

This chapter summarizes various physical, biological, and socioeconomic characteristics of the resource area that affect, or are affected by, resolution of the eleven issues identified in Chapter 2. Much of the information contained in this chapter is extracted from the Headwaters Resource Area Management Situation Analysis (MSA), which is available for review at the Headwaters Resource Area office. The MSA includes more detailed material not duplicated in this RMP/EIS document, including a description of current management (summarized in this document in Chapter 2 under Management Guidance Common to all Alternatives and Alternative B: No Action) and a discussion of the implications of current management (summarized in this document in Chapter 4 under Alternative B: No Action).

SETTING

The Headwaters Resource Area of the BLM's Butte District extends along the east side of the Continental Divide in west central Montana. It extends from Yellowstone National Park at the Wyoming state line on the south to the Blackfoot Indian Reservation near the Canadian border on the north. The resource area was created in 1976 as part of an administrative reorganization. Public land in nine counties was transferred from other BLM offices to the new Headwaters Resource Area—land in Gallatin, Broadwater, and Jefferson counties came from the old Dillon District; land in Park County came from the Billings District; land in Lewis and Clark County came from the Missoula District; land in Teton and Pondera counties and in

the part of Cascade County that is north of the Missouri River was transferred from the Malta District; and land in the rest of Cascade County and in Meagher County came from the Lewistown District. There is a total of 13,067,420 acres in the resource area, of which only 311,337 acres are under BLM management. Most of this public land is located in Jefferson, Broadwater and Lewis and Clark counties, (see the Land Status, Headwaters Resource Area map).

The resource area was named for the headwaters of the Missouri River. The river begins at the confluence of the Jefferson, Madison, and Gallatin rivers near the town of Three Forks. Major urban centers in the area are Great Falls, Helena, and Bozeman. Smaller towns include Whitehall, Boulder, Townsend, White Sulphur Springs, Livingston, and Choteau. Most of the area is rural. Because of the large size of the resource area, there is a correspondingly large amount of diversity in the public land located within it.

The climate in the resource area is a modified continental type, which has winters that are cold and summers with warm days and cool nights. Several modifying factors, such as invasions of Pacific Ocean air masses, drainage of cool air into the valleys from the mountains, and deflection of weaker storms to the south or east by the mountains, combine to make temperature changes somewhat smaller than those expected of a true continental climate. Air quality is generally excellent, although some localized air quality problems can occur in populated areas.

Terrain is an important factor in the pattern of precipitation in the area. The Continental Divide and other mountain ranges cause rain shadow effects along the major river valleys. As a result, annual precipitation varies from ten to twenty inches in the valleys to thirty to forty inches in the higher elevations. May and June are normally the wettest months. Snowfall amounts vary from around 10 inches on valley floors to 200 inches in the mountains.

Elevation is the primary determining factor for mean annual temperature throughout the resource area. The frost-free growing season varies from less than 50 days in the higher mountains to 130 days in some valleys. A few storms each winter bring in very cold arctic air, which drops temperatures to well below zero.

The entire resource area is in what is known as the "Chinook Belt," where warm, dry winds drop down from the Continental Divide. Winter and spring chinook winds often raise the temperature twenty to thirty degrees in several hours, and they can deplete much of the stored snow in the foothills and plains. Most of the resource area's public land is in the foothills and valleys; therefore it tends to be semi-arid with moderate temperatures.

The Continental Divide forms the western boundary of the resource area, which lies mostly in the Northern Rocky Mountains physiographic province. The northeast portion of the resource area lies in the Great Plains physiographic province. Elevations range from 11,205 feet in the Absaroka Range to 2,760 feet along the Missouri River below Great Falls.

In the southern part of the resource area, the Madison, Gallatin, Absaroka, Crazy, and Bridger mountains are high, rugged ranges with steep, rocky peaks. The public land there is mostly isolated tracts located along the river bottoms and in the foothills near national forest lands.

Farther north, the Big Belt, Little Belt, Elkhorn, Castle, and Bull Mountain ranges and the mountains of the Continental Divide tend to be the older, gentler ranges with rounded, often forested, peaks. In this region, public land generally consists of rolling hills and steep forested draws in the foothills or low, isolated ranges such as the Scratchgravel Hills, the Spokane Hills, and the Hilger Hills. Large tracts of public land are located in the Limestone Hills and Devil's Fence area, where parallel, north-south trending limestone ridges dominate the landscape.

North of Rogers Pass is the abrupt vertical escarpment of the Rocky Mountain Front, which lies along the western edge of the resource area. Public land, which lies along the limestone cliffs of

the front, varies from the steeply rolling hills and stream canyons at the base of the mountains to the forested cliffs themselves.

The northeast portion of the resource area is generally a transition zone between the mountains to the west and the Great Plains to the east. This area is characterized by gently rolling hills cut by the Dearborn, Sun, and Teton rivers.

SOIL AND WATER RESOURCES

Soils

Most of the areas with soil erosion problems are located in Jefferson and Broadwater counties. In Jefferson County, erosion (almost exclusively water erosion) problems are present in many of the areas where granite is the parent material. These soils are coarse textured with steep slopes and are highly susceptible to erosion. Past damage has been caused by excessive livestock concentrations in certain areas and by vehicle use of two track trails. Erosion problems are also present in the Bull Mountain and Huler-Sappington springs areas, where sedimentary parent materials are present. The soils in these areas have a shallow depth to bedrock, are poorly developed, and have steep slopes. Thus they are highly susceptible to erosion. Most of the problems in these areas have been caused by grazing, although mining has caused significant damage in the Bull Mountain area.

In Broadwater County erosion problems are present in the Limestone Hills, in the southeast portion of the county, and in other areas. These sites are characterized by shallow soils, steep slopes, and rock outcrops. The soils have some geologic erosion, but it has been accelerated by livestock grazing pressure.

Little is known about erosional conditions in Lewis and Clark county due to a lack of data. However, there are some problems on the public land that borders Holter Lake and on the portion of the Spokane Hills that borders Canyon Ferry Reservoir. Much of this erosion is geologic, but some of it may be accelerated by human activities. Opportunities for correcting erosion problems, by allotment, are identified in Appendix E.

The general characteristics of thirty-six soil series which have been surveyed by the Soil Conservation Service (SCS) in Broadwater, Lewis & Clark, and Cascade counties are outlined in Appendix J. Similar information for soils in Pondera, Teton, Jefferson, Meagher, Gallatin, and Park counties is

available at the Headwaters Resource Area office. This information will be added to Appendix J when SCS soil surveys have been completed for the remaining counties.

Surface Water

There is sufficient water in the resource area to meet present needs, as witnessed by the flow of the Missouri River at Great Falls (5,745,000 acre-ft./year). The problem is distribution of the available water. This lack of water distribution affects the public land, which is predominantly grazing land. Water is necessary for the management of livestock grazing and wildlife habitat.

Major drainage basins and subbasins within the resource area are illustrated on the Major Drainage Basins and Subbasins map.

Water quality in the resource area is generally excellent, but localized sources of pollution do exist. These sources may be due to historic or present day mining, timber harvest practices, pesticide applications, oil and gas activities, or grazing and agricultural practices.

Streambank stability ratings are shown on overlays that are available in the Headwaters Resource Area office.

Groundwater

In 1970 only about two percent of the water used in Montana was groundwater. Although this is a relatively small percentage, groundwater is a vital resource that will be further developed as surface water supplies become limited in quantity and quality (Montana, DHES 1978). The major use of groundwater on public land is for livestock.

Groundwater in the area is generally suitable for all uses. Mining, use of pesticides, improper well drilling techniques, landfill dumps, and oil and gas activities all have the potential to contaminate groundwater.

Groundwater originating in the Scratchgravel Hills is used for domestic purposes in nearby rural subdivisions. There is some potential for groundwater contamination from mining activities in the recharge area. Of particular concern is the use of cyanide for onsite processing of ores. The present quality of groundwater in the area is considered good.

ENERGY AND MINERALS

Geology

The geology of the Headwaters Resource Area is extremely varied. Igneous, metamorphic, and sedimentary rocks are all present. Ages for the rocks range from nearly 3 billion years (early Precambrian) to less than 10,000 years (very recent).

Much of the resource area lies in the Overthrust Belt, a structurally complex zone where older sedimentary rocks have been thrust eastward over younger sedimentary rocks. This overthrust zone is currently an area of intense interest for oil and gas exploration.

The forces that created the overthrust belt some 65 million years ago may have helped develop structures capable of trapping oil and natural gas. With the exception of areas where igneous rocks are found, the search for oil and gas extends throughout the resource area. The area along the Rocky Mountain Front is the most active exploration area.

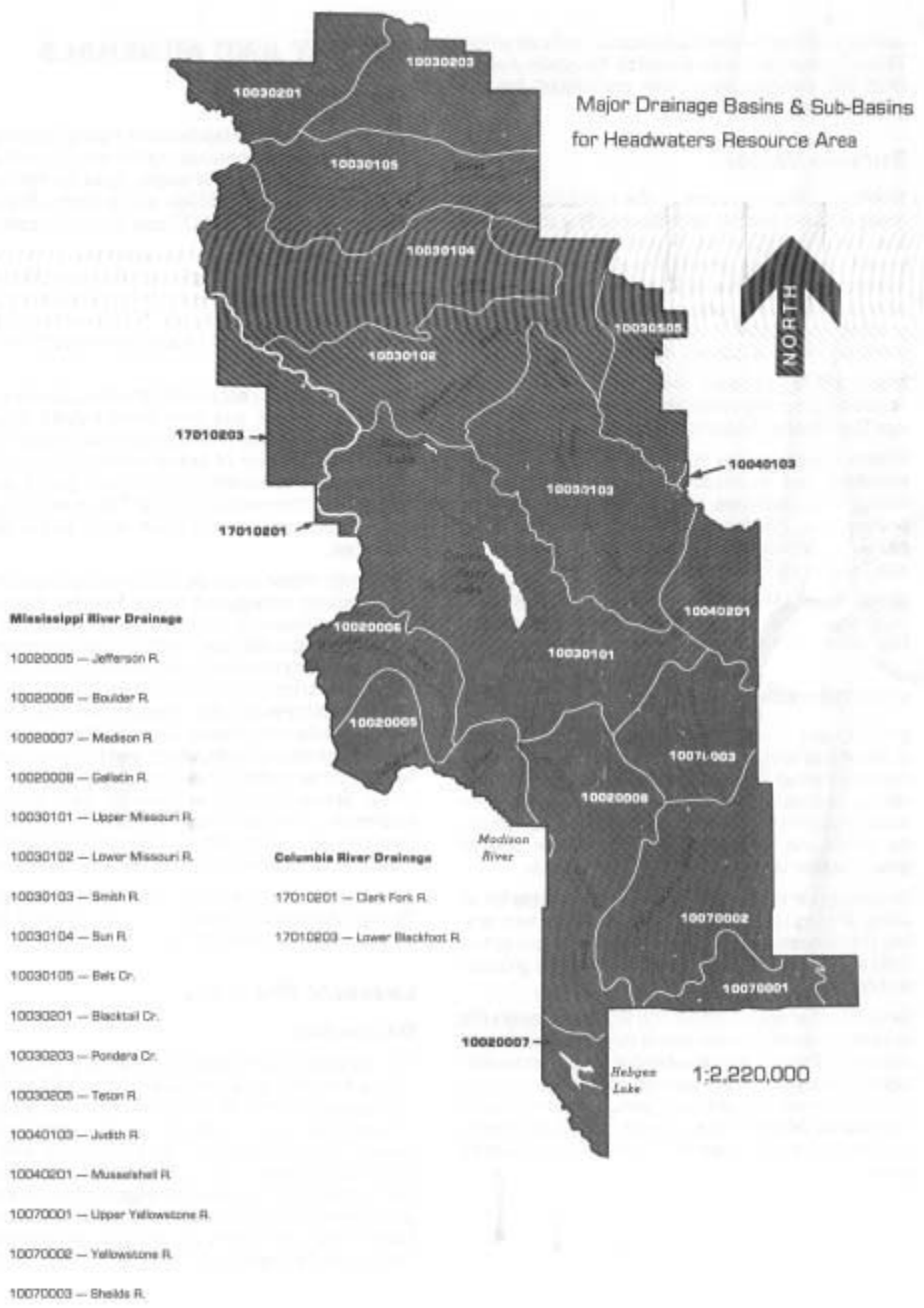
The other major geologic feature important from an economic standpoint is the Boulder batholith. Occupying much of the area between Butte and Helena, the Boulder batholith, or its related intrusions, are host to many of Montana's most famous mining districts—Butte, Corbin-Wickes, Basin, the Scratchgravel Hills, Helena and the Elkhorn area. Metals associated with the Boulder batholith include copper, gold, silver, and molybdenum, as well as other metals in lesser amounts. There are some areas within the Boulder batholith with anomalous radioactivity. The Rocky Mountain Overthrust Belt and Boulder Batholith map shows the general location of these geologic features.

Cretaceous and Tertiary sediments east of the Rocky Mountains contain very important fossil beds and some beds of coal.

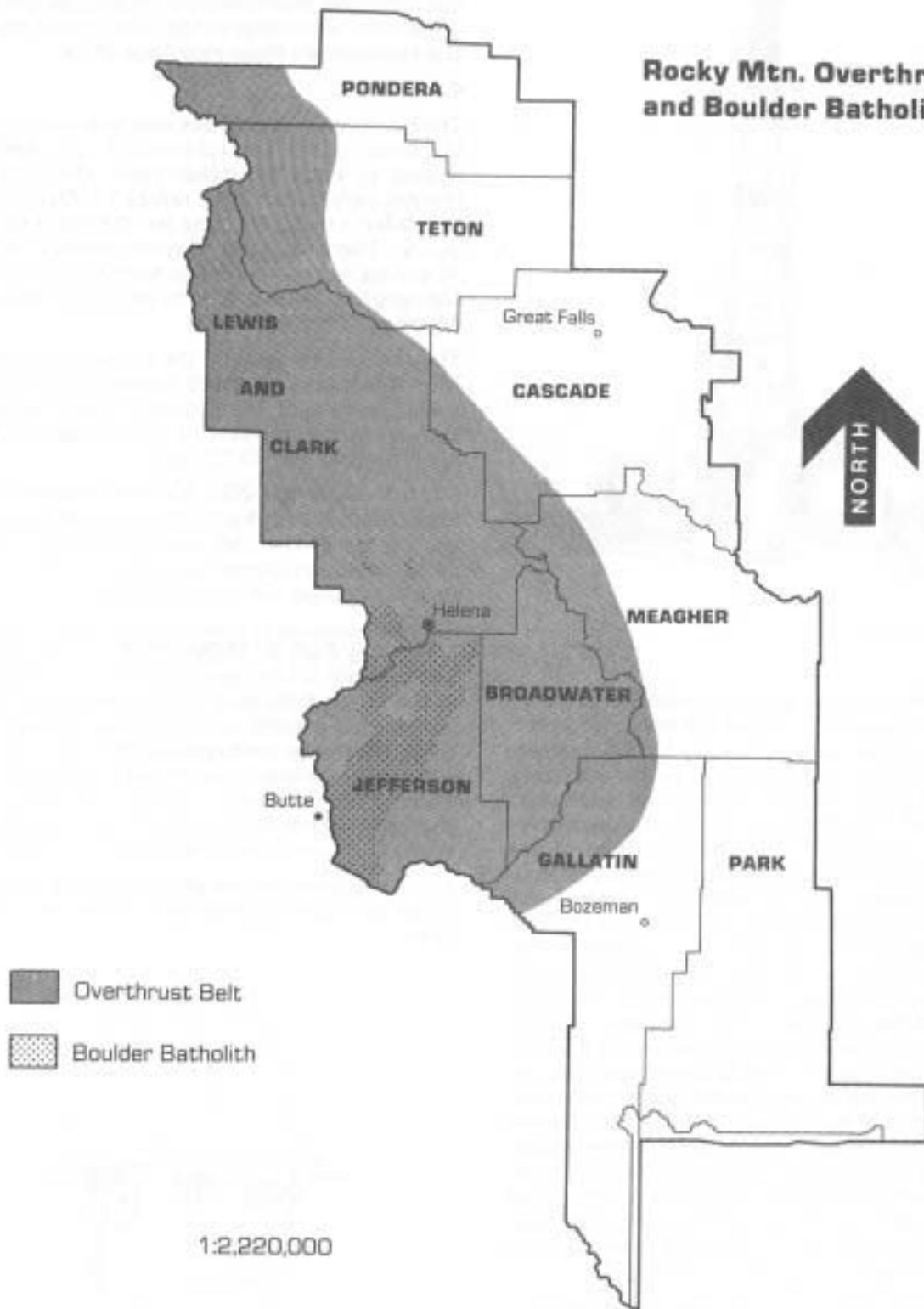
Leasable Minerals

Oil and Gas

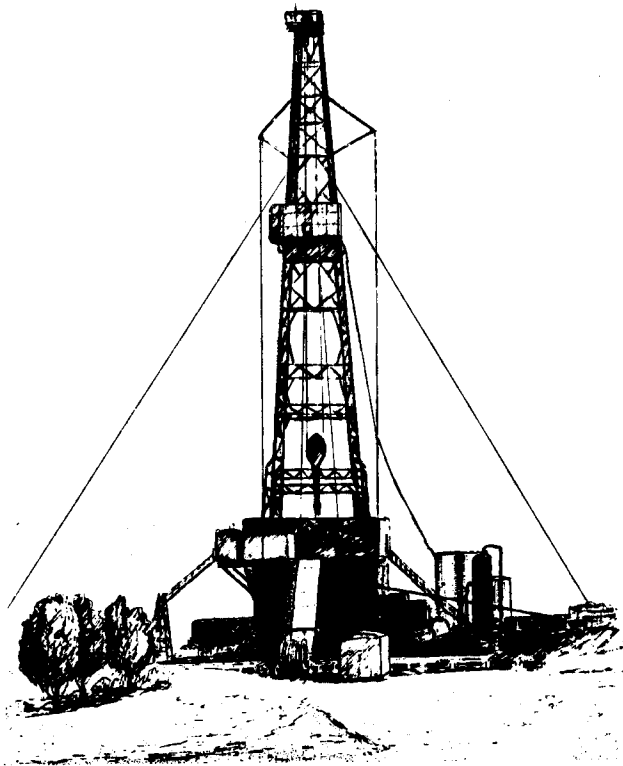
The federal government administers oil and gas rights beneath approximately 675,000 acres in the resource area. Most of the resource area has already been leased for oil and gas, and approximately ten applications for permits to drill are received annually. There is considerable exploration activity taking place throughout the resource area (see the Oil and Gas Activity, Rocky Mountain Front map) and some oil and gas production in Teton and Pondera counties, east of the RMF.



Rocky Mtn. Overthrust Belt and Boulder Batholith



3 — AFFECTED ENVIRONMENT



Some of the initial oil and gas production in Montana occurred just outside of the resource area in Glacier National Park in the early 1900s. Exploration activity from 1900 to 1950 was intermittent and there were no major finds in the overthrust belt. In 1957 the Blackleaf #1 gas well was completed. It produced 6.3 million cubic feet of gas per day. Poor market conditions made it impractical to continue production from the Blackleaf well, and exploration remained sporadic until the late 1970s. Spurred on by dramatic success in the Wyoming portion of the Overthrust Belt, exploration activities increased dramatically in the Montana Overthrust Belt. This renewed activity resulted in additional gas discoveries in 1980 in the Blackleaf Canyon. The Blackleaf gas field, as currently delineated, has the capability to produce 20-25 mmcf of natural gas per day. Only limited production is currently taking place. There are two producing horizons in the Blackleaf field, an upper and a lower thrust sheet. Production is from the Mississippian Sun River formation in both horizons. The gas occurs in a wedge edge structural trap, resulting in a long narrow gas field.

Major production in Pondera and Teton counties was established in the early 1920s. In 1979 the area produced 305,700 barrels oil and 1.37 billion cubic feet of gas. Approximately 700 holes have been drilled in the area. Up until 1982 there was considerable exploration taking place.

For additional information on oil and gas potential in the RMF area, refer to the GEM report, on file in the Headwaters Resource Area office.

Coal

The Lewistown-Great Falls coal field was mined in the early 1900s. Total production has been estimated at about 36 million tons. Mining slowed dramatically in the 1930s and by 1960 production had fallen to 43,500 tons for the preceding ten years. There is little current mining activity. Reserves are estimated to be in the 300 million ton range in Cascade County (Montana, Bureau of Mines and Geology 1967).

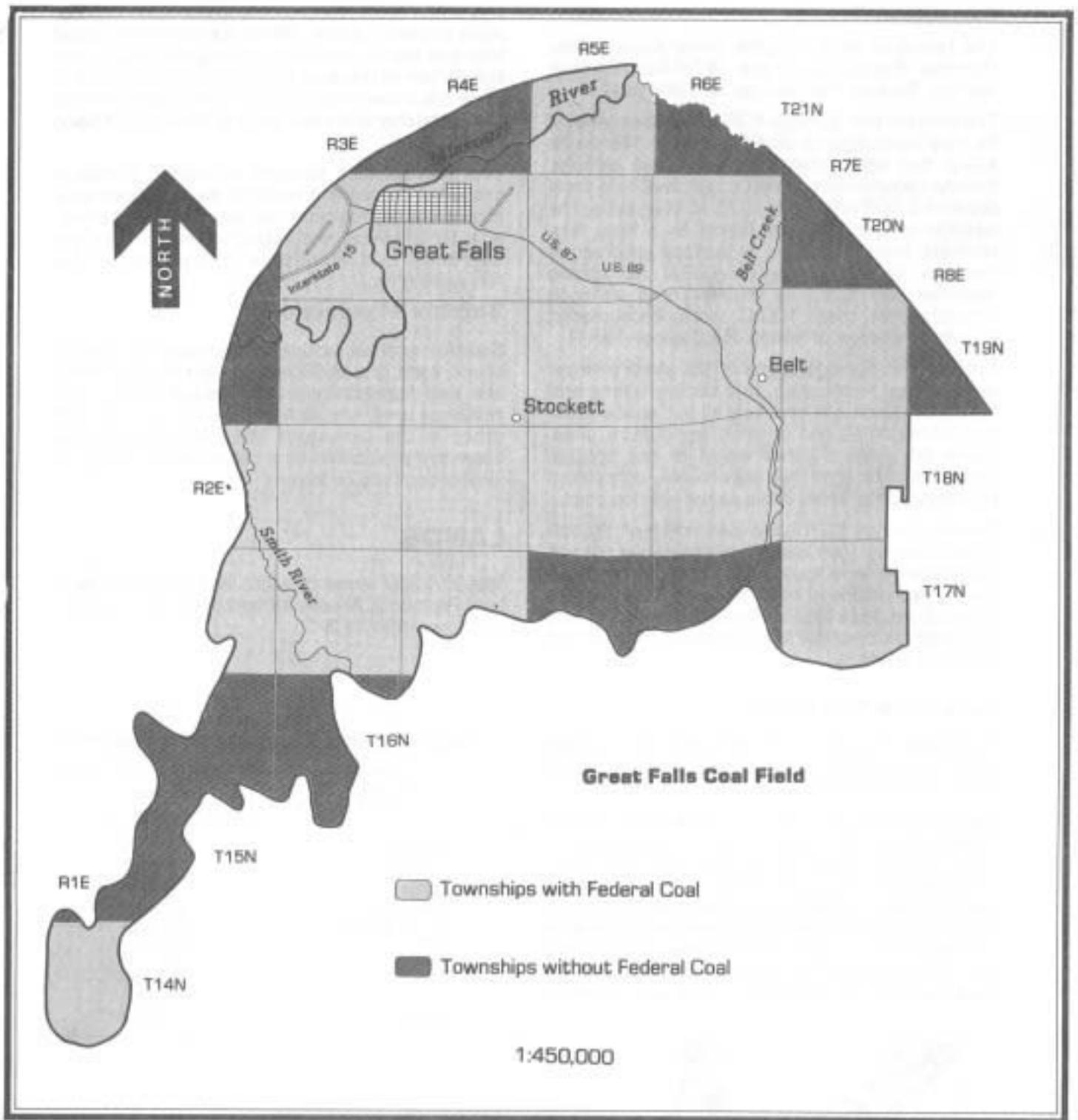
The coal seams occur in the upper portion of the Morrison formation of late Jurassic age (135-180 million years ago). The coal seams are intermixed with shale layers and vary considerably in thickness, ranging from 0-12 feet.

Depth to the coal is 200-300 feet. Recent (1981) exploration activity has confirmed the highly irregular nature of the coal seams. Many of the drill holes did not encounter any coal. There is no current exploration activity in the area.

A typical analysis of coal from the Great Falls field is: volatile matter, 28.8%; fixed carbon, 52.1%; ash content, 19.1%; and Btu/lb., 11,118. Sulphur in the Great Falls coal field averages 2.7%, but varies considerably to as high as 5.5% sulphur (ibid). Expensive underground mining costs and high sulphur and ash content all combine to make development unlikely in the near future. The approximate boundary of the Great Falls coal field is shown on the Great Falls Coal Field map.

In the southern portion of the area the small Trail Creek and Electric coal fields are largely undeveloped.





Geothermal

The resource area includes three Known Geothermal Resource Areas (KGRAs)—Corwin Springs, Boulder Hot Springs, and Marysville.

The Boulder Hot Springs KGRA has been offered for sale twice with no bidders, and the Marysville KGRA has been offered once with no bidders. Batelle Laboratories drilled a test well to a total depth of 2,100 meters in 1975 at Marysville. The location of the hole was based on a heat flow anomaly, since there are no surface geothermal features in the Marysville KGRA. No usable resource was found by the test well although temperatures over 100°C were encountered (Montana, Bureau of Mines and Geology 1981).

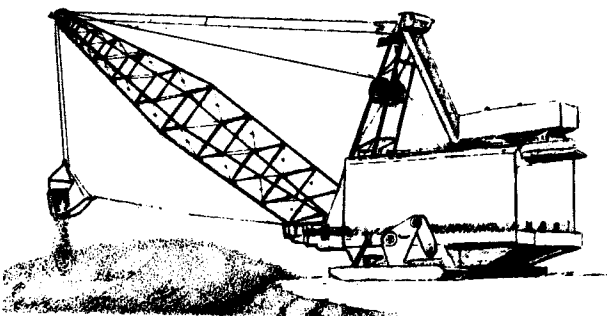
Boulder Hot Springs is one of the state's larger geothermal resources, but temperature and reservoir conditions preclude all but space heating, recreational, and possibly agriculture uses. There are several other warm or hot springs throughout the area that are probably only suited to recreation or small scale space heating uses.

Corwin Springs KGRA lies just north of Yellowstone National Park near Gardiner. It has not yet been offered for a lease sale. There has been no recent exploration activities or interest in leasing in any of the three areas. The BLM is investigating declassification of the Marysville and Boulder Hot Springs KGRAs.

Locatable Minerals

Locatable minerals in the resource area include gold, silver, copper, molybdenum, lead, zinc, uranium, and limestone.

Specific areas of interest include: the Corbin-Wickes area and Elkhorn area for possible porphyry copper deposits, possible lead-zinc-silver mineralization in the Radersburg area, possible gold deposits in the Marysville and Scratchgravel Hills areas, and additional gold reserves in the area of the Golden Sunlight Mine northeast of Whitehall. Several areas around the Boulder Batholith have anomalous radioactivity and until recently



there has been intermittent exploration for uranium in these areas. There are numerous small lode and placer operations throughout the southern portion of the area. Mining activity and mineral potential in the Scratchgravel Hills is illustrated on the Scratchgravel Hills Mineral Potential/Mining Claims map.

The Mississippian Madison limestone formation crops out throughout much of the resource area. It contains high calcium horizons that may be suitable for chemical and industrial uses. There are currently two limestone operations in the resource area.

Salable Materials

Salable materials include common variety rock and stone, sand, gravel, fill, and rip rap material. There are two community pits on public land in the resource area, one at Montana City and the other in the Limestone Hills. Mineral material sales are processed on a case-by-case basis as applications are received.

LANDS

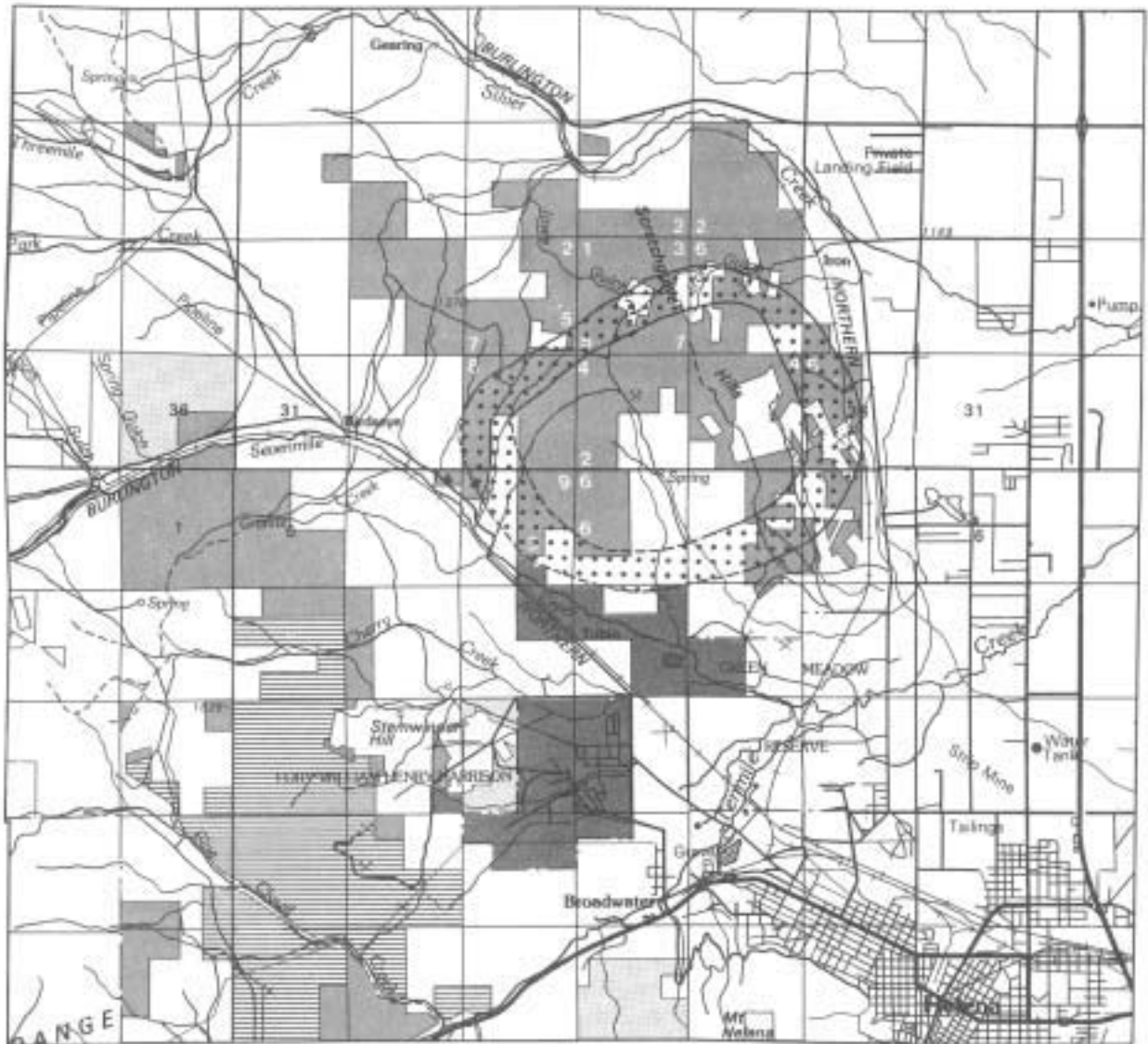
The 311,337 acres of public land in the Headwaters Resource Area is spread over nine counties as shown in Table 3-1.

**TABLE 3-1
PUBLIC LAND ACREAGE BY COUNTY**

County	Acres
Broadwater	64,591
Cascade	25,577
Gallatin	8,681
Jefferson	97,499
Lewis & Clark	72,488
Meagher	10,575
Park	13,036
Pondera	1,516
Teton	17,374

R4W

T11N



T10N

RANGE

**Scratchgravel Hills
Mineral Potential/
Mining Claims**

- | | |
|---|---|
|  Public Surface/Subsurface |  Military Reservation |
|  Public Subsurface |  State |
|  Private |  Mining Operations |
|  High Potential for Base Metals and Gold |  Mining Claims per Quarter Section |



1:100,000



3 — AFFECTED ENVIRONMENT

Most of the public land (76%) is located in three counties, Broadwater, Jefferson, and Lewis and Clark. These three counties are often referred to as the core counties. The percentages of public surface and subsurface ownership for each county are illustrated on the Percent of Public Surface Ownership and Percent of Public Subsurface Ownership maps.

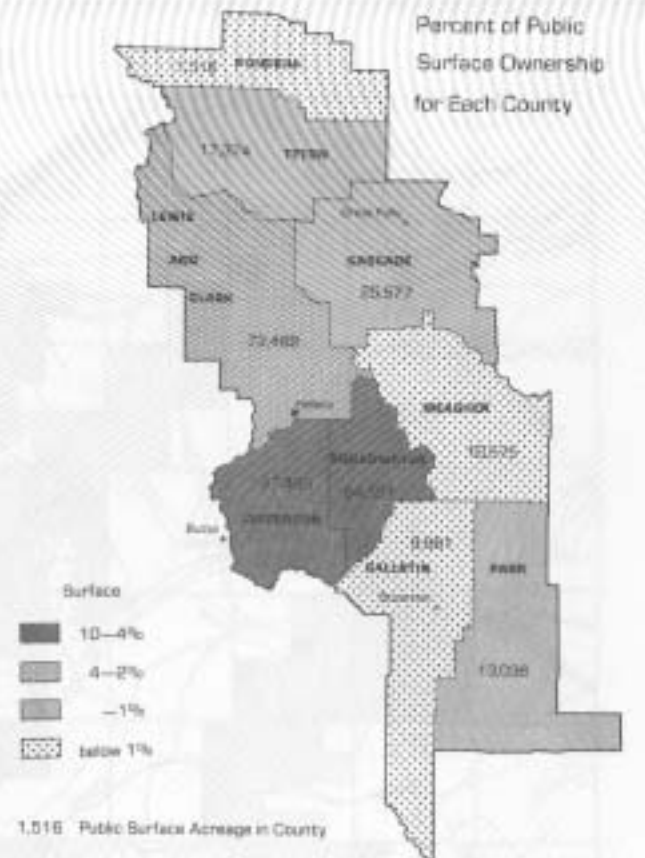
Most of the producing agricultural land in the resource area was patented under homestead laws, most known mineral land was patented under mining laws, and most forested land was withdrawn for administration by the Forest Service, U.S. Department of Agriculture. Some of the best recreational sites have been transferred to the Montana Department of Fish, Wildlife and Parks. Thus, the most productive land is generally in other ownership.

Some large blocks of BLM-administered land still exist, but in general past disposal policies have resulted in confusing land ownership patterns. In some cases there are many small isolated tracts of public land. In other cases there are areas of intermingled private, state and public land (so called checkerboard ownership). In all but the core counties, most public land consists of isolated tracts surrounded by private land or situated adjacent to national forest lands.

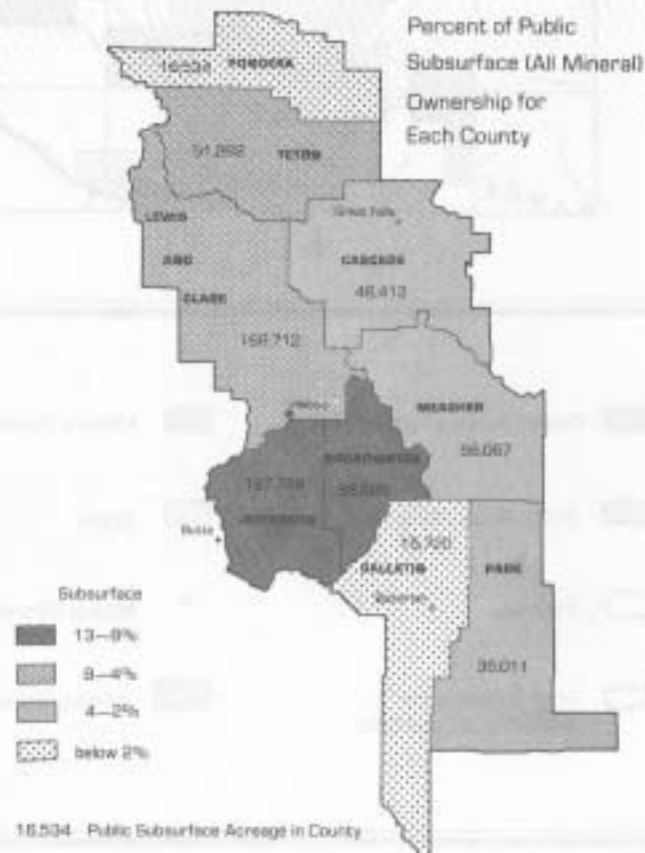
The greatest demand for land use authorization occurs in the core counties. Rights-of-way for roads, highways, telephone lines, electric transmission lines, and pipelines constitute a major portion of existing land uses and requests for new authorizations. One of the larger tracts of public land, 22,000 acres in the Limestone Hills, is under lease to the Montana National Guard for military training purposes.

There is only one designated utility corridor in the Headwaters Resource Area, the Colstrip twin 500 KV transmission line from Townsend to Garrison. Due to the constraints of topography within this corridor, it is doubtful that it will be used in its entirety for additional facilities (see the Major Utility and Transportation Corridors map).

Unauthorized use of public land is a major problem in the resource area, with nearly 100 cases on record. These trespasses fall into five major categories: occupancy, rights-of-way, agricultural, unauthorized enclosures, and unauthorized dumping. Trespasses occur primarily on small isolated tracts and in areas of complex land ownership patterns. New cases are not very frequent. The primary cause of the large backlog has been a lack of workmonths and personnel to resolve existing cases.

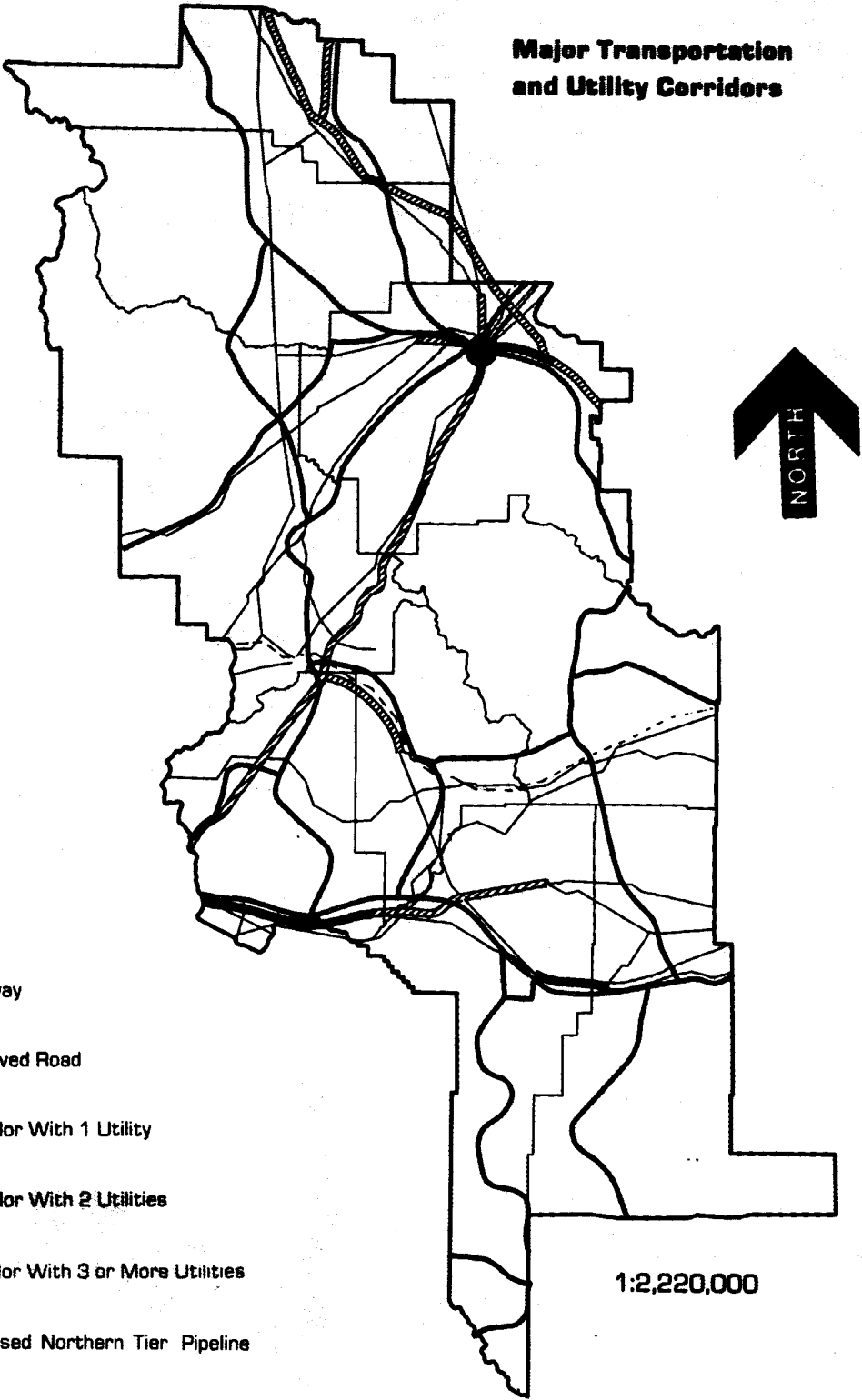


The BLM manages the surface on 2.5% of the total area in the Headwaters Resource Area



The Federal Government owns the mineral on 7% of the total land area in the Headwaters Resource Area.

Major Transportation and Utility Corridors



Utility Corridor includes Major Powerlines and Pipelines

The twenty-nine occupancy cases present the greatest problem. They are concentrated in northern Jefferson County, Lewis and Clark County, and Broadwater County. Many occupancy cases involve misuse of unpatented mining claims. Small electric transmission lines built under the Rural Electrification Act constitute most of the twenty-three rights-of-way trespasses. Although very little public land in the resource area is suitable for agriculture, there are twenty-one reported agricultural trespasses, primarily on small scattered tracts.

There are numerous withdrawals and classifications in the resource area, many of which limit management options on the public land. In Jefferson, Lewis and Clark, and Broadwater counties, only a small percentage of the public land is under withdrawal, primarily along the Missouri River and its tributaries. Public land adjacent to Canyon Ferry Reservoir has been withdrawn by the Bureau of Reclamation. Most of the remaining public land along the Missouri was withdrawn for power site and reservoir purposes by the Federal Energy Regulatory Commission (FERC). In Teton County, 31,000 acres of public land were withdrawn by the Bureau of Reclamation for irrigation projects. Numerous other smaller withdrawals are scattered throughout the resource area.

The primary effect of these withdrawals on the lands program is that they prevent disposal of the withdrawn tracts. Bureau of Reclamation withdrawals remove all management from the BLM, while FERC withdrawals are still managed by the BLM under consultation with FERC. Also, lands classified for recreation and public purposes cannot be disposed of except under the R&PP Act. All of these withdrawals are to be reviewed by the BLM by 1991, and therefore their status could change.

Major urban areas in the resource area include Helena, Great Falls, and Bozeman. Smaller cities and towns are spread throughout the resource area. There are no cases where public land is a hindrance to urban expansion and growth. However, there are significant conflicts between suburban residential use and public land use in areas around Helena. These conflicts are not a result of public land limiting growth, but are the result of new residential use conflicting with other resource values on adjacent tracts of public land.

Most of the larger tracts of public land have legal public access via existing federal, state, and county road systems. Some important exceptions, where legal access needs to be acquired, include the Spokane Hills, portions of the East Front, portions of Confederate Gulch, Muskrat Creek, Golconda Creek, and Whitetail Creek. Many

smaller tracts of public land do not have legal access. In most cases, such parcels do not have the resource values to justify public interest in acquiring access. Some small tracts along rivers serve as important public access points and require protection of existing legal access or acquisition of new legal access.

RECREATION RESOURCES

Most of the recreational use in the Headwaters Resource Area occurs in a dispersed situation, but large numbers of people utilize one particular special management area at Holter Lake. Dispersed recreation sites contain, at a maximum, picnic tables, an outhouse, minor boat launching facilities, and some area for parking. These sites are generally not designated, and normally occur either next to water or in association with ORV use.

Dispersed recreation occurs over a broad range of land and does not necessarily depend on a specific location. Some of the dispersed recreation sites have names while others are simply identified by numbers on a map. Visitors generally participate in a wide variety of recreation activities, including fishing, hunting, camping, boating, picnicking, hiking, sightseeing, swimming, horseback riding, nature observation, recreational collecting, rock-hounding, cross-country and downhill skiing, snowshoeing, hang gliding, jogging, bicycling, motorcycling, four-wheel driving, and snowmobiling. Many of these activities occur in a dispersed situation.



However, the special management areas also account for a large amount of the use. Many of the uses at these areas are the same as those in dispersed settings, such as camping, boating, picnicking, and similar activities, but they occur in a more intensive manner. Intensive sites primarily are limited to the major rivers such as the Missouri, Smith, and Yellowstone and lakes such as Holter, Upper Holter, or Hauser.

There are numerous opportunities for interpretive services within the resource area, but little has been done so far. Most interpretation is, of necessity, passive contacts rather than active ones. Thus, signing, maps, brochures, bulletin boards, and other such media are used to convey information to the public.

VISUAL RESOURCES

The physiographic province that is used for classifying the inherent scenic quality of the Headwaters Resource Area is the Northern Rocky Mountains (Fenneman 1938).

The resource area has three classes of scenic quality: Class A, high scenic values; Class B, moderate scenic values; and Class C, low scenic values. Class A lands in the resource area comprise about 4% of the total; Class B lands about 39%; and Class C lands about 57% (based on an inventory and evaluation of all lands, public and private, excluding national forest, national park, and Indian reservation lands).

In general, lands of high scenic value (Class A) (see the Class A Scenery map) have a landscape character of high, rugged, forested mountains; tree-lined river bottoms; river gorges; or major lakes. Lands of low scenic values (Class C) have a landscape character of broad, flat or round valley bottoms or foothills and plains with few or no trees and few water features. Lands with a landscape character that falls between Class A and Class C characteristics have moderate scenic values and are classified Class B.

CULTURAL RESOURCES

Archeological Resources

To date 36,973 acres, or 11.3%, of the public land in the Headwaters Resource Area has been inventoried for cultural resource occurrence. Of this total, 9% was intensively inventoried (Class III standards). A total of 163 prehistoric sites and 199 isolated finds have been recorded. Two sites

have been nominated for listing in the National Register of Historic Places. Other sites appear to be potentially eligible for nomination, but require further evaluation.

Of the recorded sites, 16 are high priority, 39 are moderate priority, and 108 are low priority sites. These priorities determine how a site should be managed. Site priorities indicate a site's potential for contributing data and explain its function or uniqueness.

Types of sites that have been located include lithic scatters, chipping stations, quarry sites, lithic procurement sites, workshops, individual and mass kill/butchering sites, game blinds, drive alignments, vision quests, cairns, pictograph/petroglyph panels, rockshelters, stone circle sites, open occupation sites, trails, and isolated artifacts.

These resources were used during the past 13,000 years by peoples of the Early, Middle, and Late periods. Archeological influences from the Plains, Plateau, and Great Basin areas are visible. During the early historic period the Headwaters Resource Area was used by the Salish, Shoshone, Bannack, Crow, Blackfeet, and Gros Ventre Indians, and as hunting areas by the Western Salish, Kutenai, Nez Perce, and Northern Piute groups.

Historic Resources

A total of eighty-three historic sites have been recorded on public land in the Headwaters Resource Area. Two sites have been listed on the National Register of Historic Places. Others appear to be eligible for nomination, but require further evaluation.

The historic sites have been evaluated in the same manner as prehistoric sites. Five are of high priority, nine of moderate priority, and sixty-seven of low priority.

Historic sites recorded on public land include mines, mills, dredges, flumes, haulage roads, residential structures, and towns associated with mining; sawmills and camps associated with the timber industry; homesteads, ranches, sheep camps, line shacks, corrals, and irrigation projects associated with agriculture; and trails, roads, railroad construction camps, and railroad grades associated with exploration and transportation. A few historic graves and an aircraft crash site have been recorded on public land.



PALEONTOLOGICAL RESOURCES

Fossils are known to occur in several geologic formations within the resource area. These formations have been classified to indicate the likelihood of significant fossil occurrence (significant fossils are considered to be vertebrate fossils of scientific interest).

Class I areas are those areas that are known, or are likely, to produce abundant significant fossils that are vulnerable to surface-disturbing activities. Class II areas are those areas that show evidence of fossils, but are unlikely to produce abundant significant fossils. Class III areas are those areas that are unlikely to produce fossils.

These classifications determine the procedures to be followed prior to granting a paleontological clearance to proceed with a project. Class I areas require a BLM survey prior to surface disturbance. Class II and Class III areas do not require surveys; however, mitigation measures are taken to protect any significant fossil finds. During most inventories within the resource area the cultural and paleontological clearances are conducted concurrently.

The Class I areas within the resource area consist of the Cretaceous deposits lying immediately east of the Rocky Mountain Front and several Tertiary deposits within the Jefferson and Missouri River drainage systems. The Cretaceous deposits consist of the Two Medicine and Marias River Formations from which intact skeletons, eggs, and nest structures of various dinosaurs have been recovered from private land. These finds have forced a reexamination of group dynamics and social structure among several species. To date, finds on public land have been restricted to isolated skeletal elements and concentrations of bone fragments found within stream-derived conglomerates. Geologic information suggests that fossil concentrations similar to those found on private land may exist on public land.

The Tertiary beds primarily consist of lake sediments dating from the Oligocene and Eocene. Significant numbers of reptile, bird, and mammal remains have been recovered from some beds, providing information on the evolution of the horse, primates, and other species.

Class II areas include portions of the Madison Formation, the Kootenai Formation, and the Morrison Formation. While the Madison Formation covers the greatest acreage of all fossiliferous deposits within the resource area, its fossil values lie in communities of invertebrates. The Kootenai

Formation forms the Great Falls coal beds and is of interest because of flora communities and potential insect, amphibian, and reptile fossils. Fish remains are present within the Morrison Formation.

Class III areas compose the majority of the resource area and include batholith and volcanic formations and areas of unconsolidated Tertiary, Pleistocene, and Recent period outwash.

WILDERNESS RESOURCES

The BLM's intensive inventory, completed in September 1981, identified nine Wilderness Study Areas (WSAs). These areas were Blind Horse Creek (MT-075-102), Chute Mountain (MT-075-105), Deep Creek/Battle Creek (MT-075-106), North Fork of Sun River (MT-075-107), Beaver Meadows (MT-075-110), Sleeping Giant (MT-075-111), Elkhorn (MT-075-114), Black Sage (MT-075-115), and Yellowstone River Island (MT-075-133).

As a result of Instruction Memorandums WO-83-188 (12/30/82) and MT-83-108 (1/17/83), some substantial study procedure changes have occurred. The Sleeping Giant unit (6,131 acres) has been deleted from further study due to its split estate problems. Black Sage and the Yellowstone River Island remain WSAs and will be studied under Section 603 of FLPMA. The remaining six units will not be analyzed under this section of FLPMA since they do not meet the 5,000-acre size requirement. Beaver Meadows (595 acres), North Fork of Sun River (196 acres), and Elkhorn (3,642 acres) have been removed from further wilderness consideration. Blind Horse Creek, Chute Mountain, and Deep Creek/Battle Creek will be studied under Section 202 of FLPMA. These three former WSAs were retained due to their outstanding wilderness qualities.

The five areas being studied for wilderness are located in Jefferson, Park, and Teton counties. The topographic and natural features represented by these five areas are quite diverse, ranging from an island at an elevation of 4,415 feet, to sagebrush/grassland prairies, to forested uplands and alpine meadows reaching elevations of 7,700 feet.

These study areas constitute approximately 6% of the public land in the resource area and cover a total of 17,197 acres. Table 3-2 lists the areas under wilderness study within the Headwaters Resource Area.

TABLE 3-2
AREAS BEING STUDIED FOR
WILDERNESS IN THE HEADWATERS
RESOURCE AREA

Study Area	Acreeage
Blind Horse Creek	4,927 acres
Chute Mountain	3,205 acres
Deep Creek/Battle Creek	3,086 acres
Black Sage	5,926 acres
Yellowstone River Island	53 acres
Total	17,197 acres

The acreages listed here differ slightly from those reported in the intensive inventory, because they have been recalculated with greater accuracy.

Three of these areas are of sufficient size to independently qualify for wilderness study. These are Blind Horse Creek, Black Sage, and the Yellowstone River Island.

The remaining two areas are significantly less than 5,000 acres and are referred to as tack-ons. These lands qualify for wilderness study because they are contiguous with land managed by another agency that has been formally determined to have wilderness or potential wilderness values. Although Chute Mountain and Deep Creek/Battle Creek are both contiguous with the same Forest Service RARE II further planning areas, they will be analyzed separately. If either of these tack-ons is recommended as suitable for wilderness designation, the recommendation will be considered preliminary until the study of the adjacent Forest Service area is completed and a Bureau of Mines/Geological Survey mineral report is done.

Wilderness Opportunities

National and Regional Opportunities

The National Wilderness Preservation System (NWPS) was comprised of 263 units as of December 31, 1980. These units covered a total acreage of 79,810,741 acres. Of this, 56,393,201 acres (about 70%) is in Alaska; 23,417,540 acres are in the lower forty-eight states and Hawaii.

A three-state area—Montana, Idaho, and Wyoming—is considered the affected region for purposes of this study. Table 3-3 summarizes by state the designated wilderness areas, areas that have received presidential recommendations for wilderness designation, and areas that are to be studied further for possible wilderness designa-

tion. The three-state region, which essentially encompasses the northern Rocky Mountains, contains some of the most extensive opportunities in the country in designated and de facto wilderness areas.

Opportunities in Montana

Montana contains 3,172,339 acres in fourteen designated wilderness areas, 1,927,625 acres in fifty-nine presidentially endorsed areas, and 1,664,627 acres in sixty-one further study units. About 28% of the acreage in further study areas in the state is on BLM-administered land. There are no designated wilderness areas or areas that have received presidential endorsement on BLM-administered land in Montana.

Two cities that qualify as standard metropolitan statistical areas (SMSAs) are within five hours driving time of some of the study areas being considered here. Billings, Montana, which has a metropolitan population of 108,035, is within five hours of two of the areas; Great Falls, where the SMSA population is 80,696, is within five hours of all five areas.

The two cities are near unusually rich wilderness opportunities (see Table 3-4). Within five hours of Billings there are five designated wilderness areas totaling 2,007,274 acres, twenty-seven presidentially endorsed areas totaling 1,449,062 acres, and thirty-nine further study areas totaling 1,020,985 acres. Within five hours of Great Falls are twelve designated wilderness areas totaling 4,122,934 acres, thirty-three presidentially endorsed areas totaling 2,569,180 acres, and thirty-two further study areas totaling 1,232,147 acres. Appendix K contains a summary of the status of wilderness and wilderness study areas in Montana.

Supply and Demand Factors

The National Wilderness Preservation System contains 50 of the 241 basic ecosystems recognized by the Bailey-Kuchler classification system as existing in the United States and Puerto Rico. Sixty-two more ecosystems are represented in presidentially endorsed areas, and seventy-eight additional ecosystems are represented in further study areas. None of the areas that have received presidential endorsement or are under study contain the remaining fifty-one ecosystems (Davis 1980; Kuchler 1964; USDA, FS 1976, 1978a). In general, the existing wilderness system includes a relatively large number of examples of high elevation mountain ecosystems and alpine, subalpine, and glacial landscapes.

**TABLE 3-3
REGIONAL WILDERNESS OPPORTUNITIES**

State	Designated Wilderness Areas		Presidentially Endorsed Areas		Further Study Areas				
	Agency	Number of Areas	Acres	Agency	Number of Areas	Acres	Agency	Number of Areas	Acres
Montana	FS	11	3,107,342	NPS	2	1,084,660	FS	23	1,207,769
	FWS	3 14	64,997	FS	32	681,385	BLM ¹	38	456,858
Idaho	FS	5	3,835,479	FWS	15	161,580		61	
	NPS	1	43,243	FS	17 49	1,240,424 1,528,769	FS	11	571,931
Wyoming	FS	6	2,194,303	BLM ¹			BLM ¹	54	1,326,799
				FS	17	627,100	FS	7	414,870
				NPS	2	1,848,744	BLM ¹	36	565,260

BLM — Bureau of Land Management
 FS — Forest Service
 FWS — Fish and Wildlife Service
 NPS — National Park Service

¹These figures may change as a result of the December 30, 1982 decision to eliminate areas of less than 5,000 acres from wilderness study under Section 603 of FLPMA.

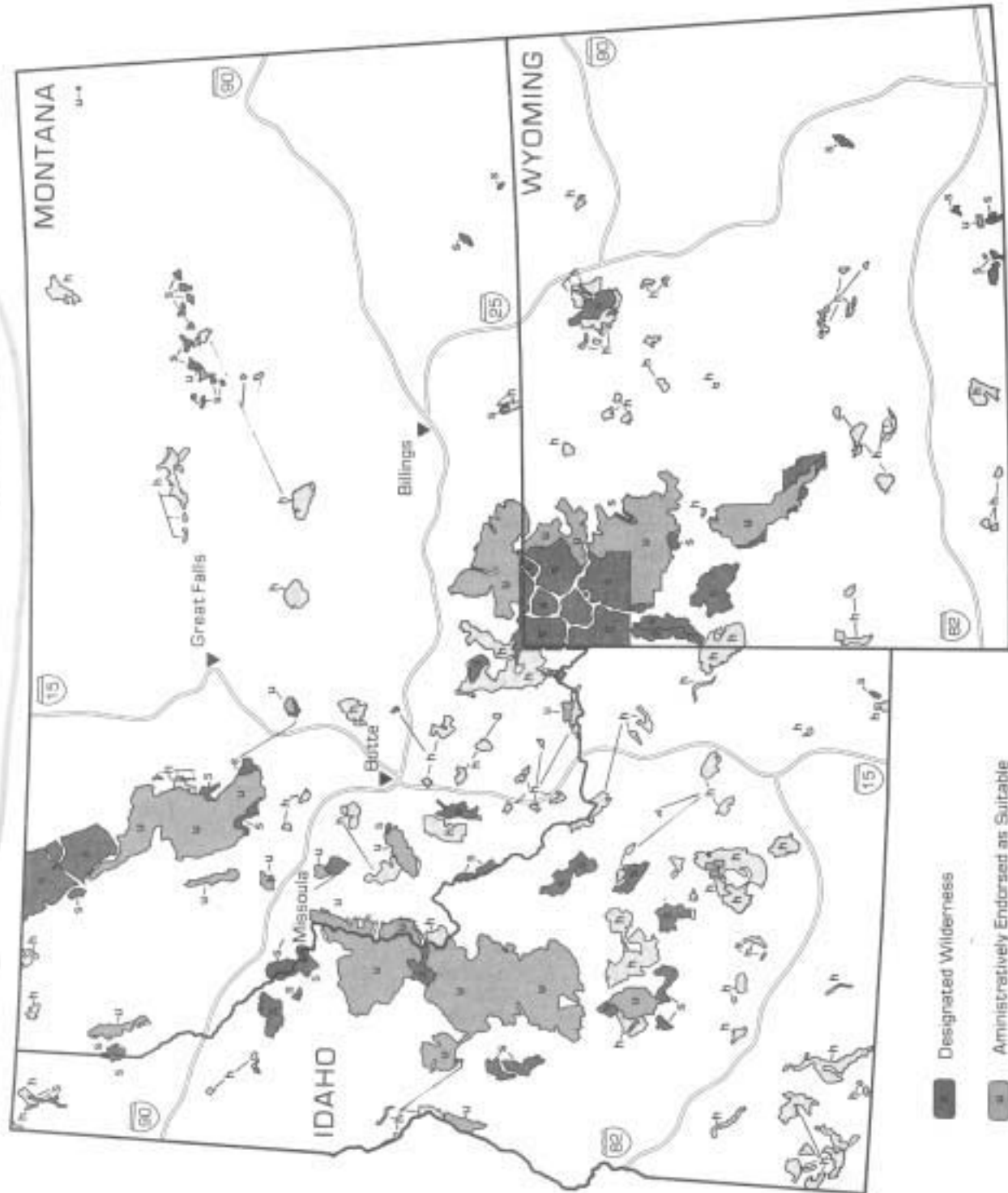
**TABLE 3-4
PROXIMITY OF WILDERNESS TO POPULATION CENTERS**

Total Acres Within One Day's Travel Time of Population Centers	Population Centers Within One Day's Travel Time of Wilderness Area	State	BLM		Other Agency	
			Number of Areas	Acreege	Number of Areas	Acreege
Statutory Wilderness Within One Day's Travel Time of Identified Population Centers						
2,007,274	Billings, Montana	Montana	None	None	3	969,786
		Wyoming	None	None	2	1,037,483
4,122,934	Great Falls, Montana	Montana	None	None	11	3,033,917
		Idaho	None	None	1	1,089,017
Areas Recommended for Wilderness by the President Within One Day's Travel Time of Identified Population Centers						
1,449,062	Billings, Montana	Montana	None	None	19	260,152
		Wyoming	None	None	8	1,188,910
2,569,180	Great Falls, Montana	Montana	None	None	31	1,392,102
		Wyoming	None	None	1	1,013,221
		Idaho	None	None	1	163,857
Other Study Areas within One Day's Travel Time of Identified Population Centers						
1,024,627	Billings, Montana	Montana	21	217,490	6	648,637
		Wyoming	12	154,858	None	None
1,236,580	Great Falls, Montana	Montana	21	218,081	11	1,014,066

Both designated wilderness and undesignated, de facto wilderness areas contribute to the supply of primitive recreation opportunities. While the supply of congressionally designated wilderness has increased since passage of the Wilderness Act of 1964, the supply of de facto wilderness areas has been declining. While one factor in this decline is the conversion of de facto wilderness to

designated wilderness, other factors are involved as well. An indication of the overall decrease in de facto wilderness areas is the loss of Forest Service trail mileage, chiefly to roads for resource extraction. A loss of more than one-third of the total mileage is documented for the period between 1946-1971 (Spencer et al. 1980). While other factors may be involved in this loss, it still

Regional Wilderness Opportunities



indicates a decrease in supply of de facto wilderness opportunities.

The demand for recreation opportunities and the need to provide diverse, high quality recreation are factors in wilderness decisions, although by themselves they do not clearly indicate that wilderness is or is not needed. In general, primitive recreation has shown tremendous growth since the mid-1960s. Various surveys show that there was a threefold or fourfold increase in hiking and backpacking from the 1960s to the late 1970s. This growth apparently has leveled off since the late 1970s, but it is expected that there will be major growth in the 1980s in snow-based activity, day use, and family hiking and backpacking (Spencer et al. 1980).

When a large number of persons seek a wilderness experience, the opportunities for such an experience can decrease. It has been documented that this happened as early as 1971, when a study of three wilderness areas revealed that more than half of the hikers using the areas were dissatisfied with the opportunities for solitude (Stankey 1971). A recent survey of managers of existing wilderness areas found that crowding was perceived as a problem in 49% of those areas (Cole and Washburne 1981).

An additional factor in the demand for wilderness opportunities is the fact that existing wilderness use is concentrated in the summer, since most areas currently in the NWPS are suited to summertime use. The system contains relatively few low elevation areas in which environmental conditions are not harsh in all seasons but summer.

While primitive recreation use has grown, the same can be said of potentially competing uses such as motorized recreation. For example, snowmobile registrations in Montana were increasing at an annual rate of about 15% in the late 1970s. The growth in both motorized and primitive recreation is reflected in an analysis of the relative need for additional opportunities in the Montana Fish, Wildlife, and Parks regions (MDF&G 1978). Region 3 and 4, which include the area under study here, are listed as having the second and third highest relative need for additional non-motorized trail opportunities and the first and third highest relative need for additional cross-country ski opportunities. Region 3 and 4 also are listed as having high relative needs for additional motorized recreation opportunities; they are first and second in snowmobiling, second and third in four-wheel driving and second and third in motor-cycling needs.

Wilderness in the Local Area

Three of the areas covered in this report are entirely within Teton County, one is in Jefferson County, and one is in Park County. Approximately 11,218 acres addressed in this study are in Teton County, 5,926 acres are in Jefferson County, and 53 acres are in Park County.

In addition to the units addressed above, the three counties contain two designated wilderness areas, three proposed wilderness areas, and four areas under further study. Table 3-5 shows the existing, proposed, and further study areas by county. Federal land comprises a significant percentage of the land in the three-county area. Approximately 53% of the total land within Jefferson County, 22% of the total in Teton County, and 54% of the total in Park County is managed by federal agencies. Roughly 12% of the land administered by BLM in the three counties is involved in this study.

Table 3-6 shows the percentage of federal land in the three counties that is designated as wilderness or under wilderness consideration.

Consistency with Other Plans

The Federal Land Policy and Management Act (FLPMA) requires that BLM plans be as consistent with state and local plans as federal laws, policies, and regulations will allow. When the decision is made to recommend an area as suitable or unsuitable for wilderness designation, the consistency of these recommendations with other federal, state, local, and tribal plans will be considered. However, the BLM cannot base its wilderness recommendations solely on consistency with these plans.

All state agencies will be notified of BLM plans, and affected state agencies will be asked to document any inconsistencies. When the draft recommendations are released, parties that might be affected will be notified so that any inconsistencies with the specific recommendations may be surfaced.

Federal Agency Plans

Forest Service. Three of the areas considered in this management plan are contiguous to national forest land. All three areas adjoin the Lewis and Clark National Forest. In discussions between the BLM and FS in October and February 1980, it was agreed that the two agencies will consider complimentary management alternatives for their adjacent lands and that coordinated recommendations be submitted to Congress.

3 — AFFECTED ENVIRONMENT

**TABLE 3-5
EXISTING AND PROPOSED WILDERNESS AREAS
AND AREAS UNDER WILDERNESS STUDY**

Type	Area Name	Acres ¹
JEFFERSON COUNTY		
Existing Wilderness	None	—
	Total	—
Proposed Areas ²	None	—
	Total	—
Further Study Areas ³	Elkhorn (FS)	64,522
	Total 1 area	64,522
PARK COUNTY		
Existing Wilderness	Absaroka Beartooth (FS)	518,376
	Total 1 area	518,376
Proposed Areas	Yellowstone 928 (NPS)	91,452
	Republic Mountain (FS)	700
	Reef (FS)	2,200
	Total 3 areas	104,352
Further Study Areas	Hyalite H (FS)	7,473
	Gallatin Divide G (FS)	51,687
	Total 2 areas	59,160
TETON COUNTY		
Existing Wilderness	Bob Marshall (FS)	84,480
	Total 1 area	84,480
Proposed Areas	None	—
	Total	—
Further Study Areas	Deep Creek (FS)	41,960
	Total 1 area	41,960

NPS — National Park System
FS — Forest Service

¹Acresages shown are those in affected counties only.

²"Proposed Areas" may refer to areas that the administering agency has recommended for wilderness designation or to areas with presidential endorsement.

³"Further Study Areas" does not include any areas for which the administering agency has made a final recommendation to Congress.

Chute Mountain and Deep Creek/Battle Creek are both tack-ons to the Lewis and Clark National Forest. The final suitability of these areas is dependent on the outcome of the study of the adjacent FS area studies. If a suitable recommendation is made for either or both of these tack-ons, it will be regarded as preliminary, pending the outcome of the Forest Service studies. Any nonsuitable recommendations however will be final.

State of Montana Plans

A recently signed memorandum of understanding between the BLM, the FS, and the governor of Montana created the Natural Resources Council, which will serve as a clearinghouse for consultation on all natural resource issues. The specific recommendations resulting from this study will be evaluated for consistency by this group.

Local Plans

None of the comprehensive county plans, for counties that have study areas within their borders, address the issue of wilderness designation.

Description of Individual Areas

The following sections provide a brief description of each of the areas that are covered by this study. More detailed information on each area can be found in Appendix L.

Blind Horse Creek

The Blind Horse Creek area contains 4,927 acres of public land administered by the BLM. Within the area boundaries are 160 acres (T25N, R8W, Section 18, NE 1/4) of private land. The area is located on the east front of the Rocky Mountains, twenty-five miles northwest of Choteau, Montana. Access into the area is primarily via gravel roads that cross private lands and extend up the Chicken Coulee and Clark Fork of Muddy Creek drainages from the east, and through Forest Service trails from the west.

**TABLE 3-6
PERCENTAGE OF LAND AFFECTED BY WILDERNESS OR WILDERNESS STUDY**

County	Designated Wilderness		Proposed Wilderness		BLM Study Areas		Other Agency Study Areas	
	% Fed. Land	% Co. Land	% Fed. Land	% Co. Land	% Fed. Land	% Co. Land	% Fed. Land	% Co. Land
Jefferson ¹	0	0	0	0	1	1	11	6
Teton ²	29	6	0	0	4	1	14	3
Park ³	57	30	11	6	0	0	6	3

¹Federally administered lands in Jefferson County comprise about 563,962 acres of the 1,071,557 county total acreage.

²Federally administered lands in Teton County comprise about 292,917 acres of the 1,348,896 county total acreage.

³Federally administered lands in Park County comprise about 911,999 acres of the 1,700,280 county total acreage.

The unit is roughly rectangular on a north-south axis. It is six and three-quarters miles in length and varies in width from one-half to two miles. The northern, southern and eastern boundaries are bordered by lands in private ownership. The western boundary consists of national forest land recommended for nonwilderness as a result of RARE II. Although the unit has less than 5,000 acres of roadless public land, the area stands as an independent study area due to strong public support and its ability to be managed in an unimpaired condition.

The topography of the area ranges from 5,100 feet to 7,000 feet. These variations in elevation are exemplified by steep, rocky cliffs with some small crevasses in the northern portion, deep winding drainages with open meadow benches in

the central portion, and gently sloping ridges in the southern portion. The primary drainages within the unit are Blind Horse Creek, Chicken Coulee, and Pamburn Creek. There are several springs throughout the area, but no perennial streams. Topography in the Blind Horse Creek area is illustrated on the Blind Horse Creek Topographic map.

Approximately 70% of the unit is forested with limber pine, Douglas fir, subalpine fir, and small pockets of aspen. The remainder of the unit is comprised of grasses, forbs, shrubs, and rock outcrops.

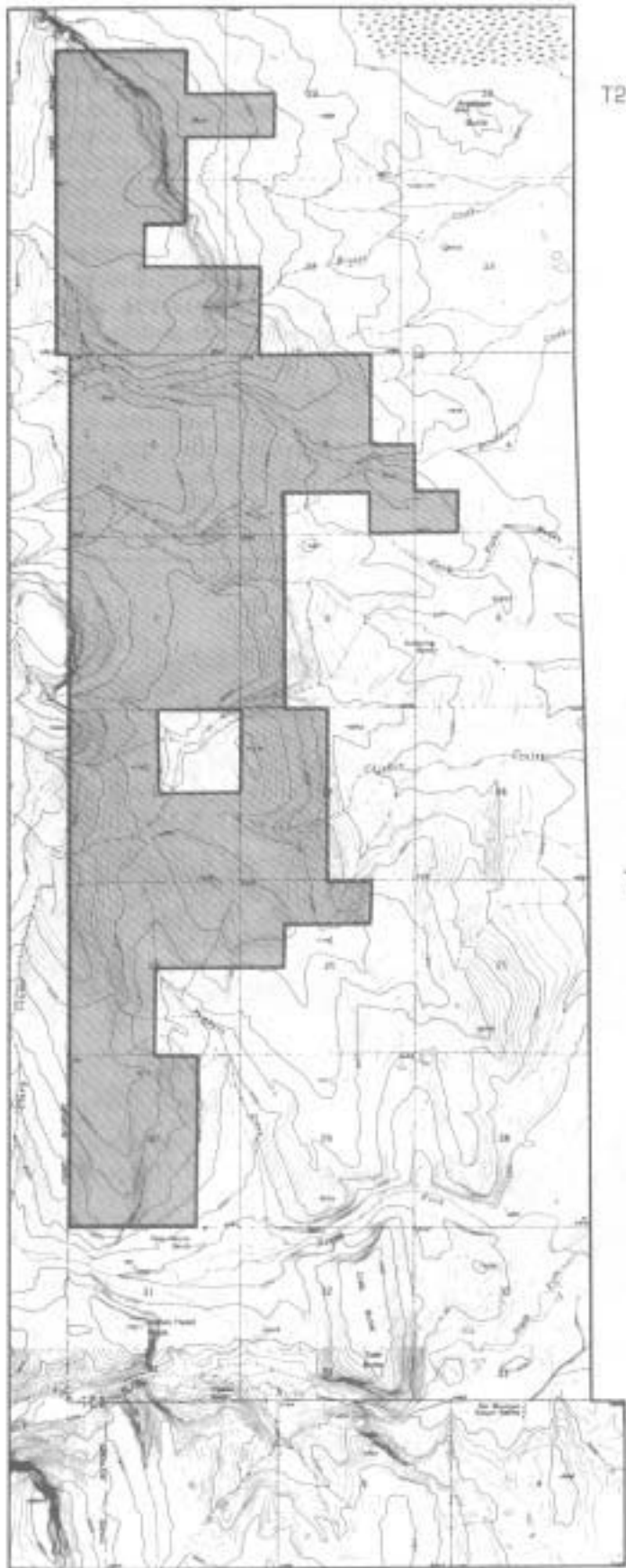
The overall quality of the wilderness resource is high. The area is nearly pristine, with only a few minor impacts, and it has outstanding opportunities for both solitude and primitive recreation. Four species of wildlife that are listed as threat-



R8W

Blind Horse Cr. Topographic Map

T26N



T25N

— WSA Boundary

■ WSA

— Improved Road

- - - - - Unimproved Dirt or Vehicle Way



ened or endangered occur, or are suspected to occur, in this study area. These species are the grizzly bear, bald eagle, gray wolf, and peregrine falcon. In addition, the area contains seasonal habitat for elk, mule deer, mountain goats, bighorn sheep, black bear, and grouse. There are currently four grazing allotments in this area. One allotment is under an AMP, two are proposed for maintenance management, and one is unleased.

The entire Blind Horse Creek study area is leased for oil and gas, and the potential for natural gas is considered to be high.

Chute Mountain

The Chute Mountain study area totals 3,205 acres of BLM-administered land contiguous to the 41,960-acre Deep Creek Further Study Area (FS RARE II areas A1-485 and P1-485). There are no

non-BLM inholdings. This tack-on area is located in the east front of the Rocky Mountains approximately twenty-five miles west of Choteau, Montana. Access from the east is through private land with permission of the owner or from the west through the Lewis and Clark National Forest.

The unit is rectangular in shape on a north-south axis. It is three and three-quarters miles in length and for the most part one and one-half miles wide. The unit is bordered by private land to the north, east, and south and by national forest land to the west.

The South Fork of Willow Creek just enters the northeastern corner of the unit while Edwards Creek and the North Fork of Deep Creek dissect the unit to the south. Edwards Creek is an intermittent stream while the North Fork of Deep



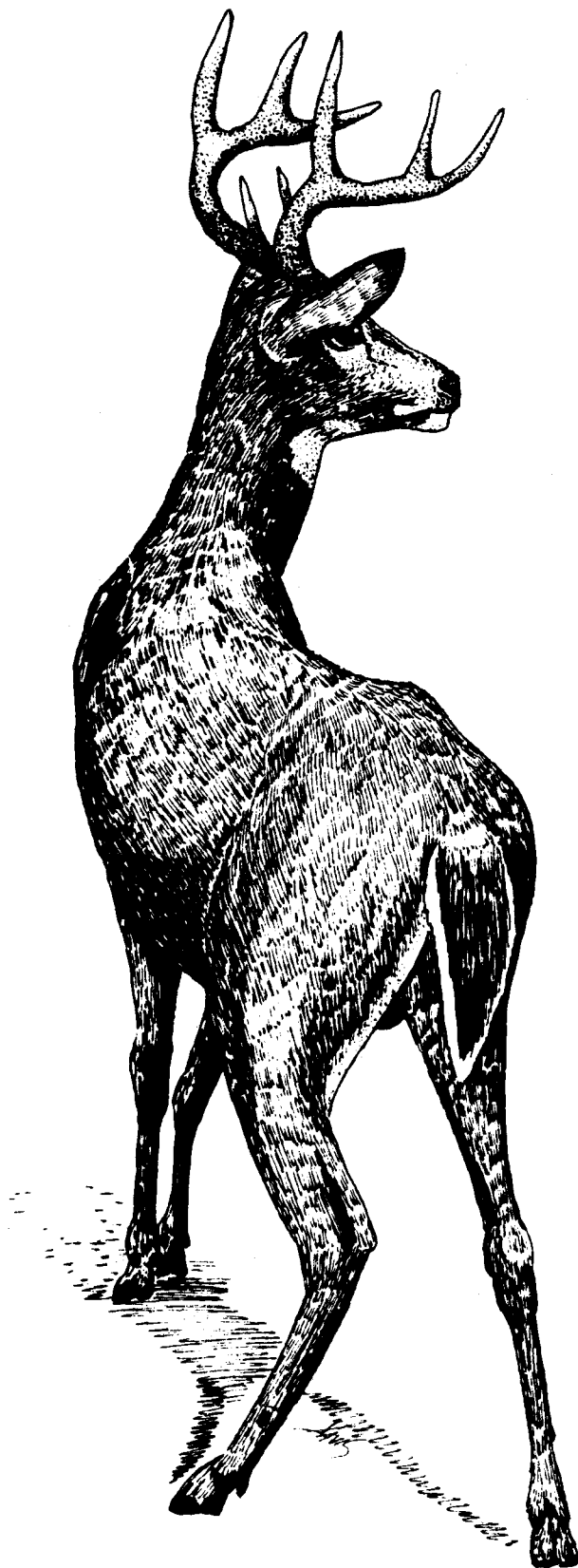
3 — AFFECTED ENVIRONMENT

Creek is a perennial stream. Both creeks drain southeast through the unit. The summit of Chute Mountain lies just to the west of the unit on national forest land. Topography in the Chute Mountain area is illustrated on the Chute Mountain Topographic map.

Elevations range from a high of 7,732 feet in the northwest portion of the area near Chute Mountain to a low of 5,200 feet in the southeast portion near the steep-sided canyon of the North Fork of Deep Creek. The higher east-facing slopes and portions of the drainages are timbered. Meadows exist on the benches and along portions of the creeks. The remainder of the unit consists of rock outcroppings and sheer cliffs.

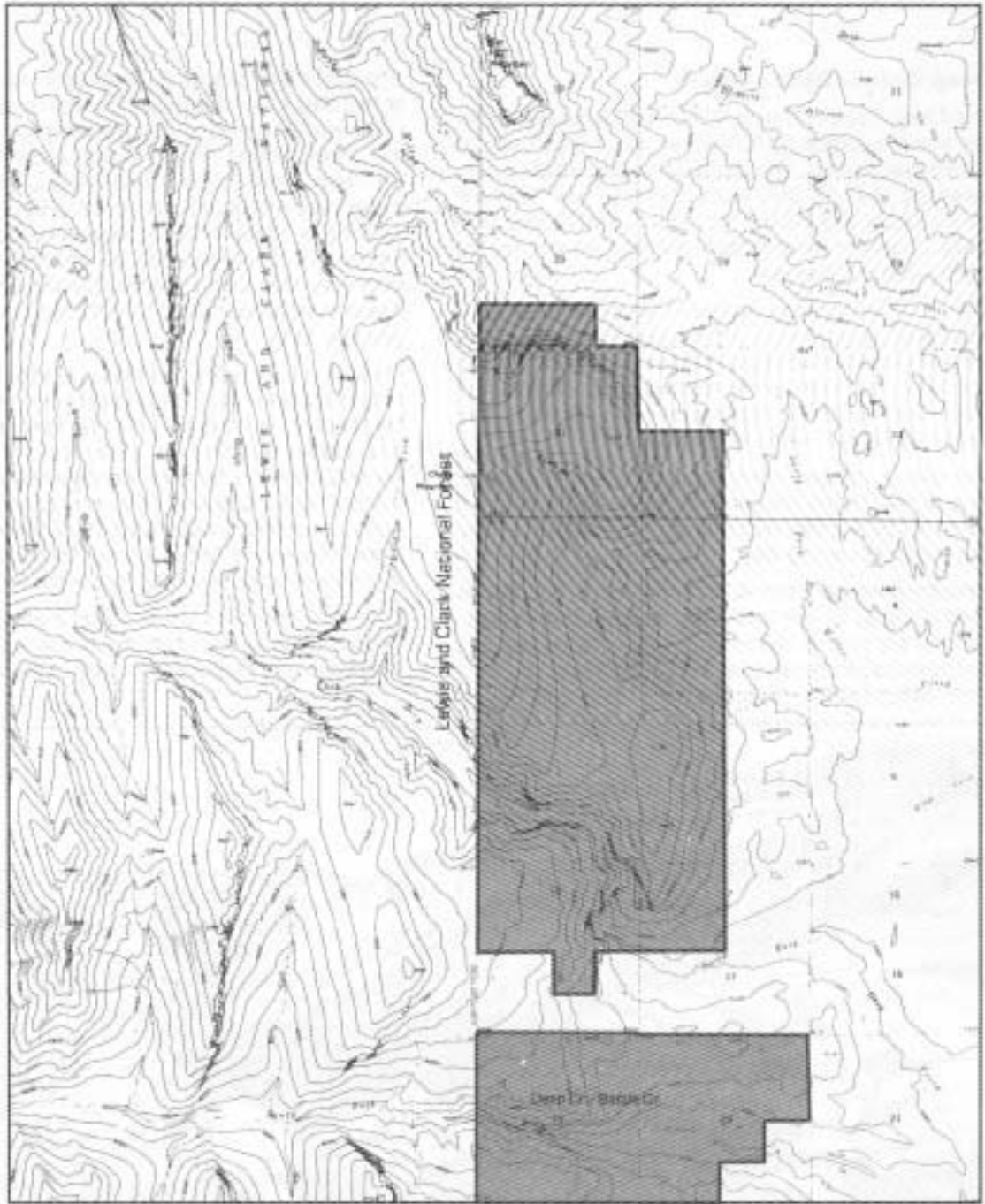
The overall quality of this area is outstanding despite its small size and it would add to the diversity of the adjoining Forest Service RARE II area. The same four threatened or endangered species of wildlife that are found in the Blind Horse Creek study area are found in this unit as well.

There is only one grazing allotment in this area, and it is proposed for maintenance management. The entire unit is leased for oil and gas, and it is considered to have high potential for natural gas.



T24N

RBW



T23N

— WSA Boundary

— Improved Road

Chute Mtn.

Topographic Map

■ WSA

..... Unimproved Dirt or Vehicle Way

== Freeway

1:63,360



Deep Creek / Battle Creek

The Deep Creek / Battle Creek study area boundary encompasses 3,086 acres, all of which are in public ownership. The tack-on is bounded on the west by the 41,960-acre Deep Creek Further Study Area (FS RARE II areas A1-485 and P1-485). Private land borders the unit on the north, south, and east sides.

The unit is located approximately twenty-two miles west-southwest of Choteau, Montana in the east front of the Rocky Mountains. Access is from the east through private land with permission from the owner or from the west through the Lewis and Clark National Forest.

The unit is roughly rectangular on a north-south axis. It is six miles long and varies in width from two miles at the northern extremity to one-half mile at the southern extremity.

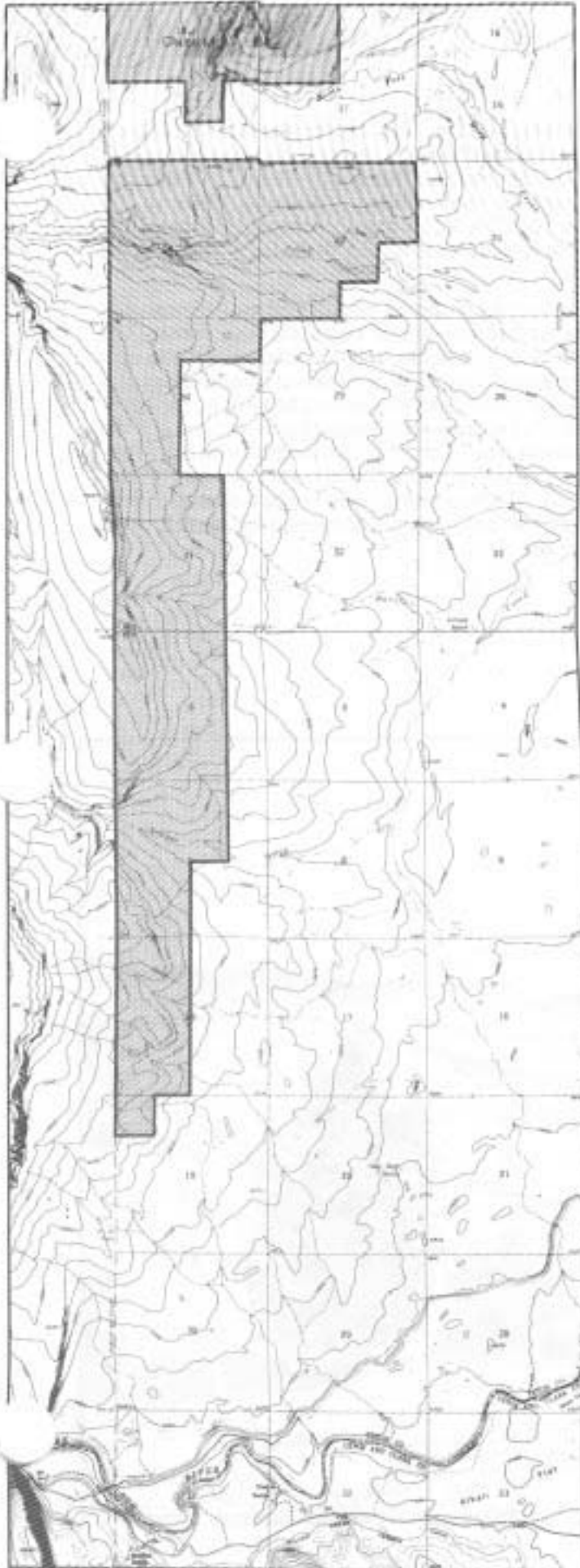
Elevation varies from 4,960 feet near the South Fork of Deep Creek to 7,480 feet near the west-central portion of the unit. Elevation changes are precipitous, with variations of 1,000 feet or more from valley floor to ridge top being common. It is an

area of limber pine and Douglas fir forests, grassy meadows, talus slopes, sheer cliffs, and numerous drainages, dominated by the deep canyons of Battle Creek, Green Timber Gulch, and the South Fork of Deep Creek. The latter two creeks are both perennial, with the South Fork of Deep Creek supporting a substantially larger stream flow. The remaining drainages are all intermittent. Topography in the Deep Creek / Battle Creek area is illustrated on the Deep Creek / Battle Creek Topographic map.





This area is very natural, offers outstanding opportunities for both solitude and primitive recreation, provides many supplemental values, and would add to the diversity of the adjacent Forest Service further study areas. It provides habitat for the same four threatened or endangered species of wildlife as the Blind Horse Creek area. The entire unit is leased for oil and gas, and it is considered to have high potential for natural gas.

This unit contains portions of two grazing allotments. One is proposed for maintenance management and the other is proposed for an AMP.





**Deep Cr./Battle Cr.
Topographic Map**

-  WSA Boundary
-  WSA
-  Improved Road
-  Unimproved Dirt or Vehicle Way



1:63,360

Black Sage

The Black Sage WSA totals 5,926 acres of BLM-managed land with no private or state inholdings. It is located between Cardwell and Boulder some thirty-two miles from Butte. The western boundary of the unit averages a distance of one mile from the Boulder River. All sides of the unit are bordered by private land and there is no legal public access.

The area is highly irregular in shape. The southern extension is one to three and one-quarter miles wide and from one to two miles long while the northern portion is one to two and one-half miles wide and from one to two miles long. These two extremities narrow to a one-quarter mile wide strip in Section 11, T3N, R2W.

The entire area is characterized by rolling hills with elevations ranging from 5,000 to 6,000 feet. Roughly 40% of the unit is vegetated with shrub juniper, mountain mahogany, and limber pine. Some stands of Douglas fir exist on a few of the north and east aspects. The remainder of the area is covered by grasses and sagebrush. There are many intruding drainages throughout, all of which

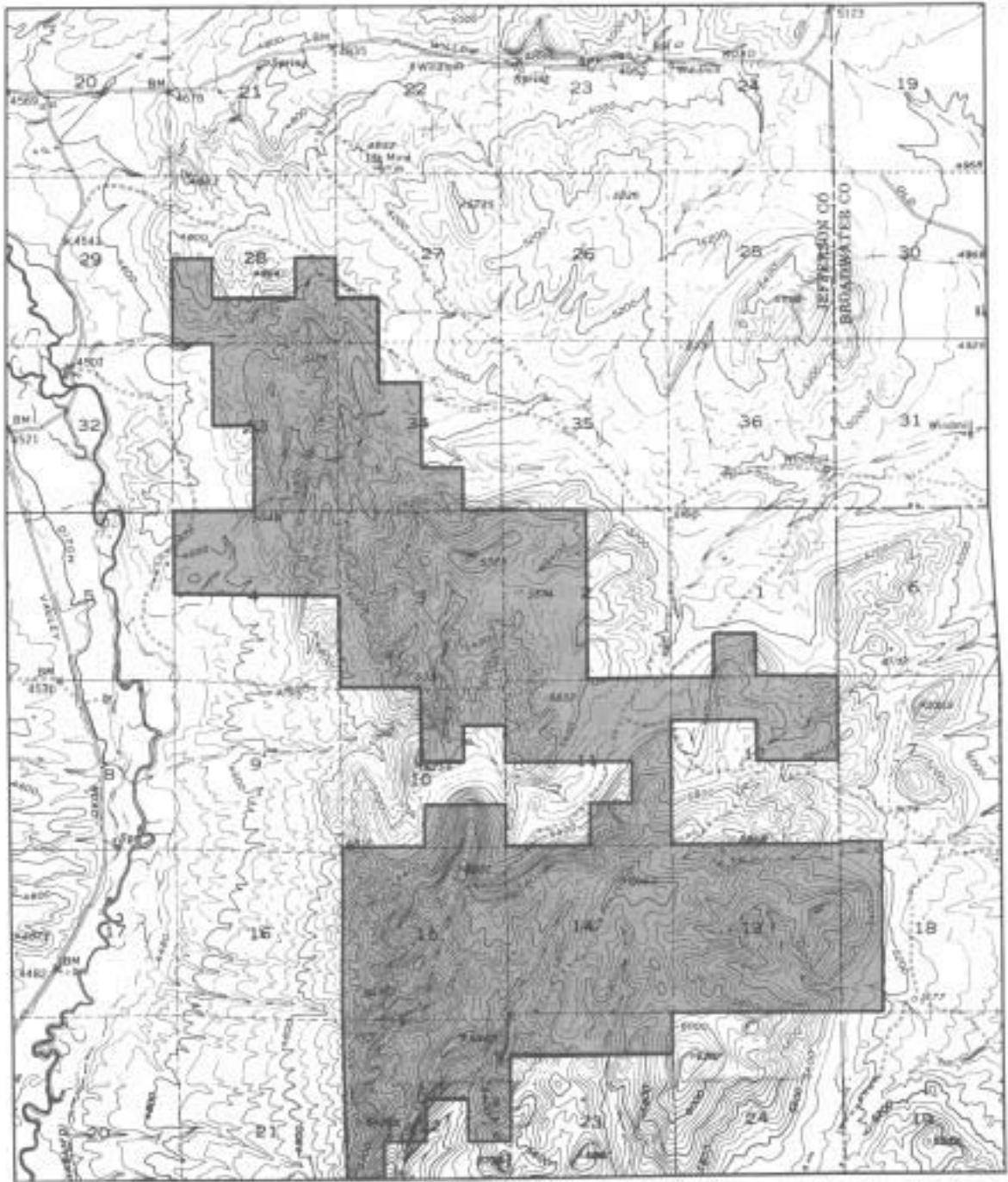
are intermittent. This dry, broken terrain lacks a high degree of natural diversity due to small elevational differences. There are no dominant features except for the forested ridge in Sections 14, 15 and 10, T3N, R2W. Topography in the Black Sage WSA is illustrated on the Black Sage Topographic map.

Due to the number of impacts on naturalness and the limited amount of vegetative screening, the quality of the wilderness characteristics is only moderate. The WSA provides crucial winter habitat for mule deer and seasonal habitat for antelope. The entire unit is leased for oil and gas and the potential for oil and gas is thought to be high. Portions of three grazing allotments are within this WSA. AMPs are proposed for two of these allotments and the third is proposed for maintenance management.



R2W

T4N



T3N

— WSA Boundary

— Improved Road

■ WSA

..... Unimproved Dirt or Vehicle Way

== Freeway

**Black Sage
MT-075-115
Topographic Map**

1:63,360



Yellowstone River Island

The Yellowstone River Island totals approximately fifty-three acres of BLM-managed land. It is located about two and one-half miles northeast of Livingston, Montana. Public access can only be obtained via the Yellowstone River, as the surrounding river frontage is private.

The WSA is roughly circular in shape. Core-to-perimeter distances are approximately one-third of a mile in all directions.

The entire island is a relatively flat sand and gravel bar that varies from zero to ten feet above the river level (low flow). The average elevation is 4,415 feet. The topographic setting of the Yellowstone River Island is illustrated on the Yellowstone River Island Topographic map.

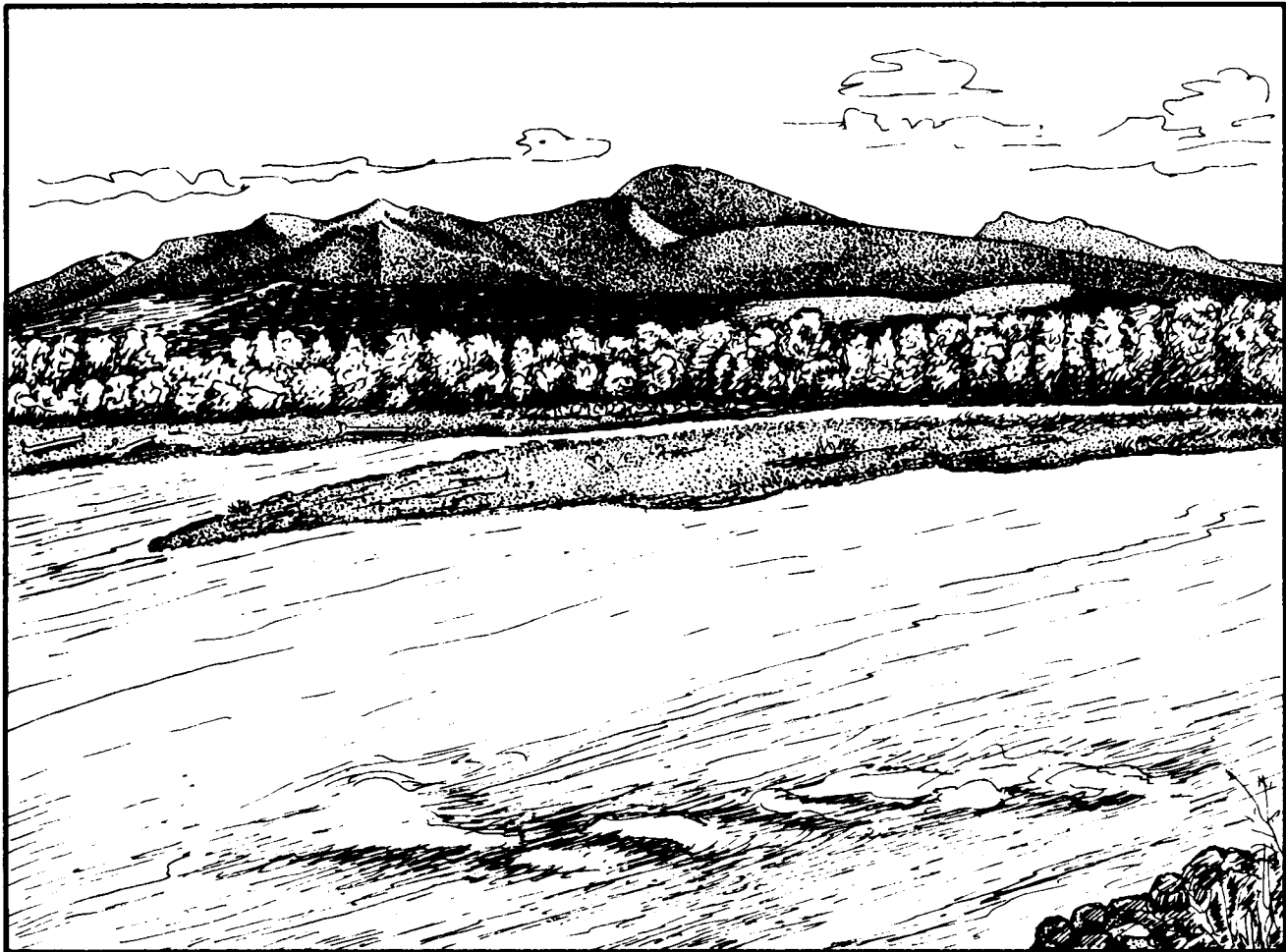
The outer portions of the island consist of cut banks and alluvial deposits. These outer banks are constantly changing with variations in river level. The vegetative cover is diverse and consists of dense, pioneer shrubs. The more stable, interior portion comprises about 60% of the island and is

vegetated with cottonwood stands intermixed with open, grassy areas.

There are several high water channels located within the WSA. Along the lower portions of these waterways are small ponds and marshy areas supporting a wide array of riparian vegetation. The major channel that dissects the eastern end of the unit still had some water movement in mid August.

The major portion of the Yellowstone River now flows north of the island, although the channel to the south is substantial as well.

The overall quality of the wilderness characteristics of this unit is fairly high. The major impacts are offsite sights and sounds. The WSA provides excellent riparian habitat for a diverse array of wildlife species, particularly nongame species. The mineral potential of the island is considered to be low. There is no commercial timber on the island and it is not leased for grazing.



R10E

T15



T2S

— WSA Boundary

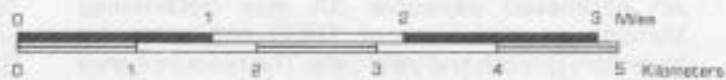
— Improved Road

■ WSA

..... Unimproved Dirt or Vehicle Way

**Yellowstone R. Island
MT-075-133
Topographic Map**

1:63,360



TIMBER RESOURCES

The resource area contains 63,081 acres of commercial forest land (CFL), with the predominant commercial species being Douglas fir, lodgepole pine, and ponderosa pine. A Timber Production Capability Class (TPCC) inventory was completed in 1982. It determined that 58,099 acres, or 92%, of all CFL in the resource area is suitable for the production of forest products. The remaining 4,982 acres of CFL are considered unsuitable because of extreme topography, rock outcrops, and fragile soils. Major concentrations of CFL are illustrated on the Commercial Forest Land map. Table 3-7 shows the CFL by county.

**TABLE 3-7
COMMERCIAL FOREST LAND AND WOODLAND BY COUNTY**

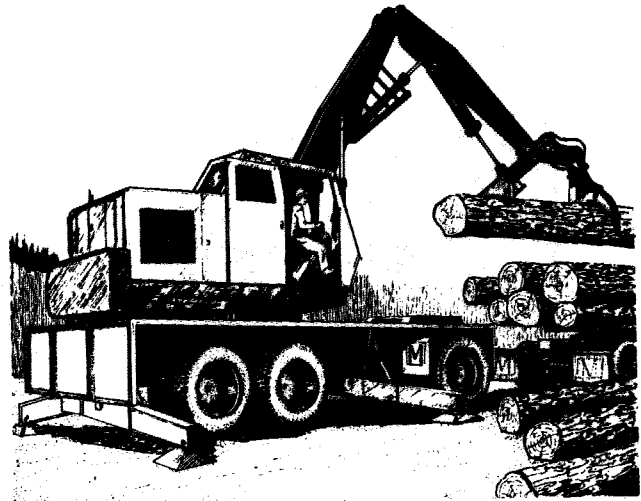
County	Commercial Forest Land (acres)	Woodland (acres)
Broadwater	3,284	2,590
Cascade	7,644	1,549
Gallatin	1,890	106
Jefferson	19,265	6,294
Lewis & Clark	24,903	5,919
Meagher	3,979	293
Park	2,116	1,099
Pondera	0	0
Teton	0	440
		650 ¹
Total	63,081	18,940

¹This 650 acres is in scattered tracts throughout the resource area of less than 10 acres each that were not covered by the TPCC inventory.

Two other inventories were completed in conjunction with the TPCC; Forest Habitat Type and Forest Cover Class mapping. The results of these studies are available in the files at the resource area office.

Silvicultural prescriptions should consider the presence of two forest pests. These are Mountain Pine Beetle, which attacks the pines, and Western Spruce Budworm, which threatens stands of Douglas fir and spruce. Recent surveys by the Forest Service's insect and disease program have shown that the budworm is especially active in Douglas fir stands throughout the resource area.

An estimated allowable cut was determined through an evaluation of TPCC and extensive inventory growth and yield data. The resource area



could support an annual allowable cut of 2.6 to 2.9 million board feet (depending on restrictions) if funding and personnel were available. An estimated yield of 50 bd ft/acre/year was used for yield determination and removal of 3,000 bd ft/acre was used as the harvest volume in determining the acres that could be cut each year.

The resource area also contains an estimated 18,940 acres of land that are at least 10% stocked with forest cover (woodland). Stocking is either noncommercial species or commercial species where growth is less than 20 cu. ft/acre/year. Much of this land is available for production of forest products such as Christmas trees, posts, boughs, and sawlogs.

RANGE RESOURCES

The Headwaters Resource Area presently has 327 grazing allotments authorized for grazing use, and 292 permittees/lessees graze livestock in these allotments. The locations of these allotments are shown on the Headwaters Resource Area Grazing Allotment map located in the back pocket. Fourteen of the allotments are authorized for use by two or more livestock operators, and the remaining 313 allotments are used by one individual, partnership or corporation. Appendix D displays the current livestock authorization and existing range condition for each allotment in the resource area.

Six allotments are grazed by sheep, 7 by horses and the remaining 314 are grazed primarily by cattle. Incidental grazing by horses is authorized for three of the allotments that are primarily grazed by cattle.

Ten allotments in the resource area are operating under allotment management plans (see Table 3-8). These AMP allotments account for 10% of the

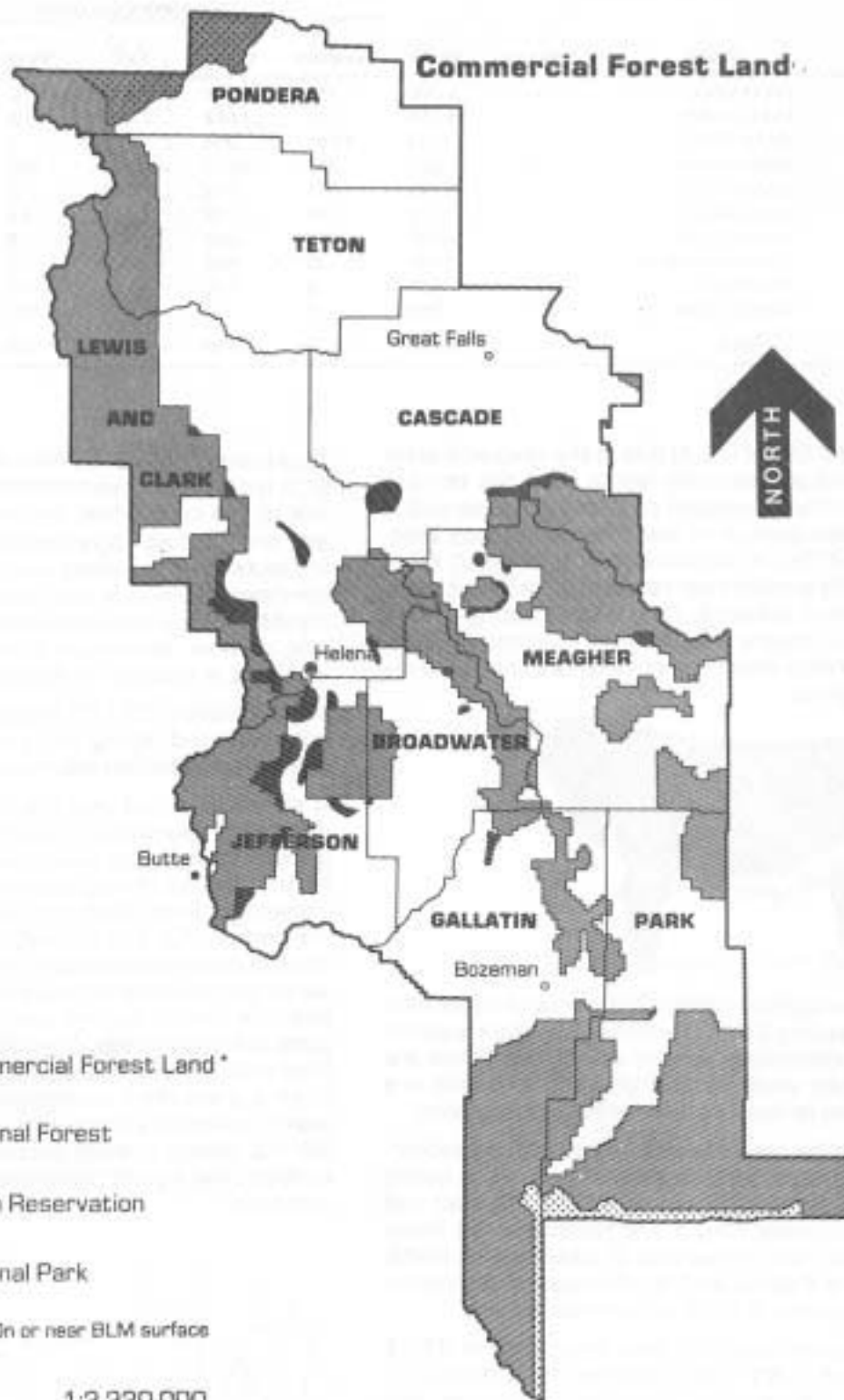
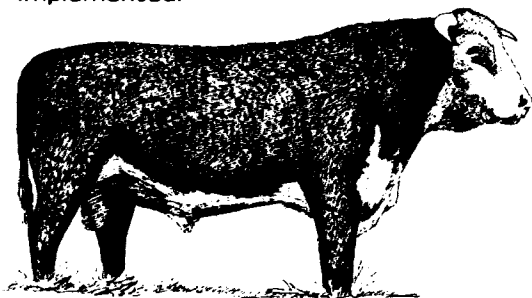


TABLE 3-8
EXISTING AMP ALLOTMENTS

Number	Name	Category	Acres	Vegetative Condition				Unclass. or Unmapped	AUMs
				Excellent	Good	Fair	Poor		
0208	Dry Mountain	M	2,326	194	1,404	443	0	285	264
0220	Bull Mountain	I	4,764	142	1,562	2,401	179	480	684
0227	Kimber Diorite	I	2,449	1,491	958	0	0	0	262
0230	Whiskey Gulch	I	7,657	389	3,894	1,833	299	1,242	311
0248	Little Boulder	I	1,793	591	612	548	0	42	114
0258	Ringing Rocks	I	3,326	28	1,109	1,718	64	407	210
6303	Chicken Coulee	I	4,582	222	1,494	400	6	2,460	279
7811	Drumlummon-Skelly	I	3,062	76	836	525	0	1,625	645
7827	Blue Cloud	I	508	0	272	117	24	95	55
7860	Whitetail Creek	I	661	0	14	132	501	14	75
Totals			31,128	3,133	12,155	8,117	1,073	6,650	2,899

acres, and 9% of the AUMs in the resource area. Conditions are generally fair to good, but there is some poor and excellent condition range as well. A substantial portion of the acreage in these allotments (21%), is unclassified or unmapped. All of the AMPs employ rest rotation or deferred rotation grazing systems. Of the ten existing AMPs, three still require a substantial investment in the form of range improvements before they are fully implemented.



There are approximately 193 tracts of public land encompassing 29,900 acres within the resource area on which no grazing is authorized. These are most often small parcels of public land that are unsuitable or inaccessible for livestock grazing.

Although the resource area issues grazing authorizations that include late fall through early spring grazing, the great majority of the licensed use occurs between May 1 and November 30. Most allotments are comprised of intermingled state, private, and public land. In a few cases allotments are comprised of 90% or more public land.

A vegetative inventory was conducted in 1979, 1980 and 1981 that classified the suitability of public land for grazing. The inventory also classified the present condition of the vegetation on public land. Following the Soil Conservation Service's

Montana Grazing Guides as amended (USDA, SCS n.d.), vegetative communities were placed in one of five categories: excellent, good, fair, poor, and unclassified. Eight percent of the public land inspected is in excellent condition, 36% is in good condition, 33% is in fair condition, 2% is in poor condition, and 21% was not classified. An explanation of how vegetative condition ratings were assigned is provided in Appendix M.

Approximately 20,173 acres of public land were not inspected during the inventory and thus no vegetative condition information is available.

It should be noted that the methodology used to determine vegetative condition is a classification system that groups plant communities according to the degree of successional change from the presumed climax plant community. This classification allows for the establishment of condition-related management objectives, but is not necessarily synonymous with particular use value. For example, fair ecological condition may represent good livestock forage condition, such as a burned area where brush or tree species are removed to favor a grass/forb component. Likewise, a climax plant community (excellent ecological condition) will not always provide better protection for soil erosion than a plant community in good ecological condition.



FISH AND WILDLIFE HABITAT

Aquatic Habitat

The Missouri and Yellowstone rivers are the two major drainages in the resource area. Both of these rivers have been rated as a Class I, highest fishery resource value, river by the Montana Department of Fish, Wildlife and Parks. Other rivers and streams in the resource area, such as the Smith, Jefferson, Madison, and Boulder rivers have been rated either a Class II, high priority fishery resource, or Class III, substantial fishery resource. Although these major rivers provide highly significant fisheries within the resource area, other small creeks are also important to fisheries by providing spawning and rearing areas. They also serve as water sources to dilute downstream pollution.

There are approximately ninety-four miles of fishable stream along eight-six streams in the resource area. Many of the streams have less than 0.25 miles of BLM-managed streambank. In addition, those rivers and streams that do have more than a mile of streambank will often have it in several sections. There are few streams where BLM manages a significant portion of the streambank.

One species of game fish in the resource area is listed by the state of Montana as being of special interest or concern. This is the native cutthroat, commonly called the upper Missouri cutthroat or west slope cutthroat (Holton 1979). Other game species are mountain whitefish and rainbow, brook, brown, and cutthroat trout. These species make up the majority of the catch from the resource area. Fishing regulations are administered by the state of Montana. Nonnative game fish have been stocked into the larger, more accessible rivers, while some of the small, inaccessible streams still contain native cutthroat.

The quality and quantity of water are the major factors influencing the number and size of fish found in the resource area. The quality of the water is generally good, but it varies with each drainage. Mining activities, road building, and livestock use have resulted in severe pollution problems along selected drainages. Irrigation is the major factor influencing water volume of some streams. In 1982, the bureau completed a contract to identify the flow necessary to maintain the fisheries in the Missouri River between Holter Dam and the Smith River.

Streams in the resource area were surveyed during the summers of 1980 and 1981. Of the 94.2 miles of stream, 61% (58.1 miles) were found to

be in either good or excellent condition. Less than 2% of these streams are in a decreasing trend. In fact, 86.6% of all the streams were either in a static or improving trend, with 13.4% found to be in a declining trend. Most of the declining trend (85%) was split between the fair and poor condition classes.

Riparian Habitat

Many important game birds such as blue grouse, ruffed grouse, sage grouse, and Hungarian partridge rely on riparian areas. Many important non-game species, including Swainson's hawk, bald eagle, marsh hawk, long-eared owl, pygmy owl, horned owl, osprey, great blue heron, sandhill crane, and goshawk, also use riparian habitat.

Furbearers, including beaver, muskrat, mink, and otter; amphibians, such as the rubber boa, garter snake, spotted frog, wood frog, and northern long-toed salamander; and large mammals, such as mule deer, white-tailed deer, moose, elk, black bear, grizzly bear, coyote, and possibly wolf, utilize riparian habitat. Big game use has not been shown to be the principal cause of unsatisfactory riparian condition; however, the potential for damage to riparian vegetation by excessive game numbers is acknowledged. Satisfactory and unsatisfactory riparian and aquatic areas are depicted in Figures 3-1 and 3-2.

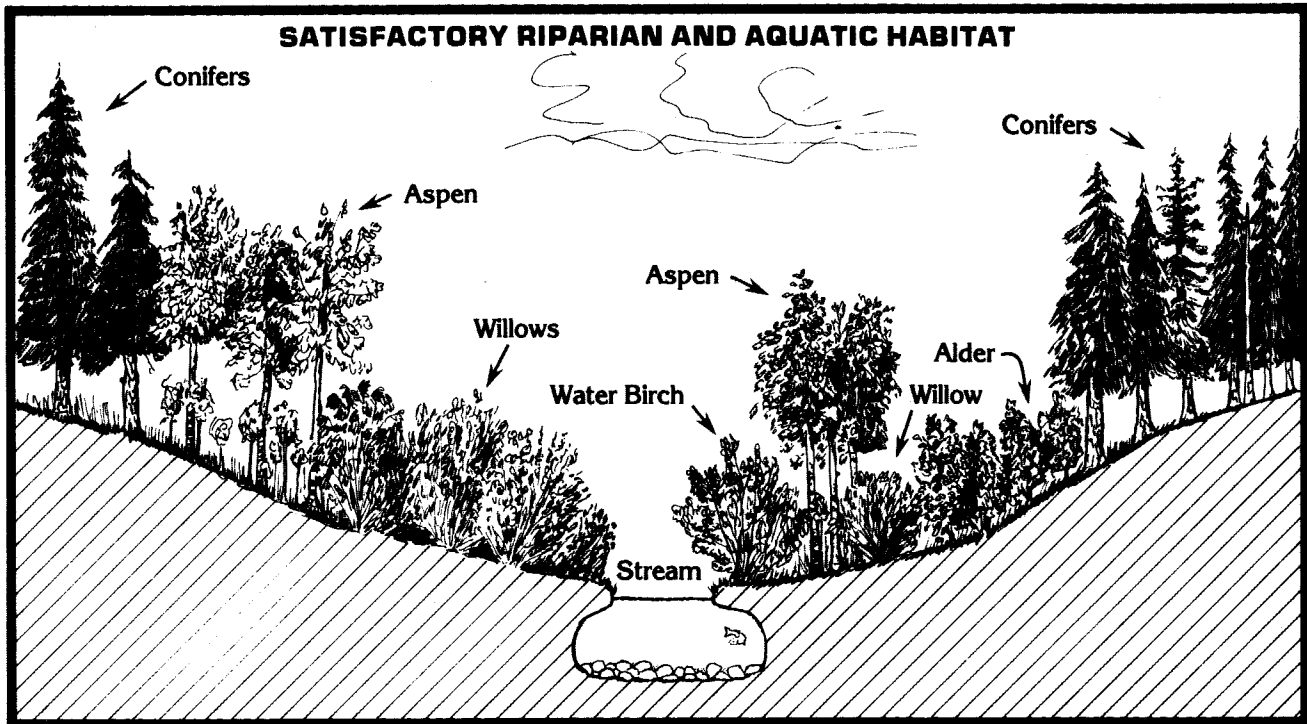
The headwaters of streams and small tributaries, in large part, dictate the productivity of downstream fisheries habitats. Riparian vegetation plays a vital role in these streams with regard to temperature regulation, flow characteristics, sediment abatement and stability, and external food and energy sources for aquatic organisms. Riparian stream habitats in the resource area influence many major downstream fisheries, including the Missouri, Yellowstone, Jefferson, Smith, Dearborn, Sun, Teton, and Boulder rivers.

Riparian condition in the resource area can be described as good. A total of 142 miles (84% of the resource area total) of riparian areas have been surveyed.

Approximately 104 miles, or 74% of the surveyed riparian habitat is in satisfactory condition and the trend for most of this riparian habitat is static. Of the 26% (38 miles) that is in unsatisfactory condition, most of this is declining, with some in a static condition. There is no riparian habitat in the resource area that is improving. The resource area has implemented trend studies that will be continued in future years.

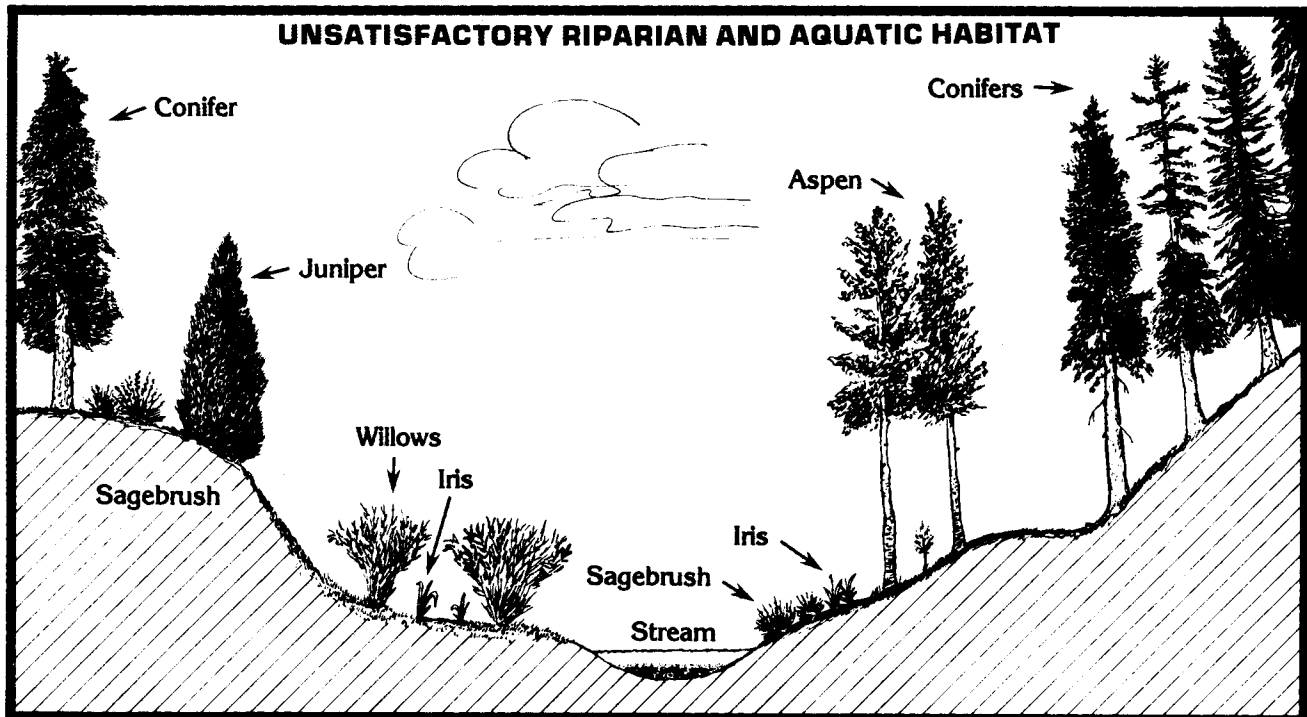
Riparian surveys included data on bank erosion and bank rock content, and the quantity and vigor of

FIGURE 3-1



Satisfactory riparian habitat is characterized by good vigor and canopy coverage, abundant reproduction of palatable plant species, and well developed, overhanging stream banks. Coarse material (gravels) dominate the substrate, which provides good habitat for fish spawning and aquatic invertebrates.

FIGURE 3-2



Unsatisfactory riparian habitat is characterized by poor vigor and canopy coverage, low species diversity, and a lack of reproduction of woody plant species. Unpalatable plants, such as sagebrush and iris, are increasing in abundance. Aquatic habitat is characterized by eroded stream banks, and a "dished-out" appearance (because the banks are not overhanging). Fine materials (silt) dominate the substrate, which provides poor habitat for fish spawning and aquatic invertebrates.

palatable woody riparian species. In general, the rating methodology that was used in the Dillon Resource Area for the Mountain Foothills Grazing EIS (USDI, BLM 1980) was also used for the Headwaters RMP effort. This was felt to be valid, since a comparison of good condition riparian areas in the Headwaters Resource Area with good condition riparian areas in the Dillon Resource Area revealed similar characteristics between the areas. In addition, it was found that basal stem diameter classes of 1 to 10 mm., 11 to 15 mm., and greater than 15 mm. corresponded to age classes of 1 to 4 years, 5 to 10 years, and over 10 years for a variety of woody riparian species, including willow (*Salix* spp.) and red dogwood (*Cornus stolonifera*). This correlation was used in the rating process as well.

Riparian improvements have been planned for some areas. These areas are generally those that are currently unsatisfactory and are in a declining trend.

Terrestrial Wildlife

Current condition ratings have been assigned to the more significant seasonal wildlife habitats in the resource area. Habitat areas were assigned ratings of poor, fair, good, or excellent. These ratings are based on existing wildlife transect data, range-site data, and observations recorded during field inventories. Each rated wildlife habitat area has the potential to attain at least a good (satisfactory) condition. Habitats rated either poor or fair were not considered satisfactory in terms of attaining wildlife habitat management goals.

A detailed description of wildlife habitat rating criteria and methodologies is available in the Headwaters Resource Area office. In brief however, the general types of criteria used in delineating satisfactory and unsatisfactory conditions included:

- fall and spring utilization levels of key browse and bunchgrass species,

- levels of decadence of key herbaceous and browse species,

- degree of reproduction as evidenced by a good representation of different age class plants,

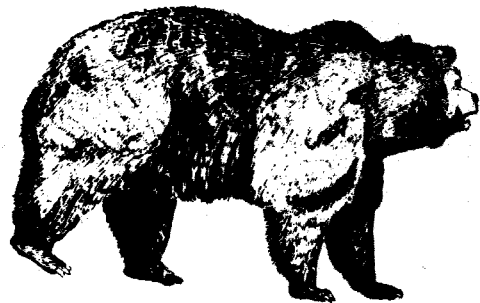
- vigor and trend of key species as evidenced by the numbers of plants per acre or amounts of canopy coverage per type of habitat, and

- composition of palatable herbaceous species as evidenced by amounts of canopy coverage per type of habitat.

Threatened or Endangered Species

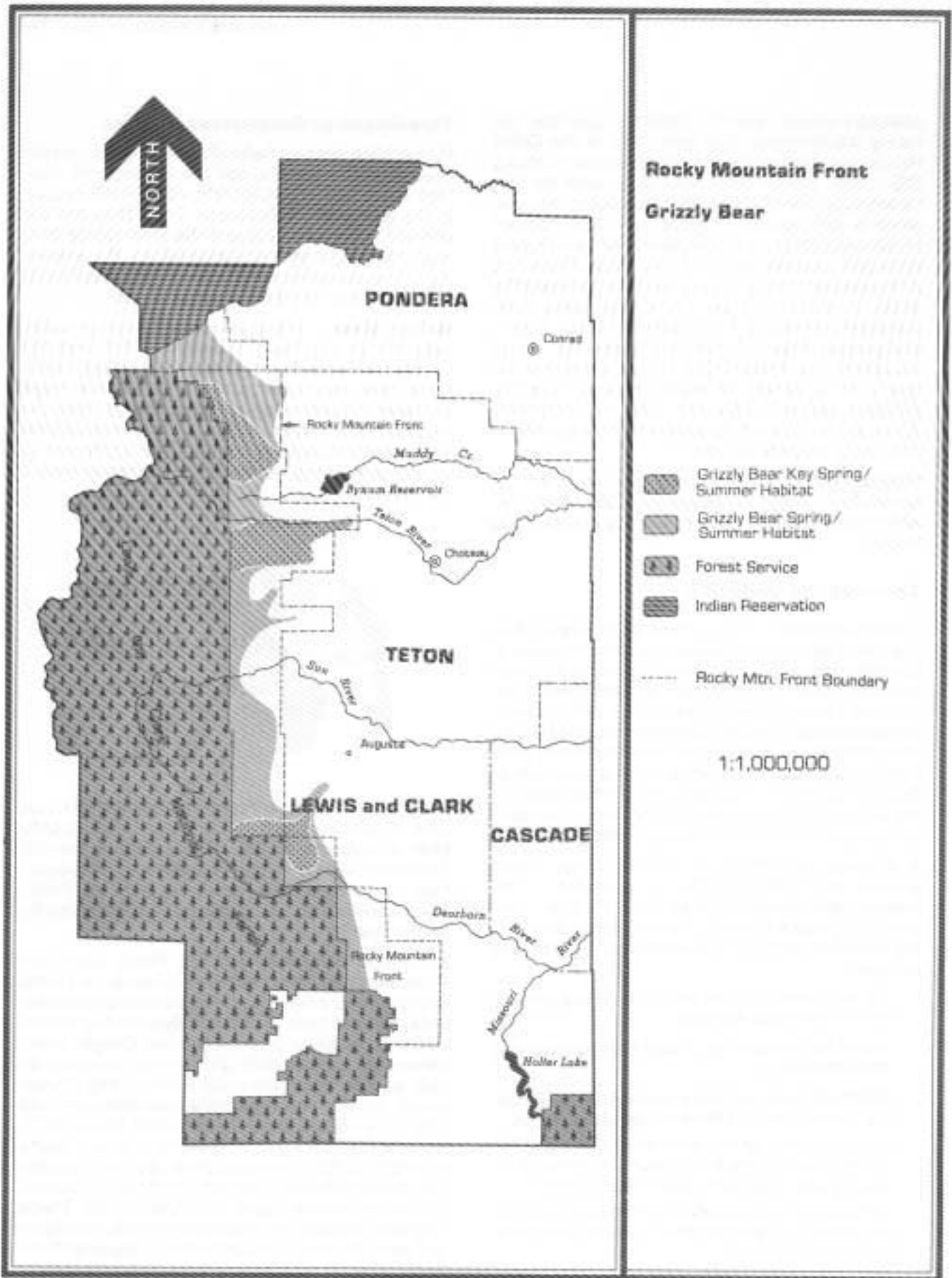
Four wildlife species federally classified as threatened or endangered under the Endangered Species Act of 1973 (50 CFR 402, 43 CFR 870) occur in the Headwaters Resource Area. They are the threatened grizzly bear and the endangered gray wolf, bald eagle, and peregrine falcon. The whooping crane has been observed and there is potential occurrence for the black-footed ferret.

Grizzly Bear. The grizzly bear occurs on public land only in the Rocky Mountain Front (see the Rocky Mountain Front Grizzly Bear map). Public land here represents the transitional edge between the grassland-shrub habitat type and the mountainous forest habitats. This transitional edge contains habitat components important to grizzly bear spring, summer, and to a lesser extent fall habitat.



The Rocky Mountain Front represents just one part of the northern Continental Divide grizzly bear ecosystem (USDI, Fish & Wildlife Service 1982), but it is very unique. Here exists an ecosystem that embraces a narrow strip of the Great Plains, and is the last plains habitat occupied by grizzly bears.

Population estimates for the Rocky Mountain Front portion of the northern Continental Divide ecosystem are difficult to make based on available data. However, the Pine Butte Swamp-Ear Mountain and Antelope Butte-Blackleaf Canyon complexes can contain daily grizzly bear densities as high as one bear per square mile. Only Kodiak Island, Alaska receives more concentrated use (USDI, Fish & Wildlife Service 1982). Since 1977, 50% of 350 spring observations of grizzly bears and 46% of 556 summer observations of grizzly bears in the Rocky Mountain Front have occurred in riparian habitat types (MDFWP 1982). These riparian habitats are used primarily for foraging and security cover. Grizzly bears on the east front derive most of their energy from protein in succulent, herbaceous vegetation, which is found primarily in riparian zones. The availability of these plants

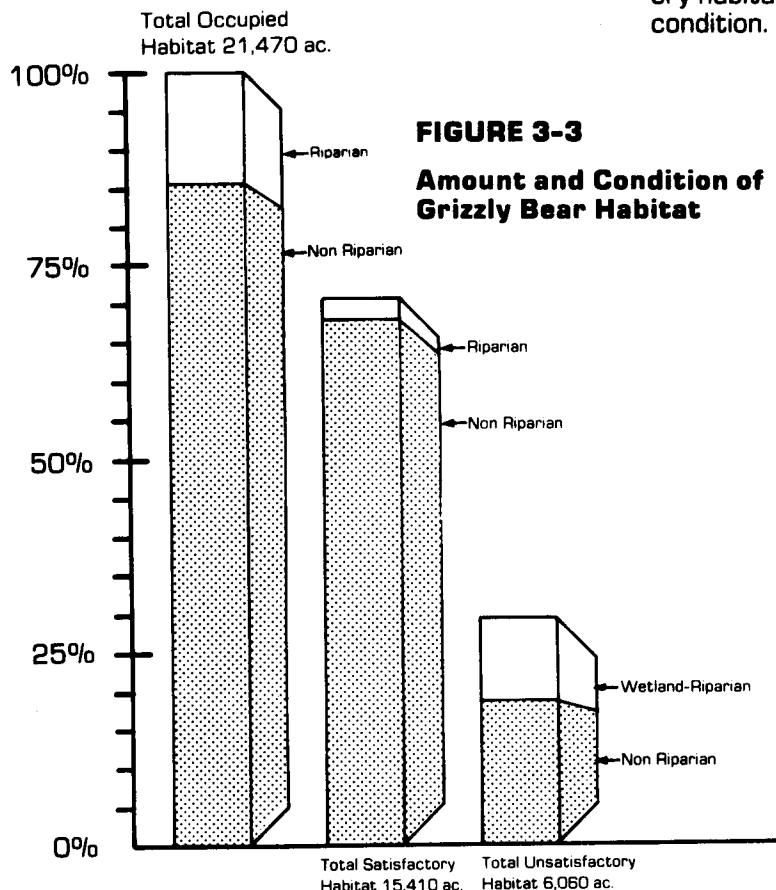


during the spring months (April-June) is very important since this is when crude protein levels and digestibility are highest. As shown in Figure 3-3, 19,410 acres (39.3%) of the 21,500 acres of grizzly bear habitat on public land are rated poor to fair (unsatisfactory). Approximately 44% of the unsatisfactory habitat is represented by the aspen/willow community types. Presently the predominate conflicts with the riparian habitat components of grizzly bear spring/summer range are season-long livestock grazing and disturbance related to oil and gas exploration and development activities. Actual loss of riparian habitat due to oil and gas exploration and development is occurring on some private lands.

The average seasonal dietary overlap between cattle and grizzly bear is shown on Figure 3-4. The similarities in diets between these two species is apparent throughout the growing season on the Rocky Mountain Front. The types of habitats utilized is also very similar. Cattle naturally congregate near water and moist areas. By midsummer most of the riparian sites, except for the one allotment with an existing AMP, are in poor condition.

Gray Wolf. Information on wolf occurrence has been gathered and compiled by the Wolf Ecology Project, University of Montana (Mattson and Ream 1978), and has been documented in the Rocky Mountain Front. Most wolf observations have been pre-1978, with few reports since then. Most occurrence, or potential occurrence, is assumed to be in association with big game winter/spring ranges along the Rocky Mountain Front. The Wolf Ecology Project estimates from zero to six wolves in the area from Sun River north to Birch Creek and from zero to one wolf in the area from the Dearborn River north to the Sun River.

As directed by the Wolf Recovery Plan (USDI, FWS 1980a), in July 1980 the BLM recommended to the U.S. Fish and Wildlife Service a total of 18,475 acres of public land as essential habitat for the gray wolf (see the Rocky Mountain Front Gray Wolf/Bighorn Sheep map). This area is considered important for the future recovery of the gray wolf in the East Front and Bob Marshall ecosystems. National forest lands immediately adjacent to the Rocky Mountain Front have also been recommended as essential habitat (USDA, FS 1980b). The condition of potential gray wolf recovery habitat is directly related to big game habitat condition.

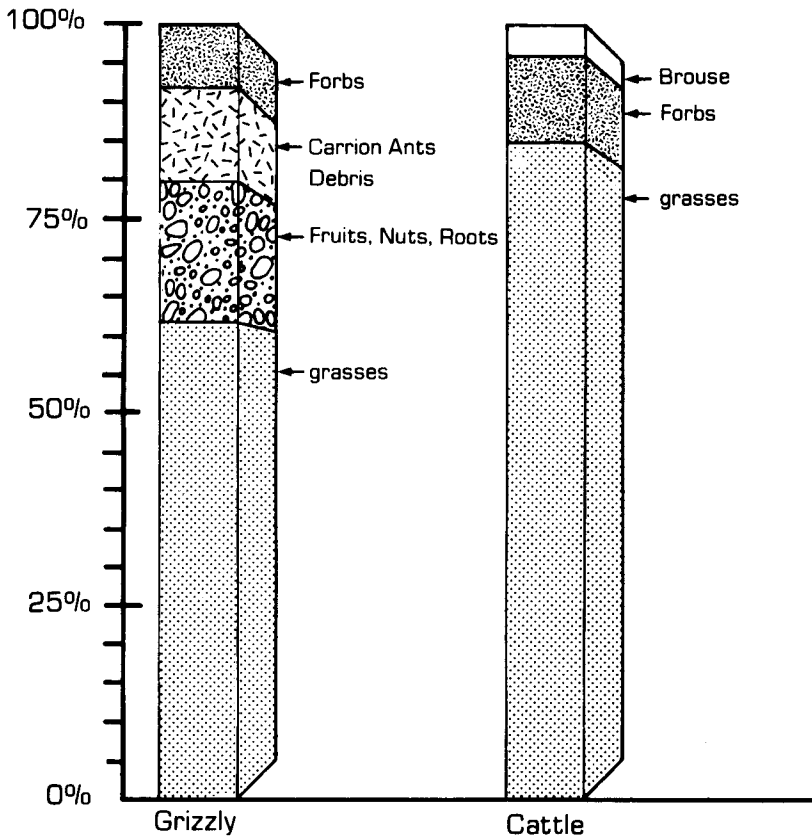


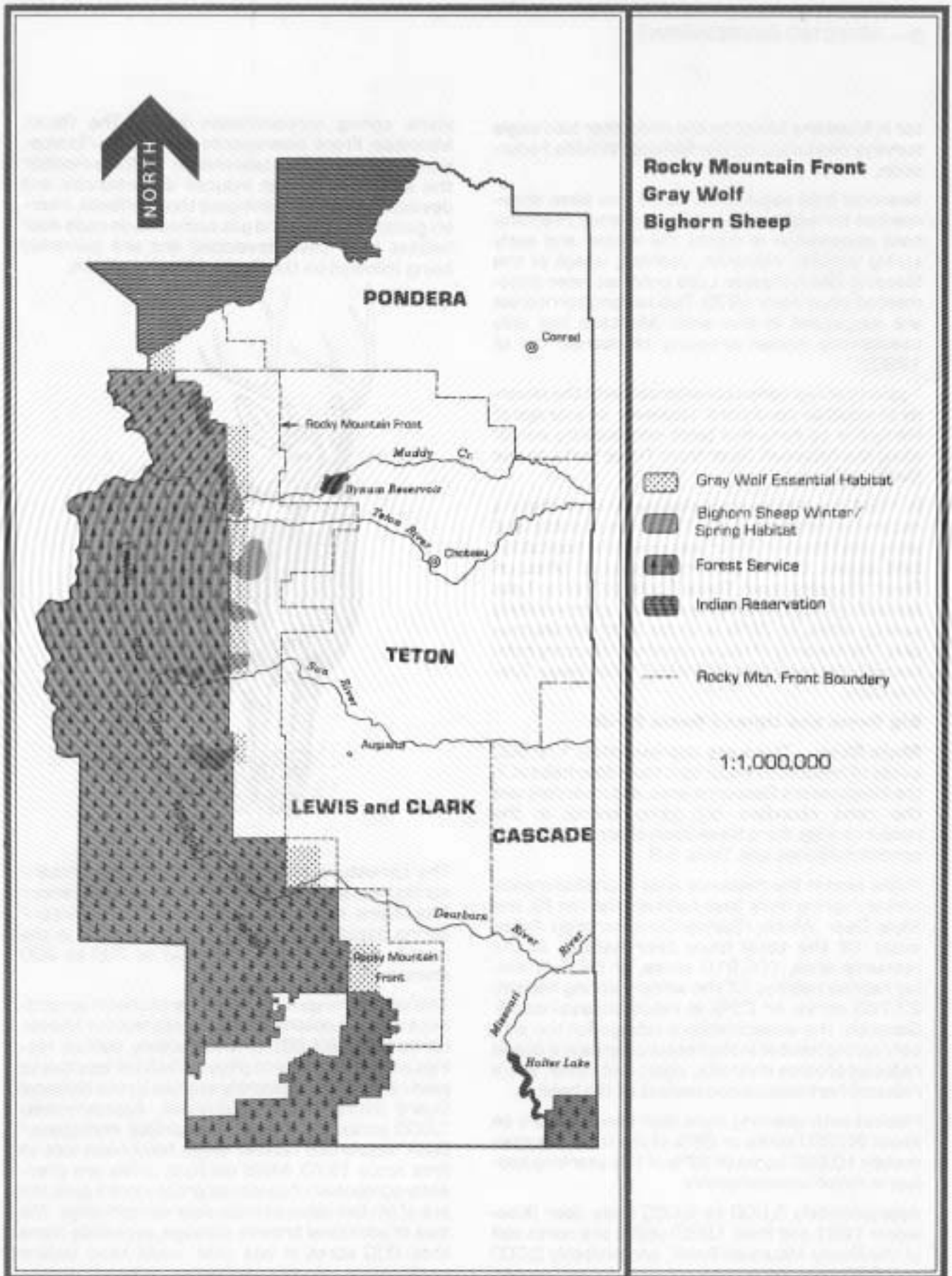


Peregrine Falcon. Suitable but currently unoccupied habitat for this species exists in several places within the resource area. No nesting has been documented but suitable habitat for the reintroduction of captive bred young birds has been identified. Observations of adult birds, presumably fall migrants, have been made during September in the Rocky Mountain Front and Sleeping Giant areas. A total of eight possible reintroduction sites totaling 3,100 acres have been identified for these areas. These areas are characterized by steep, vertical cliffs of 300 feet or more. They are close to water and are relatively free of human disturbance. They are currently in good condition and are intrinsically protected from most land use activities.

Bald Eagle. Unlike most federally listed species, the bald eagle is both more numerous and more widely distributed, particularly during the winter months. The continental population of bald eagles is estimated at 35,000 to 60,000 (Brown and Amadon 1968). Of these, about 350 to 500 win-

FIGURE 3-4
Average Dietary Components
for Grizzly Bear and Cattle





ter in Montana based on the midwinter bald eagle surveys conducted by the National Wildlife Federation.

Seasonal bald eagle occurrence has been documented throughout the resource area. Predominant occurrence is during the winter and early spring periods. However, yearlong usage of the Sleeping Giant-Hauser Lake area has been documented since early 1970. Two nesting territories are suspected in this area. Montana has only twenty-nine known breeding territories (as of 1980).

Intensity of use varies considerably with the severity of weather conditions. However, an average of thirty-five to forty-five birds consistently winter along the Missouri River from Three Forks to the Sleeping Giant.

In 1981 the Headwaters Resource Area made a recommendation that 11,009 acres of public land along the Missouri River was essential habitat for bald eagles. Of the sixty-two miles of Missouri River shoreline from Three Forks to Holter Lake (excluding Canyon Ferry Reservoir), approximately twenty miles, or 32% is under BLM administration. The majority of this is rated satisfactory habitat with the exception of the two miles below Toston Dam.

Big Game and Upland Game Birds

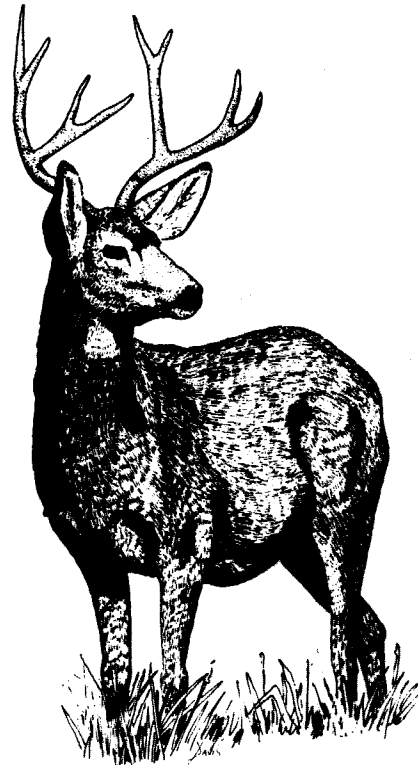
Mule Deer. There are approximately 172,500 acres of seasonally important mule deer habitat in the Headwaters Resource area, and mule deer are the most abundant big game animal in the resource area. For a breakdown of occurrence and condition ratings see Table 3-9.

Public land in the resource area is predominantly winter/spring mule deer habitat (see the Elk and Mule Deer Winter/Spring Concentration Areas map). Of the total mule deer habitat in the resource area, 109,910 acres, or 64% is winter/spring habitat. Of the winter/spring habitat, 27,763 acres, or 25% is rated unsatisfactory. Generally the unsatisfactory ratings for the winter/spring habitat in the resource area are due to reduced browse diversity, vigor, and cover, and a reduced herbaceous component of the habitat.

Habitat with yearlong mule deer usage occurs on about 50,000 acres or 29% of the total. Approximately 10,520 acres or 22% of this yearlong habitat is rated unsatisfactory.

Approximately 5,000 to 6,000 mule deer (Kasworm 1981 and Ihle 1982) utilize the north half of the Rocky Mountain Front, and probably 2,000 to 3,000 deer utilize the southern portion (see the Rocky Mountain Front Mule Deer/Elk map). Much of this area is in satisfactory condition, except for

some spring concentration areas. The Rocky Mountain Front Interagency Monitoring/Evaluation Program was established in 1980 to monitor the effects of human induced disturbances and develop guidelines to mitigate those effects. Interim guidelines for oil and gas activities on mule deer habitat have been developed and are currently being followed on the Rocky Mountain Front.



The Limestone Hills contain significant winter/spring habitat for at least 30% of the total Elkhorn Mountains mule deer population. This winter/spring population has varied considerably in the past but is currently estimated at 700 to 800 animals.

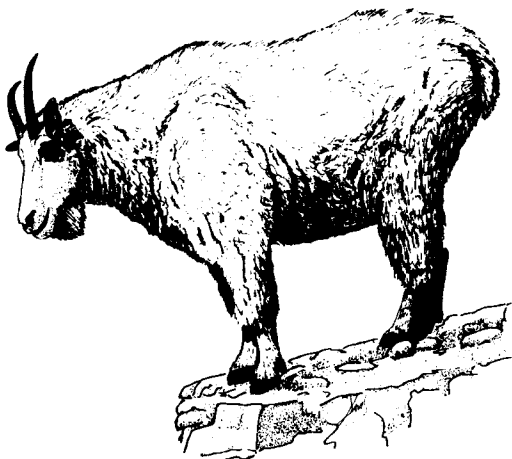
This winter range is classified as crucial in accordance with established criteria (Information Memorandum MT-82-82). Unsatisfactory habitat ratings are attributable to physical habitat loss due to past range fires accidentally started by the National Guard during training activities. Approximately 1,000 acres, or 33% of the curleaf mahogany/black sagebrush habitat types have been lost to fires since 1970. Most old burn areas are presently composed of perennial grass/forb types and are of limited value as mule deer winter range. The loss of additional browse acreage, especially more than 200 acres in one year, could have severe implications on the remaining browse stands (through subsequent overgrazing) and on the deer herd itself (through direct mortality).

TABLE 3-9
AMOUNT AND CONDITION OF MAJOR WILDLIFE HABITAT AREAS

Wildlife Species	Season	Total Acres BLM Habitat	% Satis. Habitat Cond.	% Unsatis. Habitat Cond.	% Unsatis. Due to Other Habitat Problems
Mule Deer	Winter/Spring	109,910	76	24	less than 1
	Summer/Fall	10,150	90	10	0
	"transition" ¹	3,990	100	0	0
	Yearlong	48,530	79	16	5
Elk	Winter/Spring	66,685	77	21	2
	Summer/Fall	25,550	77	22	1
	Yearlong	8,820	75	3	22
Bighorn Sheep	Winter/Spring	6,130	83	17	0
	Summer/Fall	10,100	93	7	0
	Yearlong	12,160	100	0	0
Moose	Winter/Spring	10,280	60	40	0
	Summer/Fall	5,760	88	12	less than 1
	Yearlong	1,300	77	23	0
Grizzly Bear	Yearlong	21,470	60	40	
Antelope	Winter/Spring	13,524	78	17	5
	Summer/Fall	14,180	77	23	less than 1
	Yearlong	19,830	79	21	0
Mountain Goat	Yearlong	13,420	97	3	0
Waterfowl	Spring/summer/fall	2,500	79	21	0
Sagegrouse	Yearlong	3,840	100	0	0
	Winter	800	90	10	0

¹Identified in the RMF area only, from RMF Mule Deer Study (1980,1981).

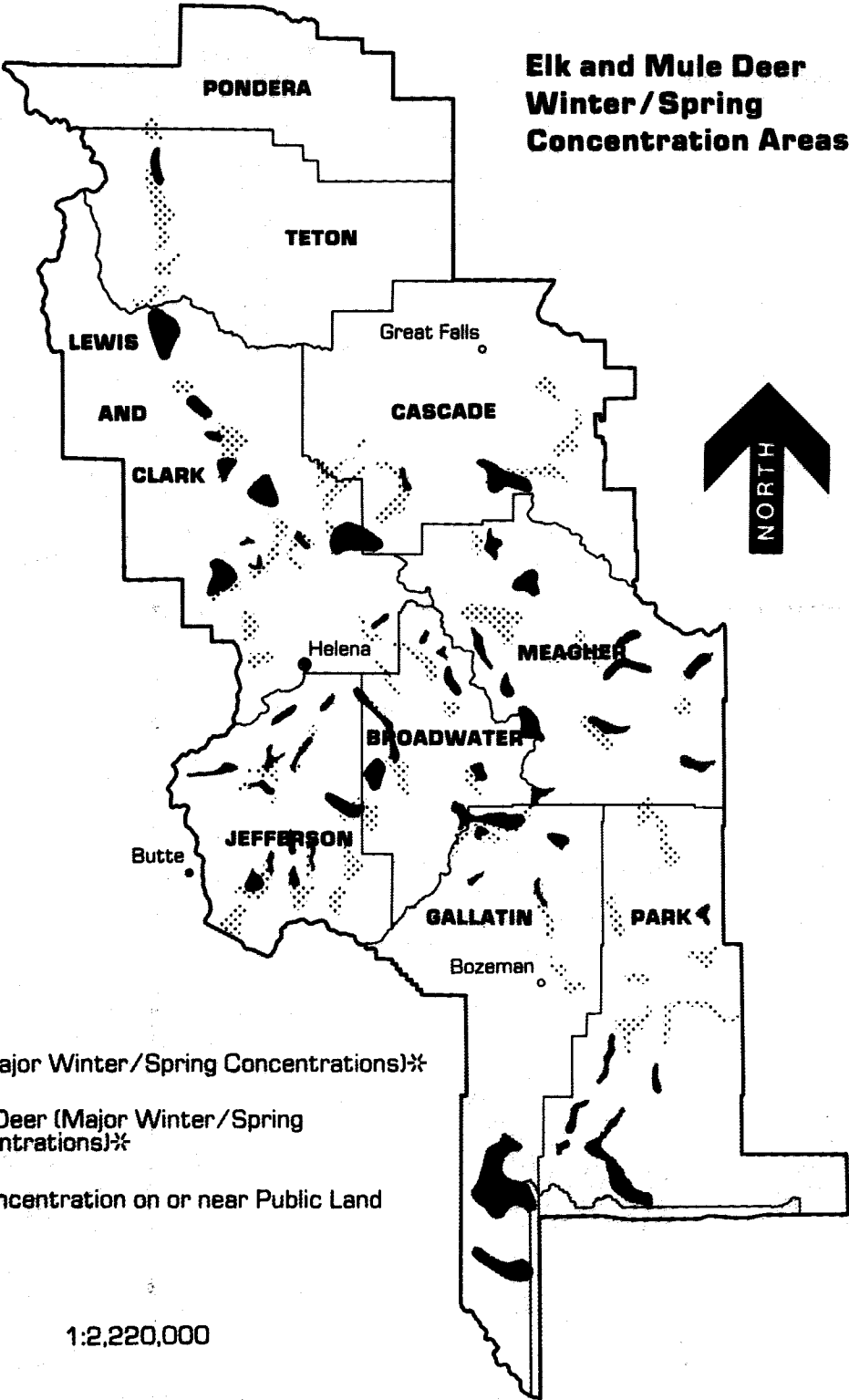
Mountain Goat. The resource area contains 13,420 acres of mountain goat habitat. Approximately 3% of the total mountain goat habitat in the resource area is rated unsatisfactory (see Table 3-9).



Bighorn Sheep. The resource area contains approximately 28,390 acres of bighorn sheep habitat. Habitat condition and trend studies have been conducted since 1965 and show that approximately 85% of the total bighorn sheep habitat is in satisfactory condition (see Table 3-9). However, the Deep Creek winter/spring range is in unsatisfactory condition.



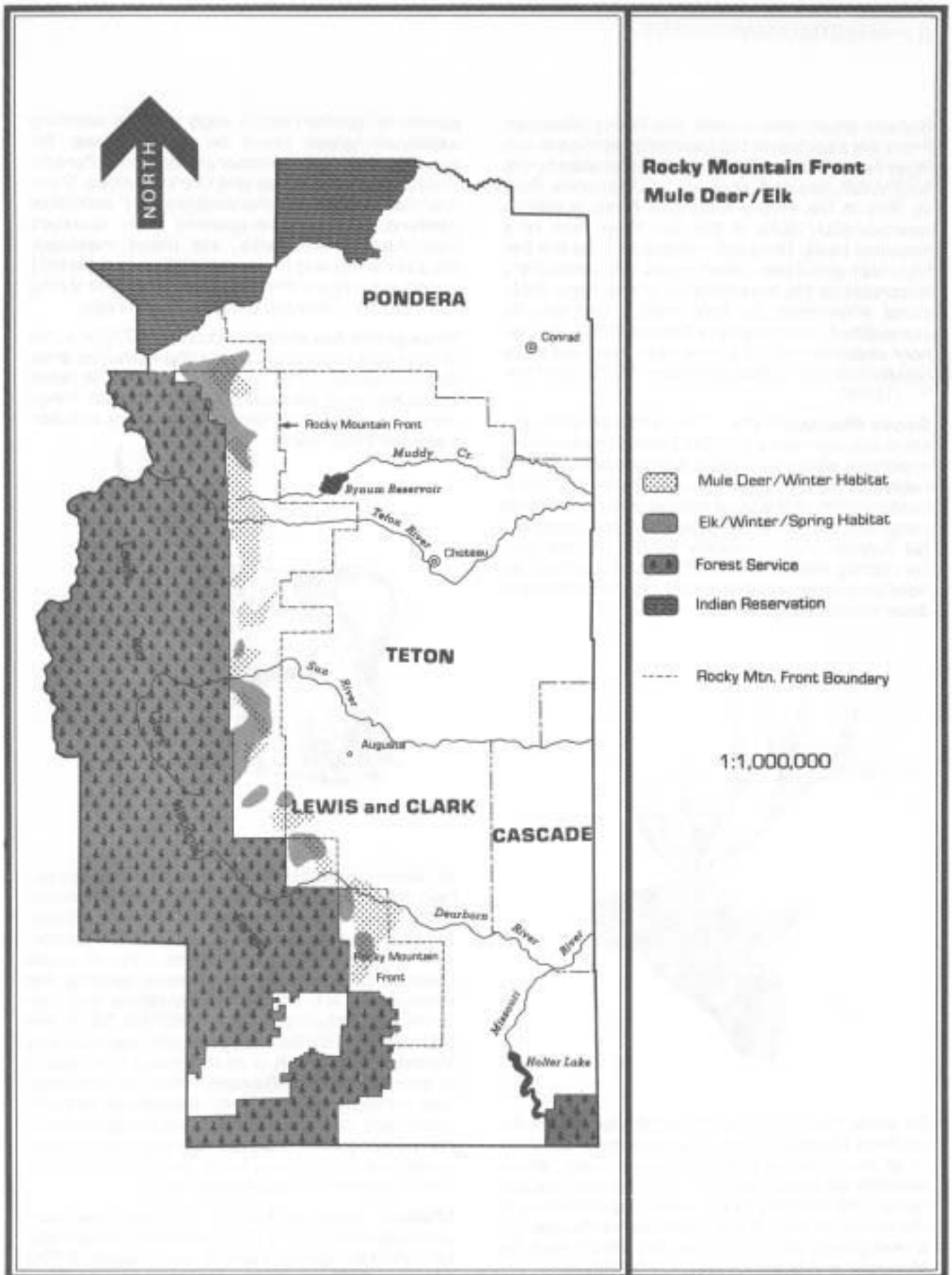
**Elk and Mule Deer
Winter/Spring
Concentration Areas**



■ Elk (Major Winter/Spring Concentrations)*

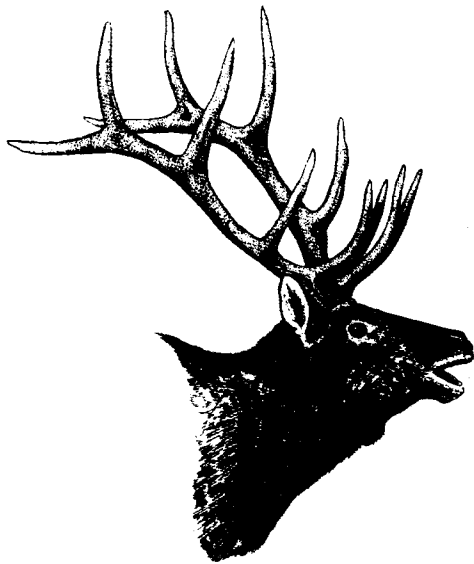
▨ Mule Deer (Major Winter/Spring Concentrations)*

*Concentration on or near Public Land



Bighorn sheep that inhabit the Rocky Mountain Front are a portion of the nationally significant Sun River herd. The Sun River herd is estimated by the MDFW&P, Region 4, at about 1,000 animals. Public land in the Rocky Mountain Front supports approximately 30% of the Sun River herd on a seasonal basis. Seasonal ranges, such as the Ear Mountain and Deep Creek areas, are particularly important to the maintenance of this herd. Additional information on food habits, interspecific competition, and seasonal habitat usage by bighorn sheep in this area have been reported on by Schallenger (1966), Erickson (1972) and Frisina (1974).

Rocky Mountain Elk. The resource area contains approximately 101,300 acres of seasonally important elk habitat. Table 3-9 contains seasonal habitat occurrence and condition ratings. Approximately 66% of the total habitat is winter/spring range and the remainder is yearlong and summer/fall habitat. Approximately 22.5% of the winter/spring habitat and 22.8% of the summer/fall habitat is rated unsatisfactory, mostly because of deteriorated range condition.



Elk winter habitat in the resource area is typically confined to perennial bunchgrass slopes adjacent to or intermingled with coniferous types. When available, elk make use of riparian and wet meadow types. The majority of elk winter/spring range in the resource area is the Idaho fescue/bluebunch wheatgrass habitat type (as described by Mueggler and Stewart, USDA, FS 1980a).

Elk calving occurs to some degree on all identified winter/spring ranges. Typical calving habitat is a

conifer or conifer/aspen edge with an adjoining sagebrush/grass stand on south slopes. Elk summer/fall habitats occur primarily in Jefferson, Broadwater, and Lewis and Clark counties. Summer/fall habitat is characterized by extensive coniferous types interspersed with abundant sagebrush, grass parks, and moist meadows. Riparian areas and moist meadows are especially important toward the end of summer and during the early fall in providing high quality forage.

Pronghorn Antelope. A total of 47,534 acres of antelope habitat occurs in the resource area. Approximately 22%, or 10,543 acres, is rated unsatisfactory because of deteriorated range condition, poor winter browse conditions, or subdivision encroachment.



Antelope populations in the resource area are not high on public land habitats. The most significant public land habitat occurs in Jefferson, Broadwater, and Lewis and Clark counties. The conversion of sagebrush/grass prairie types in these counties to cereal grains, intensive farming, and subdivisions are all changing antelope use patterns and reducing habitat (MDF&G 1976 and MDFW&P 1980a). Sagebrush, particularly Wyoming sagebrush, is an important constituent of antelope habitat (Bayless 1969). Browse species, particularly sagebrush, rabbitbrush, and winterfat, are particularly important components of the winter diet of antelope. During the summer, antelope eat principally forbs, and in the fall, forbs and browse are of equal importance.

Moose. Public land in the resource area contains approximately 17,340 acres of moose habitat. Winter/spring habitat constitutes 9,720 acres, or 56%, of the total habitat, and all of it is found in Jefferson County. The majority of the habitat conflicts occur in these winter/spring use

areas. Approximately 42% of this winter/spring habitat is rated unsatisfactory primarily due to low vigor, high decadence, and suppressed reproduction of woody riparian species.



Although moose rely heavily on riparian browse during all months of the year, 96 to 100% of the winter forage is composed of woody browse species (Knowlton 1960). During hot season grazing (July through mid September), stream bottoms and riparian zones with browse cover receive intense livestock use, because feed is more succulent and water and shade are near. At these times there may be heavy use of current annual growth and reproducing sprouts of willow and other browse species. This heavy use is the primary cause for deterioration in the quality of the riparian habitat.

Upland Game Birds and Waterfowl. Eight species of upland game birds occur in the resource area. These are ruffed grouse, blue grouse, Franklin's spruce grouse, sharp-tailed grouse, sage grouse, Hungarian partridge, ring-necked pheasant, and Merriam's turkey. Observations of the northern subspecies of white-tailed ptarmigan have been recorded on the alpine areas of the Rocky Mountain Front.

Waterfowl occur throughout the resource area with concentrated duck and goose nesting and winter use along the Missouri River from Three Forks to Hardy. The majority of the waterfowl habitat along the Missouri River is in good (satisfactory) condition. The Freezeout Lake Wildlife Management Area contains approximately 6,300 acres of public land withdrawn for the purpose of

waterfowl management. This area is managed by the MDFW&P and supports some of the largest migrating populations of waterfowl in Montana.

The Rocky Mountain Front contains some very productive waterfowl habitat on public land in the Tunnel Lake-Split Rock Lake areas. Four allotments, Tunnel Lake (6312), Pothole (7610), Black Reef (7609), and Alkali Flat (7613) contain approximately 2,500 acres of waterfowl habitat, of which 21%, or 525 acres, are identified as unsatisfactory. The spring after livestock grazing, there is limited or no residual nesting cover for waterfowl.

SOCIAL AND ECONOMIC CONDITIONS

Zone of Influence

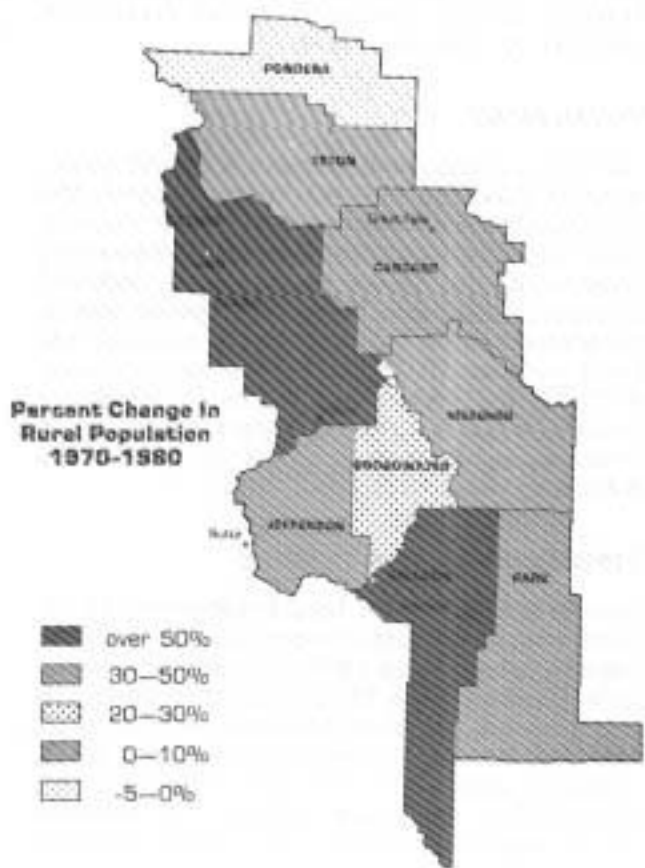
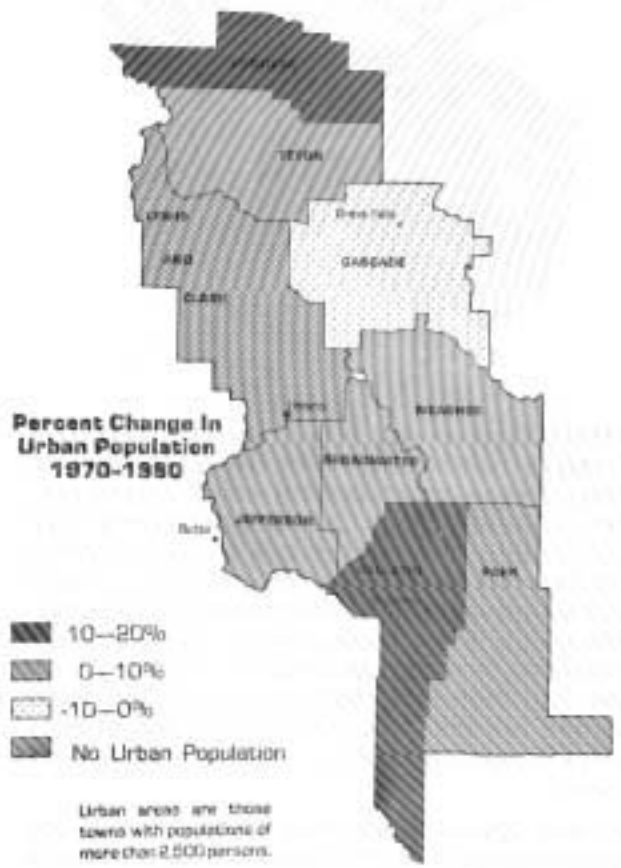
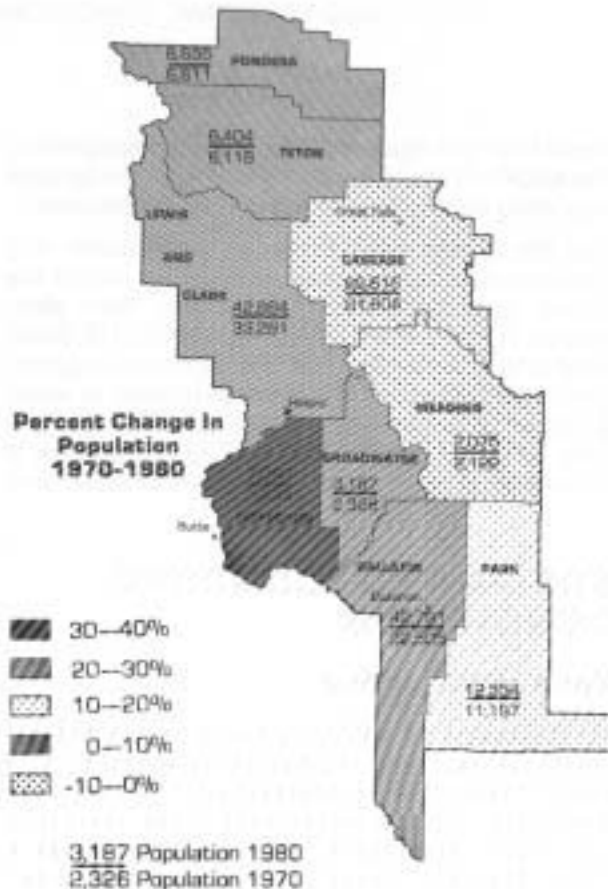
For purposes of analyzing social and economic consequences on a regional basis, zones of economic influence were established. The zone used most often in this plan consists of the nine counties in the Headwaters Resource Area (Pondera, Teton, Cascade, Meagher, Lewis and Clark, Jefferson, Broadwater, Park, and Gallatin counties). In analyzing the consequences of coal development a region that covers Glacier, Toole, Liberty, Pondera, Teton, Choteau, Cascade, Judith Basin and Meagher counties was used.

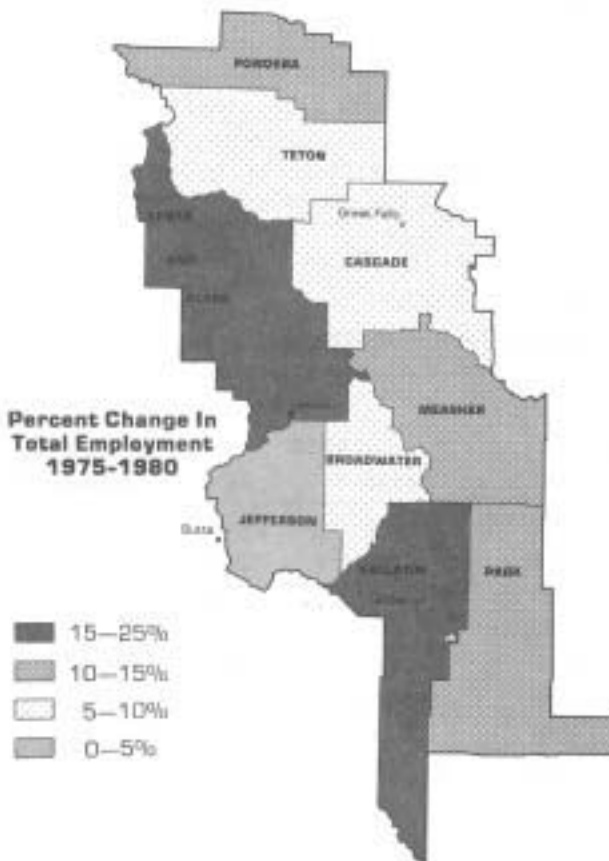
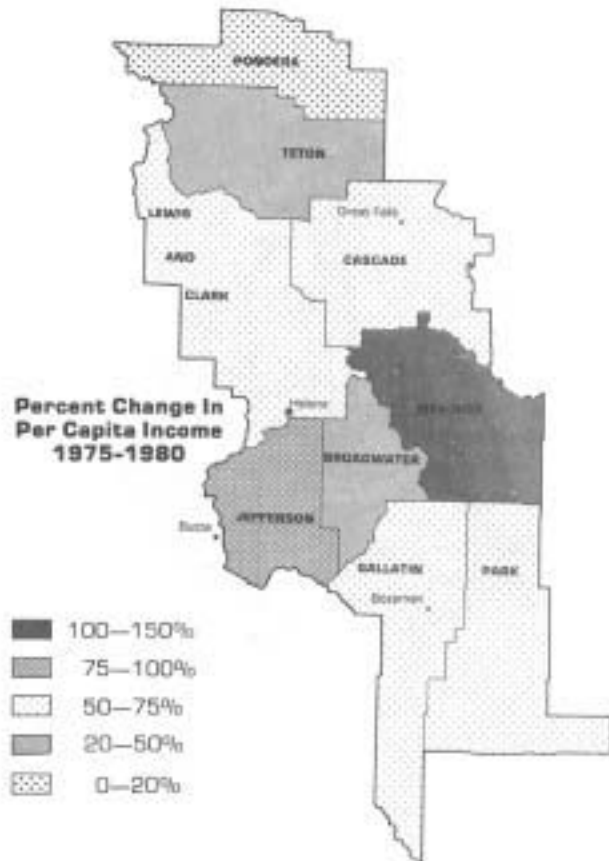
Population

The nine counties in the resource area had a population of 204,863 in 1980. Taken together, the nine counties are growing slightly faster than the state as a whole, but the individual counties vary considerably as shown in the maps depicting changes in population. The largest communities in the area are Great Falls (population 56,568), Helena (population 23,818), and Bozeman (population 21,611). The Helena and Bozeman areas are among the fastest growing in the state. Changes in housing units are shown in the Percent Change in Housing Units 1970-1980 map.

Employment and Income

The Percent Change in Total Employment 1975-1980 map shows the percent change in employment by county since 1975. The Percent Change in Per Capita Income 1975-1980 map shows the changes in per capita income since 1975. In 1980, only four counties (Cascade, Lewis and Clark, Meagher, and Teton) had per capita incomes greater than the state average. For counties whose populations grew in the 1970s, growth in



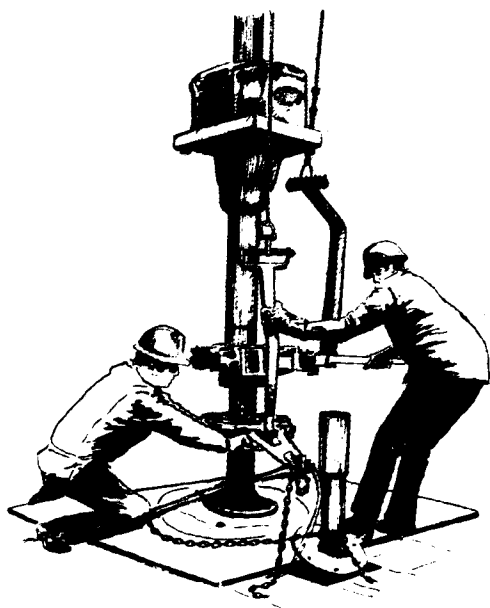


employment generally did not keep up with population growth. Projected employment by county (given the current base economy) is shown in Table 3-10. Employment growth is expected to be in urban rather than rural jobs.

Economic Relationships

Oil and Gas

Currently the only oil and gas production in the resource area is in Teton and Pondera counties. Much of this oil production is from fields that were first discovered in 1927. Subsequent oil fields were discovered in 1932, 1958, and 1967.



Recently discoveries of gas have been made in areas closer to the RMF.

Under the Mineral Leasing Act, each year the state receives a 50% share of bonuses, royalties, and rentals during the fiscal year. In fiscal year 1981 this amounted to \$12,726,624.64, that the state of Montana received for leasing in all counties. The nine counties in the resource area accounted for \$710,054.88. Over half of this was generated from Teton County. Oil royalty rates range from 12.5% to 25% depending upon production, while gas royalties range from 12.5% to 16.67%. For further oil and gas information see Appendix O.

Coal

Coal deposits in Cascade County are primarily in locations where the federal government has mineral rights, but does not control the surface. The coal is generally in small beds, has high BTU values, has high sulfur and ash contents, and would require deep mining methods. No lease applications for this coal have been received. Construction of a Montana Power Company plant at Salem near Great Falls in the late 1980s and early 1990s may create a demand for this coal. Under present economic conditions, it would appear to be more cost effective to ship surface-mined coal from eastern Montana for this project rather than develop this coal field.

Locatable Minerals

Areas in the southern part of the resource area have historically seen active mining for gold, silver, copper, lead, zinc, and other minerals. New mines for gold or silver have been opened or proposed in

TABLE 3-10
AGRICULTURAL AND NONAGRICULTURAL JOB PROJECTIONS

County	1980		1990		2005		% Change in Total Employment 1980-2005
	Nonag	Ag	Nonag	Ag	Nonag	Ag	
Cascade	37,594	1,088	41,252	1,052	46,416	1,012	18.4
Meagher	832	217	864	210	889	202	3.8
Teton	1,795	891	1,877	861	1,957	828	3.6
Pondera	2,374	810	2,667	782	3,137	752	18.1
Gallatin	15,656	1,105	19,773	1,080	27,308	1,055	40.9
Park	4,470	542	4,783	532	4,985	520	8.9
Broadwater	1,143	300	1,310	299	1,514	299	20.4
Lewis & Clark	19,415	464	23,326	460	29,362	460	33.3
Jefferson	1,912	244	2,212	242	2,625	240	37.3

Source: E/D Model

Jefferson County. Public land provides much of the land area that is open to prospecting for minerals.

Timber

Presently BLM-administered forestlands in the resource area provide little timber. Much of the timber is in small stands, some of which are quite isolated. The current allowable cut is 2.6 mmbf per year. Assuming that one mmbf provides jobs for eight persons per year, there are twenty-one jobs that could be directly supplied by timber from the Headwaters Resource Area if the current allowable cut was being harvested each year. Using an employment multiplier of 1.78 secondary jobs for each direct job, thirty-six indirect jobs could be provided. The majority of the mills in the area are small operations, with the largest mill being in Silver City near Helena.

Range

There are 327 grazing allotments in the area. At present, there are 31,501 AUMs of current authorized use. At the 1982 grazing rate of \$1.86 per AUM, this equals \$58,591.86 in grazing fees. The 1983 rate is \$1.40 per AUM equaling \$44,101.40.

Much of the grazing on public land is in the summer and fall. Reductions in AUMs available for lease would make it necessary for ranchers to purchase or rent alternative grazing land or to buy feed. In general, the ranchers in the resource area are not so dependent on BLM grazing that small cuts would cause them to go out of business. However, the purchase or rental of alternative grazing lands may not be feasible due to high land costs and possible high transportation costs. Therefore, while BLM cuts in grazing may not in themselves cause operations to go out of business, it will add further costs that may put an already marginal operation out of business.



Table 3-11 shows the number of permittees that could be affected significantly by changes in grazing permits and the distribution of dependency in each category. Those in the smaller size categories that appear to have a great dependency, generally have an outside income from other agricultural crops or from outside employment that has not been taken into account in this analysis. A ranch budget for each size category has been prepared so that proposed changes in grazing permits can be analyzed in the environmental consequences section of this document. It should be pointed out that the bulk of the changes proposed would reduce AUMs that are currently being carried as nonuse. Reductions in these AUMs would affect permit value, but would not immediately affect cash income. The analysis, however, has been made to show the worst case. Therefore, the effects on cash income of reductions has been calculated as if these AUMs were currently being used.

Average AUM figures, permit values, and base income from ranch budgets by size class are shown in Table 3-12. These figures represent averages and do not represent any one ranch operation, but general classes of operations.

Wildlife

The major economic component of wildlife is the expenditures made by hunters and anglers. The public land in the resource area provides approximately 5,859 hunter-days for big game, 1,735 days for upland game birds, and 991 for waterfowl. Total expenditures for these hunter-days are \$255,831 per year. The BLM contribution to wildlife numbers may not be reflected in these numbers, since the BLM-administered land provides important winter forage for many big game species. Winter forage is one of the limiting factors to big game herd sizes.

Recreation

Much of the recreation use in the area is local use. Public land meets a portion of the demand for hunting, fishing access, camping, boating access, ORV use, and hiking. Many BLM tracts are scattered, but some are very important recreationally. This is particularly true of those tracts along the Missouri, Smith, and Yellowstone rivers. The major impact of recreation use on the local economy is the purchase of recreation related equipment and services.

TABLE 3-11
AFFECTED PERMITTEES AND DEPENDENCY

Range Size Category (in cows)	Ranches in Category		Average Herd Size (in cows)	Dependency (number of ranches) ¹				Average % Dependency
	No ¹	%		0-15% of Total AUMs	16-30% of Total AUMs	31-45% of Total AUMs	46-80% of Total AUMs	
0-100	43	23.5	57	10	12	8	13	36.6
101-250	60	32.8	196	46	7	5	2	12.9
251-500	44	24.0	354	31	10	3	0	11.3
501-1,000	25	13.7	794	22	3	0	0	7.0
Greater than 1,000	11	6.0	1,601	11	0	0	0	3.3

¹Lists only those permittees having over 25 AUMs of BLM grazing

²The dependency figures are an estimate of the percentage of the total AUMs for the ranch that are supplied by public land

TABLE 3-12
RANCH INCOME AND PERMIT VALUE

Size Class	Ranch Size Category (in cows)	Average Herd Size (in cows)	Average Number of BLM AUMs per Ranch ¹	Income From Livestock Portion of Business (Avg. per Ranch)	Permit Value ²
1	0-100	57	70	\$3,553	\$7,000
2	101-250	196	116	\$18,041	\$11,600
3	251-500	354	197	\$39,661	\$19,700
4	501-1,000	794	261	\$104,787	\$26,100
5	Greater than 1,000	1,601	246	\$174,313	\$24,600

¹Does not include returns above family labor costs, land investment or other capital investment

²Assumes a value of \$100 per AUM

Social Setting

Historically this area has seen several periods of population growth and decline. Currently both growth and decline are occurring simultaneously in the resource area. Urban areas such as Bozeman and Helena are growing rapidly, while the rural counties are growing very slowly or declining in population. Another characteristic of these rural counties is the higher average age of the population. This indicates a large proportion of retirees or those about to retire. This can have major effects on the future services that will be required in those counties.

Much of the lifestyle of the area involves outdoor activities to some extent. Much of the state's economy is based upon natural resources and many of the most popular recreational activities are outdoor oriented. Given this, the resources managed by the BLM are of interest to a wide spectrum of the population.

Attitudes

An analysis of attitudes of people in the Headwaters Resource Area (based upon BLM discussions with interested individuals and groups and responses to the RMP issues brochure) found that attitudes were similar to those found in other parts of Montana. Many of those asked valued the rural character of the area as an important part of their lifestyle. An appreciation for the wide open spaces, naturalness, fresh air, and solitude were expressed. Other desirable qualities include lack of urban problems, relaxed pace, personal freedom, friendliness of the people, and a good place to raise children. Outside control of land or outside interference is generally resented.

Oil and gas exploration and development is generally viewed as appropriate on the public land provided there are proper safeguards. However, in the Rocky Mountain Front area there is significant opposition to oil and gas exploration and develop-

ment. This opposition primarily arises from conflicts between oil and gas exploration and development and wilderness and wildlife habitat (primarily grizzly bear) values.

In general, livestock use is viewed as appropriate for the public land. Grazing permittees tend to favor continuation of the status quo in grazing management. In addition, many permittees would like less regulation of their use of the public land, while others feel that the BLM should more closely monitor the condition of the public rangeland.

The Headwaters Resource Area provides relatively little commercial timber resources. Interest has been expressed in further developing these resources. Some resistance to timber harvest has been expressed for stands near populated areas such as the areas near Helena.

Attitudes toward designation of wilderness is split between support and opposition. Comments received during wilderness study indicated support for designation of each specific area. The results of a recent statewide poll (Keegan, Lenihan, Polzin, and Wallwork 1982) indicated that Montanans overwhelmingly approve of the concept of wilderness designation (75% of those questioned). Forty percent of those surveyed favored additions to the wilderness system in the United States, but only 25% favored additional wilderness in Montana.

The attitudes of the local population toward land tenure adjustments are currently being formed due to recent publicity about sale of some public land. Support for sale of specific tracts does exist, although there is some concern particularly from adjacent landowners about the terms of such sales. Massive sales of land appear to have less support.

Mineral exploration and development has basic support within the area. One area of conflict is in the Scratchgravel Hills, where area homeowners oppose further gold mining in the area.

The issue of motorcycle race areas is presently limited to the Helena area. Adjacent landowner opposition to these events has been expressed in both the Scratchgravel Hills and the Limestone Hills areas. Concern about property damage, noise, and crowds seem to be the main problems.

There are many people in the resource area who participate in and support off-road vehicle use. Most use in the area is confined to roadways due to terrain and vegetation. Problems arise with adjacent landowners and conflicts with wildlife. There are also conflicts with participants in other recreational activities that do not use motorized vehicles.

Opposition exists along any area designated as a utility corridor. Depending on the type of project, opposition from adjacent landowners can be quite widespread.

Local attitudes toward coal leasing are presently unknown for the Great Falls area. There is local support for the proposed Salem powerplant and some concern has been expressed about possible leasing. However the lack of any interest in leasing a specific area has precluded a public discussion of the issue. In other areas of Montana, as a coal tract approached leasing, opposition from adjacent landowners began to appear.

The designation of special areas was developed fairly late in the planning process. No specific information on attitudes is available, but this would likely be similar to wilderness attitudes.

