ridge tops. The off-site impacts affecting solitude include vehicle use on the surrounding roads. Traffic volume on the Antelope Creek Road is low during the spring and early summer, but increases substantially during late summer and fall use by hunters. The broken topography near the road limits the impacts to areas adjacent to the road. Periodic traffic is visible on the Power Plant Ferry Road along the northern and western borders during the dry summer months, but the traffic only impacts areas within one-half mile of the northern boundary of the WSA.

While no single recreational opportunity was identified as outstanding, the WSA provides a diversity of primitive recreation opportunities including hunting, horseback riding, hiking, photography and rock climbing. Hunting is currently the most popular activity, normally occurring with vehicles along ridges. The Missouri River is also an important recreational addition. Visitors floating the river can camp along the unit's shoreline, fish from the shore, hike the coulees, and enjoy the outstanding scenery.

Public access into the WSA is available along the Power Plant Ferry Road, the Antelope Creek Road, and from the Missouri River by boat, but most other access routes are controlled by private landowners. Rain or snow can make any of the dirt access roads impassable. Weather conditions normally limit access to May-October or to dry road conditions.

Artifacts of both prehistoric and historic eras may be found in the WSA. Of particular historic significance is Kid Curry's Outlaw Hideaway, just north of the WSA on private land. In this WSA, 35% of the acreage is within the Upper Missouri National Wild and Scenic River. The area has a scenic designation, which means the area will be managed to preserve the scenic and natural characteristics.

Cow Creek

The Cow Creek WSA lies north of the Missouri River and contains approximately 34,050 acres. The river is the southern boundary of the Cow Creek WSA. Forming the east, west and northern boundary of the WSA are roads, private land and state land, or the natural topographical contours. Boundaries are extremely difficult to locate on the ground except for along the roads.

Most of the terrain is rugged and steep along the numerous drainages that feed into Cow Creek and the Missouri River. The Bull Creek-Winter Creek drainages have spectacular sandstone cliffs forming the drainage walls. In sharp contrast, some parts of the WSA are rolling open prairie, particularly toward the southeast corner. Where slopes and soil allow, the vegetative cover is predominantly short prairie grasses, sagebrush and greasewood. Ponderosa pine, lodgepole pine, Douglas-fir and juniper are prevalent throughout the WSA, with the densest stands growing along the northern end.

A number of vehicle ways, reservoirs, and fences are located on Winter Ridge in the area recommended suitable for wilderness. These developments are screened from view by rolling, hilly terrain, as well as by many trees and shrubs; so altogether this does not impact naturalness from some vantage points. The remainder of the area recommended suitable for wilderness has a natural appearance.

Several developed areas are within parts recommended nonsuitable and adversely affect naturalness. A 600-acre area east of Saskatchewan Butte (T25N R23E, Section 31 and T24N R23E, Sections 5, 6, 7 and 8) has 2 reservoirs, one diversion dam, 3 vehicle ways and a power line, all easily visible. The WSA also contains 2 drilling pads, several miles of vehicle ways, reservoirs, and fences. Most of these features are screened by timber and broken terrain; however, they create an impact on naturalness from some vantage points.

Solitude opportunities are outstanding in the Cow Creek WSA. The topography provides excellent screening. Solitude opportunities are best along Gore, Cabin, and Winter Creeks and the lower reaches of Bull Creek, primarily in areas recommended suitable for wilderness designation. The size of these drainages, combined with their lack of development, supplement solitude. One cherry-stemmed road is in the area recommended suitable for wilderness. Some potential exists for disruption of solitude to persons on or near this road from periodic vehicle use.

Solitude values in the parts of the Cow Creek WSA recommended as non-suitable would be affected by the unit's configuration and 3 cherry-stemmed roads. A home site is occupied during the summer, and a road is also visible (T25N R23E, Section 31 and T24N R23E, Sections 5 and 6). Visitors to areas outside the major drainages and nearer the perimeter of the WSA, primarily parcels in the WSA that were recommended as nonsuitable, have more potential for human contact.

Recreation in the Cow Creek WSA includes hunting, horseback riding, hiking, photography and rock climbing. Hunting is the most popular activity at the present time. It is normally limited to areas around access roads because of the difficulty of retrieving game. The Missouri River, adjacent to the part of the area recommended as suitable for wilderness, has increased the public's awareness of recreational opportunities in the WSA. People floating the river often stop to hike and explore within the unit. Several good camping sites can be found along ridges or near the river.

Scenic features are a notable attribute of the Cow Creek WSA. Of particular beauty is a 4-mile long, sheer wall of sandstone that lies on the west side of the Winter Creek drainage in a portion of the WSA recommended as suitable for wilderness. Wind and water have carved this wall into many castle-like formations suitable for climbing.

The WSA is also historically rich. The Winter Creek Drainage was used for catching wild horses at the turn of the century. The box canyon above the creek formed a natural corral called Horse Thief Pass. Along this canyon and near Shetland Divide names are etched in the sandstone that date back to the early 1900s. Additionally, tipi rings, rock cairns, and a buffalo jump indicate that the area was used extensively by early peoples. Along the western boundary, the Nez Perce Indians traveled north along Cow Creek during their escape attempt to Canada in 1877.

Most public access into the Cow Creek WSA is available along the southern boundary, either via the Missouri River or the Bull Creek Road. Other access is controlled by private landowners. Wet weather and snow normally restrict access to May-October or to dry road conditions.

Dog Creek South

The Dog Creek South WSA consists of about 5,150 acres of BLM land on the south side of the Missouri River in Fergus County. The WSA boundary on the north is the river's edge, and on the south by the Dog Creek Road. Elsewhere, property ownership lines are not easily discernable on the ground.

The WSA is fairly compact, about 5 miles long and 1 to 3 miles wide. Drainages of intermittent streams are extremely steep and are separated by narrow, barren ridges. The WSA contains very little screening vegetation, but topographic screening is abundant due to the rugged river Breaks topography. Since steep slopes run from the overlooking ridges down to the river, visitors would probably be channeled to a few areas along the Missouri River to isolated pockets between minor drainages or along flat ridge tops.

A total of 10 manmade features are found in this WSA. They are mostly scattered and well screened, but one vehicle way (route) is the exception. Traversing the northern end of the unit for about 4.75 miles, this route is easily visible from the river and from the ridge tops. Although the route is revegetating in places through lack of use, it is a major infringement on the naturalness of the WSA's northern end. Mechanical rehabilitation would probably create more damage than if the way were allowed to revegetate over time.

The other manmade features are mostly associated with livestock grazing. Because of the location of most manmade features, boundary modifications would not significantly increase the apparent naturalness of this WSA.

Overall, solitude in this unit is affected by continuing agricultural operations adjacent to the northern and western parts of the Dog Creek South WSA, and these opportunities are limited to isolated drainages in the center of the WSA.

Developments within a few hundred yards of the WSA's southern edge influence solitude because of the dust and noise caused by moving vehicles and people. Extensive farming operations are also readily visible from the WSA, being from 400 yards to 1/2 mile away in much of the unit. From spring to fall, farm vehicles are regularly used on adjacent fields.

Motorized traffic down the Missouri River, and road traffic on Montana Secondary 236 and the PN Bridge across the Missouri further infringe on solitude, adversely affecting approximately 2,000 acres on the north and west sides of the WSA. True solitude is available only in the center and eastern portions of the unit.

The WSA's location on the Missouri River contributes to the primitive recreation opportunities found here, which include fishing from the shore, waterfowl hunting, and camping. Other possible recreational uses include hiking, horseback riding, nature study, and photography. Present uses are primarily sightseeing (by vehicle), hunting for mule deer, and camping along the river. The nearness to Montana Secondary 236 traffic and farm-ranch operations in this general area makes the river campsites in the Dog Creek WSA less desirable than other locations along the Missouri River. Some camping sites can be found on the long ridges inside the unit, although the lack of trees and water makes camping there less attractive. Like the other WSAs near the Missouri River, Dog Creek South provides good hunting. Possible detriments to hunting are restricted access through private land, the difficulty of retrieving game, and fluctuating game populations.

The area is remote from population centers and inaccessible in wet or snowy weather. The user season would be from May-October, in dry conditions only. Physical hazards to visitors in the area include rattlesnakes, steep terrain, lack of drinking water, and the difficulty of travel in wet weather. The lack of forest vegetation, outside distractions, narrow, long ridge lines, the channeling of visitors into the deep drainages, and the small size of this WSA all mean the Dog Creek South WSA does not offer outstanding opportunities for wilderness recreation.

Ervin Ridge

The 10,200-acre Ervin Ridge WSA is just north of the Missouri River and 10 miles east of the McClelland-Stafford Ferry Crossing. Nearly 50% of the WSA lies within the UMNWSR. All the land within its border has federal surface and subsurface ownership.

About 10 miles long and 0.25 to 0.75 miles wide, this unit is irregularly shaped. The rugged topography of steep and highly eroded ridge lines tapers to narrow edges before dropping to the Missouri River. The terrain provides solitude but the steep slopes also channel visitors along the river and to the ridge tops. Where slopes and soils allow, the vegetation cover is predominantly short prairie grasses and sagebrush, while 20% of the area has groves of ponderosa and lodgepole pine, juniper and Douglas-fir. An occasional cottonwood is found along the river. Vegetation growing along drainages and on some ridge tops provides some screening, primarily in the eastern half of the unit.

Solitude in certain parts of the Ervin Ridge WSA is affected by the configuration of this unit, outside impacts, and by two cherry-stemmed roads. Inside the unit, the wilderness user is never more than a mile from the boundary. Farming, vehicle traffic on the boundary, cherry-stemmed roads, and activities around three home sites near the west side are

distracting. On the Barnard and Pendell Ridges, intensive wheat farming borders the WSA, while farming operations across the river can be seen from the unit's ridge tops. Motorized traffic on the Missouri River, while slight, is a further infringement on solitude. The best opportunity for solitude is in the southeastern part of the WSA.

Hunting and recreation on the Missouri River are presently the two most common forms of recreational use in the Ervin Ridge WSA. Hunting usually involves vehicles traveling along the ridge tops or the use of boats. Inside the WSA, hunting is a challenge because retrieving game is complicated by the steep slopes.

Other forms of primitive recreation that could occur in the unit include horseback riding, hiking, sightseeing, photography, and shoreline fishing.

The road access to the WSA is through private land on the Ervin and Barnard Ridge roads and by boat from the Missouri River. Public vehicle access is obtained only by the landowners' permission. Wet weather and snow often make these dirt roads impassable and can quickly seal off the area, limiting access to May-October during dry weather.

Although opportunities exist for recreation, the WSA's steep terrain channels use along the river, along coulee bottoms or on finger ridges. The lack of vegetation and drinking water, difficulty of travel during wet weather, and rattlesnakes increase the hazards of recreation in the unit.

Stafford

The 4,800-acre Stafford WSA is just north of the Missouri River between the PN Bridge and McClelland-Stafford Ferry in Chouteau and Blaine Counties. This unit includes 4,346 acres within the Upper Missouri National Wild and Scenic River: 425 acres in the scenic section, 113 acres in the recreational section, and 3,808 acres in the wild section. Parts of the WSA are bounded by the Birch Creek Ridge Road, the Boiler Bottom vehicle way, state land, BLM land, the Missouri River, and private land. All the land within its border has federal surface and subsurface ownership.

The rugged terrain of the Stafford WSA has limited human imprints, which helps retain the natural appearance. Developments are few and scattered, lying primarily on the unit's periphery. The manmade features are of low significance being substantially unnoticeable. Because of their location, boundary modifications would not significantly increase the apparent naturalness of this WSA.

The few developments inside the unit are mostly associated with livestock grazing. As with all WSAs, facilities would not be rehabilitated if they were found to be unnecessary for grazing management. Vehicle ways that follow ridges and

are used primarily for seasonal hunting or sightseeing would revegetate naturally if not used.

The Stafford WSA is long and narrow, stretching 8 miles in length and 0.5 to 1.5 miles in width. It is found in a rugged portion of the Missouri Breaks with steep and highly dissected coulees that are often sparsely vegetated. Where slopes and soils permit, vegetation is composed of prairie grasses, sagebrush, and juniper. Patches of cottonwood parallel the river and juniper and pine grow in a few isolated groves.

Since the unit has few tall plants, very little screening is available from vegetation but topographic screening is abundant. Steep slopes running down from ridges overlooking the Missouri River would probably channel visitors into a few areas along the river to isolated pockets between minor drainages or along flat ridge tops. This decreases the opportunity for solitude in this unit.

The opportunity for solitude is also affected by adjacent homes, vehicle use along surrounding roads, boat travel on the river, and four farm-ranch operations next to the WSA. Fields are farmed up to the WSA boundary in the northeast end and other farming operations are within 0.75 miles of the WSA. Farm equipment is occasionally visible and audible during the main recreational season of May-October. The farming operation in Section 13 has an aircraft runway and the operators regularly fly over the WSA.

The county road to the McClelland-Stafford Ferry, immediately across the river from the east end of the Stafford WSA, is well used during the summer. A hayfield and home site are also just opposite the east end of the Stafford WSA, and the sight and sound of its irrigation system is present throughout the summer growing season. On the west end of the Stafford WSA, solitude is reduced by nearby farming operations.

Typical recreational opportunities in the Stafford WSA include horseback riding, hunting, hiking, sightseeing, photography and shoreline fishing. Hunting is the major use, and usually involves vehicles traveling along the ridge tops of the north boundary. Travelers along the Missouri River can find limited campsites along the shorelines of the WSA and can hike the coulees or enjoy the area scenery.

Although some opportunities exist for primitive recreation, use is limited in various ways. The steep terrain channels use along the river or the finger ridges, while the lack of screening vegetation limits campsites to the few scattered groves of trees along the Missouri River. Rattlesnakes, lack of water and difficulty of travel during wet weather present hazards to the wilderness user.

This WSA, like almost all of the Missouri River Breaks, contains features of scenic and historic value. Steep coulees

and clay cliffs offer stark contrast to the Missouri River. Evidence of the area's use by Indians and homesteaders can be found in the WSA, and an old wagon road forms its eastern border.

Woodhawk

The Woodhawk WSA is on the south side of the Missouri River in Fergus County and consists of 8,100 acres of BLM land. This WSA is bounded on the north by Sunshine Spur Road and BLM land; on the west by Woodhawk Trail road, state and BLM land; on the south by the Two Calf and DeMars roads; and on the east by the Missouri River and private land.

The WSA is compact, 4 miles long by 2.5 to 4 miles wide, with the distance from the center to the perimeter about 1.5 to 2 miles. The WSA is typical of broken topography in the Missouri River Breaks. The south slopes are open banded clay supporting short grasses. Two-thirds of the WSA supports ponderosa pine, juniper, and a few Douglas-fir trees. Two major drainages flow east-west into the Missouri River, leaving a deeply eroded landform in their wake.

A cluster of reservoirs are located in the southern third of the area in T23N R21E, Sections 25, 26, and 27, which adversely affect natural values. The cherry-stemmed Deweese Ridge Road, which ends 1.5 miles inside the area's boundary, detracts from naturalness in the center of the unit.

The manmade features inside the unit are mostly associated with livestock grazing. Boundary modifications would not significantly increase the WSA's apparent naturalness because the manmade features are dispersed throughout the area.

The Deweese Ridge Road, located in the middle of the WSA, is on a high, open ridge and is heavily used during the big game hunting season. This road is the only access to the central portion of the area and dead ends in the middle of the WSA. This dead end tends to concentrate both motorized and nonmotorized users, detracting from the wilderness experience. Vehicle traffic is not the only distraction. Farming operations to the south and north are visible and often audible, affecting the overall opportunity for solitude from the high ridges and hilltops.

Primitive recreational possibilities in the unit consist of rock climbing on the cliffs (T23N R21E, Sections 13 and 24), horseback riding on the ridgelines or main drainages, hiking, hunting, and sightseeing. Recreation users presently drive motorized vehicles on Deweese Ridge Road or on Sunshine Spur Road located in T23N R21E, Sections 1, 2, 11, and 12. These roads are also used for fire control. Floaters use some camping areas along the river, even though no potable water is available in the unit. Good campsites can also be found along Deweese Ridge in the

middle of the WSA. Although access is very good, rain or snow can quickly seal off the area, limiting the user season to May-October in dry conditions. Hunting quality is restricted by the difficulty of game retrieval and by fluctuating game populations. Rattlesnakes and the steep slopes provide hazards to unwary visitors.

The WSA contains several prehistoric occupation sites. In historic times, woodhawkers cut timber there to fuel steamboats on the Missouri River (hence the name of this area), and the unit was probably traversed by Chief Joseph's Nez Perce in their attempt to escape to Canada in 1877.

Cow Creek Area of Critical Environmental Concern (ACEC)

The Cow Creek ACEC is in southeastern Blaine County. Approximately 18,800 acres are inside the unit. Although the majority of the area is BLM land, 4,000 acres (21%) of the creek bottom are privately owned. Three tracts of state-owned land (800 acres) are scattered along the unit's border.

The Cow Creek area contains a portion of the Nez Perce National Historic Trail; a portion of the Lewis and Clark National Historic Trail; the Cow Island Trail; high scenic quality; and important paleontological sites. All of these resources are unique to the area. The Cow Creek emphasis area also overlaps portions of the UMNWSR and the Cow Creek WSA.

A premier portion of the Nez Perce (Nee-Me-Poo) National Historic Trail is found in the Cow Creek area. This portion has been recognized as extremely important for several reasons. First, it runs through an area that is largely unchanged since the Nez Perce made their famous journey in 1877. It is also an area where an extensive portion of this trail has remained in federal ownership.

The ACEC also includes a portion of the regionally significant Cow Island Trail. It was the main overland route for carrying persons and goods from the Cow Island Landing to Fort Benton, when the steamboats could not advance upstream due to low water. The scenery of the land is still extremely similar to that period of time. This portion of the trail is no longer used by vehicle traffic. Some abandoned outbuildings still lie in the vicinity of the trail.

The Lewis and Clark National Historic Trail (the Missouri River) forms the southern boundary of the Cow Creek area.

The entire landscape is extremely dissected with steep cliffs and rock outcroppings. Sharp contrasts between the creek bottom and overlooking ridges are evident. The topographic difference in the area can range nearly 800 vertical feet over distances less than 1 mile.

The area has significant paleontological values. Early explorations (1870s-1880s) yielded many new fossils, particularly dinosaurs. Though most were identified by incomplete skeletons, a dinosaur (Triceratops) was found in the Eagle Sandstone at the mouth of Cow Creek.

Social and Economic Conditions

Social

Below is a discussion on some of the social trends and changing attitudes that affect BLM land management, followed by a focus on the four counties in central Montana in which Monument land is located, and Hill County, which is adjacent to the Monument counties and contains the largest community in the northern tier of counties. The four counties with Monument land are: Blaine, Chouteau, Fergus, and Phillips. The social study area includes these four counties plus Hill County.

Social Trends and Attitudes

This section focuses on social trends and attitudes that affect BLM land management.

One trend is the increasing popularity of BLM land for recreation. A comprehensive report on recreation by Cordell (1999) indicates demand in the Rocky Mountain West for recreation activities will increase substantially by the year 2020 with nonconsumptive wildlife activities, sightseeing and visiting historic places having the greatest increases. A related trend is the increasing interest in the history of exploration and settlement in the western United States such as the Lewis and Clark Expedition. In a study of visitors to the Fort Benton riverfront area (McMahon 2001), nearly 50% of the respondents indicated they were motivated by an element of Lewis and Clark history to visit the site.

Another issue is maintaining access to BLM land if access through private land is required to reach the BLM land. In addition, the loss of access to some private land, for the general public, is putting more pressure on BLM land. These changes are linked to the pursuit of a quality recreation experience and occur for a variety of reasons such as: lands are purchased for recreation and home sites and closed to others; lands are leased to outfitters for exclusive use; and private land and roads are closed to avoid problems with safety, fire, fences, weeds, litter and open gates.

A third trend that is occurring in the nation and Montana is the aging of the population. In 2000, 14% of the population in Blaine, Chouteau, Fergus, Hill and Phillips Counties was 65 years and over. In the state as a whole, the percentage of population 65 years and over is expected to increase to 25%

in 2025. The percentage of people over 65 is actually increasing more rapidly in states like Montana because young people are more likely to leave for advanced education, military service and employment opportunities not available locally.

Changes in the management of BLM land are just one aspect of a broader debate on environmental and resource management that is occurring locally, nationally and globally. Social values for lands and natural resources can take many forms such as commodity, amenity, environmental quality, ecological, recreation, spiritual health and security (Stankey and Clark 1991). While the commodity interest has been prevalent in the past, a study examining public attitudes toward ecosystem management in the United States found “generally favorable attitudes toward ecosystem management (defined as maintaining ecosystem health, protecting and restoring biodiversity and ensuring sustainability) among the general public.” (Bengston et al. 2001)

A nationwide survey conducted in 2000 by Roper Starch Worldwide (2001) offers information on attitudes toward environmental regulation. Respondents were asked whether they thought environmental laws and regulations had gone too far, had not gone far enough, or had achieved the right balance. Over three times as many respondents thought laws and regulations had not gone far enough (46%) as those who thought laws and regulations had gone too far (15%). Nearly a third of the respondents (32%) thought that the laws had struck the right balance. These three figures have been fairly stable since 1995. When respondents were segmented by residence in urban versus rural areas, the figures for “not gone far enough” were 52% and 38% respectively. In addition, only 36% of the respondents who hunted in the last year thought laws had “not gone far enough.”

When similar questions were asked at the national level regarding the current regulation of specific environmental issues, the following percentages thought regulations for these specific issues had not gone far enough: water pollution (70%), air pollution (63%), wild or natural areas (50%), wetlands (44%), and endangered species (39%). Conversely, the following percentages thought regulation of specific environmental issues had gone too far: endangered species (5%), wetlands (11%), wild or natural areas (11%), air pollution (7%), and water pollution (5%). When respondents were segmented by residence in urban versus rural areas, the figures for “not gone far enough” to protect wild or natural areas were 54% and 44% respectively.

In the rural West, in places where land use has been unrestricted, concern is being expressed by some individuals and groups regarding the control and management of BLM land. People with these concerns feel that change in BLM land management is being driven by government

officials and environmental advocacy groups who do not have a true understanding of the lands or the people living nearby who depend upon these lands for their livelihood and recreation. Of particular concern is the loss of current uses of the land such as livestock grazing and cross-country vehicle use. People with these concerns seek to balance what they consider to be “environmental extremism” with economic and human concerns. They may feel that local elected officials, who deal with their problems on a daily basis, are better equipped to make decisions about BLM land.

Social Study Area Counties and Communities

The 2004 population of the social study area (including Blaine, Chouteau, Fergus, Hill and Phillips Counties) was 44,359, a decrease of 4% since 2000. During the decade 1990 to 2000, the study area population grew less than 1%. The social study area population is projected to be about the same in 2020. The area is very sparsely settled with 2.2 persons per square mile compared to a figure of 6.2 for the state as a whole. The population of the social study area is 80% white and 17% American Indian. (The remaining 3% includes Blacks, Asians and Pacific Islanders, and people of two or more races.) The American Indian population is concentrated in Blaine County, which is nearly 50% American Indian. The median family income in the social study area is lower than for the state (\$28,858 versus \$33,024), and the percentage of persons below the poverty level is higher (21.1% versus 14.6%).

Blaine County, which is located north of the Missouri River, had a 2004 population of 6,668, a decrease of 5% since 2000. It grew 4% during the decade 1990 to 2000 and is the only social study area county that is projected to grow by 2020. Of the social study area counties, Blaine has one of the lowest percentage populations 65 and over, and the highest percentage of American Indians. Chinook, the county seat, had a 2004 population of 1,315, a decline of 5% since 2000. Blaine County is home to the larger part of the Fort Belknap Indian Reservation. Two reservation communities are located within 50 miles of the Missouri River. These communities are Hays with a 2000 population of 702, and Lodge Pole with a population of 214. In 2002, Blaine County was home to 588 farms and ranches. The number of farms and ranches increased 14% during the period 1992 to 2002, while the amount of land in farms and ranches and the average size of these operations decreased by 3% and 15%, respectively (U.S. Census of Agriculture 2002). Farming/ranching was the principal occupation of 70% of the farm/ranch operators.

Chouteau County, which is located in the western part of the social study area, had a 2004 population of 5,575, a decrease of 7% since 2000. Chouteau County had a population increase of nearly 10% during the decade 1990 to 2000.

It is expected to continue to decrease slowly by 2020. Fort Benton, the county seat, is home to the BLM Fort Benton Visitor Contact Station and the place where many floaters enter the Missouri River. Fort Benton had a 2004 population of 1,506 and lost 6% of its population between 2000 and 2004. Other small communities located close to the Missouri River include Loma with a population of 92 and Big Sandy with a population of 703. The Rocky Boy's Indian Reservation is located in Chouteau and Hill Counties. Chouteau County was home to 787 farms and ranches in 2002. The number of farms, amount of land in farms, and average size of the farms has been relatively stable in the recent past (U.S. Census of Agriculture 2002). Farming/ranching was the principal occupation of 85% of the farm/ranch operators.

A survey conducted for the City of Fort Benton (2002) indicated over 70% of the respondents thought it was an excellent or above average place to live. Things people liked best about living in the area included: safe/low crime, small size/small town feeling, the friendly caring people, the quiet and peacefulness, the river, and many other attributes related to the area and its residents. Lack of job opportunities and a stagnant/weak economy were two of the main things respondents did not like about living in the area. Bringing businesses to town and creating jobs to attract young people were two of the things respondents indicated could be done to make Fort Benton a better place to live. Nearly 75% of the respondents had lived in the area more than 10 years.

Fergus County, which is located south of the Missouri River, had a 2004 population of 11,539. It lost 3% of its population between 2000 and 2004 and is projected to continue to lose population very slowly (with a decrease of less than 1% predicted in 2020). Fergus County has the highest percentage of population 65 and over of the social study area counties, and the lowest percentage of American Indians. Lewistown, the county seat, is home to the Monument Headquarters. Lewistown had a 2004 population of 6,116, an increase of 5%. Winifred, a ranching community located 14 miles south of the Missouri River, had a 2004 population of 150. In 2002, Fergus County had 830 farms and ranches. The number of farms, amount of land in farms, and average size of the farms has been relatively stable in the recent past (U.S. Census of Agriculture 2002). Farming/ranching was the principal occupation of 69% of the farm/ranch operators.

Hill County, located north of the Monument, does not actually contain any Monument land. Hill County had a 2004 population of 16,376, a decrease of 2% from 2004. Havre, the county seat, is the largest community on the HiLine. Havre had a 2004 population of 9,460.

Phillips County is located north of the river and east of Blaine County. It had a 2004 population of 4,201, a decline of 8% since 2000. It lost over 10% of its population during the decade 1990 to 2000 due to the closing of gold mines in the Zortman and Landusky areas. The county population is expected to continue to decline by over 6% by 2020. Malta, the county seat, had a 2004 population of 1,940. In 2002, Phillips County was home to 489 farms and ranches. The number of farms and ranches increased 10% between 1992 and 2002 while the average size decreased 4% (U.S. Census of Agriculture 2002). Farming/ranching was the principal occupation of 72% of the farm/ranch operators.

Note: All population figures, except for the 2004 figures, are from the 2000 Census.

Table 3.16 lists population and social characteristics for the five counties in the social study area and for the State of Montana as a whole.

Affected Groups and Individuals

Discussions of affected groups and individuals are included to facilitate the assessment of social impacts. The following groups and individuals will be discussed: ranchers and livestock permittees, groups and individuals who give a high priority to resource protection, recreationists, and groups and individuals who give a high priority to resource use. It should be noted that these groups are not mutually exclusive and examples of households fitting into all categories are likely to be present. This section is based predominately on the information collected during the initial scoping process.

Ranchers and Livestock Permittees

Ranching is an important part of the history, culture and economy of the study area. There are many challenges facing ranchers today including changes in federal regulations, economic issues and changing land use. Permittees may face increasingly stressful social situations as they try to balance their traditional lifestyles with demands from government agencies and other public users such as recreationists. Many of the comments received during scoping indicated the BLM should maintain current management for cattle grazing, access routes into the Monument, and water developments for wildlife. Other issues of concern include weed control, potential future policy changes and maintaining access to private lands. According to these commenters, the current farmers and ranchers have maintained the area in a manner that can be appreciated by others just traveling through. These farmers and ranchers would never waste their resource because it would mean an end to a valued way of life.

	<i>Blaine</i>	<i>Chouteau</i>	<i>Fergus</i>	<i>Hill</i>	<i>Phillips</i>	<i>5-County Study Area</i>	<i>State of Montana</i>
2004 Population	6,668	5,575	11,539	16,376	4,201	44,359	926,865
<i>% Change from 2000-2004</i>	-4.9	-6.6	-3.0	-1.8	-8.7	-3.9	2.7
2000 Population	7,009	5,970	11,893	16,673	4,601	46,146	902,195
<i>% Change from 1990-2000</i>	4.2	9.5	-1.6	-5.6	-10.9	.2	12.9
Projection 2020	7,150	5,760	11,820	16,650	4,310	45,690	1,085,520
<i>% Change from 2000-2020</i>	2.0	-3.5	-0.6	-0.1	-6.3	-1.0	20.3
Persons/Sq. Mi.	1.7	1.5	2.6	5.8	0.9	2.2	6.2
<i>% 65 and Over</i>	12.9	17.5	19.9	12.8	17.6	16.1	13.4
<i>% White</i>	52.6	84.0	97.1	79.5	89.4	80.5	90.6
<i>% American Indian</i>	45.4	14.6	1.2	17.3	7.6	17.2	6.2
<i>% HS Grad - 2000</i>	78.7	87.1	86.3	86.8	82.4	84.3	87.2
Median Household Income 1999	\$25,247	\$29,150	\$30,409	\$30,781	\$28,702	\$28,858	\$33,024
<i>% Persons Below Poverty Level</i>	28.1	20.5	15.4	18.4	18.3	20.1	14.6

Source: U.S. Department of Commerce, Bureau of the Census

Groups and Individuals Who Give a High Priority to Resource Protection

A variety of local, regional and national level organizations, along with their members and supporters, have shown a great deal of interest in this plan through input received during the scoping process. Many of their comments focused on protecting wildlife and native plants; historical, archeological, paleontological, geologic and cultural sites; air quality and visual resources. They indicated some ways to protect these features include limiting oil and gas development, recreation infrastructure and roads. They want the Monument to maintain its wild, empty, quiet atmosphere as an alternative to the hectic lives most people lead. These organizations indicate the condition of Monument resources is important because of wildlife, recreation, education, scenic, wilderness, open space and spiritual values and want these resources to be available in their current condition for future generations.

Recreationists

Recreation is a component of most lifestyles in the study area and is an important element of the overall quality of life

for many residents. In addition to local recreation use, recreationists from all over the United States visit the UMNWSR. Recreationists are very diverse groups of people and changes in recreation management can affect the people who engage in the various activities very differently.

Some comments on recreation concerned the potential loss of activities such as driving OHVs on roads and trails, traveling off road to retrieve game, driving off road to campsites, using motorized watercraft on the Missouri River and using backcountry airstrips. Some commenters indicated that opportunities for these activities are declining elsewhere. For each of these activities, some commenters discussed their importance to the lifestyles of the people who engage in them.

Other commenters, many of them river floaters, focused on maintaining a primitive, solitary, nonmotorized Monument recreation experience. Noise is a major issue to many of these users. Some mentioned their concern about the loss of an alternative to the world in which we live, where the noise of engines is all-pervasive, and the need to protect areas where natural quiet can be experienced. Research

confirms the importance of noise to recreationists. According to Gramann (1999), “Many surveys show that quiet, solitude, and natural sounds play important roles in recreation experiences. Recreation users consistently state that escaping noise and enjoying the sounds of nature are among the important reasons they visit natural areas.”

Groups and Individuals Who Give a High Priority to Resource Use

Groups and individuals from both inside and outside the study area have expressed concern about limitations being put on the availability of Monument lands for commercial uses such as oil and gas development, livestock grazing and river use. Maintaining access to public and private lands in the Monument is also an important issue to them, as well as not restricting the amount or types of river use. They indicate the Monument lands need to be managed to help the survival of local economies and communities and are concerned that Monument designation may increase financial expenditures for county services such as wildfire suppression and search and rescue operations.

Environmental Justice

Executive Order 12898, Environmental Justice, requires each federal agency to identify and address the “...disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations”

American Indians (including some Alaska Natives) represented 17.2% of the population in the social study area. This population is concentrated in Blaine County whose population is nearly 50% American Indian. Two Indian Reservations are located in the social study area. The Fort Belknap Reservation is located in Blaine and Phillips Counties and the Rocky Boy’s Reservation is located in Blaine and Hill Counties. The Fort Belknap Reservation, home to the Assiniboine, Assiniboine Sioux, and Gros Ventre Tribes, had a 2000 American Indian population of 2,790. The Rocky Boy’s Reservation, home to the Chippewa-Cree Tribe, had a 2000 American Indian population of 2,578. Several tribes have shown an interest in the area for cultural purposes.

In 1999, 14.6% of the persons living in the State of Montana had incomes below the poverty level. This compares to an average of 21.1% for the social study area. Figures for the individual counties range from a low of 15.4% in Fergus County to a high of 28.1% in Blaine County.

Economic

The study area examined is comprised of five Montana counties: Blaine, Chouteau, Fergus, Hill, and Phillips Counties. Four of these counties contain Monument land and the fifth, Hill County, is an integral part of the regional economy affected by activities in the Monument.

The area was first described by Lewis and Clark as they passed through on their journey to and from the Pacific Ocean. The earliest economic market activity began as fur trappers entered the area seeking furs. This was followed by trading posts and gold seekers. The Missouri River was an important transportation route, with steamboats providing access to regional markets. The growth of mining activity provided a market for beef and ranching began to flourish in the 1860s. In the 1880s, railroads were constructed in the area and ranchers and miners obtained cheaper access to distant markets. A Homestead Act was passed in 1909 and farming was expanded as farmers moved into the area to take advantage of the low priced land, and wheat became an important export crop.

Population

Community characteristics, population characteristics, and population trends are discussed in the Social section of this chapter.

Employment

Employment can be viewed as a key economic indicator, as patterns of growth and decline in a region’s employment are largely driven by economic cycles and local economic activity. The period of 1991 through 2000 was one of significant economic growth in the United States, with employment growing by almost 21%. During the same period, Montana experienced even faster growth than the nation, as employment increased by almost 26%. All of the counties in the study area had employment growth below the national and state growth rates, with two counties (Blaine and Phillips) experiencing declines. The following summarizes some notable changes in study area employment levels over the decade 1991 to 2000.

Employment in the study area grew over 8% during the 1990s, a significant increase over the previous decade when growth was less than 1%. Growth was not even across the study area (Table 3.17). At the high end of growth, Fergus County gained 943 jobs. At the low end, 84 jobs were lost in Phillips County.

Table 3.17	
Change in Total Employment in Study Area Counties, 1991 to 2000	
<i>County</i>	<i>Number of Jobs</i>
Blaine	-4
Chouteau	+498
Fergus	+943
Hill	+716
Phillips	-84
Study Area Total	+2,069

Source: U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis, Regional Economic Information System (REIS), 1969-2000, CD-ROM, May 2002.

The fastest growing sector in the study area was agricultural services, which grew by almost 50% (259 jobs) (Table 3.18). The services sector gained the most jobs (1,490), while construction had the second largest gain (395 jobs). Mining had the largest relative job loss, declining by almost 45% (150 jobs) between 1987 and 2000. The transportation and public utilities sector had the largest job loss (208 jobs), followed by the military sector of the federal government, which lost 169 jobs. Losses in military jobs occurred in all five study area counties.

Employment in agriculture has been in long-term decline as labor productivity in agriculture has steadily improved. In the study area, however, farm and ranch employment increased by 300 jobs during the decade, not following this long-term trend. At the same time, employment in agricultural services in the study area increased by 259 jobs. Together these two sectors accounted for one-quarter of total job growth in the study area.

Employment in Blaine County remained relatively constant during the decade, with employment declining only slightly, by just one-tenth of 1% (4 jobs). The largest absolute growth was in the services sector (94 jobs), followed by government (27 jobs). Sectors with large declines were finance, insurance, and real estate (79 jobs lost), and farm and ranch (36 jobs lost).

Chouteau County experienced the largest relative growth in employment in the study area. All sectors experienced employment growth except government, which decreased by 4% (23 jobs). Farm and ranch employment grew by 13 jobs and agricultural services grew by 110 jobs, which together accounted for about half of the total growth. The finance, insurance, and real estate sector and the services sector both increased by over 100 jobs each, accounting for about 40% of total growth.

While relative employment growth was higher in Chouteau County than Fergus County, Fergus had greater total job growth, 943 jobs. The fastest growing sector was construc-

Table 3.18		
Change in Employment, 1991 to 2000, Five-County Area, Montana		
<i>Sector</i>	<i>Percent Change</i>	<i>Number of Jobs</i>
Total Employment	+8.6%	+2,069
Farm and Ranch	+7.6%	+300
Agricultural Services and Other	+48.9%	+259
Mining*	-44.9% *	-150 *
Construction	+47.9%	+395
Manufacturing (including Forest Products)	+6.6%	+37
Transportation and Public Utilities	-13.3%	-208
Wholesale Trade	+7.4%	+62
Retail Trade	+4.9%	+203
Finance, Insurance, and Real Estate	+28.1%	+324
Services*	+29.1% *	+1,490 *
Government	-0.2%	-10
Federal, Civilian	+2.9%	+17
Military	-40.3%	-169
State and Local	+4.1%	+142

*Estimated due to data disclosure issues in some years.

Source: U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis, Regional Economic Information System (REIS), 1969-2000, CD-ROM, May 2002.

tion, followed by finance, insurance, and real estate. Those declining at the greatest rate were mining and military. Increased employment in the retail trade, finance, insurance, and real estate, and services sectors accounted for half of the total job growth.

Job growth in Hill County was second highest of the five counties, with an increase of 716 jobs. The greatest percentage gains were made in agricultural services and mining. The largest total growth occurred in the services sector (506 jobs), which accounted for 70% of the total job growth. Military employment declined by over 50% (100 jobs) and manufacturing employment declined by one-third (57 jobs).

Phillips County had the greatest decline in employment of the five study area counties, losing almost 3% of its jobs (84). The greatest loss was in mining, which lost over 80% of its jobs (144 jobs). The greatest percentage gain was in the construction sector, where employment nearly doubled. The greatest absolute gain was in the services sector, with 228 new jobs.

Personal Income

Personal income is the total amount of income received and includes earnings, transfer payments, and dividends, interest, and rent. It represents the total amount of income to an individual.

Earnings represent the sum of three components of personal income: wage and salary disbursements, other labor income (includes employer contribution to pension and profit-sharing, health and life insurance, and other non-cash compensation), and proprietors' income. Earnings reflect the amount of income that is derived directly from work and work-related factors.

Personal income increased in the United States by almost 40% before adjusting for inflation between 1991 and 2000. To reflect the actual spending power of income, adjustments are made for inflation. After adjusting for inflation, personal income increased by over 20% in the U.S. Growth in personal income in Montana lagged behind the U.S., growing by about 10% before inflation during the period. After adjusting for inflation, personal income in Montana actually decreased by almost 4%, reflecting a decrease in the spending power of income.

After adjusting for inflation, personal income in the study area decreased by over 4%, which is greater than the decrease in the entire state. The greatest decline in the study area and the five counties was in farm proprietors' income, a significant source of personal income to the area. Income from wages and salaries and from non-farm proprietors' income had small increases, but not enough to compensate for the large reductions in farm income.

Income from transfer payments increased over 20% after adjusting for inflation, with the income maintenance component of this category increasing by nearly 47% (Table 3.19).

Table 3.19
Changes in Personal Income and Major Components of Personal Income, 1991 to 2000, Five-County Area, Montana

<i>Personal Income Component</i>	<i>Percent Change</i>
Per Capita Personal Income	-4.6%
Wage and Salary Disbursements	+5.1%
Proprietors' Income	-54.6%
Non-Farm Proprietors' Income	+2.5%
Farm Proprietors' Income	-85.5%
Per Capita Transfer Payments	+21.5%
Per Capita Income Maintenance	+46.6%
Per Capita Retirement and Other	+20.1%
Per Capita Dividends, Interest, and Rent	+4.8%

Source: U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis, Regional Economic Information System (REIS), 1969-2000, CD-ROM, May 2002.

Chouteau County had the greatest decrease in inflation adjusted per capita income of the five counties. Fergus County had the largest increase in personal income of the five counties, despite a severe drop in farm proprietors' income.

Major Economic Sectors

What is the economy of Montana like? What are the sectors with the largest output? Which sectors employ the most people? Which ones have the largest payments of wages and salaries and proprietary income? Knowing the answers to these questions will provide some perspective on the differences between the state as a whole and the study area.

State of Montana

Historically, Montana has been noted for its mining and agriculture. Over time, Montana's economy has evolved into a modern diversified economy, as can be seen in Table 3.20. The leading sector in terms of output was the services sector, followed by the manufacturing sector. The services sector also provided the most jobs, followed by trade. Services also produced the most total personal income, followed by government. The highest paying jobs were in the mining sector, followed by transportation, communications, electric, gas and sanitary services.

Table 3.20
Industry Output, Employment, Income, and Income per Job,
by Standard Industrial Code (SIC) Division, State of Montana, 2000

<i>SIC Division</i>	<i>Output (Million \$)</i>	<i>Employment (Jobs)</i>	<i>Income (Million \$)</i>	<i>Income per Job (\$)</i>
Agriculture, Forestry, and Fishing	2,779.7	39,500	350.3	8,861
Mining	1,006.8	4,648	226.9	48,817
Construction	4,065.7	40,535	1,200.1	29,606
Manufacturing	7,475.2	29,053	1,009.0	34,729
Transportation, Communications, Electric, Gas and Sanitary Services	3,792.9	25,595	1,038.4	40,570
Trade	5,274.8	126,239	2,305.7	18,264
Finance, Insurance, and Real Estate	5,867.5	45,925	1,005.0	21,884
Services	7,897.0	161,002	3,718.4	23,095
Government and Other	4,073.8	93,185	3,090.8	33,168

Source: 2000 IMPLAN data from Minnesota IMPLAN Group, Inc., with modifications by NEA.

What are the sectors with the largest output? Which sectors employ the most people? Which ones have the largest payments of wages and salaries and proprietary income? To answer these questions, we look at the economic data in a more disaggregated form.

Industries in the state economy were ranked by the size of their industrial output to help answer these questions. Petroleum refining, a manufacturing industry, has by far the greatest output in the state. This industry requires a large capital investment in plant and equipment and a significant portion of the value of output is paid to capital. It is not included in the top ranked industries for either employment or income. No other manufacturing industries are included in this or any other rankings. Ranching ranks third in output and fourth in employment, but is not highly ranked in income. As shown above in Table 3.20, income per job in agriculture is low.

Government is an important provider of jobs and income for the Montana economy. The greatest number of jobs is provided by public education, followed closely by eating and drinking establishments. Three of the four major government industries are included in the top 15 industries when ranked by number of jobs.

Fifteen industries had more than \$200 million in total employee compensation and proprietary income. Again, three of the four government industries ranked in the top five income producers, with the fourth government industry ranked 11th. Employees in these government industries earned over \$2.8 billion combined.

Study Area

As with the state, the study area has historically been identified with the agricultural and mining industries. Agriculture still dominates the economic base as measured by industry output, but mining has declined and has now dropped to last place by this measure (Table 3.21). The services division is now second in terms of output, followed by finance, insurance, and real estate.

Manufacturing is ranked next to last in terms of output. Most of the local manufacturing serves local markets. The prepared feeds and meat packing industries serve the ranching industry, newspapers and commercial printing serve households and small businesses, and sheet metal work serves a variety of local businesses.

The division providing the most jobs is services, followed by trade. Government provides the most income, followed by services. The highest average paying jobs are found in the transportation division, with railroads having significantly higher incomes than other industries. The lowest average paying jobs are in the agricultural division.

As we look at the economic data in a more disaggregated form for the study area we find that the two principal agricultural industries, ranching and food grains (primarily wheat) are dominant in terms of output and important in terms of jobs and income.

No manufacturing industries appear in any of the rankings, emphasizing the rural, agricultural character of the area.

Table 3.21
Industry Output, Employment, Income, and Income per Job,
by SIC Division, Five-County Area, Montana, 2000

<i>SIC Division</i>	<i>Output (Million \$)</i>	<i>Employment (Jobs)</i>	<i>Income (Million \$)</i>	<i>Income per Job (\$)</i>
Agriculture, Forestry, and Fishing	407.9	4,730	41.2	8,701
Mining	35.1	138	5.5	39,817
Construction	137.7	1,426	38.7	27,107
Manufacturing	94.4	647	17.1	26,472
Transportation, Communications, Electric, Gas and Sanitary Services	216.6	1,222	64.3	52,612
Trade	186.7	5,211	81.1	15,560
Finance, Insurance, and Real Estate Services	240.2	1,666	32.4	19,476
Government and Other	278.5	6,492	122.8	18,917
	173.3	4,762	137.3	28,836

Source: 2000 IMPLAN data from Minnesota IMPLAN Group, Inc., with modifications by NEA.

The various levels of government provide important sources of employment and income to the study area. For Blaine and Chouteau Counties, natural gas and crude petroleum is also an important industry in terms of output and also is ranked tenth in income.

In Hill County, the railroad industry is the dominant part of the economic base, providing the most output and income and ranking fourth in jobs. Hospitals are also an important source of output, jobs, and income there.

As we look at the economic data in a more disaggregated form for the study area we find that the two principal agricultural industries, ranching and food grains (primarily wheat) are dominant in terms of output and important in terms of jobs and income. Table 3.22 shows those industries with more than \$30 million in output, Table 3.23 shows those industries with more than 500 jobs, and Table 3.24 shows those with income of over \$9 million.

There are no manufacturing industries ranked in any of the tables, emphasizing the rural, agricultural character of the area. The various levels of government provide important sources of employment and income to the study area.

Output Multipliers

Output multipliers measure the round-by-round effects of money coming into the study area. An example would be when the ranching sector is marketing cattle. When the cattle are exported from the study area money from the sale comes into the area. This is called the direct effect of selling cattle for export. The ranch sector also buys from and sells goods and services to other sectors in the local economy. This is called the indirect effect of the export. That is, these sectors, while not directly exporting cattle, are supplying the ranch sector with goods and services. Through these direct and indirect effects of the export, households receive income from wages, salaries, proprietary income, interest, rents, etc. Some of this household income is spent within the study area. This is called the induced effect of the export.

A multiplier is calculated by adding the direct, indirect, and induced effects together and dividing the sum by the direct effect. Multipliers typically are numbers like 1.5. This is interpreted as the sum of the direct effect being the 1 and the indirect and induced effect being the 0.5. What this means is that for every dollar of export from the sector, the multiplier produces an additional output in the total economy of the study area of 50 cents. Table 3.25 shows the multipliers for selected sectors in the study area economy.

Table 3.22
Industries Ranked by Total Industrial Output
(Greater than \$30 Million), Five-County Area, Montana, 2000

<i>Industry Group</i>	<i>Industry Output (Million \$)</i>
1. Ranch Fed Cattle Including Hay and Pasture	224.773
2. Food Grains	116.194
3. Railroads and Related Services	105.164
4. Banking	68.434
5. State and Local Government — Education	62.584
6. Hospitals	61.655
7. Wholesale Trade	56.076
8. Real Estate	54.257
9. New Residential Structures	49.051
10. State and Local Government — Non-Education	40.507
11. Eating and Drinking	38.294
12. Feed Grains	33.804
13. Federal Government — Non-Military	33.554
14. Natural Gas and Crude Petroleum	32.832
15. Communications, Except Radio and TV	30.674
16. Automotive Dealers and Service Stations	30.155

Source: 2000 IMPLAN data from Minnesota IMPLAN Group, Inc., with modifications by NEA.

Table 3.23
Industries Ranked by Total Employment
(More than 500 Jobs), Five-County Area, Montana, 2000

<i>Industry</i>	<i>Employment (Jobs)</i>
1. Ranch Fed Cattle Including Hay and Pasture	2,460
2. State and Local Government — Education	2,094
3. State and Local Government — Non-Education	1,342
4. Food Grains	1,306
5. Eating and Drinking	1,293
6. Miscellaneous Retail	1,074
7. Hospitals	1,034
8. Wholesale Trade	901
9. Automotive Dealers and Service Stations	721
10. Federal Government — Non-Military	691
11. Accounting, Auditing and Bookkeeping	632
12. Real Estate	581
13. Railroads and Related Services	560
14. Food Stores	557
15. Maintenance and Repair Other Facilities	509

Source: 2000 IMPLAN data from Minnesota IMPLAN Group, Inc., with modifications by NEA.

<i>Industry</i>	<i>Employee Compensation plus Proprietary Income (Million \$)</i>
1. State and Local Government — Education	62.584
2. Railroads and Related Services	39.542
3. Hospitals	34.571
4. State and Local Government — Non-Education	31.401
5. Federal Government — Non-Military	28.296
6. Wholesale Trade	22.912
7. Ranch Fed Cattle Including Hay and Pasture	20.415
8. Maintenance and Repair Other Facilities	14.875
9. Automotive Dealers and Service Stations	13.455
10. Banking	13.212
11. Eating and Drinking	12.599
12. Miscellaneous Retail	11.653
13. Food Stores	10.883
14. Food Grains	9.707
15. Accounting, Auditing and Bookkeeping	9.513

Source: 2000 IMPLAN data from Minnesota IMPLAN Group, Inc., with modifications by NEA.

<i>Sector</i>	<i>Output Multiplier</i>
Ranch Fed Cattle	1.9
Natural Gas & Crude Petroleum	1.3
General Merchandise Stores	1.3
Food Stores	1.3
Automotive Dealers & Service Stations	1.3
Eating & Drinking	1.4
Hotels & Lodging Places	1.4
Amusement & Recreational Services	1.4
Federal Government – Non-Military	1.4

Source: 2000 IMPLAN data from Minnesota IMPLAN Group, Inc., with modifications by NEA.

The sectors displayed above were selected to represent those sectors most related to Monument outputs and uses. Ranching and natural gas production are the primary sectors associated with the Monument that produce products for export. General merchandise stores, food stores, automotive dealers and service stations, eating and drinking, hotels and lodging places, and amusement and recreational services are the sectors affected by the recreation and

tourism associated with the Monument. Federal government – non-military is the sector where the BLM purchases of goods and services and BLM payroll occurs and reflects money coming in from outside the study area and that has a multiplier effect.

Unemployment

The 2001 unemployment rate for the U.S. was 4.8% and for Montana it was 4.6%. The rate for the study area fell between these two rates at 4.7% (Table 3.26).

Taxes

Payments in Lieu of Taxes (PILT)

Public lands held by the federal government are not in the property tax base for the counties. As a result, counties forego tax revenue they would have received if the land had been privately owned. To reimburse the counties for these monies, the U.S. Congress passed Public Law 94-565 in 1976 that allows compensation for foregone property tax revenues to each county. This compensation, Payments in Lieu of Taxes (PILT), is the payment made by the federal government each fiscal year to each county to offset lost property tax revenues (BLM 2003c). Recent payments are shown in Table 3.27. The amounts shown in the table are the amounts authorized and appropriated by Congress and

Table 3.26
Unemployment Rates for the Five-County Area and for Blaine, Chouteau,
Fergus, Hill, and Phillips Counties, Montana, 1990-2001

<i>Year</i>	<i>Study Area</i>	<i>Blaine</i>	<i>Chouteau</i>	<i>Fergus</i>	<i>Hill</i>	<i>Phillips</i>
1990	5.3%	7.8%	2.6%	5.4%	5.4%	4.8%
1991	6.6%	8.8%	3.4%	7.5%	6.8%	4.9%
1992	6.2%	8.0%	2.7%	6.5%	6.6%	5.6%
1993	5.7%	8.8%	2.2%	5.7%	6.3%	3.9%
1994	4.9%	7.1%	3.0%	4.7%	5.3%	3.2%
1995	6.3%	9.8%	3.4%	6.2%	6.1%	6.2%
1996	5.8%	9.9%	2.6%	5.6%	4.8%	8.5%
1997	5.9%	10.2%	2.4%	5.9%	5.4%	6.8%
1998	6.5%	9.2%	3.2%	6.4%	6.2%	8.6%
1999	5.9%	8.3%	3.1%	5.3%	5.8%	7.9%
2000	5.2%	6.8%	3.1%	6.0%	5.1%	4.8%
2001	4.7%	5.6%	3.1%	5.8%	4.1%	4.4%

Source: U.S. Department of Labor, Bureau of Labor Statistics, www.stats.bls.gov./lau/home.htm.

Table 3.27
Annual PILT Payments by County, 2000 and 2003

<i>Fiscal Year</i>	<i>BLM Acres</i>	<i>Total PILT Acres</i>	<i>PILT Payment</i>	<i>BLM PILT Payment</i>	<i>Payment Per Acre*</i>
Blaine County					
2000	452,650	453,464	\$287,161	\$286,646	\$0.63
2003	451,385	452,199	\$356,195	\$355,554	\$0.79
Chouteau County					
2000	111,357	157,932	\$118,073	\$83,253	\$0.75
2003	109,408	155,983	\$205,380	\$144,056	\$1.32
Fergus County					
2000	349,965	484,939	\$367,478	\$262,708	\$0.75
2003	345,371	489,533	\$637,201	\$453,811	\$1.31
Hill County					
2000	14,204	47,790	\$37,458	\$11,133	\$0.78
2003	14,132	47,718	\$64,506	\$19,104	\$1.35
Phillips County					
2000	1,088,007	1,387,265	\$187,897	\$147,364	\$0.14
2003	1,077,715	1,377,093	\$261,231	\$204,440	\$0.19
Five-County Area - Montana					
2000	2,061,183	2,535,984	\$995,067	\$791,104	\$0.38
2003	1,998,011	2,517,932	\$1,524,513	\$1,176,965	\$0.59

Source: BLM (2003d), Payments in Lieu of Taxes.

paid by the federal government each fiscal year. They are usually less than the payments based on the formulas.

The PILT payment per acre can vary between counties and between years in the same county for a number of reasons. The PILT Act provides two formulas for allocating PILT money to counties. The administrator calculates both formulas for each county, and the county receives a PILT payment based on the formula producing the higher amount. The number of acres of qualified federal lands is defined as the entitlement lands and can change from year to year due to land exchanges and purchases. Prior fiscal year funds that may be deducted from the PILT payment may cause variation. These include federal payments to local governments under programs other than PILT during the previous fiscal year including: Refuge Revenue Sharing Fund, National Forest Fund, the Taylor Grazing Act, the Mineral Leasing Act for acquired lands, and the Federal Power Act. The governor of each state must report the amount of these payments each year to BLM so they may be deducted from the PILT payment.

Gas Tax Roads

A subset of the county rural roads is the “gas tax road,” a public, BLM, or county road with unrestricted access that receives a portion of the county fuel tax revenues. If the number of miles of gas tax roads increase/decrease, the tax revenue will increase/decrease proportionately. Since access to BLM portions of gas tax roads has the potential to change with different management options considered in plan development, the miles of gas tax roads in a county could change between plan alternatives. Table 3.28 shows the amount of money allotted for gas tax roads by county for Fiscal Year (FY) 2003.

County Property Tax Revenues

The role of the federal government in providing PILT and in revenue sharing may be better understood with informa-

tion about county revenues from other sources. Table 3.29 presents the amount of money the counties in the study area received from property taxes, a major source of county revenue.

For the study area, money received from the federal government represented about 2% of the revenue obtained from property taxes in 2000.

Relationship of BLM Activities to the Study Area Economy

The economy of the study area has many links to outputs and uses from the Monument. Ranching is a very important part of the study area economy. The Monument is currently a source of natural gas production with the potential for expansion of this production. Recreation activities, particularly on the wild and scenic sections of the Missouri River, are important sources of revenue for local businesses. Hunting and fishing in the Monument are also important to the local economy. The BLM road system in the Monument provides connectivity to other transportation corridors in the area.

As discussed above, the primary economic base in the area is ranching. The production of cattle in the region typically involves the utilization of both private and public resources. Grazing of cattle on public range is an important component of the ranching industry. The forage needs of the industry are met with a balance of public grazing lands, private grazing, and hay production, supplemented with grain. Current production reflects the current balance among these sources of supply. Changes in the availability of any of the components of nutrient requirements would require adjustments in the other components. If the supply of nutrients from the other components is relatively fixed, either economically or physically, then adjustments in herd size and production will occur.

Table 3.28
Gas Tax Road Revenues by County, FY 2003

<i>County</i>	<i>Total Gas Tax Revenues</i>	<i>Total Mileage</i>	<i>Dollars/Mile</i>	<i>Gas Tax Road Miles</i>	<i>Gas Tax Road Revenues</i>
Blaine ^{1/}	\$128,938	1,467,927	\$11.38	1,470	\$16,736
Chouteau ^{2/}	\$144,108	2,090,564	\$14.51	2,400	\$34,817
Fergus ^{3/}	\$136,462	1,578,684	\$11.57	1,578	\$18,255
Hill ^{4/}	\$143,517	1,788,120	\$12.46	1,779	\$22,165
Phillips	\$123,165	1,511,846	\$12.27	N/A	N/A

^{1/}Gas Tax Road Miles—Personal Communication with Don Swenson, Blaine County Commissioner, November 26, 2003.

^{2/}Gas Tax Road Miles—Personal Communication with Harvey Worrall, Chouteau County Commissioner, December 1, 2003.

^{3/}Gas Tax Road Miles—Personal Communication with Fergus County Treasurer, Dolores Sramek, November 28, 2003.

^{4/}Gas Tax Road Miles—Personal Communication with Hill County Road Supervisor, Jerry Otto, December 4, 2003.

<i>County</i>	<i>Grand Total of All Taxes for All Purposes (Million \$)</i>
Blaine	\$5.686
Chouteau	\$8.908
Fergus	\$9.611
Hill	\$13.979
Phillips	\$6.574
Total	\$44.757

Source: Biennial Report of the Montana Department of Revenue, July 1, 1998, to June 30, 2000.

Grazing Fee Receipts

In the early days of ranching in the study area, federal grazing land was considered “free range.” In 1934, with the passage of the Taylor Grazing Act, the availability of free range was ended. The Act contained provisions that permitted the collection of fees for grazing livestock on federal lands.

Table 3.30 shows the distribution of grazing revenues by county. The values reflect averages from various sources and time periods. As such, they reflect the relative importance of revenues from grazing fees to the counties.

<i>County</i>	<i>Distribution of Grazing Fee Revenues</i>
Blaine	\$14,700
Chouteau	\$9,400
Fergus	\$14,700
Hill	\$1,100
Phillips	\$42,000

Source: Wendy Favinger, Bureau of Land Management, Billings, Montana.

Special Recreation Permit Fees

The Bureau of Land Management issues Special Recreation Permits for activities, events, and groups that may cause substantial resource damage or if public health/safety might be affected, including: commercial uses, competitions, organized group activities, or social gatherings of reunions, religious groups, Boy/Girl Scout camps, etc.

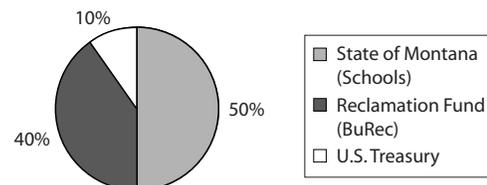
In May 2000, the BLM Lewistown Field Office issued a moratorium on new annual Special Recreation Permits for commercially-guided recreation trips on all BLM lands and waters within the Upper Missouri National Wild and Scenic River from Fort Benton downstream 149 miles to James Kipp Recreation Area.

Federal Mineral Revenue Disbursements

In addition to PILT payments, the federal government makes payments from receipts from mineral leases and development. Mineral revenues are collected from two types of lands administered by the BLM: public domain lands and Bankhead-Jones lands.

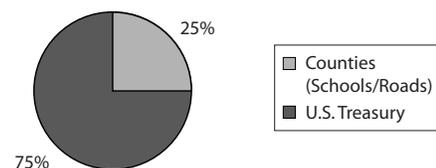
Mineral revenues on public domain lands are distributed as follows: the state receives 50%; the Reclamation Fund (managed by the Bureau of Reclamation) receives 40%; and the remaining 10% goes to the General Fund in the Department of the Treasury. The 50% distributed to the State of Montana is sent directly to the Office of Public Instruction for public school use in each county. See Figure 3.10.

Figure 3.10
Distribution of Federal Mineral Revenues from Public Domain Lands



One-quarter of the mineral revenues from the use of Bankhead-Jones lands are distributed to the counties with Bankhead-Jones lands, with the requirement that counties must use this money for schools or roads or both, and the remaining 75% goes to the federal treasury. See Figure 3.11.

Figure 3.11
Distribution of Federal Mineral Revenues from Bankhead-Jones Lands



While production of natural gas from the Monument is currently not a large component of the area economy, current production does exist and there is potential for new production. The cost of production of natural gas does not involve intensive local labor inputs. The output is sold primarily outside the study area and the revenues of gas production are paid largely to firms outside the area. Royalties and tax revenues are a source of revenue to all levels of government.

Market conditions for natural gas are an important factor in production and exploration decisions by producers. No detailed information was available on the amount of revenue local entities receive from these sources. However, data is available and presented in Table 3.31 showing the amount of natural gas produced in study area counties, the royalty value paid to the federal government, and the amount of the royalty disbursed to the state.

Travel and Tourism

Travel and tourism is a major industry that is not included in the SIC system. Travel and tourism is commonly called an “industry,” but it is not defined as such in economic statistics. Rather, travel and tourism spending is distributed across many sectors. Measuring the economic importance of tourism requires using indirect methods. Typically this is done by identifying the patterns of expenditures by travelers and tourists, estimating how many visited an area, and multiplying the expenditure patterns by the number of visits to get an estimate of the direct effect on industries where the expenditures are made.

This method was used by the University of Montana Travel Research Program to estimate the economic importance of non-resident travel in Montana. Their study estimated that about 6% of total employment in Montana is directly and indirectly related to non-resident travel and tourism (University of Montana 2004). While there are significant differences between the structure of the regional and state economy and it is very likely that travel and tourism

patterns are different, this estimate, related to the study area, may provide some insight into the size of the tourism industry in the study area. For the five-county area, 6% of total employment would represent about 1,480 jobs.

Tourism is a growing source of revenue for local businesses located near recreation areas attractive to tourists. The Monument is one such attraction. Currently, a large supply of recreational experiences is available to tourists over a wide area. However, unique recreational opportunities, such as floating the wild and scenic segments of the Missouri River, are more limited and in some cases so limited that restrictions are applied to the number of people that can use them at one time. This is the potentially emerging situation on the river in the Monument. Recreation related to these activities currently supports significant local business income. Of the 27 BLM authorized outfitting and vending services, 14 are headquartered in the study area, 24 are headquartered in the state, and three are out of state. Revenues generated by outfitted trips are important to local businesses.

Federal Government Expenditures

As discussed above, the federal government – non-military sector of the economy is an important source of jobs and household income in the counties of the study area. BLM employment is included in this sector. Changes in the management of the Monument that affect budgets may affect employment and income in this sector.

Table 3.31
Federal Natural Gas Revenue Disbursements for Study Area Counties, 1999-2001

<i>County and Year</i>	<i>Sales Volume (Mcf)</i>	<i>Royalty Value (\$1,000s)</i>	<i>Disbursement to State (\$1,000s)</i>
Blaine	1999	2,005,514	\$240.7
	2000	1,559,733	\$460.7
	2001	2,192,260	\$897.2
Chouteau	1999	382,451	\$23.3
	2000	181,148	\$44.6
	2001	260,271	\$125.5
Fergus	1999	35,078	\$4.4
	2000	31,597	\$4.2
	2001	33,081	\$12.5
Hill	1999	353,717	\$74.5
	2000	340,508	\$91.5
	2001	341,753	\$178.2
Phillips	1999	6,826,220	\$2,164.8
	2000	7,527,662	\$2,411.5
	2001	9,431,769	\$4,594.0

Source: Minerals Management Service, 1999-2001, Federal Mineral Revenue Disbursements to States, Identified by County of Origin, Washington, D.C. Website www.mrm.mms.gov/stats, October 6, 2003.