

# FOUR Environmental Consequences

## INTRODUCTION

This chapter describes the environmental, economic and social consequences of implementing the alternatives presented in Chapter 2. The impacts were identified and evaluated by an interdisciplinary team of resource specialists and are presented here for 12 environmental elements by issue and alternative (refer to Chapter 3 for a detailed description of each element). These elements are:

1. Oil and Gas
2. Hardrock Minerals
3. Air and Water Quality
4. Soils and Vegetation
5. Livestock Grazing Management
6. Wildlife
7. Forestry
8. Cultural Resources
9. Recreation
10. Visual Resources
11. Economic Conditions
12. Social Conditions

This chapter quantifies the specific impacts, where possible, and discusses where the impact would occur. The significance of the impact, including magnitude, duration and incidence are discussed where possible. National, regional or local importance is also discussed in some instances. The impact discussions relate only to BLM management actions.

It's difficult to assign a single definition of the significance of an impact to all environmental elements. The location, size and duration of an impact, as well as the amount of public opportunity, social well-being and economic change are some of the variables that can determine the significance of an impact. Yet not all of these variables apply equally to all environmental elements. The degrees of impact are discussed within the analysis.

Chapter 4 is presented in seven sections; Analysis Assumptions and Guidelines, Impacts from Management Common to All Alternatives, Impacts by Alternative, Summary of Cumulative Effects Analysis, Unavoidable Adverse Impacts, Short-Term Use Versus Long-Term Productivity and Irreversible and Irrecoverable Commitment of Resources. The environmental impacts of the alternatives are summarized in Table S.2 in the Summary at the beginning of this document.

## ANALYSIS ASSUMPTIONS AND GUIDELINES

The assumptions and guidelines used for analyzing the impacts of each alternative are listed below by general assumptions and environmental element. Environmental elements with no specific analysis assumptions and guidelines are not discussed.

### General

The assessment of impacts assumes that regulations and policies would be observed and completed.

Approximately 161,000 to 166,000 BLM acres have been identified for disposal. This disposal base provides the potential for acquiring approximately 115,000 acres of other land, based on previous land exchange ratios. This difference reflects the differing values of the lands involved. The environmental impacts of disposing of all 161,000 to 166,000 acres will be analyzed.

### Hardrock Minerals and Oil and Gas

The reasonably foreseeable development scenarios (RFDs) for oil and gas and hardrock minerals, contained in Appendices B and C, are the basis for assessing cumulative impacts from oil and gas leasing and development and hardrock exploration and mining. The RFDs discuss the general development process for extracting these resources and project levels of anticipated activity.

### Soil and Vegetation

Approximately 60% of the stream riparian areas are in a late seral or potential natural community ecological status and 40% are in early to mid seral. Most of the stream miles (72%) are intermittent rather than perennial streams.

Using livestock grazing management practices to improve riparian areas has been the subject of much research in recent years. Grazing Management in Riparian Areas (Kinch, USDI-BLM, 1989) is an excellent summary of this research and BLM and U.S. Forest Service (FS) riparian management. The projected impacts are based on this reference document and experience with successful BLM riparian grazing methods in the planning area.

## Livestock Grazing Management

Based on previous land exchanges in the planning area, 41% of the BLM land disposed of is now farmed. This percentage is used in the analysis to estimate the amount of grazing land that could be converted to small grain production. It is also assumed that conservation practices would be applied in compliance with Soil Conservation Service (SCS) conservation plans.

It's assumed construction costs for range improvements would be shared by BLM and the permittee; 75% BLM and 25% permittee.

## Wildlife

A draft biological plan, developed by the U. S. Fish and Wildlife Service (FWS) in cooperation with the Montana Department of Fish, Wildlife and Parks (MDFWP), Charles M. Russell National Wildlife Refuge (CMR) and BLM, addressed prairie dog habitat associated with black-footed ferret reintroduction. The main provisions of this plan provided that; prairie dogs be managed in a complex for black-footed ferret reintroduction (7km Complex), prairie dog towns would be managed at the 1988 acreage and distribution, and that there would be no restrictions to current land uses in the area. This biological plan was used as a framework for assessing the impacts of each alternative.

The duck production figures given in this resource management plan (RMP) are based on the assumptions that the planning area receives normal annual precipitation; is developed for waterfowl production at three reservoirs per section; and that each reservoir averages 3-surface acres in size. The total surface acres of reservoirs was then multiplied by nine ducks per surface acre when under management and one duck per surface acre without management (Gjersing, 1971 and Munding, 1975).

The goose production figures are based on the assumption that every water source would have a goose nesting structure. The total number of nesting structures was multiplied by 70%, which is the average nesting structure occupancy rate, then multiplied by four, which is the average number of goslings produced per nest (McCarthy, 1973).

## Forestry

It's assumed the average annual allowable cut would be 20 cubic feet per acre on acquired productive forest land.

## Recreation

Recreation use is estimated to average one visit for every 31 acres of BLM land and that estimate would also apply to

acquired land. Recreation use would increase by an average of one visit for every 31 acres as BLM gains access to lands with no legal public access. In those areas where BLM now has limited public access, recreation use is estimated at one visit every 37 acres. Recreation use would probably increase to the estimated average (1 visit per 31 acres) as BLM gains additional public access to those lands.

## Economic

Land disposal was assumed to follow the same pattern as the past 10 years in terms of whom land was conveyed to. The pattern for the past 10 years is as follows:

Public land disposed of (conveyed to):

federal agencies	=	9%
state	=	30%
counties	=	5%
private	=	56%

Increases in crop production are based on the analysis in "Impacts to Livestock Grazing Management;" primarily, that some BLM land disposed of could be converted to small-grain production.

The unit value per small-grain acre is \$40.00. This value was derived as a weighted average dollar value of small-grain production in the six counties in the planning area (Chouteau, Fergus, Judith Basin, Petroleum, Phillips, Valley). This value was calculated from Montana Agricultural Statistics 1988.

Reductions in livestock production are based on reductions in AUMs estimated in "Impacts to Livestock Grazing Management."

The unit value per AUM is \$28.00. This figure is based on the following assumptions: In the planning area, livestock production associated with BLM land is estimated to comprise about 14% of total livestock production. Based on figures from the Montana Agricultural Statistics (1988), total livestock receipts are estimated to be \$83,381,000; thus, the portion estimated to be attributable to BLM land (14.1%) is \$11,755,000 (see Chapter 3, Economic Conditions). The \$28.00 unit value was derived by dividing \$11,755,000 by 452,380 which represents the total number of AUMs on BLM land in the planning area.

It is assumed that all agricultural production (livestock and crops) is exported from the planning area.

The increase in economic activity associated with recreation is based on the analysis described in "Impacts to Recreation" which provides estimates of the increase in recreation use. The recreation section estimates what the proportional increase would be in each resource area over current

conditions. This proportion is then applied to the economic estimate of current conditions in terms of economic activity. These proportions also apply to the estimate of changes in "net willingness to pay" for recreational opportunities.

Half of the recreation expenditures are generated by planning area residents and half by nonresidents.

Data obtained from the University of Montana Bureau of Business and Economic Research (BBER) indicate about 1.7% of the timber harvest in the planning area is attributable to BLM land.

Half of the forest harvest attributable to BLM land is processed locally and is exported from the planning area. The other half is processed outside the planning area.

The unit value for harvest processed locally and exported is \$215 per thousand board feet (MBF). The unit value for harvest that was processed outside the planning area is \$160/mbf.

The impacts to hardrock mining are based on the analysis in Appendix C, the Reasonably Foreseeable Development Scenario, in terms of the number of exploration projects, developments, the size and duration of projects.

Estimated changes in PILT are based on the net change in public land in each county in the planning area.

Estimated changes in property tax revenues are based on 1987 estimates for taxable valuation of agricultural land, agricultural production and the average levy for state, county and schools.

Changes in tax revenue are based on the net change in private land in each county in the planning area. They are also based on estimated changes in agricultural production that is subject to taxation.

BLM expenditures are spent in the planning area.

All dollar figures are in 1987 dollars, unless otherwise noted.

The estimates of regional impacts, such as secondary spending and employment effects, were derived using an economic-demographic model developed by the Department of Agriculture Economics of North Dakota State University (NDSU). This model is described in NDSU Agricultural Economics Miscellaneous Report No. 61, titled "Expansion and Adaptation of the North Dakota Economic-Demographic Assessment Model (NEDAM) for Montana: Technical Description" (1982).

Significant impacts which may occur are expressed in terms of the percentage of change from current conditions.

## IMPACTS FROM MANAGEMENT COMMON TO ALL ALTERNATIVES

The environmental consequences described in this section apply to all alternatives and are discussed by environmental element. This section describes those impacts from Management Common To All Alternatives and is presented here to avoid repetition.

Some of the information is summarized from environmental impacts identified in the Carpenter Creek-Craig Coulee Management Framework Plan (MFP) Amendment (1986), Bitter Creek Wilderness Environmental Impact Statement (EIS) (1989), Missouri Breaks Wilderness EIS (1987), Prairie Potholes Vegetation Allocation EIS (1981), Missouri Breaks Grazing EIS (1979), Northwest Area Noxious Weed Control Program EIS (1987), Containment/Eradication of Selected Noxious Plants Programmatic Environmental Assessment (EA) (1986), Vegetation Treatment on BLM Lands EIS (1991), Willow Creek Interdisciplinary Watershed Activity Plan EA (1987), Wildlife Habitat Improvement Project Programmatic EA (1978), Animal Damage Control Plan (1987), and Small Sales of Forest Products Programmatic EA (1978).

These documents are regional EISs and EAs which analyzed proposed actions for soils, vegetation allocation, watershed development, grazing, land treatments, wildlife, wilderness, visual resources, cultural, noxious plant control and forest product management on all, or portions of the planning area. Additional information can be found in the respective document. These documents may be obtained through the Lewistown District Office or the resource area offices in Malta and Glasgow.

Managing geothermal, oil shale, coal, geologic and paleontology resources would not impact any of the environmental elements and those resources are not discussed further in this section. Only those environmental elements that would be impacted by Management Common To All Alternatives are discussed.

### Impacts to Hardrock Minerals and Oil and Gas from Management Common

**From Wilderness Management:** There would be no impact to oil and gas development in the Dog Creek South, Bitter Creek or Woodhawk Wilderness Study Areas (WSAs). These areas are not recommended for wilderness designation. Opportunities for exploration and development of oil and gas could be restricted or foregone in portions of the Cow Creek and Antelope Creek WSAs and the entire Burnt Lodge WSA because these areas were recommended suitable for wilderness designation.

**From Bentonite Mining:** Areas with high potential for bentonite resources would remain open to mineral development. Oil and gas drilling relies heavily on a local supply of this commodity for drilling fluid. The availability of BLM land for this type of activity has a positive impact on oil and gas.

**From Hazardous Materials Management:** Reviewing mineral authorizations for proper use, control, storage and disposal of hazardous materials could result in longer approval time and more costly operating requirements. This would be a minor negative impact to mineral developers, particularly hardrock mining operations.

**From BLM Land Sales:** There would be no impact to mineral resources from the land sale identified in the Valley Resource Area (RA). The BLM lots in the Zortman and Landusky Town Sites (in the Phillips RA) have moderate mineral potential. Selling these lots could have a negative impact on mineral development. This would require site-specific evaluation before disposal.

## Impacts to Air and Water Quality from Management Common

**From Grazing, Vegetation, Wilderness, Watershed, Noxious Plant and Forest Management:** Contour furrowing would result in a slight to moderate increase in infiltration rates, no change in aquifer recharge, a slight decrease in peak discharges, a slight reduction in average annual runoff and a slight improvement in drainage. Vegetation treatments and grazing management would decrease sediment and water yield in the long term. Water quality and consumption would also increase in the long term.

There would be a slight chance of water contamination from chemical control of noxious plants. Grazing, recreation and wilderness management would have no residual adverse impacts to air quality.

**From Bentonite, Mineral Materials and Solid Minerals Management:** Bentonite and gravel mining can create a short-term minor amount of dust. Water often collects in the deep excavations and becomes very saline. After reclamation, there is no residual impact to air or water quality.

## Impacts to Soil and Vegetation from Management Common

**From Grazing, Vegetation, Wilderness, Watershed, Noxious Plant and Forest Management:** Grazing management in the Missouri Breaks Grazing EIS area would slightly decrease soil compaction and the erosion condition class would improve with more acres in the stable

condition class. Sediment yield would decrease in the long term. There would be no residual adverse impacts.

Vegetation management in the Prairie Potholes Vegetation Allocation EIS area would decrease erosion on BLM land in the long term as sediment and water yields decrease. Soil losses from range developments would be minor. Water use would increase slightly due to more livestock.

Controlling noxious plants would increase desirable vegetation productivity.

Logging forest products would result in soil compaction along roads, landings and skid trails which could result in minor soil erosion.

Grazing management methods in the Missouri Breaks Grazing EIS area would improve range condition. Short-term unavoidable impacts from the loss of forage production on contour furrowed, and plowed and seeded lands would occur. Within 2 to 3 years, these lands would be producing more forage than before treatment and in several additional years, would have more than compensated for the lost productivity. Long-term unavoidable impacts would occur on land permanently removed for the life of range improvement projects such as wells, reservoirs, stock tanks and other water developments.

Vegetation management in the Prairie Potholes Vegetation Allocation EIS area would improve rangelands in early seral to mid-seral ecological status to late seral or potential natural community in allotments with existing and proposed allotment management plans (AMPs). Some allotments in early seral to mid-seral ecological status would be slow to respond because of soil characteristics. Other allotments would not be improved because of scattered land patterns. Watershed, wildlife and non-consumptive AUMs could increase 15%.

**From Bentonite, Mineral Materials and Solid Minerals Management:** Mining would have significant site-specific negative impacts on soil and vegetation in the short term (approximately 5 years) as access roads are built and mining commences. After reclamation, there would be no residual impact to soil or vegetation.

**From Hazardous Material Management:** Hazardous material contamination of BLM land would be limited by the provisions of this RMP. Damage from hazardous materials to vegetation and soil would not occur.

**From Fire Management:** Fire management practices would not result in a significant change in burned acres in the grass-shrub type, Fire Management Zone (FMZ) 1. Limiting heavy equipment use would reduce potential damage to soils and vegetation on steep slopes. However, because of the intermingled land pattern in most of the planning area and the high rate of spread in these fuels, most fires would threaten private land. Heavy equipment could

be used in that case. Because of the small number of fires which occur in this area and the soils which respond favorably to disturbance, no impact is expected.

Limiting the use of heavy equipment would have a positive impact in the Missouri Breaks (FMZ 2). Past use of heavy equipment in the Breaks has scarred the landscape, which has shallow soils that do not recover well from major disturbance. Using fire in the Missouri Breaks, either as prescribed burning or skillful management of wildfire, can achieve desired management objectives (Eichhorn and Watts, 1984). Fire in dense ponderosa pine and juniper in the Missouri Breaks increases grass and forb production and can benefit deer, elk and other wildlife.

Intensive suppression efforts would put fires out quickly which allows other vegetation to grow and age; increasing the mountain timber fuel type in FMZ 3. This would maintain the current situation by keeping fires small and maintaining the conifer stands. The risk of large fires would increase as fuels build. This problem would be offset by burning slash piles, thinning lodgepole pine stands and harvesting mature stands of conifers to reduce hazardous fuel buildup.

Using prescribed fire would reduce tree and shrub cover and increase grass and forb production. In some cases, prescribed fire would improve watershed cover. Vegetation types considered for prescribed fire are crested wheatgrass, big sagebrush with canopy coverage of greater than 50%, ponderosa pine and clubmoss-blue grama.

**From Leases and Permits:** Minor impacts could result from roads or other surface disturbances associated with routine leases and permits.

**From Rights-of-Way:** Rights-of-way activity can create short-term soil and vegetation disturbances. Natural or near-natural conditions are restored on disturbed areas by planting native vegetation. Upland areas with gentle slopes recover quickly from disturbance and would often be more productive than adjacent undisturbed areas for several to many years after reclamation. Permanent scarring can occur from disturbance on steep slopes with shallow soils, such as the mountain areas and Missouri River Breaks. Careful planning and design of the disturbing activity can normally limit this potential impact.

A common residual impact of rights-of-way is the service road. Some additional or upgraded roads are usually needed to maintain the facility. This results in a minor loss of vegetation and an insignificant increase in erosion.

### **Impacts to Livestock Grazing Management from Management Common**

**From Grazing, Vegetation, Wilderness, Watershed, Noxious Plant and Forest Management:** There would be

no impact on livestock management including the maintenance of range projects in the Dog Creek South, Woodhawk or Bitter Creek WSAs. There would be no impact on livestock management of the maintenance of range projects in those portions of the Cow Creek and Antelope Creek WSAs recommended as nonsuitable for wilderness designation. There could be minor additional costs to operators due to restricted motorized vehicle use in designated wilderness areas. There would be no change in stocking levels on lands recommended for wilderness.

Grazing management in the Missouri Breaks Grazing EIS area could increase livestock grazing AUMs by 7% in the long term.

Vegetation management in the Prairie Potholes Vegetation Allocation EIS Area could increase vegetation production by 15% in the long term. In allotments with AMPs, the expected increase is about 27%. Riparian vegetation along streams and below reservoirs would increase significantly. There would be a moderate increase in livestock and use (numbers or extension of the grazing season).

**From Bentonite, Mineral Materials and Solid Minerals Management:** Forage production on BLM land used for bentonite and gravel mining is very low and there would be little impact to grazing. Usually less than 10 acres are disturbed and after reclamation, there would be no residual impact to grazing management.

**From Recreation Management:** Recreation would have very little impact on grazing management. However, the increased number of people using BLM land during the fall increases the chances of a gate being left open or otherwise disrupting the planned grazing schedule.

**From Fire Management:** Prescribed fire in the Missouri Breaks can achieve desired management objectives. Fires in dense ponderosa pine and juniper increase grass and forb production and can benefit livestock grazing.

### **Impacts to Wildlife from Management Common**

**From Grazing, Vegetation, Wilderness, Watershed, Noxious Plant and Forest Management:** Mule deer populations would not be impacted in the Dog Creek South, Bitter Creek and Woodhawk WSAs because they were not recommended for wilderness designation. Wilderness could provide some benefits to wildlife by providing a secure area and protecting habitat.

Grazing management in the Missouri Breaks Grazing EIS area would result in short-term mule deer declines immediately around new reservoirs. Vegetation treatment sites would provide additional habitat through improved cover and forage availability. This would create a slight

improvement in white-tailed deer and elk habitat and no change in antelope habitat. There would be a decrease in sharp-tailed grouse near new reservoirs and a considerable local improvement for waterfowl as aquatic vegetation matures and new waters are developed.

Vegetation management in the Prairie Potholes Vegetation Allocation EIS Area would improve big game habitat. Vegetation for big game would increase 16% in the long term. There would be an improvement in upland game bird habitat, waterfowl production and shoreline vegetation.

Controlling noxious plants would improve wildlife habitat. There would be a slight possibility of damaging fisheries when using chemicals to control noxious plants.

**From Bentonite Mining, Mineral Materials, and Solid Minerals Management:** Mining would disturb grass and shrub vegetation communities. These communities provide some habitat for mule deer, antelope, sage grouse, small mammals and song birds. Mining would displace most animals by removing vegetation. Some winter range could be disturbed if sagebrush or other shrubs important to wildlife are removed during mining. Wildlife would be disturbed in the immediate vicinity of mining activities. Some animals would be killed as machinery, man and wildlife come into contact with each other. The larger animals are less dependent on the vegetation disturbed by mining activities and would disperse, while smaller animals may be lost. The mine site could range from 5 to 100 acres and the area would be reclaimed after mining is complete.

**From Cave Resource Management:** Caves contain various species such as insects, birds and mammals. Insects hibernate in caves during the late fall and winter periods. Birds may nest in or near cave entrances during the summer but usually migrate south during the winter. Most mammals use cave entrances for shelter, but do not normally utilize the intensive dark and deep reaches of the cave. Bats use caves in the summer and usually migrate to a hibernaculum during the winter. A cave management plan would consider the wildlife values of each cave and establish mitigating measures to protect and manage the uniqueness of each cave. This would have a positive impact on wildlife.

**From Hazardous Material Management:** The use and storage of hazardous materials would be evaluated and mitigation developed to protect wildlife. This would have a positive benefit to wildlife.

**From Recreation Management:** Most wildlife use and enjoyment is associated with recreation and many recreation facilities are developed to interpret or enjoy wildlife. The facilities attract people to an area and the concentration of people disturbs, displaces and sometimes removes wildlife in and near these facilities. With proper management and education of the public, these impacts would be minimized and benefit the public through enjoyment of wildlife resources.

**From Fire Management:** Fire management can reduce dense stands of sagebrush, juniper, etc. and allow other plant species (grasses and forbs) to invade these areas, thus improving wildlife habitat.

Uncontrolled fire can be very detrimental to wildlife. Fire can remove large stands of juniper and sagebrush from winter ranges and reduce or eliminate wildlife populations on burned areas. The severity of the burn could prevent reestablishment of shrubs for over 10 years. This can be a significant negative impact to wildlife in the short and long term if reestablishment of shrubs does not occur.

**From Rights-of-Way:** Rights-of-way involving trenching would have short-term negative impacts to wildlife while a trench is open.

### **Impacts to Forestry from Management Common**

**From Recreation Management:** Recreation management would have little or no impact on forest resources. Upgrading and maintaining existing recreation sites would have no impact on forestry. Wildlife viewing areas, the Back Country Byways program, interpretive site development, scenic overlooks and identification of paleontological sites would have no impact on the annual allowable cut, but could constrain harvest levels.

**From Fire Management:** There would be a positive impact on forest resources by protecting and preserving the resource values.

**From Leases and Permits:** There could be a negative impact on forest resources, depending on the location and type, size and duration of the permit or lease.

**From Rights-of-Way:** Issuing rights-of-way could have a positive impact by building roads and providing access to previously uneconomic stands of timber.

### **Impacts to Cultural Resources from Management Common**

**From Bentonite Mineral Materials and Solid Minerals Management:** A cultural resource inventory would be conducted on proposed mining areas. Where impacts to significant cultural resources are likely, mitigation measures would be employed to minimize impacts.

**From Recreation Management:** Some cultural properties may be interpreted for public use. Prior to this use, mitigation measures would be employed to recover all usable information. Acceptable impacts to cultural resources should be anticipated.

**From Fire Management:** Cultural properties could be disturbed by fire line construction and/or mechanical disturbance. If cultural properties were disturbed, the information in the disturbed areas could be recovered and the properties stabilized.

## Impacts to Recreation from Management Common

**From Grazing, Vegetation, Wilderness, Watershed, Noxious Plant and Forest Management:** Primitive, non-motorized recreational opportunities would be preserved or enhanced on areas closed to motorized vehicles. There would be no impacts to recreational off-road vehicle (ORV) use in the Dog Creek South, Bitter Creek and Woodhawk WSAs because they are recommended nonsuitable for wilderness designation. Recreational ORV use would decline in the Cow Creek, Antelope Creek and Burnt Lodge WSAs because they are recommended suitable for wilderness designation.

Grazing management in the Missouri Breaks Grazing EIS area would slightly increase hunting opportunities and improve recreation quality. There would be no significant change in fishing or off-road vehicle use.

Vegetation management in the Prairie Potholes Vegetation Allocation EIS area would significantly increase the recreation opportunities for big game hunting; a positive impact.

Controlling noxious plants would maintain or enhance recreation and aesthetics.

**From Bentonite Mining:** Bentonite exploration and/or development would have a minor adverse impact, primarily on hunting. This would be short term, 5 years or less, until reclamation is completed.

**From Cave Resource Management:** Recreation would increase slightly as additional cave locations are found, inventoried and become known. The impact on recreation use and quality would be positive.

**From Recreation Management:** The opportunities for recreation and the quality of recreation could decline through minimal maintenance of facilities and the potential closing of some undeveloped sites; a negative impact. Additional facilities and maintenance would be coordinated through partnerships and volunteers. If this occurs, the opportunities for dispersed recreation activities would increase along with the quality of undeveloped sites; a positive impact.

The quality of recreation could be enhanced by increasing the opportunities to view wildlife in the field.

Recreation use could increase moderately with the Back Country Byways program. The quality of recreation could

be significantly enhanced, especially for the sightseer and those who drive for pleasure.

Recreation use could moderately increase with interpretive site development, but the quality of recreation could be significantly enhanced, especially for history buffs and for sightseers.

Recreation use could increase slightly with trail development, while the quality of recreation would be enhanced.

**From Fire Management:** Fire management would have a positive impact on recreation use and the quality of recreation by protecting and preserving the resource values.

**From Leases and Permits:** Impacts on recreation use and quality would be considered on an individual basis.

**From Rights-of-Way:** Avoidance areas would have a moderate positive impact on recreation use and a significant positive impact on the quality of recreation. Rights-of-way outside of these areas would be considered on a case-by-case basis. Issuing rights-of-way could have a negative impact on recreation use and the quality of recreation, depending on type and size.

## Impacts to Visual Resources from Management Common

**From Grazing, Vegetation, Wilderness, Watershed, Noxious Plant and Forest Management:** Grazing systems in the Missouri Breaks Grazing EIS area would slightly improve scenic quality. Disturbances would decrease over time, due to rehabilitation in range improvements. Vegetation management in the Prairie Potholes Vegetation Allocation EIS Area would not change the visual resources.

**From Bentonite Mining:** The visual quality would deteriorate in areas where bentonite exploration and/or development would occur. These activities would impact line, form and color of the natural landscape. The overall impacts to visual qualities would be mitigated by using regulations on public domain and through appropriate measures on acquired land.

**From Mineral Materials Management:** The small amount of acreage disturbed would create negligible impacts. However, the location of a disturbed area can create significant impacts regardless of its size. Line, form and color would be impacted in site-specific areas in the short term, until reclamation is completed.

**From Solid Minerals Management:** The exploration and development of these mineral resources would impact visual qualities; affecting line, form and color of the natural landscape. Mitigating measures would be developed through

the prospecting permit process which would lessen the potential negative impact on visual quality.

**From Recreation Management:** Recreation management would maintain visual qualities. Trail development would be a minor negative impact affecting line, form and color of the natural landscape by constructing and/or continuing trails.

**From Fire Management:** Fire management would have a positive impact on visual quality by protecting and preserving the resource values.

**From Leases and Permits:** There could be a negative impact on the visual quality, depending on the type, size and duration of the permit or lease. Line, form and color of the natural landscape could be negatively impacted.

**From Rights-of-Way:** Avoidance areas would have a significant positive impact on visual quality because of the absence of intrusions. Rights-of-way outside of avoidance areas would be considered on a case-by-case basis. Issuing rights-of-way could have a negative impact on the visual quality, depending on type, size and duration of the right-of-way. Line, form and color of the natural landscape could be affected.

## Impacts to Economic Conditions from Management Common

**From Grazing, Vegetation, Wilderness, Watershed, Noxious Plant and Forest Management:** Some permittees would incur additional costs and labor in the Cow Creek, Antelope Creek and Burnt Lodge WSAs if they are designated suitable by Congress.

Grazing management in the Missouri Breaks Grazing EIS area would increase annual direct livestock income from BLM land and employment. There would be no new direct employment from construction.

Vegetation management in the Prairie Potholes Vegetation Allocation EIS Area would have a moderate positive impact overall. Ranch income and permit values would increase for some ranches. Ranch employment would increase, but the overall impact to the regional area would not be significant.

In the short term, some ranch operations would experience a disruption of grazing as mechanical treatments are applied and/or grazing systems implemented. Licensed livestock grazing levels would be reduced slightly following implementation of the proposed action. While these changes could represent a significant impact to a few individual operators in the short term, when land was out of production, they would not be significant to the regional economy. The full implementation of AMPs would increase licensed use

above present levels. In the long term, some operations would show an increase in livestock sales, but most would experience no change.

Recreation opportunities would be enhanced with improved wildlife habitat. In the short term, there would be little or no impact on recreation related earnings and employment. In the long term, recreation expenditures would increase, but this change would not be significant to the regional economy.

Controlling noxious plants would benefit the agricultural economy.

**From Bentonite, Mineral Materials and Solid Minerals Management:** Exploration and development of bentonite, mineral materials and solid minerals resources could impact economic activity, employment, tax revenues, public services and infrastructure. Market conditions as well as changes in technology could impact the potential for development of minerals and materials.

**From Recreation and Cave Resource Management:** Economic activity associated with recreation management and cave resources could impact economic conditions. Long-term recreation opportunities and demand could increase regional economic activity, primarily in retail trade and services. Improved conditions for non-consumptive recreation opportunities, such as wildlife viewing, could increase economic activity throughout the planning area.

**From Fire and Hazardous Materials Management:** Fire management would protect resources and maintain economic activity. Hazardous materials management could increase costs for mineral developers; a minor impact.

**From BLM Land Sales, Leases and Permits and Rights-of-Way Management:** BLM land sales would have a minor positive impact on taxable valuation and property taxes. Leases and permits could create impacts to economic conditions depending on the type, size and location. Rights-of-way avoidance areas could cause an utility or transportation corridor to take a longer route and increase the cost of construction for transmission lines.

## Impacts to Social Conditions from Management Common

**From Grazing, Vegetation, Wilderness, Watershed, Noxious Plant and Forest Management:** An economic gain would be realized by ranch operations with an increase in grazing permit values and ranch employment in the Missouri Breaks and Prairie Potholes area. This would improve the social well-being of ranch families.

**From Bentonite, Mineral Materials and Solid Minerals Management:** If impacts occurred to population and



public services, community social organization and social well-being could be impacted. There could be a minor decrease in recreation quality and quantity which could reduce the social well-being for recreationists.

**From Cave Resource, Hazardous Materials, Recreation and Fire Management:** There could be an increase in recreation quality and opportunities which would enhance the social well being for recreationists. An increase in recreation use could cause increases in problems for ranchers such as gates left open, leading to declines in the social well-being of affected ranchers.

**From BLM Land Sales, Leases and Permits and Rights-of-Ways Management:** Changes to population and public services could impact community social organization and social well-being. There could be negative impacts to recreation quality and opportunities which could diminish the social well being of recreationists.

## IMPACTS BY ALTERNATIVE

This section describes the environmental consequences from implementing the five alternatives. The impacts are discussed for each environmental element by issue and alternative.

## IMPACTS TO OIL AND GAS

### From Land Acquisition and Disposal

**Alternatives A (Current), B, C, D & E (Preferred):** Many of the lands identified for disposal have moderate to high development potential for oil and gas. In cases where the mineral estate is retained, creating split estate situations, a minor negative impact would result from additional administrative problems in permitting activity.

### From Access to BLM Land

**Alternatives A (Current), B & C:** Existing access is adequate to allow oil and gas activity to proceed. Access to BLM land would have no impact on oil and gas exploration and development.

**Alternatives D & E (Preferred):** Most of the lands identified for access have recreational value. These lands do not correspond with areas that are currently active for oil and gas activity. Additional access would create a minor positive impact on oil and gas by simplifying the process of obtaining access to leased land.

## From Off-Road Vehicle Designations

**Alternative A (Current):** No impact to oil and gas exploration and development.

**Alternative B:** Allowing the maximum amount of BLM land open to ORVs would be a positive impact to geophysical exploration, by reducing the amount of permitting required.

**Alternative C:** Approximately 984,000 BLM acres would have either seasonal or yearlong restrictions on off-road travel. Most of this land is available for oil and gas leasing, exploration and development. Geophysical contractors, surveyors and others which have been allowed to travel off-road to locate lines, potential access routes and stake drilling locations would have to obtain permission from the authorized officer to travel off-road. This would create a minor negative impact to oil and gas exploration.

**Alternative D:** All BLM land within the planning area would be subject to some type of off-road travel restriction. This would increase the amount of administrative approval required before routine activity associated with oil and gas exploration could occur. Geophysical contractors would need permission from the authorized officer to travel off-road. Permission would also be required before a surveyor could enter leased land to stake a drilling location. This would be a minor negative impact to oil and gas exploration and development.

**Alternative E (Preferred):** Approximately 814,000 acres would have either seasonal or yearlong restrictions on off-road travel. ORV designations would not impact oil and gas exploration and development. Oil and gas interests are entitled to administrative access under the appropriate mineral development regulations. Approximately 1,990,000 acres would be open to off-road travel and would not impact oil and gas exploration and development.

## From Oil and Gas Leasing and Development

**Alternative A (Current):** About 3.2 million acres of BLM land would be open to oil and gas leasing with standard stipulations (see Appendix B). This would be a positive impact to oil and gas exploration and development.

About 19,000 acres would have No Surface Occupancy restrictions or seasonal stipulations and 138,000 acres would remain closed to leasing. This would be a minor negative impact to oil and gas exploration and development.

**Alternative B:** Most of the planning area (97%) would be open to oil and gas leasing with standard lease terms. This would have a positive impact on oil and gas exploration and development.

**Alternative C:** Stipulations would apply to about 2.7 million acres of BLM land. This would be a minor negative impact to oil and gas exploration and development.

Standard lease terms would be used to protect wildlife and other surface concerns on about 441,000 acres. This would be a positive impact to oil and gas exploration and development by reducing the delay in processing leases and subsequent permits on BLM land.

**Alternative D:** Approximately 64% of the BLM land within the planning area would be either closed to leasing or leased with a No Surface Occupancy restriction. The shallow depth and limited production potential of the gas reservoirs in this area make directional drilling an uneconomic technology. A No Surface Occupancy restriction could have the same effect as closing the area to leasing. This would be a major negative impact to oil and gas exploration.

About 441,000 acres of BLM land would be open to oil and gas leasing with standard lease terms. Oil and gas exploration and development on these lands would be conducted with a minimum of administrative delay. This would be a positive impact to oil and gas exploration and development.

**Alternative E (Preferred):** The majority of the BLM land with high development potential (74%) would be available for oil and gas leasing with standard lease terms. This would be a positive impact to oil and gas exploration and development with minimum permitting delay and administrative processing.

There would be moderate development potential land subject to stipulations and No Surface Occupancy restrictions which would be a minor negative impact to oil and gas exploration and development.

### From Hardrock Mining

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to oil and gas exploration and development.

### From Riparian and Wetland Management of Watersheds

**Alternative A (Current):** No impact to oil and gas exploration and development.

**Alternative B:** This alternative would place standard lease terms on oil and gas leases within riparian-wetland areas. This would have a positive impact on oil and gas exploration and development by allowing more access to the water sources needed to conduct drilling operations. It would also reduce the need to reroute pipelines to avoid restricted areas.

**Alternatives C, D & E (Preferred):** No impact to oil and gas exploration and development.

### From Elk and Bighorn Sheep Habitat Management

**Alternative A (Current):** Seasonal restrictions on oil and gas leases would be applied to about 571,000 acres to protect elk habitat. This would limit exploration activities to the summer and fall; a minor negative impact to oil and gas exploration and development.

About 14,000 acres in south Valley County would be restricted by No Surface Occupancy to protect elk habitat. This would be a negative impact to oil and gas exploration and development by placing the land off limits to drilling and producing facilities.

**Alternative B:** Timing restrictions of up to 60 days would apply to elk and bighorn sheep habitat and would delay activities during certain times of the year. This would create a moderate negative impact to oil and gas exploration. There would be no impact to production, since the timing restrictions apply only to exploration activities.

**Alternative C:** Winter range and calving areas would contain seasonal stipulations which limit the time for conducting surface disturbing activities to the summer and fall. This would be a minor negative impact to oil and gas exploration and development.

**Alternative D:** Elk and bighorn sheep winter habitat which has been open to oil and gas leasing and development, with seasonal restrictions, would now be subject to No Surface Occupancy restrictions. This would be a major negative impact to oil and gas exploration and development.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative C.

### From Prairie Dog and Black-Footed Ferret Management

**Alternative A (Current):** About 10,680 acres in south Phillips County would be protected by a No Surface Occupancy restriction to protect prairie dog towns identified as potential reintroduction areas for black-footed ferrets. This would be a negative impact to oil and gas exploration and development. For open areas, a ferret inventory would be required before surface disturbing activities could be conducted. This would cause delay in the permitting process; a negative impact to oil and gas exploration and development.

**Alternative B:** The oil and gas lease terms that apply to all surface concerns would be implemented to mitigate impacts.

It is anticipated that in most cases the timing and relocation distance would be applied to the area identified for protection. This would create a moderate negative impact to oil and gas exploration. There would be no impact to production, since the timing restrictions apply only to exploration. The endangered status of the black-footed ferret means that all decisions involving activities within areas designated as potential habitat for this species would be reviewed by the U.S. Fish and Wildlife Service under the provisions of the Endangered Species Act. This could result in applying restrictions beyond those in the standard terms to oil and gas exploration and development activity on 6,462 BLM acres in Phillips County. The possibility of denying exploration and development activity, as a result of T&E consultation, exists. This would have a negative impact on oil and gas exploration and development. It is not anticipated that oil and gas exploration and development would be disrupted.

**Alternative C:** BLM land within Complex 1+2 (approximately 70,000 acres) would be open to oil and gas leasing with a No Surface Occupancy restriction. This would be a negative impact on oil and gas exploration and development. The shallow depth and limited production potential of the gas reservoirs in this area make directional drilling an uneconomic technology. A No Surface Occupancy restriction could have the same effect as closing the area to leasing.

**Alternative D:** The impacts would be similar to Alternative C, except a No Surface Occupancy restriction would apply to BLM land within the 7km Complex (approximately 400,000 acres).

**Alternative E (Preferred):** About 12,300 acres in south Phillips County would be protected by a Controlled Surface Use restriction to protect prairie dog towns identified for reintroduction of the black-footed ferret. This would be a negative impact to oil and gas exploration and development.

### **From the Judith Mountains Scenic Area ACEC**

**Alternatives A (Current) & B:** No impact to oil and gas exploration and development.

**Alternative C:** Approximately 4,566 acres would be subject to special lease stipulations to mitigate visual impacts from exploration and/or development activity. This would be a minor negative impact to oil and gas exploration. This area has not been actively leased and explored for oil and gas.

**Alternative D:** Approximately 4,566 acres would be subject to a No Surface Occupancy restriction. This would be a minor negative impact to oil and gas exploration. This area has not been actively leased and explored for oil and gas.

**Alternative E (Preferred):** Approximately 3,702 acres would be subject to lease stipulations to mitigate visual impacts from exploration and/or development activity. This would be a minor negative impact to oil and gas exploration. This area has not had interest for leasing or development from industry, but is open to leasing.

### **From the Acid Shale-Pine Forest ACEC**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to oil and gas exploration and development.

### **From the Square Butte ONA ACEC**

**Alternative A (Current):** Closing 1,947 acres to oil and gas leasing could be a negative impact to oil and gas exploration and development.

**Alternative B:** BLM land that has been closed to leasing would now be available for leasing. This would allow the land to participate in any production that might result from exploration on adjacent land. This would create a positive impact to oil and gas exploration and development.

**Alternatives C & D:** The impacts would be the same as those in Alternative A.

**Alternative E (Preferred):** The ACEC would have a 1/4-mile perimeter with a No Surface Occupancy restriction to accommodate possible participation in production from future exploration on adjacent lands. This would be a positive impact to oil and gas exploration and development.

### **From the Collar Gulch ACEC**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to oil and gas exploration and development.

### **From the Azure Cave ACEC**

**Alternative A (Current):** No impact to oil and gas exploration and development.

**Alternative B:** This area would be open to oil and gas leasing; a positive impact to oil and gas exploration and development.

**Alternatives C, D & E (Preferred):** No impact to oil and gas exploration and development.

### **From the Big Bend of the Milk River ACEC**

**Alternatives A (Current) & B:** No impact to oil and gas exploration and development.

**Alternative C:** BLM land which has been open to oil and gas leasing with standard stipulations would be leased subject to a No Surface Occupancy restriction. This would be a minor negative impact to oil and gas exploration and development. The area contains federal minerals that are fully committed to the Ashfield and Bowdoin Unit Agreements. There are numerous producing wells and associated facilities within the ACEC. All of the existing leases would be subject to the original terms and stipulations. The No Surface Occupancy restriction would not apply to activity on these leases.

A No Surface Occupancy restriction would have the same effect as closing some of the area to leasing. The shallow depth and low volumes of commercial gas production in this area makes directional drilling an uneconomic technology. The BLM land within the potential ACEC that is not currently leased would be subject to No Surface Occupancy restrictions. All BLM land within the potential ACEC are rated as high for both occurrence and development potential.

**Alternative D:** Under this alternative 10,720 BLM acres, which have been open to oil and gas leasing with standard stipulations, would be leased subject to a No Surface Occupancy restriction. All BLM land within the potential ACEC is rated as high for both occurrence and development potential. The ACEC area contains federal minerals that are fully committed to the Ashfield and Bowdoin Unit Agreements. There are numerous producing wells and associated facilities within the ACEC. All of the existing leases would be subject to the original terms and stipulations. The No Surface Occupancy restriction would not apply to activity on these leases. A No Surface Occupancy restriction would have the same effect as closing some of the area to leasing. The shallow depth and low volumes of commercial gas production in this area makes directional drilling an uneconomic technology. The BLM land within the potential ACEC that is not currently leased would be subject to No Surface Occupancy restrictions.

**Alternative E (Preferred):** There would be no impact to oil and gas exploration and development from designating the Beaucoup Site an ACEC.

BLM land within the Henry Smith Site would be subject to a No Surface Occupancy restriction. The shallow depth and limited production potential of the gas reservoirs in this area make directional drilling an uneconomic technology. A No Surface Occupancy restriction could have the same effect as closing the area to leasing. This would be a minor negative impact to oil and gas exploration and development since this area is located within a high development potential area.

## IMPACTS TO HARDROCK MINERALS

### From Land Acquisition and Disposal

**Alternatives A (Current), B, C, D & E (Preferred):** Disposing of BLM land would increase split estate because most exchanges are for surface values rather than mineral. In most cases, the mineral estate is at least prospectively valuable and would be retained in federal ownership.

Acquisition and disposal could increase the likelihood of surface owner conflicts with mineral development, which leads to increased permitting complexity and development costs. This would be a minor negative impact due to the small acreage of the disposal tracts relative to the total amount of BLM land in the planning area. Exchanges specifically for minerals would facilitate mineral development.

### From Access to BLM Land

**Alternative A (Current):** Under the appropriate regulations, administrative access would be provided to mineral developers. Increased signing would assist mineral interests in identifying areas with existing access routes or restrictions; a positive impact.

**Alternatives B & C:** No impact to hardrock mineral resources.

**Alternatives D & E (Preferred):** The impacts would be the same as those in Alternative A.

### From Off-Road Vehicle Designations

**Alternatives A (Current), B, C, D & E (Preferred):** ORV designations would not impact mineral exploration and development. Mineral interests are entitled to administrative access under the appropriate mineral development regulations.

### From Oil and Gas Leasing and Development

**Alternatives A (Current), B, C, D & E (Preferred):** Oil and gas leasing and development would not impact other mineral exploration and development. Increased mineral material needs for road work and general construction purposes would occur in areas with oil and gas development.

## From Hardrock Mining

**Alternative A (Current):** Appendix C describes a reasonably foreseeable development (RFD) scenario for hardrock exploration and development. The RFD is based on mineral resource potential and would not change should this alternative be selected.

The existing withdrawals on Judith Peak and Red Mountain would be revoked. These areas have high occurrence potential and moderate development potential for locatable minerals. Revoking these withdrawals would be a positive impact to mineral resource development.

Table 4.1 shows the acres of hardrock mineral development potential by management category.

Development Potential	Management Category		
	Open	Restricted	Closed
High	7,775 (99%)	0 (0%)	99 (1%)
Moderate	40,256 (99%)	0 (0%)	420 (1%)
Low	29,553 (84%)	5,538 (16%)	175 (<1%)

Note: "Open" lands are open to location under the mining laws and are not special category lands such as ACECs, WSAs, wild and scenic rivers, areas closed to ORV use, etc. as defined in 43 CFR 3809.1-4. Lands in the "closed" category have been withdrawn, or segregated from operation of the mining laws and are not available for mineral development. "Restricted" lands remain open to operation of the mining laws and are available for mineral development, yet special management restrictions apply. These restrictions do not allow operations under the Notice provision of the regulations (a Plan of Operations is necessary) and can result in increased environmental mitigation costs.

Source: BLM, 1990

Most of the land with high and moderate hardrock mineral development potential is in the open category. The 5,538 acres of low development potential lands, in the restricted management category, lie within the Cow Creek WSA. The mineral development potential of these lands is related to the diamond-bearing potential of the ultramafic diatremes in this area.

In general, the current management situation is very favorable to hardrock exploration and development. The vast majority of the high and moderate potential lands would be open to operation of the mining laws without special management restrictions.

Hardrock mining would not inhibit other mineral development on BLM land. Mineral development of other commodities can usually be accommodated. Developing hardrock extraction and processing facilities would require a proportional amount of construction materials such as bentonitic shales for low permeability impoundment liners, or gravel for road building and maintenance. Concurrent mining of limestone resources for pH control may also be necessary.

**Alternative B:** The existing withdrawals on Judith Peak and Red Mountain would be revoked. These areas have high occurrence potential and moderate development potential for locatable mineral resources. These areas would probably be explored when the withdrawal is revoked; a positive impact to mineral resource development.

Revoking the withdrawals in the Little Rocky Mountains would increase exploration and development opportunities; a positive impact to mineral resource development.

Table 4.2 shows the acres of hardrock mineral development potential by management category.

Development Potential	Management Category		
	Open	Restricted	Closed
High	7,874 (100%)	0 (0%)	0 (0%)
Moderate	40,522 (100%)	0 (0%)	54 (<1%)
Low	29,648 (84%)	5,538 (16%)	80 (<1%)

Source: BLM, 1990

The majority of the lands with high and moderate hardrock mineral development potential are in the open category. The 5,538 acres of low development potential lands in the restricted management category are in the Cow Creek WSA. The mineral potential of these lands is related to the diamond-bearing potential of the ultramafic diatremes in this area.

This alternative would generally be very favorable to hardrock mineral exploration and development; a positive impact to mineral resources. Additional exploration opportunities would be available, but would probably not result in a substantial increase in exploration or mining projects.

Impacts to other mineral development would be the same as those in Alternative A.

**Alternative C:** The existing withdrawals on Judith Peak and Red Mountain would be revoked. These areas have high occurrence potential and moderate development potential for locatable minerals. Revoking these withdrawals would be a positive impact to mineral resource development. Table 4.3 shows the acres of hardrock mineral potential by management category.

Development Potential	Management Category		
	Open	Restricted	Closed
High	7,419 (94%)	356 (5%)	99 (1%)
Moderate	34,453 (85%)	5,971 (15%)	252 (<1%)
Low	28,477 (81%)	6,659 (19%)	130 (<1%)

Source: BLM, 1990

This alternative would reduce hardrock development opportunities. Approximately 10 mineral exploration projects could be foregone in the Judith Mountains. It is estimated that one underground mining operation could be foregone in the Collar Gulch ACEC and two open-pit operations could be foregone in the Judith Mountains Scenic Area ACEC.

Management prescriptions in the Judith Mountains Scenic Area ACEC could restrict developing mineral resources by open-pit mining methods on some lands within the ACEC. This would be a significant negative impact to mineral resource development if an ore body could not be developed by other methods.

Management prescriptions for the Collar Gulch ACEC could restrict locating mineral processing facilities that use chemicals detrimental to the westslope cutthroat trout. This could make individual mining operations infeasible due to facility siting difficulties and/or requiring increased haulage distances.

The Azure Cave ACEC includes high and moderate development potential land. It also includes an existing withdrawal that contains high and moderate mineral development potential (see Supplemental Color Map J located at the conclusion of the Appendices). That portion of the ACEC open to mineral entry would require a Plan of Operations, where a Notice would usually suffice. This would represent a minor negative impact to mineral development. The withdrawn portion of the ACEC could be a significant impact on mineral development, should an economic deposit be identified.

Impacts to other mineral development would be the same as those in Alternative A.

**Alternative D:** This alternative would withdraw large areas with mineral development potential. Withdrawals would involve 60% of the high development potential land, 72% of the moderate development potential land and 79% of the low development potential land in the Judith RA. In the Phillips RA, 93% of the high development potential land would remain open, but 36% of the moderate development potential land would be closed.

The effect of these withdrawals on mineral exploration and development would be significant. Based on the RFD scenario in Appendix C, in the Little Rocky Mountains, 16 exploration projects and 2 mine development projects could be foregone. In the Judith Mountains, 33 exploration projects and 4 mine development projects (2 open-pit and 2 underground) could be foregone. In the Moccasin Mountains, 10 exploration projects and 1 mine development project could be foregone.

Table 4.4 shows the acres with hardrock mineral development potential by management category.

Development Potential	Management Category		
	Open	Restricted	Closed
High	5,774 (73%)	240 (3%)	1,860 (24%)
Moderate	16,167 (40%)	100 (<1%)	24,409 (60%)
Low	21,372 (61%)	5,538 (16%)	8,356 (23%)

Source: BLM, 1990

Impacts to other mineral development would be the same as those in Alternative A.

**Alternative E (Preferred):** This alternative would close 1% of high and moderate development potential land, and less than 1% of low development potential land, in the planning area (see Table 4.5). Approximately 11% of the lands with moderate development potential would be in the restricted category, due mostly to ACEC designation.

The designation of ACECs and associated management prescriptions is estimated to have a possible negative impact to hardrock exploration and mining. The overall effect could be loss of five exploration projects, as well as the possible development of one large open-pit type deposit (see Appendix C and Table C.7).

The Judith Mountains Scenic Area ACEC requirements could impact mineral development on some BLM lands within the ACEC.

Designating Azure Cave in the Little Rocky Mountains as an ACEC would not impact mineral development since these lands are currently withdrawn.

Table 4.5 shows the hardrock mineral development potential by management category.

Development Potential	Management Category		
	Open	Restricted	Closed
High	7,619 (97%)	156 (2%)	99 (1%)
Moderate	35,840 (88%)	4,584 (11%)	252 (1%)
Low	28,917 (82%)	6,219 (18%)	130 (<1%)

Source: BLM, 1990

The 6,219 acres of low development potential lands in the restricted management category include 5,538 acres in the Cow Creek WSA. The development potential of these lands is related to the diamond bearing potential of the ultramafic diatremes in this area.

Impacts to other mineral development would be the same as those in Alternative A.

### From Riparian and Wetland Management of Watersheds

**Alternatives A (Current), B, C, D & E (Preferred):** Managing these resources would not create a significant impact on mineral development. Project specific requirements for reclaiming riparian-wetland areas would be required during environmental review.

### From Elk and Bighorn Sheep Habitat Management

**Alternatives A (Current) & B:** No impact to hardrock mineral resources.

**Alternative C:** Special protective mitigating measures for elk and bighorn sheep habitat would be a minor negative impact to hardrock mineral exploration and development. Other mineral resources would not be impacted.

**Alternative D:** Withdrawing areas in the Judith, North Moccasin and Little Rocky Mountains to protect elk and bighorn sheep habitat would be a significant negative impact to hardrock mineral exploration and development. These areas contain more than 33% of the high and moderate hardrock development potential land.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative C.

### From Prairie Dog and Black-Footed Ferret Management

**Alternatives A (Current), B, C, D & E (Preferred):**

Impacts to bentonite mining could occur if mineral development proposals coincide with ferret reintroduction areas. The probability of this occurring is considered low due to reintroduction areas being located away from the areas with proven bentonite potential. Ferret reintroduction could be attempted on an experimental non-essential basis. This means that other potential land uses would not be pre-empted by ferret reintroduction.

### From the Judith Mountains Scenic Area ACEC

**Alternatives A (Current) & B:** The scenic area would not be designated an ACEC. This would allow hardrock mineral exploration and development to proceed as anticipated in the RFD scenario (see Appendix C). Hardrock activity in these areas would still be required to prevent unnecessary or undue degradation of visual resources.

**Alternative C:** The ACEC designation would require operators who normally submit a Notice to submit a Plan of Operations. The additional filing and processing requirements of a Plan would be a minor negative impact to mineral operators.

The management prescriptions in the scenic area could restrict developing hardrock resources by open-pit mining methods. This could result in the potential loss of two open-pit mining operations if an ore body could not be developed by other methods; a significant negative impact.

**Alternative D:** The impacts would be similar to Alternative C, except the withdrawal would remove the lands from mining claim location, exploration and development. In addition to the two potential open-pit mining operations foregone in Alternative C, there could also be the loss of one, or more, underground mining development opportunities. This would be a significant negative impact.

**Alternative E (Preferred):** The requirement to file a Plan of Operations, where a Notice would normally suffice,

would be a minor negative impact to mineral operators and development.

Designation of the Judith Mountain Scenic Area ACEC, with the associated management prescriptions, could have a significant negative impact on hardrock mineral development. Most hardrock operations could be accommodated in the ACEC using the management prescriptions described in Chapter 2. The exception would be in the case of a large open-pit mining operation situated such that it would be either economically impractical or technically unfeasible to reclaim the landscape back to VRM Class II condition. Assuming optimistic mineral potential for the area such an operation could be foregone under this alternative; however, the probability of such an impact occurring is not definite.

### From the Acid Shale-Pine Forest ACEC

**Alternatives A (Current) & B:** The area would not be designated an ACEC and would remain open to mineral development activities. Stipulations would be required to mitigate impacts from mineral development to avoid unnecessary or undue degradation.

**Alternative C:** Approximately 817 acres would be designated an ACEC and left open to mineral entry. ACEC designation would require a Plan of Operations instead of a Notice; a negative impact to locatable mineral operators seeking to explore and develop bentonite resources.

**Alternative D:** Withdrawing 3,619 BLM acres from mining claim location would be a locally significant negative impact to locatable mineral resource development; particularly bentonite resources, which have a high occurrence potential in this area.

**Alternative E (Preferred):** Approximately 2,463 acres would be designated an ACEC and left open to mineral entry. ACEC designation would require a Plan of Operations instead of a Notice; a negative impact to locatable mineral operators seeking to explore and develop bentonite resources.

### From the Square Butte ONA ACEC

**Alternative A (Current):** The area would remain closed to mineral entry and development. There would be no impact to mineral development because of the low mineral potential of these lands.

**Alternative B:** Opening these lands to mining claim location would be a minor positive impact to mineral development.

**Alternatives C, D & E (Preferred):** The impacts would be the same as those in Alternative A.

### From the Collar Gulch ACEC

**Alternatives A (Current) & B:** Collar Gulch would not be designated an ACEC and would not be withdrawn from mineral entry. This would allow hardrock mineral exploration and development to proceed as anticipated in the RFD scenario (see Appendix C). Hardrock mineral activity in this area would still be required to prevent unnecessary or undue degradation.

**Alternative C:** The ACEC designation in Collar Gulch would require a Plan of Operations for activities that could normally be conducted under a Notice. This would be a moderate negative impact to locatable mineral exploration and development. The management prescriptions for the Collar Gulch ACEC could restrict the location of mineral processing facilities that use chemicals which could be detrimental to the westslope cutthroat trout of Collar Gulch Creek. This could make individual mining operations infeasible by causing facility siting difficulties and/or increased haulage distances.

**Alternative D:** The withdrawal of this area from mining claim location would have a significant negative impact on hardrock mineral exploration and development. The RFD scenario predicts that one underground mining operation could be foregone in this area (see Appendix C).

**Alternative E (Preferred):** The impacts would be similar to those in Alternative A, except the presence of two wildlife species of special concern (westslope cutthroat trout and big eared bats) may have an undefined negative impact on mineral development.

### From the Azure Cave ACEC

**Alternative A (Current):** The area surrounding the Azure Cave withdrawal would not be designated an ACEC, though the withdrawal would be maintained. Hardrock mineral development would proceed in the area as described in the RFD scenario (see Appendix C). Mine development in the Pony Gulch area could be negatively impacted by the Azure Cave withdrawal. The exact degree of impact is unknown at this time, but could be significant.

**Alternative B:** Revoking the withdrawal would facilitate mineral development in the Pony Gulch area; a positive impact to mineral development.

**Alternatives C & D:** The impacts would be similar to those in Alternative A, except the designation of an ACEC would require a Plan of Operations for activity that could normally be conducted under a Notice. This would be a negative impact to hardrock mineral activities.

**Alternative E (Preferred):** Azure Cave would be designated an ACEC, but the impacts would be the same as those in Alternative A since the area is currently withdrawn.



## From the Big Bend of the Milk River ACEC

**Alternatives A (Current) & B:** Under this alternative the area would not be designated an ACEC and would remain open to mineral entry. There would be no impacts to hardrock mineral resource development.

**Alternative C:** The designation of an ACEC would require a Plan of Operations for activities that could normally be conducted under a Notice. This would be a minor negative impact to bentonite mineral activities.

**Alternative D:** The withdrawal of approximately 10,720 acres would have a significant negative impact on mineral resource development. Though the area has moderate, at best, potential for the occurrence of minable bentonite deposits, the size of this withdrawal could create a potentially significant impact.

**Alternative E (Preferred):** The designation of this area as an ACEC and withdrawing 2,120 acres to mineral entry and solid mineral leasing, would create minor negative impacts to the development of the minable bentonite resources.

## IMPACTS TO AIR AND WATER QUALITY

### From Land Acquisition and Disposal

**Alternatives A (Current), B, C & D:** This alternative could result in the conversion of approximately 68,069 BLM acres (41% of the 166,021 acres identified for disposal) from native prairie vegetation or crested wheatgrass to dryland farming. Dust would cause local short-term pollution, but would not significantly impact air quality.

There would be no impact to water quality.

**Alternative E (Preferred):** This alternative could result in the conversion of approximately 66,407 BLM acres (41% of the 161,968 acres identified for disposal) from native prairie vegetation or crested wheatgrass to dryland farming. Dust would cause local short-term pollution, but would not significantly impact air quality.

There would be no impact to water quality.

### From Access to BLM Land

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to air or water quality.

## From Off-Road Vehicle Designations

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to air or water quality.

## From Oil and Gas Leasing and Development

**Alternatives A (Current), B, C, D & E (Preferred):** Air quality would be impacted in the immediate area of active wells where venting or flaring occurs but this would not be significant. H<sub>2</sub>S gas could pose a potential hazard to workers and animals near stored crude oil or gas lines where accidental inhalation of toxic vapors could occur. Standard safety procedures minimize this risk.

Oil and gas development has the potential to impact the groundwater resources through cross contamination of aquifers or introduction of drilling fluids into the wellbore. Contaminates encountered in the wellbore could potentially impact surface waters. Onshore Oil and Gas Orders 1 and 2 provide regulations to operators and drillers which protect contamination of surface and ground waters. The orders require surface casing and cementing of the wellbore to prevent cross contamination of any fresh water aquifers. A cement bond log is also required to prevent migration of fluids and/or gasses and to ensure protection of all surface water. Drilling muds can not contain any hazardous materials. Surface disposal pits will be lined when the quality of produced water would degrade surface waters or shallow ground waters. Abandoned wellbores will be plugged to prevent migration of fluids and/or gasses.

## From Hardrock Mining

**Alternatives A (Current) & B:** Dust from open pit mining would cause local pollution, but would not significantly impact air quality.

Surface and groundwater degradation is possible during and after mining operations. Suspended sediment is the major pollutant associated with exploration projects. Heavy metals, changes in pH, increases in total dissolved solids, nitrates and cyanide are the most common pollutants from actual mining operations (Table 4.6 shows the Environmental Protection Agency (EPA) recommended maximum allowable concentrations of various constituents associated with mining. Surface disturbing activities associated with mining could interrupt surface and encountered ground water flow paths. Mitigating measures are described in Chapter 2, under Management Common To All Alternatives.

Exploration projects usually result in short-term increases of suspended sediment in nearby surface water. The short term sedimentation would continue as long as the roads and drill pads are unreclaimed.

Impacts to groundwater could also occur from cross contamination of aquifers in exploration drill holes. Normal plugging procedures prevent this from occurring, however improperly plugged holes could allow cross contamination. Cross contamination is not likely to cause significant water quality degradation because most exploration drill holes are shallow (less than 500 feet deep) and most shallow aquifers in the mountainous regions are of similar quality.

**TABLE 4.6  
WATER QUALITY CRITERIA FOR CONSTITUENTS  
NORMALLY ASSOCIATED  
WITH HARD ROCK MINING ACTIVITIES**

Constituent	Criteria
Arsenic	0.05 mg/1
Cadmium	0.01 mg/1
Chloride	250 mg/1
Chromium	0.05 mg/1
Copper	1.0 mg/1
Cyanide-Surface water (WAD)	0.22 mg/1
Cyanide-Groundwater (WAD)	0.22 mg/1
Dissolved Solids	500 mg/1
Iron	0.3 mg/1
Lead	0.05 mg/1
Magnesium	125 mg/1
Mercury	0.002 mg/1
Nickel	No criteria set
Nitrates, Nitrites (as N)	10 mg/1
pH	6.5 - 8.5
Selenium	0.01 mg/1
Silver	0.05 mg/1
Sodium	20 mg/1
Specific Conductivity	No criteria set
Sulfates	250 mg/1
Zinc	5.0 mg/1

Source: U.S. Environmental Protection Agency, 1976

State and federal regulations prohibit degradation of waters outside the mine permit boundary. However, spilled mine processing chemicals could enter the surface water and/or the groundwater system. This could cause water quality deterioration of variable duration, intensity and extent.

Almost all liners under heap leach operations, seep to some degree. Leaks are generally caused by angular pieces of ore puncturing the liner or the ore body shifting and tearing the liner. Most leaks are so small that impacts to waters flowing through the under drains beneath the liners exhibit no significant degradation of water quality. All heap leach operations have monitoring wells to detect any significant leaks of process solutions and they are checked on a regular basis.

Since 1988, all cyanide leach operations must have a land application area identified in case excess process solution needs disposal. Disposal would generally occur only during extreme or prolonged precipitation events or at the end of

the life of the mine. Disposal of neutralized process solution has occurred in the planning area three times in the last four years. All disposal events were successful and no degradation to surface or groundwater occurred.

The chance of mass failure of the dikes supporting valley fill heap leaches is always present as long as these facilities exist. The two most probable causes of a mass failure are earthquakes and extreme precipitation events. Should a mass failure of a dike occur, the impacts to both surface and groundwater, in that particular drainage, could be irreversible and irretrievable. Two pads have been permitted in the Landusky operations which, when fully loaded with ore, will exceed in volume any valley fill leach pads known to exist in the industry. Engineering studies indicate this extreme amount of ore (40 and 50 million tons each) will not impact liner or the dike stability. Liner integrity and dike stability are monitored closely to detect any irregularities.

If state and federal regulations are followed, no significant water quality degradation should occur, under normal operating conditions. All cyanide facilities are designed to contain a 100 year precipitation event in addition to their normal operating solution levels. As long as operating conditions remain normal, water quality degradation is minimized. When normal conditions are exceeded, the potential for surface and groundwater contamination is increased. As the number of active mine sites increases, the risk of experiencing abnormal operating conditions and water quality degradation also increases.

The potential for water quality degradation from underground mining generally occurs as an increase in nitrates from blasting or acid mine drainage resulting from increased oxidation rates. Mitigation requires reclamation of abandoned underground mining operations. Water quality degradation can result from unreclaimed underground operations.

**Alternative C:** Impacts would be similar to those of Alternative A, except that revoking the withdrawals in the Little Rocky Mountains would potentially increase the risk of water contamination.

**Alternative D:** Impacts would be similar to Alternative A, except suspended sediments from exploration activities in surface waters could be reduced approximately 50% because only half of the projected exploration projects may occur. All other types of impacts to water quality would be similarly reduced.

**Alternative E (Preferred):** Impacts would be similar to those in Alternative A, except revoking the Judith Peak Red Mountain, Landusky Town Site, Landusky Recreation Site and Zortman Town Site withdrawals would increase the potential acreage disturbed by mining and the risk of water contamination. A withdrawal for the Big Bend of the Milk River ACEC would offset this somewhat.

## From Riparian and Wetland Management of Watersheds

### Alternatives A (Current), B, C, D & E (Preferred):

There would be no impact to air quality. Water quality would improve to varying degrees in all alternatives as a result of increased streambank vegetation and reduced erosion. Riparian-wetland areas act as sponges to hold water in streambanks and release water slowly, increasing the duration of water flow. Ground water supplies are enhanced by increased water reaching the aquifers. Flood waters will be dispersed to the floodplains by increased streambank vegetation and filling of stream channels.

## From Elk and Bighorn Sheep Habitat Management

Alternatives A (Current), B, C, D & E (Preferred): No impact to air or water quality.

### From Prairie Dog and Black-Footed Ferret Management

Alternatives A (Current), B, C, D & E (Preferred): No impact to air or water quality.

## From the Judith Mountains Scenic Area ACEC

Alternatives A (Current), B, C, D & E (Preferred): No impact to air or water quality.

## From the Acid Shale-Pine Forest ACEC

Alternatives A (Current), B, C, D & E (Preferred): No impact to air or water quality.

## From the Square Butte ONA ACEC

Alternatives A (Current), B, C, D & E (Preferred): No impact to air or water quality.

## From the Collar Gulch ACEC

Alternatives A (Current) & B: Potential mining in Collar Gulch could contaminate surface and groundwater. The impacts would be similar to those discussed under the Impacts to Air and Water Quality from Hardrock Mining Section.

Alternatives C & D: There could be a positive impact to water quality from management prescriptions addressing the present stream contamination problems.

Alternative E (Preferred): The impacts would be the same as those in Alternative A.

## From the Azure Cave ACEC

Alternatives A (Current), B, C, D & E (Preferred): No impact to air or water quality.

## From the Big Bend of the Milk River ACEC

Alternatives A (Current), B, C, D, & E (Preferred): No impact to air or water quality.

## IMPACTS TO SOIL AND VEGETATION

### From Land Acquisition and Disposal

Alternatives A (Current), B, C, D & E (Preferred): Approximately 41% of the BLM acres identified for disposal could be converted to small grain production. There would be a minor increase in soil erosion, assuming conservation practices are applied in compliance with SCS conservation plans. There is also the risk of negligent farming practices on highly erodible soils which would result in significant erosion. According to the SCS, highly erodible land can erode at up to eight times the normal soil loss tolerance level with the wrong farming practices. Average small grain production of the farmed lands is expected to be 20 bushels per acre, on an every other year basis under a crop-fallow rotation, i.e., 10 bushels per year.

Potential land use changes which could negatively impact soil and vegetation would be largely avoided on acquired land.

### From Access to BLM Land

Alternative A (Current): There would be a slight risk of erosion from new or improved roads and off-road vehicle travel could damage vegetation. The risk of spreading noxious plants would increase slightly, due to increased use of the area by the public.

Alternative B: No impact to soil or vegetation.

Alternative C: This alternative would provide public access to 71,793 additional acres. No significant impacts would be expected from increased use by the public. The risk of noxious plant infestation would increase slightly, due to increased use of the area by the public.

**Alternative D:** There would be a slight risk of soil erosion from increased use of roads and trails, and new or improved roads. Also, the risk of noxious plant infestations would increase slightly. No significant impacts would be expected to soil or vegetation.

**Alternative E (Preferred):** Impacts would be similar to those in Alternative D, except that off-road vehicle travel would not be restricted in much of the area identified for access. This could cause increased off-road vehicle travel, resulting in damaged vegetation and local soil erosion.

## From Off-Road Vehicle Designations

**Alternative A (Current):** ORV use is expected to increase, causing soil erosion due to destruction of vegetation. In most cases, this erosion would not represent a significant loss of soil, however gullies could be caused by vehicle traffic on steep slopes, especially in the Breaks area and other sedimentary soils. These gullies could result in locally significant soil loss in the immediate area.

Impacts to vegetation in the areas open to ORVs would range from minor destruction of annual forage production to long-term (greater than 15 years to recover) loss of productivity. The degree of vegetation loss is not expected to be significant. Most of the vegetation loss would not be permanent, but would be a flattening of annual growth, making the forage unavailable to grazing animals. This problem has increased in recent years. If current trends continue, destruction of vegetation could become locally significant in the most popular hunting areas. The potential for introducing noxious plants from seeds carried by ORVs would remain high.

**Alternative B:** The impacts would be similar to Alternative A, except the potential for introducing noxious plants from seeds carried by ORVs would increase slightly.

**Alternative C:** Restricting ORV use on 862,709 acres would benefit the areas receiving most of the off-road travel activity. Destruction of vegetation and creating new trails would be curtailed. Yearlong restrictions on 121,206 acres and closing 3,805 acres would protect soils and vegetation from potential damage.

ORV use is expected to continue to increase on the areas open to ORV use, causing increased soil erosion due to destruction of vegetation. Overall, erosion would not represent a significant loss of soil, since the most popular hunting areas and highest erosion potential areas would have ORV limitations. However, gullies could be caused by vehicle traffic on steep slopes. These gullies could result in locally significant soil loss in the immediate area.

The potential for introducing noxious plants from seeds carried by ORVs would be reduced.

**Alternative D:** ORV use would be limited or closed throughout the planning area. This would result in the recovery of locally impacted areas and prevent further degradation of the soil and vegetation. The risk of noxious plant infestations would be reduced.

**Alternative E (Preferred):** ORV seasonal restrictions on 656,296 acres, primarily in the Missouri Breaks, would benefit the areas receiving most of the hunting off-road vehicle travel activity. Destruction of vegetation and creating new trails would be curtailed. Yearlong restrictions on 157,413 acres and closing 1,947 acres would protect soil and vegetation from potential damage.

ORV use is expected to continue increasing on the areas open to ORV use, causing increased soil erosion due to destruction of vegetation. Overall, erosion would not represent a significant loss of soil, however, small gullies could be caused by vehicle traffic on steep slopes. These gullies could result in locally significant soil loss in the immediate area. The potential for introducing noxious plants from seeds carried by ORVs would be reduced.

The impacts to vegetation in the areas open to ORV use would range from minor destruction of annual forage production to long-term (greater than 15 years to recover) loss of productivity. The risk of serious damage is quite low in the open areas as recreation use is generally dispersed and soils are relatively stable, compared to the limited and closed areas.

The Frenchman Creek and Cottonwood Creek areas in Phillips County and the Willow Creek area in Valley County are erosive areas that would remain open to ORV use. If current trends in hunting use and pressure continue, destruction of vegetation could become locally significant in these areas.

## From Oil & Gas Leasing and Development

**Alternative A (Current):** Soil on the immediate site of well pads would be subject to insignificant, short-term erosion, with reclamation restoring protective ground cover within 2 to 4 years. There would be the potential for local soil contamination from oil leaks or spills at the few anticipated oil exploration wells.

New roads and pipelines would create short-term (less than 5 years) vegetation losses and a low potential for increased soil erosion because of design standards which minimize erosion and require revegetation of disturbed areas. Reclaimed sites may be more productive than adjacent undisturbed areas for several years due to the increased water infiltration and fertilization resulting from tillage.

**Alternative B:** There would be a potential for increased soil erosion on slopes greater than 30% and a greater

amount of disturbance during exploration activities. Other impacts would be similar to those in Alternative A.

**Alternative C, D & E (Preferred):** Impacts would be similar to those in Alternative A, except that greater protection would be provided soils on slopes greater than 30% and for floodplain and riparian areas. This would reduce potential adverse impacts, soil erosion from disturbance on steep slopes and water contamination from pollutant runoff into streams and rivers; all positive impacts.

**From Hardrock Mining**

**Alternatives A (Current) & B:** Projected exploration and mining could disturb 1,430 acres (see Table 4.7). Soils and subsoils would be disturbed by exploration and mining activities including road building, open-pit mining and heap leaching. Reclamation would stabilize soils and revegetate this acreage, but revegetation may take years.

TABLE 4.7 PROJECTED EXPLORATION AND MINING DISTURBANCE ON BLM LAND (ACRES)					
Mountain Range	ALTERNATIVE				
	A	B	C	D	E
<b>EXPLORATION</b>					
Little Rockies	200	200	200	120	200
Judiths	200	200	150	35	150
North and South					
Moccasins	100	100	100	50	100
Little Belts	50	50	50	50	50
Total	550	550	500	255	500
<b>MINING</b>					
Little Rockies	730	730	730	690	730
Judith	100	100	70	10	70
North and South					
Moccasins	40	40	20	20	20
Little Belts	10	10	10	10	10
Total	880	880	830	730	830
Total Exploration and Mining	1,430	1,430	1,330	985	1,330

Source: BLM, 1990

**Alternative C:** Projected exploration and mining could disturb 1,330 acres (see Table 4.7). Reclamation would revegetate this acreage as described in Alternative A.

**Alternative D:** Projected exploration and mining could disturb 985 acres (see Table 4.7). Reclamation would revegetate this acreage as described in Alternative A.

**Alternative E (Preferred):** Projected exploration and mining could disturb 1,330 acres (see Table 4.7). Reclamation would revegetate this acreage as described in Alternative A.

**From Riparian and Wetland Management of Watersheds**

**Alternative A (Current):** This alternative would involve 192 existing AMPs and 78 proposed AMPs. This includes 83% of the stream riparian areas, 64% of the natural and man-made water sources and 71% of the BLM land comprising watersheds.

Implementation and/or continuation of grazing management practices which control the time livestock can spend on a given area, provide rest and deferment to the plants, improve livestock distribution, limit hot season use of riparian areas and increase vegetation production would bring about improvement in streambank stability and result in succession to desired plant communities, primarily late seral to PNC seral stages. Overall, 199 miles of stream (4,776 acres) are in less than proper functioning condition and would improve to proper functioning condition while 299 miles of stream (7,176 acres) would be maintained in proper functioning condition. This improvement may be as rapid as 3 to 5 years. Changes in woody vegetation seral stages would be much slower. For cottonwood and streambank willow community types, which are very common, the desired plant community will likely be early or mid seral in most cases. Achieving the desired plant community may take more than 20 years depending on the condition of the zone, potential for improvement, natural plant community, grazing management practices applied and site factors that limit opportunity for improvement.

Site factors including noxious plants, natural erosion and the influence of man-made water control structures limit the potential for improvement in many cases. Leafy spurge and knapweeds are noxious plants which limit improvement in riparian areas in several drainages in the planning area.

As stream riparian areas improve, perennial plants that absorb the erosive impact of the stream would fill barren areas and replace annual or shallow rooted species. Grasses and grass-like plants including western wheatgrass, slender wheatgrass, Canada wildrye, prairie cordgrass, Nuttall alkaligrass, Nebraska sedge, baltic rush and common cattail would replace bare ground, and such low value species as cocklebur and foxtail barley on the inner banks of streams. This vegetation slows the flow of water and captures sediment which provides an environment for establishing willows and cottonwoods within the streambank. Vegetation on overflow range sites adjacent to the creeks would become dominated by productive grasses and such shrubs and trees as rose, snowberry, buffaloberry, boxelder and green ash. Establishing vegetation would stabilize 199 miles of eroding stream banks.

Vegetation for livestock and wildlife would increase dramatically as range sites improve from fair (mid seral) to good (late seral) and excellent condition (PNC). Current vegetation production on the 11,952 acres of riparian area is equivalent to approximately 11,750 AUMs; 7,050 of these AUMs are allocated to wildlife and watershed and 4,700 to livestock. Total production would increase by about 3,250 AUMs as ecological condition improves. Of this increase, 1,625 AUMs would be allocated to livestock and 1,625 AUMs would go to watershed and wildlife.

This alternative involves 4,118 water sources in the form of man-made reservoirs and natural potholes. Approximately 3,474 of these are currently within AMPs which provide deferment and/or rest which allows for the development of emergent vegetation and increased production of adjacent vegetation. Some of the highest quality wetlands are currently fenced to exclude livestock.

An estimated 400 to 500 additional reservoirs would be needed to implement intensive grazing management on the 553,087 acres of proposed AMPs. A minimum of 1,044 additional reservoirs and potholes would receive rest and deferment or exclusion from grazing, resulting in increased shoreline and emergent vegetation.

Riparian and wetland management would include the entire affected watershed. As an example, improved management of uplands would occur as an integral part of riparian and wetland management. The Missouri Breaks Grazing and Prairie Potholes Vegetation EISs projected substantial improvement in ecological condition, increased watershed cover and increases in available forage. Based on projections made in these EISs, the total available vegetation could increase by approximately 10% (82,500 AUMs) of which 33,000 would be allocated to livestock and 49,500 to wildlife and watershed. This includes the AUMs from riparian and wetland management.

**Alternative B:** This alternative would involve 192 existing AMPs which includes 61% of the stream riparian areas, 54% of the natural and man-made water sources and 52% of the BLM land comprising watersheds.

Overall, 147 miles of stream (3,500 acres) in less than proper functioning condition and in fair condition (mid seral) would improve to proper functioning condition with desired plant communities while 221 miles of stream (5,300 acres) would be maintained in proper functioning condition with desired plant communities, resulting in stabilization of 147 miles of eroding stream banks.

Current vegetation production on the 8,830 acres of riparian area is equivalent to approximately 8,610 AUMs; 5,170 of these AUMs are allocated to wildlife and watershed and 3,440 AUMs are allocated to livestock. Total production would increase by about 2,420 AUMs as ecological condition improves. Of this increase, 1,210 AUMs would be allocated to livestock and 1,210 to watershed and wildlife.

This alternative involves 3,480 water sources in the form of man-made reservoirs and natural potholes. All of these are currently within AMPs which provide deferment and/or rest which allows for the development of emergent vegetation and increased production of adjacent riparian vegetation. An estimated 100 to 200 additional reservoirs would be needed to implement intensive grazing management. At least 100 additional reservoirs and potholes would receive rest and deferment or exclusion from grazing, resulting in minimal increased shoreline and emergent vegetation.

A total of 1,507,379 acres of BLM land would be under management designed to create substantial improvement in ecological condition and increased watershed cover. The total available vegetation could increase by approximately 10% (58,750 AUMs) of which 23,500 would be allocated to livestock and 35,250 to wildlife and watershed. This includes the AUMs from riparian and wetland management. Reductions in livestock allocations may be needed in some allotments to accomplish the improvements desired. The projected increase takes any such reductions into account.

**Alternative C:** This alternative would involve 192 existing AMPs, 78 proposed AMPs and 151 potential AMPs which includes 85% of the stream riparian areas, 66% of the natural and man-made water sources and 85% of the BLM land comprising the watersheds.

Overall, 206 miles of stream (4,950 acres) in less than proper functioning condition would improve to proper functioning condition with desired plant communities while 308 miles of stream (7,400 acres) would be maintained in proper functioning condition and maintained or improved to reach the desired plant community, stabilizing 206 miles of eroding stream banks.

Current vegetation production on the 12,350 acres of riparian area is equivalent to approximately 12,027 AUMs; 7,216 of these are allocated to wildlife and watershed and 4,811 AUMs are allocated to livestock. Total production would increase by about 3,400 AUMs as ecological condition improves. Of this increase 850 AUMs would be allocated to livestock and 2,550 allocated to watershed and wildlife.

This alternative involves 5,910 water sources in the form of man-made reservoirs and natural potholes. Of these 3,474 are currently within AMPs which provide deferment and/or rest which allows for the development of emergent vegetation and increased production of adjacent vegetation. The remaining 2,436 water sources are in allotments not under AMPs. An estimated 500 to 800 additional reservoirs would be needed to implement intensive grazing management in these allotments. At least 2,936 additional reservoirs and potholes would receive rest and deferment or exclusion from grazing in this alternative, resulting in increased shoreline and emergent vegetation.

A total of 2,451,765 BLM acres would be managed to improve ecological condition and increase watershed cover.

In the affected allotments, total available vegetation could increase by approximately 10% (95,750 AUMs) of which 38,300 would be allocated to livestock and 57,450 to wildlife and watershed. This includes the AUMs from riparian and wetland management.

**Alternative D:** This alternative would involve 100% of the stream riparian areas, 100% of the natural and man-made water sources and 91% of the BLM land comprising watersheds.

Overall, 240 miles of stream (5,760 acres) in less than proper functioning condition would improve to proper functioning condition with desired plant communities while 360 miles of stream (8,640 acres) would be maintained in proper functioning condition and maintained or improved to reach the desired plant communities, stabilizing 360 miles of eroding stream banks.

Current vegetation production on the 14,400 acres of riparian area is equivalent to approximately 14,040 AUMs; 8,424 of these AUMs are allocated to wildlife and watershed and 5,616 to livestock. Total production would increase by about 3,960 AUMs as ecological condition improves. AUMs would be allocated 100% to watershed and wildlife.

This alternative involves 6,387 water sources in the form of man-made reservoirs and natural potholes. Approximately 3,474 of these are currently within AMPs which provide deferment and/or rest which allows for the development of emergent vegetation and increased production of adjacent vegetation. The remaining 2,913 are not in AMPs. An estimated 500 to 1,000 additional reservoirs or other water sources would be needed to implement intensive grazing management on the 447 new AMPs. A minimum of 3,413 additional reservoirs and potholes would receive rest and deferment or exclusion from grazing, resulting in increased shoreline and emergent vegetation.

A total of 2,858,469 BLM acres would have substantial improvement in ecological condition and increased watershed cover. Total available vegetation would increase by approximately 10% (103,000 AUMs) of which 100% would be allocated to wildlife and watershed. This includes the AUMs from riparian and wetland management.

**Alternative E (Preferred):** This alternative would involve 159 existing AMPs, 55 proposed AMPs, 85 potential AMPs and 49 non-AMP areas and includes 99% of the stream riparian areas, 92% of the natural and man-made water sources and 85% of the BLM land comprising the watersheds.

Overall, 238 miles of stream (5,714 acres) in less than proper functioning condition would improve to proper functioning condition while 357 miles of stream (8,568 acres) would be maintained in proper functioning condition and maintained or improved to reach desired plant communities, stabilizing 238 miles of eroding stream banks.

Current vegetation production of the 14,282 acres of riparian area is equivalent to approximately 13,930 AUMs; 8,360 of these AUMs are allocated to wildlife and watershed and 5,570 to livestock. Total production would increase by about 3,780 AUMs as ecological condition improves AUMs which would be allocated to watershed, wildlife and livestock on a case-by-case basis.

This alternative involves 5,850 water sources in the form of man-made reservoirs and natural potholes. Approximately 3,386 of these are currently within AMPs which provide deferment and/or rest which allows for the development of emergent vegetation and increased production of adjacent vegetation. The remaining 2,464 water sources are in the proposed, potential and non-AMPs. An estimated 450 to 700 additional reservoirs would be needed to implement intensive grazing management on these allotments. A minimum of 2,914 additional reservoirs and potholes would receive rest and deferment or exclusion from grazing in this alternative, resulting in increased shoreline and emergent vegetation.

A total of 2,377,161 BLM acres would have grazing management practices which would result in substantial improvement in ecological condition and increased watershed cover. In the affected allotments, total available vegetation would increase by approximately 10% (equivalent to 92,860 AUMs). This includes the AUMs from riparian and wetland management. Vegetation allocations would be made on a case-by-case basis.

### **From Elk and Bighorn Sheep Habitat Management**

**Alternatives A (Current), B, C, D & E (Preferred):** The elk and bighorn sheep habitat areas are in good (late seral) to excellent (PNC) ecological condition and would remain so. There would be no impact to soil or vegetation.

### **From Prairie Dog and Black-Footed Ferret Management**

**Alternative A (Current):** Eliminating 10,013 acres of prairie dog towns and emphasizing vegetation management would increase vegetation cover, reduce erosion and improve ecological condition from poor (early seral) to fair (mid seral) or good condition (late seral).

The 3,308 acres of prairie dog towns managed for ferret reintroduction would remain in poor ecological condition (early seral). Excluding livestock grazing around the prairie dog towns would increase vegetative cover. Cattle tend to utilize the scant forage on the towns in preference to adjacent areas, possibly due to increased palatability caused by the fertilizing effect of prairie dog activity.

**Alternative B:** Eliminating 6,859 acres of prairie dog towns and emphasizing vegetation management would moderately increase vegetation cover, reduce erosion and improve ecological condition from poor (early seral) to fair (mid seral) or good condition (late seral).

The 6,462 acres of prairie dog towns managed for ferret reintroduction would remain in poor ecological condition (early seral).

**Alternative C:** Eliminating 1,330 acres of prairie dog towns and emphasizing vegetation management would negligibly increase vegetation cover, reduce erosion and improve ecological condition from poor (early seral) to fair (mid seral) or good condition (late seral).

The 7,367 acres of prairie dog towns managed for ferret reintroduction and the 4,624 acres managed for prairie dog shooting would remain in poor ecological condition (early seral).

Excluding livestock grazing around the prairie dog towns managed for ferret reintroduction would increase vegetative cover. Cattle tend to utilize the scant forage on the towns in preference to adjacent areas, possibly due to increased palatability caused by the fertilizing impact of prairie dog activity.

**Alternative D:** This alternative would allow prairie dogs to expand by 8,885 acres in the Phillips RA; 4,200 acres in the Valley RA; and 4,929 acres in the Judith RA. Potentially, this could result in 18,014 acres of additional prairie dog towns and a corresponding decline in ecological condition and increased erosion.

The 12,105 acres of prairie dog towns managed for ferret reintroduction would remain in poor ecological condition (early seral).

**Alternative E (Preferred):** The 26,000 acres of prairie dog towns cooperatively maintained and managed for ferret reintroduction (12,346 BLM, 5,800 CMR, 2,012 DSL, 5,821 private) would remain in poor ecological condition (early seral).

### **From the Judith Mountains Scenic Area ACEC**

**Alternatives A (Current) & B:** Exploration and mining could disturb soils and subsoils through road building, open-pit mining and heap leaching; a negative impact. Reclamation would stabilize soils and revegetate disturbances, but revegetation may take years.

**Alternatives C & D:** Limiting surface disturbing activities on 4,566 acres would maintain natural vegetation. Careful design and reclamation practices would return natural vegetation to disturbed areas.

**Alternative E (Preferred):** Limiting surface disturbing activities on 3,702 acres would maintain natural vegetation. Careful design and reclamation practices would return natural vegetation to disturbed areas.

### **From the Acid Shale-Pine Forest ACEC**

**Alternatives A (Current), B & C:** No impact to soil or vegetation.

**Alternative D:** Protection from mining claim location would reduce the risk of site disturbance on 3,619 acres plus any land acquired and added to the ACEC. The War Horse tract (817 acres) would be closed to ORV and livestock use, which would increase ground cover.

**Alternative E (Preferred):** Yearlong ORV restrictions on 2,463 acres would ensure no impact to soil or vegetation, but would have no immediate benefit as little off-road travel is occurring. Timber harvest would be prohibited, unless necessary for stand preservation. This would result in no appreciable change, as the timber on the site is of very low value and little demand exists for harvest.

### **From the Square Butte ONA ACEC**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to soil or vegetation.

### **From the Collar Gulch ACEC**

**Alternatives A (Current) & B:** There would be the potential for mining activity in the Collar Gulch area. Mining could adversely impact vegetation and soil resources. ORV use would remain limited to slopes greater than 30% which could result in future damage to soil and vegetation.

**Alternative C:** This alternative would prevent potential soil and vegetation damage caused by surface disturbing activities. The 1,160 acre area would be undisturbed. There would be additional public access, which could result in increased off-road travel during the spring and summer.

**Alternative D:** This alternative would protect the area from mining and ORV use; preventing damage to soil and vegetation.

**Alternative E (Preferred):** There would be the potential for mining activity in the Collar Gulch area. Mining could adversely impact vegetation and soil resources.

### **From the Azure Cave ACEC**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to soil or vegetation.



## From the Big Bend of the Milk River ACEC

**Alternatives A (Current) & B:** No impact to soil or vegetation.

**Alternative C:** ACEC designation would reduce soil and vegetation disturbance from mineral activities or other uses in the 2,120 acre area. This would not be significant to the soil and vegetation resource.

**Alternative D:** Withdrawing 10,720 acres would prevent soil and vegetation disturbance from mineral activities. This would not be significant to the soil and vegetation resource, because reclamation is very successful due to the productive nature of the soils in the area.

**Alternative E (Preferred):** Withdrawing 2,120 acres would prevent soil and vegetation disturbance from mineral activities or other uses. This would not be significant to the soil and vegetation resource, since anticipated disturbing activities would not have a significant long-term impact on soil and vegetation.

## IMPACTS TO LIVESTOCK GRAZING MANAGEMENT

### From Land Acquisition and Disposal

**Alternatives A (Current), B, C & D:** Approximately 41% of the 166,021 acres identified for disposal could be converted to small grain production. Livestock grazing could continue on the 97,982 acres that may not be farmed. Major changes in grazing management practices and stocking levels would not be expected as a result of transfer to private or state ownership because the disposal tracts are primarily in allotments where BLM management is custodial. Forage availability on the 68,089 acres which may be farmed could be reduced from an average of 5.5 acres/AUM to 10 acres/AUM because forage is only available on the stubble (SCS recommendation, Dennis Phillippi personal communication, 1990). The loss in forage availability, if grazing land is converted to farmland, would be approximately 5,570 AUMs.

Based on livestock forage allocations made on acquired lands in the past ten years in the planning area, allocations of livestock forage on acquired lands (estimated 115,000 acres) would be reduced by 17%. Past allocations made on lands acquired for a range of purposes; administrative, recreational and wildlife habitat have averaged 17% less than private land rates. Overall, livestock forage allocations could be reduced by 3,555 AUMs compared to current levels on private lands. This assumes 115,000 acres of acquired lands with an average livestock grazing capacity as private land of 5.5 AUMs/acre and an average livestock

forage allocation of 83% of private land rates. The total estimated reduction of 9,125 AUMs (5,570 + 3,555) represents a reduction in cow numbers of 760 head, or a loss of seasonal six-month pasture for 1,520 head.

Disposal of isolated BLM land would improve BLM grazing administration efficiency; about 300 small allotments would be eliminated. BLM has little management control on these scattered tracts due to the preponderance of private land associated with these allotments. Management efficiency would be improved where lands were acquired in larger allotments; BLM would have greater control of grazing practices and construction of improvements.

An estimated \$5.00 per acre (total \$100,000) could be spent by BLM to construct various improvements to implement multiple-use management on the acquired land. These improvements would enhance wildlife habitat, recreation use and facilitate improved grazing management. Management costs for ranchers may increase on acquired land, however the costs would generally be offset by improved livestock productivity, as more intensive management yields greater livestock gains due to improved conception rates, higher weaning weights and higher daily gains.

**Alternative E (Preferred):** The impacts would be similar to Alternative A, except 66,407 acres of the 161,968 BLM acres identified for disposal could be converted to small grain production.

### From Access to BLM Land

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to livestock grazing management.

### From Off-Road Vehicle Designations

**Alternatives A (Current) & B:** Impacts to livestock forage production and use from off-road travel are not significant. However, there is forage damage in some of the most popular hunting areas where the planned grazing is in the late fall and winter. These areas often involve substantial private land with intermingled BLM land. Significant forage loss, requiring reductions in livestock grazing or major changes in livestock operations, is not occurring and is not expected to occur. Ranchers are concerned with the disturbance of livestock during the hunting season, primarily by ORVs. This would not change in this alternative.

**Alternative C & D:** ORV restrictions in the most popular hunting areas would eliminate the concern by ranchers relative to forage loss and livestock disturbance. Livestock operators would be required to have permission from the authorized officer to travel off-road for fence maintenance, checking livestock and moving livestock in the limited

areas. If they could get permission routinely, there would be no impact to grazing management.

**Alternative E (Preferred):** The impacts would be similar to those in Alternative C, except ranchers in the Cottonwood and Frenchman Creek areas would continue to be concerned with forage loss and livestock disturbance from ORV use.

## From Oil and Gas Leasing and Development

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to livestock grazing management.

## From Hardrock Mining

**Alternatives A (Current), B & C:** Livestock grazing could be affected in the North and South Moccasin, Little Belt and portions of the Judith Mountains. This would not result in a significant loss of forage, as the mining areas are steep and of low productivity. Much of the potential mining area in the Little Rocky and Judith Mountains is not allocated for livestock grazing.

**Alternatives D:** No impacts to livestock grazing management.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative A.

## From Riparian and Wetland Management of Watersheds

**Alternative A (Current):** Vegetation for livestock would increase dramatically as range sites improve from fair (mid seral) to good (late seral) and excellent (PNC) condition. Total production would increase by about 82,500 AUMs as ecological condition improves. Of this increase, 33,000 AUMs would be allocated to livestock. Reduced livestock allocations may be needed to improve riparian-wetland areas in some allotments.

Management costs would increase for those ranchers required to maintain additional fences, move livestock more frequently and monitor forage more carefully. In most cases, these costs would be offset by improved livestock productivity as more intensive management yields greater livestock gains due to improved conception rates, higher weaning weights and higher daily gains. However, many permittees whose allotments are in AMPs would not experience a major change in their ranch operations and would not experience major increases in livestock productivity.

Construction costs for implementing and revising AMPs (water developments, enclosure fences, and land treatments)

would total approximately \$7.1 million; \$5.8 million BLM cost and \$1.3 million permittee cost.

**Alternative B:** Total production would increase by about 58,750 AUMs as ecological condition improves. Of this increase, 23,500 AUMs would be allocated to livestock. Reduced livestock allocations may be needed to improve riparian-wetland areas in some allotments.

Affected permittees would experience some increase in operating expenses to maintain additional fences and other range developments. Because these allotments are already in AMPs, a major change in ranch operations would not result. Since these ranch operations are already receiving the livestock production benefits of intensive grazing management, there would be little economic benefit from the riparian and wetland management practices to the permittees.

Construction costs for implementing and revising AMPs (water developments, enclosure fences, and land treatments) would total \$3.8 million; \$3 million BLM cost and \$.8 million permittee cost.

**Alternative C:** Total production would increase by about 95,750 AUMs as ecological condition improves. Of this increase, 38,300 AUMs would be allocated to livestock. Reduced livestock allocations may be needed to improve riparian-wetland areas in some allotments.

In most cases, increased management costs for affected ranchers would be offset by improved livestock productivity.

Construction costs for implementing and revising AMPs (water developments, enclosure fences, and land treatments) would total approximately \$10.2 million; \$7.7 million BLM cost and \$2.5 million permittee cost.

**Alternative D:** Total production would increase by about 103,000 AUMs as ecological condition improves, however none of the increase would be allocated to livestock. Reduced livestock allocations may be needed to improve riparian-wetland areas in some allotments.

In most cases, increased management costs for affected ranchers would be offset by improved livestock productivity.

Construction costs for implementing and revising AMPs (water developments, enclosure fences and land treatments) would total approximately \$12.1 million; \$9.0 million BLM cost and \$3.1 million permittee cost.

**Alternative E (Preferred):** Vegetation production would increase by about 92,860 AUMs as ecological condition improves and these additional AUMs would be allocated to livestock on a case-by-case basis. Reduced livestock allocations may be needed to improve riparian-wetland areas in some allotments.

In most cases, increased management costs for affected ranchers would be offset by improved livestock productivity.

Construction costs for implementing and revising AMPs (water developments, enclosure fences and land treatments) would total approximately \$9.6 million; \$7.4 million BLM cost and \$2.2 million permittee cost.

## **From Elk and Bighorn Sheep Habitat Management**

**Alternatives A (Current) & B:** No impact to livestock grazing management.

**Alternative C:** The forage on BLM land would not limit elk expansion in the Judith Mountains, Square Butte, the North Moccasins, and Big and Little Snowy Mountains. The tolerance of adjacent private landowners to crop depredation would be the limiting factor.

Domestic sheep grazing would not be allowed to overlap bighorn sheep habitat. Currently there is no sheep grazing authorized in the current or projected bighorn sheep habitat, so there would be no impact to grazing operations, except to limit the future option of converting to sheep.

**Alternatives D & E (Preferred):** Currently, forage is not limiting elk expansion and substantial population increases could occur before forage would become a limiting factor. The MDFWP has found rest-rotation grazing of cattle can be beneficial to elk (Frisina, personal communication). The elk habitat is primarily in existing AMPs or proposed AMPs where grazing management can benefit elk.

Domestic sheep grazing would not be allowed to overlap bighorn sheep habitat. Currently there is no sheep grazing authorized in the current or projected bighorn sheep habitat, so there would be no impact to grazing operations, except to limit the future option of converting to sheep.

## **From Prairie Dog and Black-Footed Ferret Management**

**Alternative A (Current):** Livestock grazing would be excluded from 19 prairie dog towns and 1/4-mile around those towns (a total of 10,680 acres) resulting in a reduction of about 1,940 livestock AUMs. Land treatments outside the exclusion areas would increase forage, but 19,000 acres would have to be chisel-plowed to replace the 1,940 AUMs. Assuming soils are suitable in the affected allotments, there would be no long-term loss in livestock forage. There would be short-term losses while chiseling is completed and established. For the purposes of this analysis, it is assumed that the 1,940 AUMs would be lost for a period of 5 years and then would be replaced.

**Alternative B:** No impact to livestock grazing management.

**Alternative C:** Livestock grazing would be excluded from the core towns managed for ferret reintroduction and 1/4-mile around those towns (a total of 4,480 acres) resulting in a reduction of about 815 livestock AUMs. Land treatments outside the exclusion areas would increase forage, but 8,000 acres would have to be chisel-plowed to replace the 815 AUMs. Assuming soils are suitable in the affected allotments, there would be no long-term loss in livestock forage. There would be short-term losses while chiseling is completed and established. It's assumed the 815 AUMs would be lost for a period of 5 years and then would be replaced.

**Alternative D:** Prairie dogs would be allowed to expand on 18,014 BLM acres. However, expansion would be limited to no more than 10% of the BLM portion of any allotment, and the change in AUMs may not be significant enough (approximately 6.5%) to require a reduction in livestock grazing. The ecological condition of each allotment, combined with the current acreage of prairie-dog towns in each allotment would be the primary factors to determine if a livestock grazing reduction would be necessary. Also, mechanical treatments would be applied where necessary on suitable soils off-site, to compensate for decreased forage. Since the expansion would be gradual, mechanical treatments could be completed as needed to result in no net loss or short-term loss in livestock forage. As a worst case scenario, up to 20,000 acres would need to be chisel plowed to replace 100% of the AUMs lost by prairie dog expansion. There is a low probability that prairie dog towns would expand to 5,000 acres over the next 10 to 15 years in the Valley and Judith RAs based on observations of the few towns that exist there.

Livestock grazing would be excluded from the core towns, an area of 6,080 acres, resulting in a reduction of about 1,105 livestock AUMs. Land treatments outside the exclusion areas would increase forage, but 11,000 acres would have to be chisel-plowed to replace the 1,105 AUMs. Assuming soils are suitable in the affected allotments, there would be no long-term loss in livestock forage. There would be short-term losses while chiseling is completed and established. For the purposes of this analysis, it is assumed that the 1,105 AUMs would be lost for a period of 5 years and then would be replaced.

**Alternative E (Preferred):** Prairie dog acreage would be managed at current levels and no change in livestock AUMs, would be made. There would be no impact to livestock grazing management.

## **From the Judith Mountains Scenic ACEC**

**Alternatives A, B, C, D & E (Preferred):** No impact to livestock grazing management.

## From the Acid Shale-Pine Forest ACEC

**Alternatives A, B & C:** No impact to livestock grazing management.

**Alternative D:** Little livestock use occurs on the site due to very low site productivity and timber cover. Approximately 100 AUMs are currently authorized on this tract. These AUMs would be lost to the two affected permittees.

**Alternative E (Preferred):** No impact to livestock grazing management.

## From the Square Butte ONA ACEC

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to livestock grazing management.

## From the Collar Gulch ACEC

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to livestock grazing management.

## From the Azure Cave ACEC

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to livestock grazing management.

## From the Big Bend of the Milk River ACEC

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to livestock grazing management.

## IMPACTS TO WILDLIFE

### From Land Acquisition and Disposal

**Alternatives A (Current), B, C & D:** Disposing of 166,021 acres would decrease or destroy some yearlong wildlife habitat on 68,069 acres which could be farmed. However, many of these parcels are isolated crested wheatgrass pastures surrounded by farmland with very low wildlife values. Most of the 97,952 acres of non-farmable disposal parcels are in mountainous terrain or steep and rough breaks and the wildlife values would not change.

Land acquisitions that include habitat for T&E species, crucial winter range, riparian-wetland areas and reservoirs or reservoir sites could benefit wildlife.

Land acquisition and disposal would result in habitat changes that would positively impact some wildlife while not benefiting others. A few isolated BLM parcels with wildlife values could be disposed of; a site specific negative impact. The overall impacts would be positive.

**Alternative E (Preferred):** The impacts would be similar to Alternative A, except 66,407 acres of the 161,968 BLM acres identified for disposal could be converted to small grain production.

### From Access to BLM Land

**Alternative A (Current):** New public access would allow people to enter areas that have not been readily accessible. Public access could reduce the quality of wildlife habitat by disturbing or destroying crucial wildlife habitat or by harassing wildlife during critical periods (reproduction, nesting, raising of young, and winter survival); a minor negative impact.

**Alternative B:** Maintaining the present access to BLM land would allow the public to enter only those areas with current legal access. BLM lands without public access would protect wildlife habitat and species from harassment, disturbance or destruction. Wildlife harassment would continue on accessible BLM land during critical periods (reproduction, nesting, raising of young, and winter survival); a minor negative impact.

**Alternative C:** The impacts to wildlife would be similar to those in Alternative A, but would be specific to the areas where new access occurs.

**Alternatives D & E (Preferred):** The impacts to wildlife would be similar to those in Alternative A, however they would apply to specific BLM land as additional roads are developed.

### From Off-Road Vehicle Designations

**Alternative A (Current):** ORV use could occur yearlong on 2,375,440 acres. Most use occurs during the hunting season, but some ORV use occurs yearlong from other activities. Habitat destruction would be minimal. However, wildlife harassment during critical periods would impact wildlife. Anticipated increased ORV use and human presence would cause short-term species movement. ORV activities on big game and upland game bird winter range would disturb many species already under stress. Similar disturbances during the spring and summer would occur to waterfowl, raptors and non-game birds and mammals. This harassment and disturbance would be a negative impact.

There would be very little impact to wildlife on the 428,770 acres where the yearlong restriction confines vehicle use to

existing roads and trails. BLM would provide administrative ORV access which could cause some habitat disturbance and species harassment during critical times of the year. However, these impacts would be minor.

There would be no impact to wildlife on the 1,947 acres closed to ORVs on the Square Butte ONA.

Overall, this alternative would create a negative impact to wildlife.

**Alternative B:** ORV use would occur yearlong on 2,687,570 acres and the impacts from habitat disturbance and wildlife harassment would be the same as those in Alternative A.

There would be very little impact to wildlife on the 116,640 acres where the yearlong restriction confines vehicle use to designated roads and trails. The impacts from administrative ORV access would be the same as those in Alternative A.

There would be no impact to wildlife on the 1,947 acres closed to ORVs on the Square Butte ONA.

Overall, this alternative would create a negative impact to wildlife.

**Alternative C:** ORV use would occur yearlong on 1,818,437 acres and the impacts would be the same as those in Alternative A.

There would be very little impact to wildlife on the 121,206 acres where the yearlong restriction confines vehicle use to designated roads and trails. The impacts of administrative ORV access would be the same as those in Alternative A.

There would be some impact to wildlife on 862,709 acres with seasonal restrictions. Impacts would not occur during the hunting season, however habitat disturbance and harassment could occur during the rest of the year. ORV activities on big game and upland game bird winter range would disturb many species already under stress. Similar disturbances during the spring and summer would occur to waterfowl, raptors and non-game birds and mammals. This would be a negative impact on wildlife.

The intensive use ORV area north of Glasgow (40 acres) would not impact wildlife.

There would be no impact to wildlife on the 3,805 acres closed to ORVs on the Square Butte ONA (1,947) and the core area prairie dog towns (1,858) in the southern portion of Phillips RA.

Overall, this alternative would create a positive impact to wildlife.

**Alternative D:** ORV use would occur yearlong only on the 40 acre intensive use area north of Glasgow. There would be no impact to wildlife.

There would be very few impacts to wildlife on the 657,667 acres where the yearlong restriction confines vehicle use to designated roads and trails. Administrative use and seasonal restrictions could still create some site specific negative impacts to wildlife. The impacts would be the same as those in Alternative A.

There would be some minor impacts to wildlife on 2,127,480 acres with seasonal restrictions. These impacts would be the same as those in Alternative C.

There would be no impact to wildlife from ORV closures on the 20,970 BLM acres in the Square Butte ONA, Collar Gulch ACEC, Acid Shale-Pine Forest ACEC, Rock Creek Canyon, and eight prairie dog core towns in the southern portion of the Phillips RA.

Overall, this alternative would create a significant positive impact.

**Alternative E (Preferred):** Unrestricted ORV use would occur yearlong on 1,990,501 acres and the impacts would be the same as those in Alternative A.

There would be very little impact to wildlife on the 157,413 acres where the yearlong restrictions confine vehicle use to designated roads and trails. Administrative use and seasonal restriction could create some site-specific negative impact to wildlife. These impacts would be similar to those in Alternative A.

There would be some minor impacts to wildlife on 656,296 acres with seasonal restrictions. These impacts would be the same as those in Alternative C.

The impacts to wildlife on the intensive use area north of Glasgow (40 acres) would be the same as those discussed in Alternative C.

There would be no impact to wildlife on the 1,947 acres of wildlife habitat closed to vehicular traffic on the Square Butte ONA ACEC.

Overall, this alternative would be a positive impact to wildlife.

## From Oil and Gas Leasing and Development

**Alternative A (Current):** Wildlife resources would be protected from potential oil and gas exploration and development in those areas closed to oil and gas leasing (137,802 acres); a significant positive impact.

Most wildlife habitat (3,249,885 acres) would be protected by standard or special stipulations and No Surface Occupancy restrictions (see Table 4.8); a significant positive impact to wildlife. The only wildlife habitat that would not

be fully protected with these stipulations is raptor nesting. These species are susceptible to disturbance during the nesting season and each raptor species has a different tolerance to disturbance. The distance of disturbance from a nesting raptor varies by species. The 1/4-mile No Surface Occupancy restriction would adequately protect some raptors, but not others and could allow negative impacts to wildlife.

The Judith Game Range in the Judith RA would be protected from oil and gas activities with a special stipulation. The game range is leased with a No Surface Occupancy restriction from November 1 to March 31, and any oil production would be piped off the game range. This stipulation protects the integrity of the game range and is a positive impact to wildlife.

Overall, this alternative would protect most wildlife resources and would be a significant positive impact to wildlife.

**Alternative B:** Wildlife resources would be protected from potential oil and gas exploration and development in areas closed to oil and gas leasing (117,962 acres); a significant positive impact.

Most wildlife habitat would not be protected by the standard terms of moving a drilling activity 200 meters or delaying it by 60 days (see Table 4.8) (3,269,725 acres). Oil and gas activities could be placed too close to various wildlife habitats during critical time periods; a significant negative impact.

Black-tailed prairie dog towns and upland game bird leks would be the only habitat adequately protected with standard terms; a significant positive impact.

Overall, standard terms would not protect most wildlife resources and would be a significant negative impact to wildlife.

**Alternative C:** Wildlife resources would be protected from potential oil and gas exploration and development in areas closed to oil and gas leasing (137,802 acres); a significant positive impact.

Most wildlife habitat (3,249,885 acres) would be protected by oil and gas stipulations (see Table 4.8); a significant positive impact to wildlife.

The only wildlife habitat that would not be completely protected is winter range. The stipulation would not extend long enough into the late winter or early spring season to protect the wintering wildlife and to provide undisturbed calving opportunities. Winter is a crucial time for most resident wildlife and disturbance on the winter range lessens their fat reserve. Stress and disturbance late in the winter

can eliminate individuals who are weak from the depletion of their fat reserve. The degree of negative impact depends on the amount of oil and gas activity and the severity of the winter. This would not be a significant impact.

Overall, these stipulations would protect most wildlife resources and would be a significant positive impact.

**Alternative D:** Wildlife resources would be protected from oil and gas exploration and development in areas closed to oil and gas leasing (143,562 acres); a significant positive impact.

Wildlife habitat (3,244,125 acres) would be protected by oil and gas stipulations (see Table 4.8). These stipulations would protect wildlife resources and would be a significant positive impact to wildlife.

**Alternative E (Preferred):** Wildlife resources would be protected from oil and gas exploration and development in areas closed to oil and gas leasing (117,962 acres); a significant positive impact.

Most wildlife habitat (3,269,725 acres) would be protected by oil and gas stipulations (see Table 4.8); a significant positive impact to wildlife.

The only wildlife habitat that would not be completely protected is winter range and grouse nesting zones. The negative impacts to winter range are discussed in Alternative C. Grouse normally nest within 1.5 and 2 miles of the mating ground. Disturbance during the nesting season could cause nest abandonment however, grouse would re-nest as long as the disturbance is not persistent. Even though the entire grouse nesting habitat is not protected from disturbance, oil and gas development would not impact grouse nesting in the long term.

Overall, these stipulations would protect most wildlife resources and would be a significant positive impact to wildlife.

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## From Hardrock Mining

**Alternative A (Current):** The Zortman and Landusky mining sites in the Little Rocky Mountains contain yearlong habitat for a number of wildlife, specifically bighorn sheep. Negative impacts occur to wildlife from habitat loss, human and mechanical harassment and animal loss. Mining activities have decreased the yearlong crucial habitat by 4%. The projected mine and exploration expansion (930 acres) would decrease yearlong habitat by another 5%. This loss of habitat would not be a significant impact to bighorn sheep.

**TABLE 4.8  
WILDLIFE PROTECTION STIPULATIONS ON BLM LAND**

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Bald Eagle	No surface occupancy within 1/4-mile of nesting sites would not adequately protect eagles. (NEG)	Moving an activity 200 M or delaying it 60 days would not protect eagles. (SIG NEG)	No surface occupancy within 1/2-mile of an active nesting site would protect eagles. (SIG POS)	Same as C.	Same as C.
Peregrine Falcon	No surface occupancy within 1/4-mile of nesting sites would not adequately protect falcons. (NEG)	Moving an activity 200 M or delaying it 60 days would not protect falcons. (SIG NEG)	No surface occupancy within 1.0-mile of any nesting site would protect falcons. (SIG POS)	Same as C.	Same as C.
Black-Footed Ferret	No surface occupancy within 1/4-mile of dog towns would protect ferret habitat. (SIG POS)	Moving an activity 200 M or delaying it 60 days would protect ferret habitat. (SIG POS)	No surface occupancy within designated ferret reintroduction areas would protect ferret habitat. (SIG POS)	Same as C.	Controlled Surface Use for prairie dog towns within the ferret reintroduction area would protect ferret habitat. (POS)
Piping Plover	No surface disturbance within 1/4-mile of nesting sites between May 15-June 30 would protect nesting plovers. (SIG POS)	Moving an activity 200 M or delaying it 60 days would not protect nesting plovers. (SIG NEG)	No surface occupancy within 1/4-mile of plover wetland habitat would protect nesting plovers. (SIG POS)	Same as C.	Same as C.
Interior Least Tern	No surface occupancy within 1/4-mile of tern nesting sites would protect terns. (SIG POS)	Moving an activity 200 M or delaying it 60 days would not protect nesting terns. (SIG NEG)	No surface occupancy within 1/4-mile of tern wetland habitat would protect nesting terns. (SIG POS)	Same as C.	Same as C.
Ferruginous Hawk	No surface occupancy within 1/4-mile of nesting sites would not adequately protect hawks. (NEG)	Moving an activity 200 M or delaying it 60 days would not protect nesting hawks. (SIG NEG)	No surface occupancy within 1/2-mile of any nesting site active within 2 years would protect nesting hawks. (SIG POS)	Same as C.	No surface disturbance between March 1-August 1 within 1/2-mile of any nesting site active within last 2 years would protect nesting hawks. (SIG POS)
Winter Range	No surface disturbance between December 1-May 15 would protect winter range. (SIG POS)	Moving an activity 200 M or delaying it 60 days would not protect winter range. (SIG NEG)	No surface disturbance between 12/1-3/31 would not protect winter range during severe winters. (NEG)	NSO would protect winter range. (SIG POS)	Same as C.
Grouse Leks	No surface occupancy within 500 feet of leks would protect mating grouse. (SIG POS)	Moving an activity 200 M or delaying it 60 days would protect mating grouse. (SIG POS)	No surface disturbance within 1/4-mile of leks would protect mating grouse. (SIG POS)	Same as C.	No surface disturbance between March 15-June 15 within 1/4-mile or less would protect mating grouse. (SIG POS)
Grouse Nesting Zones	No surface disturbance between March 1-June 30 on nesting zone would protect nesting grouse. (SIG POS)	Moving an activity 200 M or delaying it 60 days would not protect nesting grouse. (SIG NEG)	No surface disturbance between March 1-June 30 within 2.0 miles of nesting zone would protect nesting grouse. (SIG POS)	Same as C.	No surface disturbance between March 15-June 15 within 1/4-mile of nesting zone could possibly cause nest abandonment. (POS)

**TABLE 4.8 (CONTINUED)**  
**WILDLIFE PROTECTION STIPULATIONS ON BLM LAND**

	A	B	C	D	E
Raptor Nests	No surface disturbance between 3/1-8/1 within 1/4-mile of nesting sites would not protect raptor nests (NEG)	Moving an activity 200 M or delaying it 60 days would not protect raptor nests. (SIG NEG)	No surface occupancy within 1/2-mile of nesting site would protect raptor nests. (SIG POS)	Same as C.	No surface disturbance between 3/1-8/1 within 1/2-mile of nesting sites would protect raptor nests. (SIG POS)
Black-tailed Prairie Dog Towns	Moving an activity 200M or delaying 60 days would protect dog towns. (POS)	Same as A.	Same as A.	Same as A.	Same as A.
Fishing Reservoirs	No surface occupancy within 500 feet of fishing reservoirs would protect fisheries habitat. (SIG POS)	Moving an activity 200 M or delaying it 60 days would not protect fisheries habitat. (SIG NEG)	No surface occupancy within 1/4-mile of fishing reservoirs would protect fisheries habitat. (SIG POS)	Same as C.	Same as C.
Riparian Areas	No surface occupancy within 500 feet of 25 year flood plains (lakes, reservoirs, ponds and intermittent ephemeral or small perennial streams) and within 1,000 feet of 100 year flood plains (larger perennial streams, rivers and domestic water supplies) would protect riparian habitat. (SIG POS)	Moving an activity 200 M or delaying it 60 days would not protect riparian habitat. (SIG NEG)	No surface occupancy within riparian areas and 100 year flood plains would protect riparian habitat. (SIG POS)	Same as C.	Same as C.

Note: SIG = Significant  
POS = Positive  
NEG = NEGATIVE

Source: BLM, 1990

Wildlife is harassed by humans and mechanical apparatus in the Little Rocky Mountains. Blasting, moving ore with machinery and general mine activities disrupt the normal activities of wildlife, especially in the summer. Wildlife do adapt to the mining activities, but mining may disturb wildlife during critical time periods (breeding and rearing of young).

Mitigation during Plans of Operation on mining activities would be used to protect most wildlife habitat. Maintaining fences around leach ponds as well as developing water impoundments for wildlife away from the mine activity would draw wildlife away from the mine area.

One of the limiting factors for bighorn sheep in the Little Rocky Mountains is open, grassy, south facing slopes interspaced within the forest. Almost all of the south facing

slopes in the Little Rocky Mountains are covered with lodgepole pine. Through mining and reclamation, many of the now wooded, south facing slopes would be changed into interspaced open, grassy slopes; a positive impact.

The withdrawal of Azure Cave in the Little Rocky Mountains adequately protects the cave resources, especially bats.

Mining in the Judith Mountains has decreased the yearlong crucial habitat by less than 1%. The projected mine and exploration expansion (300 acres) would decrease yearlong habitat by another 2%. This loss of habitat would not be a significant impact to wildlife. Mining activity in the Collar Gulch area could impact the westslope cutthroat trout population; a significant negative impact as discussed in the impact analysis in the Collar Gulch ACEC section of this alternative. The general impacts discussed above for the



Little Rocky Mountains would be the same for the Judith Mountains.

Mining in the Moccasin Mountains has decreased the yearlong crucial habitat by less than 4%. The projected mine and exploration expansion (140 acres) would decrease yearlong habitat by another 1%. This loss of habitat would not be a significant impact to wildlife. The general impacts discussed above for the Little Rocky Mountains and would be the same for the Moccasin Mountains.

Mining in the Little Belt Mountains has decreased the yearlong crucial habitat by less than 1%. The projected mine and exploration expansion (60 acres) would decrease yearlong habitat by another 2%. This loss of habitat would not be a significant impact to wildlife. The general impacts discussed above for the Little Rocky Mountains would be the same for the Little Belt Mountains.

The Square Butte ONA would remain withdrawn from mining activities which protects wildlife values.

Overall, hardrock mining exploration and development impacts wildlife habitat. The protective withdrawals, reclamation and the amount of actual surface disturbance (less than 10%) would not create a significant impact on wildlife.

**Alternative B:** The impacts of mining in the Little Rocky Mountains would be similar to those in Alternative A, except revoking the Azure Cave withdrawal could allow mining in and around the cave. Azure Cave could be mined and the wildlife values lost. Mitigation may take place, but mining could destroy the important features of the cave as a valuable bat hibernaculum. This would be a significant negative impact to wildlife.

The impacts of mining in the Judith, Moccasin and Little Belt Mountains would be the same as those in Alternative A.

Opening the Square Butte ONA to mining claim location would be a significant negative impact.

Overall, hardrock mining exploration and development impacts wildlife habitat. The current amount of actual surface disturbance (less than 10%) would not have a significant impact on wildlife. However, the loss of specific protective withdrawals would have locally significant negative impacts. Overall, the impacts to wildlife would not be significant.

**Alternative C:** The impacts of mining in the Little Rocky, Moccasin, Little Belt and Judith Mountains would be the same as those discussed in Alternative A.

The Square Butte ONA would remain withdrawn from mining activities which protects wildlife values.

Overall, hardrock mining exploration and development impacts wildlife habitat. The protective withdrawals, reclamation and the amount of actual surface disturbance (less than 10%) would not create a significant impact to wildlife.

**Alternative D:** The impacts of mining in the Little Rocky Mountains would be similar to those in Alternative A, except the withdrawal of crucial bighorn sheep habitat (5,504 acres) would eliminate the disturbance of an additional 4% of the habitat.

The impacts of mining activities in the Judith Mountains would be similar to those in Alternative A, except withdrawals would be proposed in the Judith Mountains (25,160 acres). The withdrawal of crucial elk habitat would eliminate future disturbances from mining on 1% of the habitat. The withdrawal in the Collar Gulch ACEC would protect the westslope cutthroat trout as discussed in the impact analysis in the Collar Gulch ACEC section of this alternative. The Judith Mountains contain yearlong habitat for various wildlife and the withdrawal would protect this habitat from mining activity; a positive impact.

The impacts of mining activity in the Moccasin Mountains would be similar to those in Alternative A, except the withdrawal of crucial elk habitat (3,267 acres) would eliminate future disturbance from mining.

The impacts of mining activity in the Little Belt Mountains and Square Butte ONA would be the same as those in Alternative A.

Overall, hardrock mining exploration and development impacts wildlife habitat. The various protective withdrawals, reclamation and the amount of actual surface disturbance (less than 10%) would have a significant positive impact on the wildlife resource in this alternative.

**Alternative E (Preferred):** The impacts in the Little Rocky and Little Belt Mountains and the Square Butte ONA would be the same as those in Alternative A.

The impacts of mining in the Judith Mountains would be similar to Alternative A, except management prescriptions to protect scenic values and elk habitat would reduce the impacts to wildlife.

The impacts of mining in the Moccasin Mountains would be similar to Alternative A, except surface disturbance would be reduced to protect crucial elk habitat.

Overall, hardrock mining exploration and development impacts wildlife habitat. The protective withdrawals, reclamation and the amount of actual surface disturbance (less than 10%) would not create a significant impact to wildlife.

## From Riparian and Wetland Management of Watersheds

**Alternative A (Current):** Improving or maintaining the quality of 498 stream miles (11,952 acres) in 270 allotments, especially the habitat in poor condition, would provide better quality habitat for numerous species (see Table 4.9). Habitat in good condition may support as many as 104 wildlife species, as found along the Milk River in 1983 (BLM, 1985).

Those stream riparian areas not included in this alternative (2,424 acres or 101 miles) would remain static or decline in condition, as would their value as wildlife habitat.

Increasing the quality of upland habitat in combination with additional reservoirs, surface acres of water and goose nesting islands in 270 allotments would increase wildlife habitat and numbers (see Table 4.9). The goose nesting islands would also provide secure nesting habitat for many other wildlife species such as ducks, shorebirds and some upland non-game birds. Geese also nest on reservoir shorelines, but at a significantly reduced level. This alternative could produce an additional 149,900 ducks and 23,800 geese annually.

The condition of those wetland areas not included in this alternative (2,269 reservoirs/6,807 acres) would remain static or decline, as would their value as wildlife habitat.

Overall, this alternative would create a significant positive impact to wildlife.

**TABLE 4.9  
ALTERNATIVE A  
RIPARIAN AND WETLAND MANAGEMENT**

	Current Conditions	Alternative A Would
Streams Considered in this Alternative	7,176 acres/299 miles of streams in good or excellent condition	Maintain or improve this habitat
	4,776 acres/199 miles of streams in fair condition	Improve this habitat to good or excellent condition
Streams Not Considered in this Alternative	2,424 acres/101 miles	This habitat would remain static or decrease in condition
Wetlands Considered in this Alternative	4,118 reservoirs/12,354 acres with 1,150 goose nesting islands producing 111,200 ducks and 3,200 geese annually	Provide an additional 5,550 reservoirs/16,650 acres and an additional 8,513 nesting islands which would produce an additional 149,900 ducks and 23,800 geese annually
Wetlands Not Considered in this Alternative	2,269 reservoirs/6,807 acres with 635 nesting islands producing 6,800 ducks and 1,800 geese annually	This habitat would remain static or decrease in condition

Source: BLM, 1990

**Alternative B:** This alternative would include 192 allotments with 368 miles of stream riparian areas (8,832 acres). Improving the quality of this habitat would provide better quality habitat for numerous species (see Table 4.10).

The condition of those stream riparian areas not included in this alternative (5,544 acres/231 miles) would remain static or decline, as would their value as wildlife habitat.

Increasing the quality of the upland habitat, number of reservoirs, surface acres of water and goose nesting islands

in 192 allotments would create the same type of impacts as Alternative A, but could produce an additional 97,000 ducks and 17,100 geese annually (see Table 4.10)

The condition of those wetland areas not included in this alternative (2,907 reservoirs/8,721 acres) would remain static or would decline, as would their value as wildlife habitat.

Overall, this alternative would create a significant positive impact to wildlife.

**TABLE 4.10  
ALTERNATIVE B  
RIPARIAN AND WETLAND MANAGEMENT**

	Current Conditions	Alternative B Would
Streams Considered in this Alternative	8,832 acres/368 miles of streams in fair, good or excellent condition	Maintain or improve the good or excellent habitat and improve the fair habitat to good or excellent condition
Streams Not Considered in this Alternative	5,544 acres/231 miles	This habitat would remain static or decrease in condition
Wetlands Considered in this Alternative	3,480 reservoirs/10,440 acres with 970 goose nesting islands producing 94,000 ducks and 2,700 geese annually	Provide an additional 3,593 reservoirs/10,779 acres and 6,107 nesting islands on all sources which would produce an additional 97,000 ducks and 17,100 geese annually
Wetlands Not Considered in this Alternative	2,907 reservoirs/8,721 acres with 814 nesting islands producing 8,700 ducks and 2,300 geese annually	This habitat would remain static or decrease in quality

Source: BLM, 1990

**Alternative C:** This alternative would include 421 allotments and 556 miles of stream riparian areas. Improving the quality of stream riparian areas would provide better quality habitat for wildlife on 12,350 acres (see Table 4.11).

The condition of those stream areas not included in this alternative (1,032 acres/43 miles) would remain static or decline, as would their value as wildlife habitat.

Increasing the quality of the upland habitat, number of reservoirs, surface acres of water and goose nesting islands

in 421 allotments would create the same type of impacts as Alternative A, but could produce an additional 150,300 ducks and 27,500 geese annually (see Table 4.11).

The condition of those wetland areas not included in this alternative (477 reservoirs/1,431 acres) would remain static or decline, as would their value as wildlife habitat.

Overall, this alternative would create a significant positive impact to wildlife.

**TABLE 4.11  
ALTERNATIVE C  
RIPARIAN AND WETLAND MANAGEMENT**

	Current Conditions	Alternative C Would
Streams Considered in this Alternative	13,344 acres/556 miles of streams in fair, good or excellent condition	Maintain or improve the good or excellent habitat and improve the fair habitat to good or excellent condition
Streams Not Considered in this Alternative	1,032 acres/43 miles	This habitat would remain static or decline in condition
Wetlands Considered in this Alternative	17,730 acres/5,910 reservoirs with 1,649 nesting islands producing 159,600 ducks and 4,600 geese annually	Provide an additional 5,568 reservoirs/16,704 acres with an additional 9,823 nesting islands would produce an additional 150,300 ducks and 27,500 geese annually
Wetlands Not Considered in this Alternative	477 reservoirs/1,431 acres with 135 nesting islands producing 1,400 ducks and 400 geese annually	This habitat would remain static or decrease in condition

Source: BLM, 1990

**Alternative D:** This alternative would include 647 allotments with 599 miles of stream riparian areas (14,376 acres). Improving the quality of these areas would provide the same type of impacts discussed in Alternative A. (see Table 4.12).

Increasing the number of reservoirs, surface acres of water and goose nesting islands would create the same types of impacts as Alternative A, but could produce an additional 161,100 ducks and 29,600 geese annually, (see Table 4.12).

Overall, this alternative would create a significant positive impact to wildlife.

**Alternative E (Preferred):** Improving or maintaining the quality of the stream riparian areas in 348 allotments (14,280 acres/595 miles) in this alternative would produce the same type of impacts discussed in Alternative A (see Table 4.13).

The condition of those stream riparian areas not included in this alternative 96 acres/4 miles) would remain static or decline, as would their value as wildlife habitat.

Increasing the quality of the upland habitat, number of reservoirs, surface acres of water and goose nesting islands in 348 allotments would create the same types of impacts as Alternative A, but could produce an additional 161,100 ducks and 25,800 geese annually (see Table 4.13).

The condition of those wetland areas not included in this alternative (537 reservoirs/1,611 acres) would decline, as would their value as wildlife habitat.

Overall, this alternative would create a significant positive impact to wildlife.

**TABLE 4.12  
ALTERNATIVE D  
RIPARIAN AND WETLAND MANAGEMENT**

	<b>Current Conditions</b>	<b>Alternative D Would</b>
Streams Considered in this Alternative	14,376 acres/599 miles	Maintain or improve the good or excellent habitat and improve the fair habitat to good or excellent condition.
Wetlands Considered in this Alternative	6,387 wetlands/19,161 acres with 1,784 goose nesting islands producing 172,400 ducks and 5,000 geese annually	Provide an additional 5,967 reservoirs/17,901 acres with an additional 10,570 nesting islands would produce an additional 161,100 ducks and 29,600 geese annually

Source: BLM, 1990

**TABLE 4.13  
ALTERNATIVE E  
RIPARIAN AND WETLAND MANAGEMENT**

	<b>Current Conditions</b>	<b>Alternative E Would</b>
Streams Considered in this Alternative	14,280 acres/595 miles in fair, good or excellent condition	Maintain or improve the good or excellent habitat and improve the fair habitat to good or excellent condition
Streams Not Considered in this Alternative	96 acres/4 miles	This habitat would remain static or decline in condition
Wetlands Considered in this Alternative	5,850 reservoirs/17,550 acres with 1,631 nesting islands producing 158,000 ducks and 4,600 geese annually	Provide an additional 5,005 reservoirs/15,015 acres with an additional 9,212 nesting islands and would produce an additional 135,100 ducks and 25,800 geese annually
Wetlands Not Considered in this Alternative	537 reservoirs/1,611 acres with 153 nesting islands producing 1,600 ducks and 400 geese annually	This habitat would remain static or decline in condition

Source: BLM, 1990

## From Elk and Bighorn Sheep Habitat Management

**Alternative A (Current):** BLM would provide 593,980 acres of elk habitat throughout the planning area, but would not provide additional habitat. This would not allow elk expansion in the Highwood and Little Belt Mountains or the Missouri River Breaks north of the river. Elk from these three areas are expanding and impacting adjacent property (private, state and federal) by damaging crops and consuming livestock forage. The habitat in the Highwood and Little Belt Mountains is at its elk carrying capacity and populations are being held at their present levels.

Additional elk habitat would be provided on Square Butte and in the Judith, North Moccasin, Little Snowy and Big Snowy Mountains. Elk would also be allowed to expand into other portions of the planning area, but BLM would not allocate additional forage to accommodate such expansions.

BLM would provide 84,711 acres of bighorn sheep habitat throughout the planning area. The bighorn habitat in the Little Rocky Mountains, Larb Hills and Chimney Bend areas support huntable populations and could support additional bighorns before reaching its carrying capacity. The most significant potential negative impact could occur from contact between bighorns and domestic sheep. Bighorn sheep in these habitat areas could be significantly reduced by contracting diseases from domestic sheep.

Overall, this alternative would be a positive impact to wildlife.

**Alternative B:** BLM would provide 593,980 acres of elk habitat throughout the planning area. The impacts in the Highwood and Little Belt Mountains and the Missouri River Breaks areas would be the same as those discussed in Alternative A.

Additional elk habitat would not be available on Square Butte or in the Judith, North Moccasin, Little Snowy and Big Snowy Mountains. Elk would be confined to their current habitat areas which could impact the quality of their forage.

This alternative would provide 66,788 acres of bighorn sheep habitat throughout the planning area. Bighorns would be confined to their current habitat areas which could impact the quality of their forage. Bighorn sheep in these habitat areas could be significantly reduced by contracting diseases from domestic sheep.

Overall, this alternative would create a negative impact.

**Alternative C:** This alternative would provide 593,980 acres of elk habitat throughout the planning area. The Highwood and Little Belt Mountains and in the Missouri River Breaks habitat would not support additional elk. The Square Butte and in the Judith, North Moccasin, Little

Snowy and Big Snowy Mountains habitat areas could support additional elk.

This alternative would provide 84,711 acres of bighorn sheep habitat throughout the planning area and would provide additional habitat at the mouth of the Judith River. The bighorn habitat areas in the Little Rocky Mountains, Larb Hills and Chimney Bend areas could support additional bighorns and would not be impacted by contact with domestic sheep. BLM would not allow domestic sheep grazing to overlap bighorn sheep habitat. This would protect bighorns from contracting diseases from domestic sheep.

Overall, this alternative would create a significant positive impact for wildlife.

**Alternative D:** The elk habitat in the Highwoods, Little Belts, Missouri Breaks, Judiths, North Moccasins, Little Snowys and Big Snowys would be managed as discussed in Alternative A.

BLM would provide an additional 66,160 acres of elk habitat in the Little Rocky and South Moccasin Mountains and the Bull Creek area of the Missouri Breaks.

Acquiring crucial elk habitat would stabilize land use practices and protect habitat from developments that would reduce the value to wildlife or make it inaccessible. Acquiring specific cropland or alfalfa meadows would decrease the incidence of elk depredation on private property. Planting lure crops on strategic BLM lands to draw elk away from private property may reduce elk depredation on private property.

BLM would provide 156,930 acres of bighorn sheep habitat throughout the planning area. This would provide additional bighorn habitat in the Larb Hills (Bull Creek) and at the mouth of the Judith River. Bighorn and domestic sheep disease problems would not occur because BLM would not allow domestic sheep grazing to overlap bighorn as discussed in Alternative C.

Acquiring crucial sheep habitat would stabilize that habitat and protect it from development that would negatively impact the habitat or make it inaccessible to the public.

Overall, this alternative would create a significant positive impact for wildlife.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative A.

## From Prairie Dog and Black-footed Ferret Management

**Alternative A (Current):** Eliminating prairie dog towns on BLM land in the Judith RA would reduce the habitat available for associate species; a significant negative impact.

Managing 770 acres of prairie dog towns in the Valley RA would provide for associate species and prairie dog shooting which would slightly reduce the density of prairie dogs; a positive impact. This acreage would not provide enough habitat for reintroducing the black-footed ferret.

Eliminating 10,013 acres (75%) of the prairie dog towns in the Phillips RA and the scattered nature (further than 7km apart) of the remaining 3,308 acres (25%) would reduce the habitat available for associate species and would be a significant negative impact to the potential of this area to support a ferret reintroduction.

New prairie dog towns larger than 50 acres would be allowed and could support associate species and depending on their location, could be important to a black-footed ferret reintroduction. New prairie dog towns smaller than 50 acres would be eliminated.

Prairie dog shooting would continue on the remaining 3,308 acres until there was a black-footed ferret reintroduction, then no further shooting would be allowed. Prairie dog shooting could limit town expansion to 3% per year, while normal prairie dog expansion averages 15% per year. This would not impact a potential black-footed ferret reintroduction.

Additional measures would be required around each prairie dog town identified for reintroduction. These measures could include modifying power poles associated with above ground ROW, defining avoidance areas for ROW, No Surface Occupancy restrictions on oil and gas exploration and development and no additional livestock improvements or grazing on these towns and a 1/4-mile perimeter around each town (10,680 acres). These measures would maintain the area's potential as a ferret reintroduction area.

Overall, this alternative would create a significant negative impact to prairie dogs and black-footed ferret reintroduction by eliminating 75% of the prairie dog acreage in the Phillips RA.

**Alternative B:** The impacts in the Judith and Valley RAs would be the same as those in Alternative A.

Eliminating 55% of the prairie dog acreage (6,458 acres) in the Phillips RA and not allowing new towns would reduce the habitat available for associate species and would be a significant negative impact to the potential of this area to support a ferret reintroduction.

Prairie dog shooting would continue on the remaining 6,462 acres of prairie dog towns. This could create negative impacts to black-footed ferrets by reducing their primary food source or disturbing ferrets.

ORV use in Complex 1 could harass or disturb ferrets during the reintroduction process; a negative impact.

Oil and gas exploration and development would have little effect on the area's potential as a ferret reintroduction area.

Acquiring lands with prairie dog towns would provide more habitat for associate species and black-footed ferret reintroduction; a positive impact.

Overall, this alternative would create a significant negative impact to prairie dogs and black-footed ferret reintroduction by eliminating 55% of the prairie dog acreage in the Phillips RA.

**Alternative C:** The impacts in the Judith and Valley RAs would be the same as those in Alternative A.

About 56% of the prairie dog acreage (7,367 acres) would be available for black-footed ferret reintroduction. This would not be enough acreage to support a black-footed ferret reintroduction. Another 9% of the prairie dog acreage would be eliminated and the remaining 35% would be managed for prairie dog shooting.

Prairie dog shooting would continue in Complex 1+2 until a ferret reintroduction occurs and the expansion rates would average 3% and 15% respectively before and after reintroduction. This would not impact the area's potential for ferret reintroduction.

New prairie dog towns would be allowed within Complex 1+2. This would provide additional habitat for associate species and help maintain the integrity of Complex 1+2; a positive impact.

The management guidelines for above ground ROW, livestock grazing and range improvements in core towns within Complex 1+2 would be the same as those in Alternative A and would not impact the area's potential as a ferret reintroduction area.

Oil and gas exploration and development with No Surface Occupancy restrictions would protect the area's potential as a ferret reintroduction area and be a significant positive impact.

Acquiring lands with prairie dog towns would provide more habitat for associate species and black-footed ferret reintroduction; a positive impact.

Overall, this alternative would be a significant negative impact to prairie dogs, associate species and the area's potential as a reintroduction area.

**Alternative D:** Prairie dog acreage would be allowed to expand to 5,000 acres each in the Judith and Valley RAs (10,000 acres total). This would provide additional habitat for prairie dog viewing, shooting or associate species; a significant positive impact. This type of expansion could also provide habitat for ferret reintroduction and new towns could be strategically located to develop a complex.

Maintaining the prairie dog acreage in the Phillips RA would be a significant positive impact to prairie dogs, associate species and the area's potential as a ferret reintroduction area.

New prairie dog towns would be allowed within the 7km Complex. This would benefit prairie dogs, associate species and maintain the integrity of the 7km Complex; a positive impact.

Prairie dog shooting would be managed in this area (7km Complex) and could create a negative impact by reducing the ferret's primary food source or disturbing ferrets.

Above ground ROW, livestock grazing, range improvements and ORV use would not be allowed within 1/4-mile of the eight core towns within the 7km Complex. This would maintain the integrity of the complex.

Seasonal livestock grazing and livestock improvements on the 16 secondary core towns in this complex would mitigate livestock impacts to black-footed ferrets. ORV use on these secondary core towns would be restricted yearlong to existing roads and trails which would also mitigate impacts to black-footed ferrets.

Oil and gas leasing with No Surface Occupancy restrictions would be a significant positive impact to the area's potential as a reintroduction area.

Acquiring lands with prairie dog towns would provide more habitat for associate species and black-footed ferret reintroduction; a positive impact.

Overall, this alternative would be a significant positive impact to black-footed ferret reintroduction.

**Alternative E (Preferred):** BLM would maintain the existing prairie dog towns in the Judith and Valley RAs and there would be no impacts.

The BLM land identified for ferret reintroduction in the Phillips RA (12,346 acres) would be designated an ACEC and would be a portion of a larger area (approximately 26,000 acres) identified as the 7km Complex. This complex also contains 5,800 CMR acres, 2,012 DSL acres and 5,821 private acres. These acreage figures could fluctuate, but would be held at the 1988 level. This would be a significant positive impact for prairie dogs, associate species and the area's potential as a black-footed ferret reintroduction area.

Prairie dog shooting would be allowed on BLM land within the 7km Complex and could create a negative impact by reducing the ferret's primary food source or disturbing ferrets. However, shooting can be used as a supplemental form of prairie dog control.

Oil and gas leasing with controlled surface use for prairie dogs within the reintroduction area would protect the black-footed ferret; a significant positive impact.

Other restrictions within the 7km Complex would create positive impacts for prairie dogs, associate species and the area's potential as a reintroduction area

Overall, this alternative would be a significant positive impact to prairie dogs, associate species and the black-footed ferret.

## **From the Judith Mountains Scenic Area ACEC**

**Alternatives A (Current) & B:** Hardrock mining exploration and development would create a minor impact on wildlife.

**Alternatives C, D & E (Preferred):** No impact to wildlife.

## **From the Acid Shale-Pine Forest ACEC**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to wildlife.

## **From the Square Butte ONA ACEC**

**Alternative A (Current):** The Square Butte ONA would remain withdrawn from mining activities which protects wildlife values and would not impact wildlife.

**Alternative B:** Opening the area to mining claim location would be a negative impact to wildlife.

**Alternative C:** Acquiring an additional 1,760 acres and continuing the mineral withdrawal would protect wildlife values; a significant positive impact.

**Alternatives D & E (Preferred):** Acquiring an additional 4,760 acres and continuing the mineral withdrawal would protect wildlife values; a positive impact.

## **From the Collar Gulch ACEC**

**Alternatives A & B:** The Collar Gulch area consists of a stream about 1.5 miles long in the Judith Mountain that contains a pure strain of westslope cutthroat trout. The upper 1/2 mile is on BLM land. There are occasional mining activities in and near the creek. It is estimated that 5% of the habitat in Collar Gulch has been disturbed or destroyed by mining and an additional 10% could be destroyed in the

future. Most of the impacts are minor, but if a mining discovery is made in the future, the cutthroat trout population in Collar Gulch Creek could be completely lost; a significant negative impact.

There are 40 acres of patented mining claims located within Collar Gulch. Mining could affect adjacent BLM land and have a significant negative impact to wildlife.

Based on past activity, Tate-Poetter Cave should not be impacted unless a mining operation was placed over or in the immediate vicinity of the cave. Chances of this occurring are considered slight.

Additional claims could be patented in Collar Gulch. Once a claim is patented, the BLM no longer has control to protect the trout population. This is a significant negative impact to wildlife. Overall, there is a significant negative impact to wildlife.

**Alternative C:** Mitigating measures would be proposed in the Judith Mountains to protect 1,160 acres in the Collar Gulch ACEC. This would be a significant positive impact to wildlife, especially for the pure strain of westslope cutthroat trout in Collar Gulch Creek. Mitigating measure would apply to unpatented mining claims and would protect the wildlife values.

The 40 acres of patented mining claims could be acquired. This action would be a significant positive impact to wildlife.

Collar Gulch would not be protected from all mining activities. The area would be subject to claim location and mineral activity without a mineral withdrawal. It is estimated that 5% of the habitat in Collar Gulch has been disturbed or destroyed by mining and an additional 10% could be destroyed in the future. This could be an overall significant negative impact to wildlife.

**Alternative D:** A mineral withdrawal would be proposed in the Judith Mountains to protect 1,618 acres in the Collar Gulch ACEC. This would be a significant positive impact to wildlife, especially for the pure strain of westslope cutthroat trout in Collar Gulch Creek.

It is estimated that 5% of the habitat in Collar Gulch has been disturbed or destroyed by mining and an additional 10% could be disturbed or destroyed in the future. The projected 10% would not take place with the mineral withdrawal. This would be a significant positive impact to wildlife.

The 40 acres of patented mining claims could be acquired. This action would be a significant positive impact to wildlife.

The additional acquisition of the private land at the mouth of the canyon would place the entire Gulch in BLM ownership. This would allow for full protection of the cutthroat trout, an additional positive impact to wildlife.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative A.

## From the Azure Cave ACEC

**Alternative A (Current):** Azure Cave is currently withdrawn from mineral entry and closed to public use which protects the cave's values; a significant positive impact.

**Alternative B:** Revoking the Azure Cave withdrawal could allow mining in and around the cave. The cave could be completely mined and the wildlife values lost. Allowing entrance to the cave through the year could disturb the cave's hibernaculum values. If the disturbance is severe enough or frequent enough, the fat reserve of the bats is used up. When this occurs the bat dies in hibernation or if the reserve is used up as the bat comes out of hibernation, the bat is weak and not able to survive long enough to collect food, gain strength and rebuild its fat reserve for the next hibernation, thus dying during the food gathering process. This alternative would create significant negative impacts.

**Alternative C:** The cave would be open to the public from May 15 to September 15. Recreational use through that period could disturb bat hibernation and decrease or eliminate the bat population; a significant negative impact.

**Alternative D:** The cave would be open to the public from June 15 to August 15. Recreational use through that period would not disturb bat hibernation and the facilities proposed would not inhibit bat movement. This would be a significant positive impact.

**Alternative E (Preferred):** This alternative would not disturb bats during hibernation and the facilities proposed would not inhibit normal bat movements. This would be a significant positive impact.

## From the Big Bend of the Milk River ACEC

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to wildlife.

## IMPACTS TO FORESTRY

### From Land Acquisition and Disposal

**Alternatives A (Current), B, C, D & E (Preferred):** Disposing of BLM land could create a loss of approximately 1,000 acres of productive forest land in Fergus County.

However, land acquired in exchange for the disposal land could contain productive forest land. The potential net gain or loss of productive forest land cannot be accurately



determined without knowing the specific locations of lands that would be acquired. In the past, many of the acquisitions have contained productive forest land. Therefore, the potential exists for an increase in annual allowable cut, depending on the volume of timber on lands that may be acquired.

### **From Access to BLM Land**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to forestry.

### **From Off-Road Vehicle Designations**

**Alternative A (Current):** Restricting motorized travel would lessen the fire hazard potential; a positive impact.

**Alternative B:** There would be a greater fire hazard potential with unrestricted off-road travel which could create a negative impact to forestry.

**Alternatives C, D & E (Preferred):** The impacts would be the same as those in Alternative A.

### **From Oil and Gas Leasing and Development**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to forestry.

### **From Hardrock Mining**

**Alternatives A (Current), B, C, D & E (Preferred):** There could be a loss of some productive timber in the Little Rocky and North Moccasin Mountains with expansion of the existing mining operations. This would not be a significant loss.

### **From Riparian and Wetland Management of Watersheds, Elk and Bighorn Sheep Habitat Management, and Prairie Dog and Black-footed Ferret Habitat Management**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to forestry.

### **From the Judith Mountains Scenic Area ACEC**

**Alternatives A (Current) & B:** No impact to forestry.

**Alternatives C & D:** Approximately 3,000 acres of productive forest land which lies in the area, would be limited to selective cutting. This could have a minor negative impact on forestry.

**Alternative E (Preferred):** Approximately 2,200 acres of productive forest land which lies in the Judith Mountains Scenic Area would be limited to selective cutting. This could have a minor negative impact on forestry.

### **From the Acid Shale-Pine Forest ACEC**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to forestry.

### **From the Square Butte ONA ACEC and the Collar Gulch ACEC**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to forestry.

**Alternative C:** Approximately 700 acres of forest land would be taken out of production in Fergus County; a minor negative impact.

**Alternatives D & E (Preferred):** Approximately 900 acres of forest land would be taken out of production in Fergus County. This would have a slight negative effect at the local level, but would not be significant on the regional level.

### **From the Azure Cave ACEC**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to forestry.

### **From the Big Bend of the Milk River ACEC**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to forestry.

## **IMPACTS TO CULTURAL RESOURCES**

### **From Land Acquisition and Disposal**

**Alternatives A (Current), B, C, D & E (Preferred):** Inventorying all lands identified for disposal could create a positive impact by increasing the amount of cultural resource

information. Acquired land could contain cultural resources that would increase opportunities and information.

## From Access To BLM Land

**Alternatives A (Current), B, C, D & E (Preferred):** Public access to BLM land may increase vehicle use of existing trails during wet conditions and increase the potential for cultural resource damage and vandalism. Such impacts could be mitigated by avoidance, where possible, or by information recovery. The overall impacts would be minor.

## From Off-Road Vehicle Designations

**Alternatives A (Current) & B:** Minimal ORV restrictions could create negative impacts by contributing to cultural resource damage, vandalism or casual or commercial collection; a negative impact.

**Alternative C:** Seasonal restrictions on ORV use would reduce potential cultural resource damage, vandalism or unauthorized collection; a positive impact.

**Alternative D:** ORV restrictions would reduce potential cultural resource damage, vandalism or unauthorized collection; a positive impact.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative C.

## From Oil and Gas Leasing and Development

**Alternative A (Current):** Cultural resources would be protected by using standard lease terms, the Notice (MT-3101-1) and the potential for a No Surface Occupancy restriction on cultural properties of a significant nature. In most cases, direct impacts to cultural resources could be avoided. Inventorying lands could create a positive impact by increasing the amount of cultural resource site information. Additional development could create adverse impacts for cultural properties through additional disturbance.

An unknown number of an estimated 1,286 cultural properties could be impacted. In most cases, these impacts can be mitigated through avoidance or information recovery.

**Alternative B:** The impacts would be similar to those in Alternative A, but for an unknown percentage of an estimated 1,307 cultural properties. In most cases, these impacts can be mitigated through avoidance or information recovery.

**Alternative C:** Cultural resources would be protected by standard lease terms and a No Surface Occupancy restriction on priority sites, eligible for the NRHP. Cultural resource

sites protected only by standard terms would be mitigated by avoidance, where possible, information recovery or further documentation and recording. Impacts would be similar to Alternative A, but for an unknown percentage of an estimated 1,227 cultural properties. In most cases, these impacts can be mitigated through avoidance or information recovery.

**Alternative D:** This alternative relies heavily on a No Surface Occupancy restriction to protect a variety of resource values, including cultural resources. Impacts similar to Alternative A, but for an unknown percentage of an estimated 643 cultural properties. In most cases, these impacts can be mitigated through avoidance or information recovery.

**Alternative E (Preferred):** The impacts would be similar to those in Alternative A, but for an unknown percentage of an estimated 1,289 cultural properties.

## From Hardrock Mining

**Alternative A (Current):** In general, impacts to cultural properties from mining are proportional to the number of acres disturbed. Increasing/decreasing the number of acres open to mineral entry therefore has the potential to increase/decrease impacts to cultural properties. Planned mineral withdrawal revocations may thereby result in impacts to cultural properties, if such properties are present. Potential impacts could probably be mitigated through avoidance or information recovery as permit stipulations under public land laws in most cases. A total of 2,653 acres are segregated from mineral entry under this alternative.

**Alternative B:** Potential impacts would be similar to those in Alternative A, but more extensive as a total of 320 acres would be segregated from mineral entry. This would increase the risk for disturbance.

**Alternatives C, D & E (Preferred):** Potential impacts would be similar to those in Alternative A, but less extensive as a total of 2,447 acres would be segregated from mineral entry. This would decrease the risk for disturbance.

**Alternative D:** Potential impacts would be similar to those in Alternative A, but less extensive as a total of 50,533 acres would be segregated from mineral entry.

**Alternative E (Preferred):** Potential impacts would be similar to those in Alternative A, but less extensive as a total of 6,205 acres would be segregated from mineral entry.

## From Riparian and Wetland Management of Watersheds

**Alternative A (Current):** Proposed water developments could negatively impact cultural resources by disturbing

the context in which the resources are found or by scattering cultural resources. However, standard operating procedures should prevent unnecessary negative impacts and could create a positive impact by providing additional resource information. Overall, this alternative would create a minor negative impact.

**Alternative B:** Fewer water developments would create fewer negative impacts and less cultural resource information gathering. Overall, this alternative would create a minor negative impact.

**Alternative C:** Increasing the number of water developments would increase the negative impacts to cultural resources discussed in Alternative A. This would also increase the amount of additional cultural resource information provided. Overall, this alternative would create a minor negative impact.

**Alternative D:** This alternative could result in the greatest number of water developments and would create the most negative impacts to cultural resources. It would also provide the most additional resource information. Overall, this alternative would create a minor negative impact.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative C.

### **From Elk and Bighorn Sheep Habitat Management**

**Alternatives A (Current), B & C:** No impacts to cultural resources.

**Alternatives D & E (Preferred):** Planting lure forage crops would require cultural resource inventories, which could create positive impacts by gathering additional resource information.

### **From Prairie Dog and Black-footed Ferret Management**

**Alternatives A (Current), B, C, D & E (Preferred):** Mechanical treatments would require cultural resource inventories, which could create positive impacts by gathering additional resource information.

### **From the Judith Mountains Scenic Area**

**Alternatives A (Current) & B:** In general, impacts to cultural properties are proportional to the number of acres disturbed. Standard operating procedures would be followed and potential impacts would be mitigated through avoidance or information recovery where possible though there would still be some potential for impacts.

**Alternative C:** Potential impacts would be similar to Alternative A, but less extensive because of a reduced possibility of large ground disturbing development projects due to required adherence to Class II visual standards. Standard operating procedures would be followed and no impacts anticipated.

**Alternative D:** Removal of lands from mineral entry would reduce the potential for impacts from mineral development. Standard operating procedures would be followed and no impacts anticipated.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative C.

### **From the Acid Shale-Pine Forest ACEC**

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to cultural resources.

### **From the Square Butte ONA ACEC**

**Alternative A (Current):** Designating 1,947 acres as an ACEC would protect the area's cultural resources; a positive impact.

**Alternative B:** This alternative would allow mining which would negatively impact cultural resources.

**Alternative C:** Designating 1,947 acres as an ACEC would protect the area's cultural resources. However, trail development could contribute to additional cultural resource disturbance or unauthorized collection. Overall, the impacts would be positive.

**Alternatives D & E (Preferred):** Designating 1,947 acres as an ACEC would be a positive impact to the area's cultural resources. This alternative would also create a parking area at the base of Square Butte, increase trail development on the butte and create easier access to the butte. These developments could contribute to cultural site disturbance or unauthorized collection which would be negative impacts. Overall, the impacts would be positive.

### **From the Collar Gulch ACEC**

**Alternative A (Current) & B:** Hardrock mining activities could create negative impacts to cultural resources. These impacts could be lessened by additional information recovery.

**Alternatives C & D:** No impact to cultural resources.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative A.

## From the Azure Cave ACEC

**Alternative A (Current):** No known cultural resources would be directly impacted by this alternative. However, there is a slight possibility of negative impacts if surface disturbing activities such as drilling and blasting damage cave or cultural resources in the area.

**Alternative B:** This alternative would allow mining activities which could impact cultural resources in the area; a minor negative impact.

**Alternatives C, D & E (Preferred):** The impacts would be the same as those in Alternative A.

## From the Big Bend of the Milk River ACEC

**Alternative A (Current):** This alternative would allow continued energy development and ORV use and potential negative impacts to the area's cultural resources; particularly the Beaucoup Site Complex. These impacts include site disturbance and vandalism. Such impacts could be lessened, but not eliminated, by information retrieval. An NSO restriction for oil and gas exploration and development could prevent energy development impacts from occurring to the Henry Smith Site; a positive impact. Overall, the impacts would be negative.

**Alternative B:** The impacts of this alternative would be similar to those in Alternative A, except the lack of an NSO restriction for the Henry Smith Site would allow negative impacts from oil and gas development.

**Alternative C:** Designating the 2,120 acres an ACEC and managing the Beaucoup Site exclusively for scientific use would produce additional information which would be a positive impact. Additional natural gas development could potentially create negative impacts from site disturbance, but these impacts could be lessened by additional information gathering. Vandalism would be reduced; a positive impact.

Managing the Henry Smith Site for public use would be a positive impact. Placing an NSO stipulation on this area for oil and gas exploration and development would also be a positive impact. Overall, the impacts would be positive.

**Alternative D:** Designating a large area (10,720 acres) an ACEC and managing its cultural resources for increased inventory and data recovery, would be positive impacts. The entire ACEC would be managed more intensively to prevent vandalism; a positive impact. Because much of the ACEC is presently leased, additional natural gas development could create negative surface disturbance impacts. Such impacts could be lessened by additional information recovery. The NSO restriction on the Henry Smith Site area would be a positive impact.

**Alternative E (Preferred):** Designating the 2,120 acres an ACEC and managing the Beaucoup Site for scientific use would be positive impacts. Continued natural gas development could create negative impacts, which could be lessened by additional information gathering. Managing the Henry Smith Site for scientific use would be a positive impact. Both site areas would be managed more intensively to prevent vandalism; a positive impact.

## IMPACTS TO RECREATION

### From Land Acquisition and Disposal

**Alternatives A (Current) B, C, D & E (Preferred):** The impact of disposing BLM land would be negligible since most of the parcels identified for disposal are isolated and receive little or no recreation use.

Acquiring land in exchange for BLM land could increase recreation opportunities, considering that past acquisitions have primarily been for known recreation values or recreation potential. This would result in an increase of recreation use.

Consolidating BLM land would reduce recreation and landowner conflicts. There would be less stress on the visitor with a decreasing number of private landowner conflicts. Ease of movement on BLM land with a decreasing amount of trespass and private landowner conflicts would provide greater freedom for the visitor.

Private land currently under lease to outfitters, but acquired by BLM would become available for public use by all hunters once in BLM ownership. Outfitters would compete with other recreationists and users. There could be a negative impact to outfitters relative to quality of the hunt and success of harvest. However, this would not be significant.

Overall, there would be a significant positive impact to recreation opportunities and quality.

### From Access to BLM Land

**Alternative A (Current):** BLM would acquire access for administrative purposes, for authorized users and for the general public. There would be little or no change in recreation use.

Figures indicate recreation use on BLM land will increase 2% per year while BLM has gained access to only one or two additional blocks yearly. This could have a slightly negative impact. There may not be enough legal access available to BLM land to meet the long-term demand. This could create additional recreation and landowner conflicts and lessen the recreational experience. If the demand for

recreation is met elsewhere, there could be a loss of visitors on BLM land.

**Alternative B:** There would be no management emphasis on gaining additional access which could create negative impacts by concentrating recreationists in areas that do have legal access. The quality of recreation would be lessened.

**Alternative C:** Acquiring new access to blocks of BLM land could increase recreation use by 2,300 visits or 3%. The Judith RA would absorb 1,400 visits, the Phillips RA 700 visits and the Valley RA 200 visits. This alternative would enhance the quality of dispersed recreation by providing additional opportunities on BLM land.

**Alternatives D & E (Preferred):** Additional access could create an estimated 11% increase in recreation use or 9,600 recreation visits. Of this increase, 2,300 visits would occur on lands with no current legal access and 7,300 visits would occur on lands that currently have at least some legal access. The Judith RA would absorb 5,800 visits, the Phillips RA 2,900 visits and the Valley RA 900 visits.

The planning area would benefit from increased recreation opportunities such as hunting, hiking, sightseeing, driving for pleasure, week-end excursions and picnicking. This alternative would enhance the quality of recreation by increasing the opportunities to participate in dispersed recreation activities on BLM land.

## From Off-Road Vehicle Designations

**Alternative A (Current):** The opportunities for off-road travel would not change while the demand for ORV use, walk-in hunting and other hunting is expected to increase. This could create the potential for recreation and landowner conflicts and lessen the recreational experience; a negative impact.

**Alternative B:** The opportunities for off-road travel by hunters and others would increase; a positive impact. There would also be a decrease in opportunities for hunters who enjoy walk-in hunting because of increased motorized vehicle disturbance; a negative impact.

An increase in off-road travel could create the potential for recreation and landowner conflicts. These could decrease the recreation opportunities in some areas, if landowners control and restrict access to BLM land.

**Alternative C:** The opportunities for off-road travel by hunters and others would decrease; a negative impact. There would also be an increase in opportunities for hunters who enjoy walk-in hunting because of less motorized vehicle disturbance. The quality of recreation for walk-in hunters would be significantly enhanced; a positive impact.

An intensive ORV use area in the Valley RA would provide opportunities for off-road races and rallies; a positive impact.

A decrease in off-road travel could lessen the potential for recreation and landowner conflicts in some areas. This could increase the opportunities in some areas if landowners allow additional access to BLM land; a positive impact.

**Alternative D:** The opportunities for off-road travel during the big game hunting season would decrease. This would be a significant negative impact for some hunters. The opportunities for off-road travel by non-hunters would also decrease in this alternative; a negative impact. Hunters and others who enjoy off-road travel may start using other areas. There would be a significant increase in opportunities for hunters who enjoy walk-in hunting because of less motorized vehicle disturbance; a positive impact. An intensive ORV use area in the Valley RA would provide opportunities for off-road races and rallies; a positive impact.

A decrease in off-road travel could lessen the potential for recreation and landowner conflicts in some areas; a positive impact. This could increase the opportunities in some areas, if landowners allow additional access to BLM land; a positive impact.

**Alternative E (Preferred):** The opportunities for off-road travel by hunters and other recreationists would increase; a positive impact. An intensive ORV use area in the Valley RA would provide opportunities for off-road races and rallies. Other areas for intensive ORV use would be designated as the need arises; positive impacts.

Exceptions in limited areas for camping, game retrieval, snowmobiles and the non-ambulatory handicapped would have a positive impact. Walk in hunting would be enhanced at times during the day when off-road game retrieval is restricted.

## From Oil and Gas Leasing and Development

**Alternative A (Current):** Oil and gas exploration and development activities could have a temporary, negative impact on recreation. Upgrading roads, new road construction and pipeline construction would displace some wildlife and affect hunting activities. The quality of recreation would be lessened by the intrusion of oil and gas activities in some areas. Overall, the impact to recreation would not be significant.

**Alternative B:** Crucial winter range for elk, deer and bighorn sheep could be negatively impacted by oil and gas activities. Hunting opportunities in these areas could decline. This could have a locally significant negative impact on recreation in some areas.

Oil and gas exploration and development activities could have a temporary, negative impact on recreation activities. The quality of recreation would be lessened by the intrusion of oil and gas activities (upgrading roads, new road construction and pipeline construction).

While oil and gas activities could have a locally significant negative impact in some areas, the overall impact to recreation in the planning area would not be significant.

**Alternatives C, D & E (Preferred):** The impacts would be the same as those in Alternative A.

## From Hardrock Mining

**Alternative A (Current):** Mining activity in the Little Rocky Mountains has reduced the opportunities for hiking, camping and sightseeing. Additional mining could further impact these activities and discourage use of the Camp Creek and Buffington recreation sites. The quality of dispersed recreation would be lessened as more land is disturbed.

Mining activity in the Judith Mountains has created little impact on dispersed recreation (picnicking, hiking, sightseeing and wildlife viewing). Additional exploration and mine development would be a negative impact to recreation use with increased traffic, noise and road building. Mining could discourage or curtail dispersed recreation use and displace some recreation use to other areas.

Mining activity in the North Moccasin and Little Belt Mountains has created little impact on recreation on BLM land. However, recreation opportunities on nearby private land have decreased due to mining. Additional mining on public land could adversely impact recreation on BLM land.

**Alternative B:** Additional mining in the Little Rocky Mountains could decrease recreation activities such as hiking, camping and sightseeing. The quality of dispersed recreation would be lessened as more land is disturbed.

Revoking the withdrawals in the Little Rocky Mountains could create significant negative impacts by allowing mine development to the edge of the Camp Creek and Buffington recreation sites. Mining activities would increase noise and discourage or curtail use of these recreation sites.

The impacts to recreation in the Judith, Moccasin and Little Belt Mountains would be the same as those in Alternative A.

**Alternative C:** Additional mining in the Little Rocky Mountains could decrease general recreation activities such as hiking, camping and sightseeing. The quality of dispersed recreation would be lessened as more land is disturbed.

Revoking the withdrawal for the Landusky recreation site would have no effect on current recreation sites.

Additional mining in the Judith Mountains would have a negative impact on dispersed recreation (picnicking, hiking, sightseeing and wildlife viewing) from increased traffic, noise and road building. Mining could discourage or curtail dispersed recreation use and displace some recreation use to other areas. Recreation would not be impacted to the same degree in the Collar Gulch and Judith Mountains Scenic Area ACECs because of the protection afforded by designation.

The impacts to recreation in the Moccasin and Little Belt Mountains would be the same as those in Alternative A.

**Alternative D:** Maintaining the withdrawals in the Little Rocky Mountains would protect the existing recreation sites; a positive impact. A protective withdrawal for bighorn sheep habitat in the southern portion of the Little Rocky Mountains would provide dispersed recreation opportunities; a positive impact. Additional mining in other areas in the Little Rocky Mountains could decrease general recreation activities such as hiking, camping and sightseeing; a negative impact.

A protective withdrawal in the Judith Mountains would maintain dispersed recreation opportunities by limiting disturbance, noise and traffic; a positive impact.

The impacts to recreation in the Moccasin and Little Belt Mountains would be the same as those in Alternative A.

**Alternative E (Preferred):** Revoking the withdrawals for Judith Peak, Red Mountain and the Landusky Recreation Site would have a minor negative effect on recreation. Continuing the withdrawals on the Blacktail Fossil Site, Azure Cave, and Camp Creek Campground would protect the recreation values; a positive impact.

Management prescriptions/mitigating measures that would be applied to Plans of Operations would increase protection of recreation values and potential recreation values in the Judith Mountains Scenic Area ACEC, elk habitat in the Judith and North Moccasin Mountains and bighorn sheep habitat in the Little Rocky Mountains; a positive impact.

The impacts to recreation in other portions of the Judith and North Moccasin Mountains would be the same as Alternative A.

## From Riparian and Wetland Management of Watersheds

**Alternative A (Current):** There would be a slight increase in recreation use associated with wildlife viewing and no impact on waterfowl hunting in the planning area. The

majority of ducks and geese produced on islands and reservoirs are harvested outside the planning area. Hunting associated with this waterfowl production is of national significance. Nearly 261,100 ducks and 27,000 geese would be produced, providing an estimated 58,000 visits for waterfowl hunting in states south of Montana.

**Alternative B:** There would be no impact to waterfowl hunting in the planning area, but a significant positive impact outside of the area. An estimated 191,000 ducks and 19,800 geese would be produced on islands and ponds, providing approximately 42,000 visits for waterfowl hunting in states south of Montana.

Increased waterfowl production would increase opportunities for wildlife viewing in the planning area.

**Alternative C:** There would be no impact to hunting in the planning area, but a significant positive impact outside of the area. The majority of ducks and geese are harvested in other states south of Montana. Nearly 309,900 ducks and 32,100 geese would be produced on islands and ponds. This would provide approximately 68,000 visits for hunting waterfowl in states south of Montana.

Increased waterfowl production would increase opportunities for wildlife viewing in the planning area.

**Alternative D:** There would be no impact to waterfowl hunting in the planning area, but a significant positive impact outside of the area. An estimated 333,500 ducks and 34,600 geese would be produced on islands and ponds. This would provide approximately 74,000 visits for hunting waterfowl in states south of Montana.

Increased waterfowl production would increase opportunities for wildlife viewing in the planning area.

**Alternative E (Preferred):** There would be no impact to waterfowl hunting in the planning area, but a significant positive impact outside of the area. Nearly 319,100 ducks and 30,400 geese would be produced on islands and ponds. This would provide approximately 65,000 visits for waterfowl hunting in states south of Montana.

Increased waterfowl production would increase opportunities for wildlife viewing in the planning area.

## **From Elk and Bighorn Sheep Habitat Management**

**Alternative A (Current):** Expanding elk and bighorn sheep habitat would increase the opportunities for wildlife viewing. Hunting opportunities on BLM land could increase, but would depend on MDFWP raising harvest limits to meet new elk and bighorn sheep hunting opportunities.

**Alternative B:** Maintaining elk and bighorn sheep habitat would have no effect on the opportunities of wildlife viewing and hunting.

**Alternatives C, D & E (Preferred):** The impacts would be the same as those in Alternative A.

## **From Prairie Dog and Black-Footed Ferret Management**

**Alternative A (Current):** Eliminating 10,013 acres of prairie dog towns would decrease wildlife viewing opportunities for associate species (mountain plover, burrowing owl, and ferruginous hawk); a negative impact. The opportunity for viewing black-footed ferrets, prairie dogs and associate species would increase within the reintroduction area (3,308 acres); a positive impact.

Currently about 300 people each year spend an average of 4 days each shooting prairie dogs on BLM land. Under this alternative there would be a 100% loss of prairie dog shooting opportunities; a significant negative impact.

**Alternative B:** Eliminating 6,859 acres of prairie dog towns would decrease wildlife viewing opportunities for associate species; a negative impact. The opportunity for viewing black-footed ferrets, prairie dogs and associate species would increase within the reintroduction area 6,462 acres; a positive impact.

There would be a 50% loss of prairie dog shooting opportunities on BLM land from eliminating prairie dog towns. Recreation use would decrease by 150 visits; a significant negative impact.

In the long term, there could be an increase in wildlife viewing and prairie dog shooting with the potential acquisition of prairie dog towns.

**Alternative C:** Eliminating 1,330 acres of prairie dog towns would decrease wildlife viewing opportunities for associate species; a negative impact. The opportunity for viewing black-footed ferrets, prairie dogs and associate species would increase within the reintroduction area (7,367 acres); a positive impact.

Until ferret reintroduction occurs, there would be a 9% loss of prairie dog shooting opportunities on BLM land from eliminating prairie dog towns. After ferret reintroduction occurs, there would be a 62% loss of prairie dog shooting opportunities. Recreation use would decrease by 190 visits; a significant negative impact.

In the long term, there could be an increase in wildlife viewing and prairie dog shooting with the potential acquisition of prairie dog towns.

**Alternative D:** The opportunity for viewing black-footed ferrets, prairie dogs and associate species would increase within the reintroduction area (12,105 acres); a positive impact.

Until ferret reintroduction occurs, there would be no change in prairie dog shooting opportunities. After ferret reintroduction occurs, there could be a 86% loss of prairie dog shooting opportunities. Recreation use could decrease by 260 visits; a significant negative impact.

In the long term, there would be an increase in wildlife viewing and prairie dog shooting opportunities from expanding prairie dog towns on BLM land. Recreation use could increase 380 visits with shooting opportunities above the current level; a significant positive impact.

**Alternative E (Preferred):** The opportunity for viewing black-footed ferrets, prairie dogs and associate species would increase within the reintroduction area (12,346 acres); a positive impact.

Prairie dog shooting would be allowed, unless impacts from shooting are shown to be detrimental to the black-footed ferret. This alternative could have an effect on prairie dog shooting opportunities on BLM land.

### From the Judith Mountains Scenic Area

**Alternatives A (Current) & B:** There would be little or no impact to the general recreation use in the area. A negative impact to sightseeing and hiking in the Judith and South Moccasin Mountains could result from noise, traffic and road building associated with mining.

**Alternatives C & D:** There would be little or no impact to dispersed recreation use. The quality of some recreation activities (sightseeing and hiking) would be maintained by protecting the scenic quality; a positive impact.

**Alternative E (Preferred):** BLM would designate 3,702 acres an ACEC (Judith Mountains Scenic Area) to protect scenic, wildlife and recreation values. A negative impact to sightseeing and hiking in the South Moccasin Mountains could result from noise, traffic and road building associated with mining. The quality of some recreation activities (sightseeing and hiking) in the Judith Mountains Scenic Area ACEC would be somewhat maintained by protecting the scenic quality; a positive impact.

### From the Acid Shale-Pine Forest ACEC

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to recreation.

### From The Square Butte ONA ACEC

**Alternative A (Current):** No impact to recreation.

**Alternative B:** Terminating the CMU Classification could decrease recreation use by opening the area to mining claim location.

**Alternatives C, D & E (Preferred):** Acquiring land would provide more opportunities for recreation on Square Butte and improve the quality of hiking and sightseeing. Legal access to the Butte would increase visitor use. Acquisition and access could double visitor use from 800 annual visits to 1600 visits, a significant positive impact.

### From the Collar Gulch ACEC

**Alternatives A (Current) & B:** Disturbances associated with mining activities could reduce wildlife viewing, sightseeing and hiking opportunities; a negative impact.

**Alternatives C & D:** Restricting surface disturbing activities would maintain the quality of and increase the opportunity for recreation in the area; a positive impact.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative A.

### From the Azure Cave ACEC

**Alternative A (Current):** Not allowing admittance to the cave would be a negative impact to some recreationists.

**Alternative B:** Revoking the protective withdrawal could create a negative impact on the cave resources, if mining occurred. A significant increase in recreation use would occur in the short term. However, there would be a potential risk to public safety. Cave resources could receive substantial damage with no control of or restrictions on visitors. Over a period of time, the attractiveness of the cave resource could diminish, resulting in a decrease in visitors.

**Alternative C:** This alternative would provide a significant increase in the opportunity for recreation use, but the overall quality could decrease in the long term. A concessionaire could maximize recreation use, but there is no demand for developed cave activities. The interest is in exploring wild caves or undeveloped areas.

**Alternative D:** Allowing cave use by a permit system would create a moderate increase in recreation opportunities. The opportunity for access, by permit, would improve the availability of the cave for the public to explore.

**Alternative E (Preferred):** Allowing access to the cave could create a moderate increase in the opportunity for



recreation use. Specific impacts to recreation would be addressed during development of the activity plan.

## **From the Big Bend of the Milk River ACEC**

**Alternatives A (Current) & B:** Opportunities to interpret cultural resources would be lost; a negative impact.

**Alternatives C, D & E (Preferred):** There would be a moderate increase in recreation use and an opportunity to develop one site for cultural interpretation. Interpretive panels, a trail system and picnic area would enhance the quality of recreation in the area. There is an opportunity to provide over 10,000 recreation visits (based on the Madison Buffalo Jump west of Bozeman, which is a similar site and receives about 14,000 visits on a yearly basis).

## **IMPACTS TO VISUAL RESOURCES**

### **From Land Acquisition and Disposal**

**Alternatives A (Current), B, C, D & E (Preferred):** Disposing of BLM land could result in some visual impairment. Various intrusions could be constructed and land use practices could change. Acquiring land would aid in maintaining visual qualities. The potential for visual impairment would be reduced in these areas and some existing visual intrusions could also be reclaimed which would enhance the visual qualities. Overall, there would be a positive impact on visual resources.

### **From Access to BLM Land**

**Alternative A (Current):** Acquiring access for the general public and authorized users could deteriorate visual qualities, depending on the frequency, type of use and location. The impacts would be less in areas with ORV restrictions. Overall, the impacts would be minor.

**Alternative B:** No impact to visual resources.

**Alternatives C, D & E (Preferred):** The impacts would be the same as those in Alternative A.

### **From Off-Road Vehicle Designations**

**Alternative A (Current):** Unrestricted ORV use on 2,375,440 acres would have a negative impact by lowering the visual quality of the natural landscape. New trails could be created by off-road travel, especially during hunting season. The visual qualities would decline as a result.

The Square Butte ONA ACEC would be closed to ORV use which would protect the visual quality of this area; a positive impact.

ORV use in the WSAs would be restricted yearlong to designated roads and trails which would protect visual qualities; a positive impact.

**Alternative B:** Unrestricted ORV use on 2,687,570 BLM acres would create impacts similar to those in Alternative A.

The Square Butte ONA ACEC would be closed to ORV use which would protect the visual quality of the area; a positive impact.

ORV use in the WSAs would be restricted yearlong to designated roads and trails which would protect visual qualities; a positive impact.

**Alternative C:** Unrestricted ORV use on 1,818,437 acres would create impacts similar to those in Alternative A.

The Square Butte ONA would be closed yearlong to ORV use which would protect the visual quality of the area; a positive impact.

ORV use in the WSAs would be restricted yearlong to designated roads and trails which would protect visual qualities; a positive impact.

Vehicle travel would be limited to designated roads and trails on 983,915 BLM acres from September 1 to December 1. This would protect visual qualities; a positive impact.

**Alternative D:** Restricting off-road travel seasonally or yearlong on all BLM land would be a significant positive impact. The visual quality would improve as a result.

The Square Butte ONA ACEC, Rock Creek Canyon area, Collar Gulch ACEC and Acid Shale-Pine Forest (War Horse) ACEC would be closed to ORV use. The visual quality of these areas would be protected; a positive impact. ORV use in the WSAs would be restricted yearlong to designated roads and trails which would protect visual qualities; a positive impact.

**Alternative E (Preferred):** The Square Butte ONA ACEC would be closed to ORV use; a positive impact.

ORV use in the WSAs would be restricted yearlong to designated roads and trails which would protect visual qualities; a positive impact.

Unrestricted ORV use on 1,990,501 BLM acres would lower the visual quality of the natural landscape. New trails would be created by off-road travel, especially during hunting season and the visual quality in these areas would

decline as a result. Restricting ORV use on 813,709 BLM acres would protect and maintain the visual quality in those areas; a positive impact.

### From Oil and Gas Leasing and Development

**Alternatives A (Current), B, C, D & E (Preferred):** In general, exploration, development and production would affect line, form, color and texture of the natural landscape in oil and gas fields. Impacts from seismic activity would be short term. Although there would be temporary negative impacts from new well production in producing areas, the long-term impacts would be minimal. This is due to the localized nature of oil and gas development and production, the temporary nature of disturbing activities, reclamation requirements, VRM requirements or the No Surface Occupancy restrictions.

The impacts would vary slightly among alternatives, but would not be significant.

### From Hardrock Mining

**Alternative A (Current) & B:** Mining exploration and development would continue in the Little Rocky, Judith, North and South Moccasin and Little Belt Mountains. Mining activities would affect the line, form, color and texture of the natural landscape and create the potential for deteriorated visual qualities. Some of these activities would cause long-term or permanent changes in the natural landscape. Mitigation measures would help minimize some of the adverse impacts.

Table 4.14 shows the VRM classes and projected acres of disturbance for the various mountain ranges

Mountain Range	VRM Class	Alternative				
		A	B	C	D	E
Little Rockys	II	930	930	930	810	930
Judiths	II	300	300	220	45	220
Moccasins	III	140	140	120	70	120
Little Belts	III	60	60	60	60	60

Source: BLM, 1990

Significant negative impacts could occur in the Little Rocky, Judith and Moccasin Mountains because of the visual qualities (VRM Class II) and the acreage disturbed. Visual quality would deteriorate in these areas as new mining activities occur.

**Alternative C:** Mining exploration and development would be expected in the Little Rocky, Judith, North and South Moccasin and the Little Belt Mountains. The potential exists for some deterioration of visual quality in these areas. Special mitigating measures would be implemented to protect scenic qualities in the South Moccasin and Judith Mountains during the project permitting process; a positive impact. Table 4.14 shows the VRM classes and projected acres of disturbance for the various mountain ranges.

BLM would continue most existing withdrawals and pursue a withdrawal on the Square Butte ONA. This would protect the visual qualities in these specific areas; a positive impact.

**Alternative D:** BLM would continue current withdrawals and pursue seven additional withdrawals. Table 4.14 shows the VRM classes and projected acres of disturbance for the various mountain ranges.

This alternative would be extremely beneficial to visual resources. The protection afforded by withdrawals from mining activities would significantly protect the visual quality in these specific areas. Of notable importance would be the protection of the scenic qualities in the South Moccasin and Judith Mountains.

**Alternative E (Preferred):** Mining exploration and development would be expected in the Little Rocky, Judith, North and South Moccasin and the Little Belt Mountains. The potential exists for some deterioration of visual quality in these areas. Mining activities would affect the line, form, color and texture of the natural landscape. Some of these activities would cause long-term or permanent changes in the natural landscape. With the exception of extreme circumstances, specific management prescriptions would help to maintain the visual integrity and scenic qualities in the Judith Mountains Scenic Area ACEC.

Table 4.14 shows the VRM classes, and projected acres of disturbance for the various mountain ranges.

This alternative would be beneficial to the visual resources in the planning area. The protection afforded from mining activities by withdrawals and the special management prescriptions would enhance and/or protect the visual quality in these specific areas; a regionally significant positive impact.

### From Riparian and Wetland Management of Watersheds

**Alternatives A (Current), B, C, D & E (Preferred):** Management prescriptions and other actions that improve and protect riparian-wetland areas would enhance the visual qualities. Maintaining riparian-wetland areas would have no impact on visual quality.

## From Elk and Bighorn Sheep Habitat Management

**Alternatives A (Current), B, C, D & E (Preferred):** No impacts to visual resources.

## From Prairie Dog and Black-Footed Ferret Management

**Alternatives A (Current), B, C, D & E (Preferred):** On a site-specific basis, there would be a minor positive impact by eliminating prairie dog towns. Soils would stabilize and range conditions would improve. A minor negative impact would occur where prairie dog towns are maintained. Soils and vegetation would remain disturbed which would be in contrast with the surrounding area. Overall, there would be little or no impact to the visual qualities.

## From the Judith Mountains Scenic Area

**Alternatives A (Current) & B:** The scenic quality could be significantly impacted in this area without visual resource protection. Surface disturbing activities would affect the line, form, color and texture of the natural landscape. The potential for deteriorated scenic qualities exists from mining claim location, exploration and development. Mining activities could cause long-term or permanent changes in the natural landscape.

**Alternative C:** BLM would designate 4,566 BLM acres an ACEC to protect the scenic qualities in the Judith and South Moccasin Mountains. These lands would be managed to protect the area from surface disturbing activities. This would protect the visual resources.

**Alternative D:** BLM would designate 4,566 BLM acres an ACEC to protect the scenic qualities in the Judith and South Moccasin Mountains. These lands would be withdrawn from mining claim location to protect the area from surface disturbing activities.

This would be a significant positive impact by protecting the visual resources.

**Alternative E (Preferred):** BLM would designate 3,702 acres an ACEC to protect scenic, wildlife and recreation values in the Judith Mountains. Management prescriptions on Plans of Operations within this area would help in the protection of the visual quality from surface disturbing activities; a positive impact.

## From the Acid Shale-Pine Forest ACEC

**Alternatives A (Current), B, C, D & E (Preferred):** No impacts to visual resources.

## From the Square Butte ONA ACEC

**Alternative A (Current):** Designating 1,947 acres as an ACEC, the ORV closure and the management prescriptions would maintain the visual quality of Square Butte and the surrounding area. The area would remain segregated from mineral entry; a positive impact.

**Alternative B:** The impacts would be similar to those in Alternative A, except the area would be open to mineral entry. This could be a negative impact to visual resources.

**Alternative C:** The ORV closure and implementing management prescriptions would maintain the visual quality of Square Butte and the surrounding area. The area would be withdrawn from mining claim location. This would protect the visual quality of Square Butte; a positive impact.

**Alternative D:** Designating 1,947 BLM acres as an ACEC, the ORV closure and implementing management prescriptions would maintain the visual quality of Square Butte and the surrounding area. The area would be withdrawn from mining claim location. This would protect the visual quality of Square Butte; a positive impact.

**Alternative E (Preferred):** Designating 1,947 BLM acres as an ACEC, the ORV closure, implementing management prescriptions and acquiring additional land would protect and maintain the visual quality of Square Butte and the surrounding area. The area would be withdrawn from mining claim location which would protect the visual quality of Square Butte; a positive impact.

## From the Collar Gulch ACEC

**Alternatives A (Current) & B:** The visual quality of the area could deteriorate; a significant negative impact.

**Alternative C:** Designating 1,160 BLM acres as an ACEC and implementing management prescriptions would maintain the visual quality of the area; a positive impact.

**Alternative D:** Designating 1,618 BLM acres as an ACEC and the subsequent withdrawal would protect and maintain the visual quality of the area; a positive impact.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative A.

## From the Azure Cave ACEC

**Alternative A (Current):** No impacts to visual resources.

**Alternative B:** There could be a negative impact to the cave area with few or no restrictions and/or management prescriptions. The visual quality would begin to deteriorate.

**Alternatives C & D:** The visual quality of Azure Cave and the surrounding 479 BLM acres would be maintained by the ACEC designation and specific management prescriptions; a positive impact.

**Alternative E (Preferred):** The visual quality of Azure Cave and the surrounding 140 BLM acres would be protected and maintained by the ACEC designation, specific management prescriptions and the withdrawal from mining claim location and mineral leasing; a positive impact.

**From the Big Bend of the Milk River ACEC**

**Alternatives A (Current), B, C, D & E (Preferred):** No impacts to visual resources.

**IMPACTS TO ECONOMIC CONDITIONS**

**From Land Acquisition and Disposal**

**Alternatives A (Current), B, C & D:** Disposal of 166,021 acres could decrease BLM land by 6% in the planning area; 10% in the Judith RA, 3% in the Valley RA, and 6% in the Phillips RA (see Table 4.15). Based on previous BLM land exchanges, state and county land holdings could increase nearly 7%, while private land could increase by 1%.

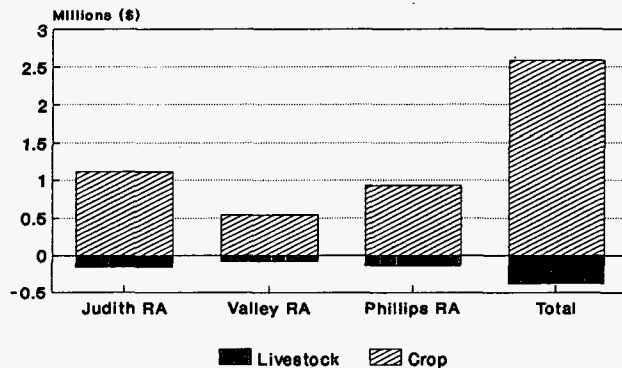
Total economic activity in the planning area could increase \$2.2 million, due to an increase in crop production (\$2.6 million) and a decrease in livestock production (\$384,000) (see Figure 4.1). This assumes that 41% of the BLM acres identified for disposal could be converted from native prairie vegetation or crested wheatgrass to dryland farming. In the Judith RA, economic activity could increase \$1.1 million from crop production and decrease \$160,000 from livestock production. In the Phillips RA, economic activity could increase \$932,000 from crop production and decrease \$140,000 from livestock production. In the Valley RA, economic activity could increase \$544,000 from crop production and decrease \$84,000 from livestock production. These impacts would not be significant in relation to total output for all sectors of the planning area, nor would the increase be significant for the agricultural sector in the planning area. There could be additional impacts to economic activity if lands are acquired by BLM through exchange. Impacts would depend on the values for which the land is acquired.

**TABLE 4.15  
LAND DISPOSAL SUMMARY**

Resource Area and County	Acres Identified For Disposal	% of total BLM Acres	% of Total Land Surface
<b>Judith RA</b>			
Chouteau	6,024	0.9 %	0.10 %
Judith Basin	2,406	0.3 %	0.04 %
Fergus	42,491	6.1 %	0.71 %
Petroleum	17,410	2.5 %	0.29 %
Subtotal	68,331	9.7 %	1.14 %
<b>Valley RA</b>			
Valley	34,089	3.3 %	1.26 %
<b>Phillips RA</b>			
Phillips	63,601	5.9 %	1.95 %
Total	166,021	5.9 %	1.39 %

Source: BLM, 1990

**FIGURE 4.1  
Total Economic Benefit Change  
Land Acquisition/Disposal**

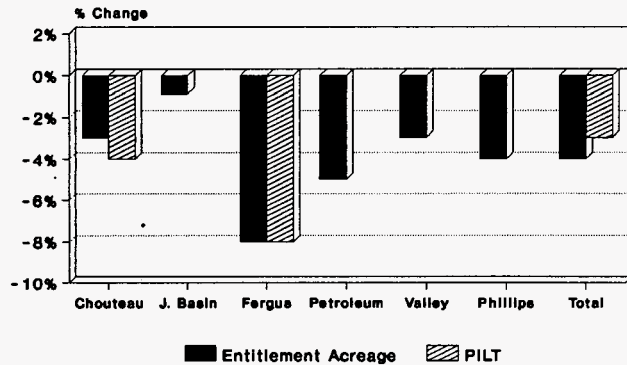


Change from Current Conditions

Total annual employment could increase by 35 jobs, primarily due to increases in crop production; this increase includes employment from both direct and secondary spending and would not be significant.

Disposal could result in a decrease in Payments-in-Lieu-of Taxes (PILT) of \$31,000 per year, or 3%. This decline is due to a 4% decrease in Chouteau County (\$5,000) and an 8% decrease in Fergus County (\$26,000). The other counties are not expected to experience changes in PILT since they have reached the ceiling limits used for PILT calculations. Acquisition of land through exchange could offset decreases in PILT resulting from disposal in some counties. Figure 4.2 shows, by county, the comparison between changes in PILT and changes in entitlement acres.

**FIGURE 4.2  
PILT and Entitlement Acreage  
Change by County**



Change from Current Status

Increases in private agricultural land could raise taxable valuation for the six counties in the planning area. The increase in annual property-tax revenues resulting from disposal of BLM land could be \$61,000.

Overall, increases in property-tax revenues could more than offset the decreases in PILT, resulting in a net increase of \$30,000 in annual tax revenues in the planning area. However, in Fergus County there could be a net decrease in annual tax revenues of \$3,000 because property tax increases would not completely offset the decrease in PILT. Table 4.16 summarizes the changes in PILT and property tax revenues.

**TABLE 4.16  
PAYMENTS IN LIEU OF TAXES  
AND PROPERTY TAX REVENUE  
ALTERNATIVES A - D**

Resource Area and County	Change in PILT	Change in Property Tax	Net Change in Revenue
<b>Judith RA</b>			
Chouteau	\$< 5,000>	\$5,000	\$0
Judith Basin	0	1,000	1,000
Fergus	<26,000>	23,000	<3,000>
Petroleum	0	4,000	4,000
<b>Subtotal</b>	<b>\$&lt;31,000&gt;</b>	<b>\$33,000</b>	<b>\$2,000</b>
<b>Valley RA</b>			
Valley	0	\$14,000	\$14,000
<b>Phillips RA</b>			
Phillips	0	\$14,000	\$14,000
<b>Total</b>	<b>\$&lt;31,000&gt;</b>	<b>\$61,000</b>	<b>\$30,000</b>

Source: BLM, 1990

**Alternative E (Preferred):** The economic impacts from disposing of 161,968 acres would be similar to Alternative A. The only measurable difference is in Chouteau County, where PILT could decline \$4,000 (rather than \$5,000). Thus, the net increase in annual tax revenues in the planning area could be \$31,000 (rather than \$30,000) (see Table 4.17).

**TABLE 4.17  
PAYMENTS IN LIEU OF TAXES  
AND PROPERTY TAX REVENUE  
ALTERNATIVE E**

Resource Area and County	Change in PILT	Change in Property Tax	Net Change in Revenue
<b>Judith RA</b>			
Chouteau	\$< 4,000>	\$5,000	\$1,000
Judith Basin	0	1,000	1,000
Fergus	<26,000>	23,000	<3,000>
Petroleum	0	4,000	4,000
<b>Subtotal</b>	<b>\$&lt;30,000&gt;</b>	<b>\$33,000</b>	<b>\$3,000</b>
<b>Valley RA</b>			
Valley	0	\$14,000	\$14,000
<b>Phillips RA</b>			
Phillips	0	\$14,000	\$14,000
<b>Total</b>	<b>\$&lt;30,000&gt;</b>	<b>\$61,000</b>	<b>\$31,000</b>

Source: BLM, 1990

### From Access to BLM Land

**Alternative A (Current):** Future demand for recreation opportunities may be greater than the increase in supply that results from additional access to BLM land. The potential exists in the long-term for overuse of current recreational areas if demand for recreation on BLM land increases in the planning area. If the quality of recreation declines from overuse, thus decreasing recreation use of BLM land, there could be a negative impact on regional economic activity which would be felt primarily in the retail trade and services sectors.

**Alternative B:** The impacts would be similar to Alternative A, except that no new access would be pursued, leading to potentially greater negative economic impacts to regional economic activity.

**Alternative C:** Acquiring access would increase recreation opportunities in the long-term. Annual total economic benefit, which includes total economic activity and net willingness to pay, could increase by \$383,000. Annual total economic activity would increase by \$267,000, primarily in the retail trade and services sectors. The increase

would not be significant in relation to total output in the planning area; however, the increase would be significant for the Judith RA, where economic activity attributable to BLM land is estimated to increase \$160,000, or 5%. Increases in the Valley and Phillips RAs, \$43,000 and \$65,000 respectively, would not be significant. Net willingness to pay for recreation opportunities would contribute \$115,000 to the total increase in economic benefit in the planning area.

Some of the increase in recreation opportunities could be hunting that currently may be occurring on private land. To the extent that this hunting activity is transferred to BLM land due to increased access, full implementation of this alternative would not generate the economic impact estimated. Rather, the current level of economic activity attributable to hunting on private land could merely be transferred to BLM land.

Total annual employment could increase by seven jobs in the planning area, primarily in the retail trade and services sectors. This increase would not be significant.

**Alternatives D & E (Preferred):** The economic impacts would be similar to Alternative C, except that annual total economic benefit is estimated to increase \$1.6 million due to increased recreation opportunities. Annual total economic activity would increase by \$1.1 million, primarily in the retail trade and services sectors. The increase would not be significant in relation to total output in the planning area; however, in terms of economic activity attributable to recreation on BLM land, this represents a 13% increase which is significant. The increase would be significant for each resource area as well: Judith RA \$667,000 (19%); Valley RA \$183,000 (11%); and Phillips RA \$279,000 (7%). Net willingness to pay for recreation opportunities would contribute \$484,000 to the total increase in economic benefit in the planning area.

Some of the increase in recreation opportunities could be hunting that currently may be occurring on private land. To the extent that this hunting activity is transferred to BLM land due to increased access, full implementation of this alternative would not generate the economic impact estimated. Rather, the current level of economic activity attributable to hunting on private land could merely be transferred to BLM land.

Total annual employment could increase 28 jobs in the planning area, primarily in the retail trade and services sectors. This increase would not be significant.

## From Off-Road Vehicle Designations

**Alternative A (Current):** Although there may be a shift in the type of hunting activity occurring on BLM land to relatively more walk-in hunting, the impacts to economic conditions in the planning area would be negligible.

**Alternative B:** Although there would be potential for increased economic activity from off-road travel hunting and decreased potential from walk-in hunting, the impacts to economic conditions in the planning area would be negligible.

**Alternative C:** The impacts would be similar to those in Alternative A, except BLM would designate an intensive ORV use area in the Valley RA. This designation could contribute to an increase in economic activity, although the impact would be negligible since most users would likely come from the local area. No off-road travel for game retrieval during the big game hunting season could reduce economic activity associated with big game hunting.

**Alternative D:** The impacts would be similar to Alternative C, except that off-road travel for game retrieval during the big game hunting season would be allowed.

**Alternative E (Preferred):** The impacts would be similar to Alternative C, except that off-road travel for game retrieval during the big game hunting season would be allowed.

## From Oil and Gas Leasing and Development

**Alternatives A (Current), B & C:** There would no significant impacts to economic conditions. However, a new oil or gas discovery would increase economic activity in the short-term during field development and in the long-term during production. Unless a major discovery occurs, development activity would be on a small scale and would not cause significant impacts. Production revenue would also increase regional economic activity, primarily in the petroleum and natural gas extraction, construction and transportation sectors. Additionally, there may be a negligible increase in employment but, again, this would depend on the size of the discovery.

**Alternative D:** Leasing restrictions could reduce the level of exploration occurring on federal land anticipated by the oil and gas RFD scenario (see Appendix B). Consequently, economic activity related to exploratory drilling on federal leases could potentially be foregone. In addition, leasing restrictions could lead to a decrease in federal leases, resulting in a decrease in federal rents and royalties paid. On the other hand, if exploration occurs at anticipated levels on nonfederal leases, there may be no impact to the regional economy.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative A.

## From Hardrock Mining

**Alternatives A (Current) & B:** Based on the RFD in Appendix C is estimated that 70 exploration projects could

be undertaken in Fergus and Judith Basin Counties and 40 in Phillips County. In the Judith RA, exploration activity could result in the development of ten additional mining operations; five could be small underground operations in the Judith Mountains, two could be small open-pit heap-leach operations and one could be a large open pit operation in the same area, and two could be small open-pit heap-leach operations in the North and South Moccasin Mountains. In the Phillips RA, exploration activity could result in the development of eight additional mining operations in the Little Rocky Mountains, including the current Zortman and Landusky mines. These would most likely be open-pit, heap-leach operations, most of which could be expansions of existing mines, rather than entirely new operations.

A typical exploration project would cost \$200,000, of which \$40,000 may be expected to be spent in the planning area (see Appendix C). Exploration activity could increase total economic benefit \$5.2 million in the Judith RA and \$3 million in the Phillips RA, a total of \$8.2 million over the life of the plan. Of the estimated \$8.2 million, \$4.4 million would be direct expenditures primarily in the construction and services sectors with an additional \$3.8 million in secondary spending. It is estimated that about 25 exploration projects are currently underway or nearly completed. The level of exploration activity projected would not represent a significant increase with respect to regional economic activity. Exploration activity in the Judith and Phillips RAs could increase total annual employment over the life of the plan by up to eight jobs. This would not be a significant increase in employment at the regional or county level.

New mining operations would have a significant impact on the area's economic activity, employment, population, and tax revenues, during both the construction and production phases. The impacts may be long-term, depending on the size of the operation, and the ability to maintain operations and expand. The timing, size, and location would determine the magnitude of the impacts to the area's economy. These factors, as well as the inherent uncertainty of future economic conditions, make it speculative at best to estimate when the operations projected might be developed. Accordingly, it would be impossible to assess specific impacts with any degree of accuracy. However, a maximum possible development scenario for mineral development is presented here to illustrate the potential magnitude of impacts. Appendix C describes three hypothetical operations that could reasonably be expected to occur in the planning area.

In the Phillips RA, an additional eight mining operations projected for the Little Rocky Mountains could increase peak employment in the mining industry by 600 jobs in the foreseeable future if these operations were to come online concurrent with the Zortman-Landusky mines. If all new jobs were filled by non-local labor, the population could increase by 1,500 people at peak employment as new workers and their families move into the area, a significant

increase of 28% over the 1988 estimated Phillips RA population of 5,400. It is likely, however, that for the foreseeable future the local labor pool, primarily from Phillips County and the Fort Belknap Indian Reservation, would continue to fill a significant portion of new jobs created by the mining industry in the Little Rocky Mountains.

In the Judith RA, an additional 10 mining operations projected for the Judith, North Moccasin, and South Moccasin Mountains could increase peak employment by 800 jobs in the foreseeable future if all operations were at some future point online simultaneously. This could potentially increase the Judith RA population by 2,000, an increase of 12% over the 1988 estimated population of 16,650 (assuming all new employment is filled by non-local labor). Most of this increase likely would be felt in Fergus County. As with employment in the Little Rocky Mountains, it is likely that, for the foreseeable future, the local labor pool would continue to fill a significant portion of new mining industry jobs.

The projected peak employment and population impacts would increase employment opportunities as well as reverse long-term trends in population decline in the region. There could be a significant increase in economic activity in the planning area and increased tax revenues in the counties where mining operations are located. The impacts to economic activity would result from increases in regional expenditures by mining operations as well as indirect impacts from secondary spending activity. Taxable valuation would increase due to the construction of mining facilities, leading to an increase in property-tax revenues when operations come online. Other state tax revenues generated during the production phase would come from the Gross Proceeds Tax, Metal Mines License Tax, and the Resource Indemnity Trust Tax.

**Alternative C:** For the Phillips RA, the regional economic impacts from hardrock exploration and development would be the same as those in Alternative A. For the Judith RA, the impacts would be similar to those of Alternative A, except that the magnitude of the impacts would not be as great, due to a lesser degree of exploration and development. The following description of impacts pertains to the Judith RA.

It is estimated that 60 exploration projects could be undertaken in Fergus and Judith Basin Counties and 10 exploration projects could be foregone. Exploration activity could result in the development of seven additional mining operations, four could be small underground operations in the Judith Mountains, two could be small open-pit heap-leach operations in the same area, and one could be a small open-pit heap-leach operation in the North Moccasin Mountains. Three potential mining operations could be foregone based on the RFD, one small open-pit operation and one large open pit in the South Moccasin-Judith Mountains Scenic Area and one underground operation in the Collar Gulch ACEC.

Exploration activity could increase total economic benefit \$4.5 million in the Judith RA and an estimated \$700,000 in potential economic activity could be foregone. Of the estimated \$4.5 million, \$2.4 million would be direct expenditures primarily in the construction and services sectors with an additional \$2.1 million in secondary spending. This level of exploration would not represent a significant increase with respect to regional economic activity. Exploration activity in the Judith and Phillips RAs combined could increase total employment over the life of the plan by up to seven jobs. This would not be a significant increase in employment at the regional and county levels.

An additional seven mining operations projected for the Judith and the North Moccasin Mountains could increase peak employment by 500 jobs in the foreseeable future if all operations were at some future point online simultaneously. Potential long-term employment opportunities lost are estimated to total about 100 for the foregone operations in the South Moccasin-Judith Mountains Scenic Area and Collar Gulch ACECs. The estimated increase in employment could potentially increase the Judith RA population by 1,200, a significant increase of 7% over the 1988 estimated population of 16,650 (assuming all new employment is filled by non-local labor). Most of this increase would be felt in Fergus County. It is likely, however, that for the foreseeable future, the local labor pool would continue to fill a significant portion of new jobs created by the mining industry.

The projected peak employment and population impacts would increase employment opportunities as well as reverse long-term trends in population decline in the region. There could be a significant increase in economic activity in the planning area and increased tax revenues in the counties where mining operations are located. The impacts to economic activity would result from increases in regional expenditures by mining operations as well as indirect impacts from secondary spending activity. Taxable valuation would increase due to the construction of mining facilities, leading to an increase in property-tax revenues when operations come online. Other tax revenues generated during the production phase would come from the Gross Proceeds Tax, Metal Mines License Tax, and the Resource Indemnity Trust Tax.

**Alternative D:** For both the Judith and Phillips RAs, the impacts would be similar to those of Alternative A, except that the magnitude of the impacts would not be as great, due to a much lower level of exploration and development. It is estimated that 27 exploration projects could be undertaken in Fergus and Judith Basin Counties; 43 exploration projects could be foregone. In the Phillips RA 24 exploration projects could be undertaken; 16 could be foregone.

In the Judith RA, exploration activity could result in the development of five additional mining operations, three could be small underground operations in the Judith

Mountains, one could be a small open-pit heap-leach operation in the same area, and one could be a small open-pit heap-leach operation in the North Moccasin Mountains.

In the Phillips RA, exploration activity could result in the development of six additional mining operations in the Little Rocky Mountains. These would most likely be open-pit, heap-leach operations, most of which could be expansions of existing mines, rather than entirely new operations.

Seven potential mining operations could be foregone due to withdrawals of land from mining claim location. One small open-pit mine, one large open pit mine and one underground mine in the South Moccasin-Judith Mountains Scenic Area, one underground mine in the Collar Gulch ACEC, two open-pit mines due to withdrawal for elk and bighorn sheep habitat in the Little Rocky Mountains, and one small open-pit mine in the Judith Mountains.

Exploration activity could increase total economic benefit \$2 million in the Judith RA and \$1.8 million in the Phillips RA, a total of \$3.8 million over the life of the plan; an estimated \$4.4 million in potential economic activity could be foregone. Of the estimated \$3.8 million, \$2 million would be direct expenditures primarily in the construction and services sectors with an additional \$1.8 million in secondary spending. This level of exploration would not represent a significant increase with respect to regional economic activity. Exploration activity in the Judith and Phillips RAs could increase total employment over the life of the plan by up to four jobs. This would not be a significant increase in employment at the regional and county levels.

In the Phillips RA, an additional six mining operations projected for the Little Rocky Mountains could increase peak employment in the mining industry by over 400 jobs in the foreseeable future if these operations were to come online concurrent with the decline in current operations at the Zortman-Landusky mines. Potential long-term employment opportunities lost are estimated to total about 150 for the foregone operations in the Little Rocky Mountains. If all new jobs were filled by non-local labor, the population could increase by 1,100 people at peak employment as new workers and their families move into the area, a significant increase of 20% over the 1988 estimated population of 5,400. It is likely, however, that for the foreseeable future the local labor pool, primarily from Phillips County and the Fort Belknap Indian Reservation, would continue to fill a significant portion of new jobs created by the mining industry in the Little Rocky Mountains.

In the Judith RA, an additional five mining operations projected for the Judith and North Moccasin Mountains could increase peak employment by 300 jobs in the foreseeable future if all operations were at some future point online simultaneously. Potential long-term employment opportunities lost are estimated to total about



200 for the foregone operations. The estimated increase in employment could potentially increase the Judith RA population by 700, a marginally significant increase of 4% over the 1988 estimated population of 16,650 (assuming all new employment is filled by non-local labor). Although a marginally significant increase for the Judith RA as a whole, most of the increase would likely be felt in Fergus County and would create significant impacts there. As with employment in the Little Rocky Mountains, it is likely that, for the foreseeable future, the local labor pool would continue to fill a significant portion of new mining industry jobs.

The projected peak employment and population impacts would increase employment opportunities as well as reverse long-term trends in population decline in the region. There could be a significant increase in economic activity in the planning area and increased tax revenues in the counties where mining operations are located. The impacts to economic activity would result from increases in regional expenditures by mining operations as well as indirect impacts from secondary spending activity. Taxable valuation would increase due to the construction of mining facilities, leading to an increase in property-tax revenues when operations come online. Other tax revenues generated during the production phase would come from the Gross Proceeds Tax, Metal Mines License Tax, and the Resource Indemnity Trust Tax.

Validity exams would be performed on claims in the South Moccasin-Judith Mountains Scenic Area and Collar Gulch ACECs. Based on historical levels of exploration and other surface-disturbing activities, 35 validity exams could be performed over the life of this plan. Assuming a cost of \$12,500 for a typical exam, this could result in an increase in BLM management costs of \$437,500, primarily for labor, travel, equipment and other administrative expenses (see Table 4.18).

Location	# of Exams	Total Cost
Collar Gulch ACEC	5	\$62,500
South Moccasin-Judith Mountains	5	62,500
Hwys 191 & 87 Scenic Area	25	312,500
<b>Total</b>	<b>35</b>	<b>\$437,500</b>

Source: BLM, 1990

Based on the development potential of the areas subject to validity examinations some mining claims could be valid, that is, there is a discovery of a valuable mineral deposit. A process of evaluating the mineral deposit to estimate the probable costs of mining and returns gained through sale of

the commodity must first be completed and, following that, a determination would be made regarding the fair market value of the deposit. The fair market value represents the cost BLM would incur to prevent development of the deposit. If conditions lead to consideration of purchasing valid mining claims, an analysis would be performed to access the fair market value of the deposit.

**Alternative E (Preferred):** The regional economic impacts would be similar to Alternative A, except that one open-pit mining operation (of the 18 operations projected) could potentially be foregone in the Judith Mountains Scenic Area ACEC; however, the probability of such an impact occurring is not definite. Consequently, there may be only minor impacts to potential future opportunities for economic activity from mineral development (see Impacts to Economic Conditions from the Judith Mountains Scenic Area ACEC).

### From Riparian and Wetland Management of Watersheds

**Alternative A (Current):** Annual total economic benefit, which includes total economic activity and net willingness to pay, could increase \$2.3 million in the planning area. This includes economic activity attributable to increased livestock production (\$548,000 in the Judith RA, \$962,000 in the Valley RA, and \$779,000 in the Phillips RA) and increased waterfowl production (\$16,000 in the recreation sector). Net willingness to pay for recreation opportunities would contribute \$20,000 to total economic benefit. In relation to total output for these sectors, the increase would not be significant.

Economic activity would increase outside the planning area, including the Central Flyway Region, where an estimated 95% of the waterfowl hunting opportunities, as well as most viewing opportunities, would occur. Direct expenditures in the recreation sector are estimated to increase \$221,000 annually. Including \$382,000 for net willingness to pay, total economic benefit would increase \$603,000 annually. Because it is not known precisely where this recreation would occur, estimates of secondary spending impacts could not be obtained.

Management costs could increase for both BLM and affected ranching operations. Over the life of the plan expenditures could total \$22.4 million (\$21 million for BLM and \$1.4 million for ranching operations). Costs would be incurred for such construction projects as nesting islands, reservoirs, land treatments, and enclosure fences. These expenditures could result in an increase in total economic activity of \$30 million in the planning area. The increase in costs for affected operations would, in most cases, be offset by improved livestock productivity.

Total annual employment in the planning area would increase over the life of the plan by an equivalent of 80 jobs; 38 would be attributable to changes in annual livestock

production and 42 would be attributable to management costs. These employment impacts would not be significant.

Property-tax revenues would increase as a result of changes in livestock production, although the increase would not be significant. Estimated increases for each resource area are: Judith \$1,900; Valley \$3,700; and Phillips \$2,200.

**Alternative B:** The regional economic impacts would be similar to Alternative A, with some quantitative differences. Annual total economic benefit could increase \$1.7 million. This includes economic activity attributable to increased livestock production (\$245,000 in the Judith RA, \$865,000 in the Valley RA, and \$521,000 in the Phillips RA) and increased waterfowl production (\$12,000 in the recreation sector). Net willingness to pay for recreation opportunities would contribute \$15,000 to total economic benefit. In relation to total output for these sectors, the increase would not be significant.

Economic activity would increase outside the planning area, including the Central Flyway Region, where an estimated 95% of the waterfowl hunting opportunities, as well as most viewing opportunities, would occur. Direct expenditures in the recreation sector are estimated to increase \$162,000 annually. Including \$280,000 for net willingness to pay, total economic benefit would increase \$442,000 annually. Because it is not known precisely where this recreation would occur, estimates of secondary spending impacts could not be obtained.

Management costs could increase for both BLM and affected ranching operations. Over the life of the plan expenditures could total \$14 million (\$13 million for BLM and \$800,000 for ranching operations). Costs would be incurred for such construction projects as nesting islands, reservoirs, land treatments, and enclosure fences. These expenditures could result in an increase in total economic activity of \$19 million in the planning area. The increase in costs for affected ranch operations would not be met by increases in livestock productivity; thus, there would be little economic benefit from riparian and wetland management practices to the affected permittees.

Total annual employment in the planning area would increase over the life of the plan by an equivalent of 52 jobs; 27 would be attributable to changes in annual livestock production and 25 would be attributable to management costs. These employment impacts would not be significant.

Property-tax revenues would increase as a result of changes in livestock production, although the increase would not be significant. Estimated increases for each resource area are: Judith, \$800; Valley \$3,300; and Phillips, \$1,400.

**Alternative C:** The regional economic impacts would be similar to Alternative A, with some quantitative differences. Annual total economic benefit could increase \$2,704,000.

This includes economic activity attributable to increased livestock production (\$559,000 in the Judith RA, \$1 million in the Valley RA, and \$1.1 million in the Phillips RA) and increased waterfowl production (\$18,000 in the recreation sector). Net willingness to pay for recreation opportunities would contribute \$24,000 to total economic benefit. In relation to total output for these sectors, the increase would not be significant.

Economic activity would increase outside the planning area including the Central Flyway Region, where an estimated 95% of the waterfowl hunting opportunities, as well as most viewing opportunities, would occur. Direct expenditures in the recreation sector are estimated to increase \$262,000 annually. Including \$453,000 for net willingness to pay, total economic benefit would increase \$715,000 annually. Because it is not known precisely where this recreation would occur, estimates of secondary spending impacts could not be obtained.

Management costs could increase for both BLM and affected ranching operations. Over the life of the plan expenditures could total \$26.2 million (\$23.7 million for BLM and \$2.5 million for ranching operations). Costs would be incurred for such construction projects as nesting islands, reservoirs, land treatments, and enclosure fences. These expenditures could result in an increase in total economic activity of \$35.3 million in the planning area. The increase in costs for affected ranch operations would, in most cases, be offset by improved livestock productivity.

Total annual employment in the planning area would increase over the life of the plan by an equivalent of 93 jobs; 43 would be attributable to changes in annual livestock production, and 50 would be attributable to management costs. These employment impacts would not be significant.

Property-tax revenues would increase as a result of changes in livestock production, although the increase would not be significant. Estimated increases for each resource area are: Judith, \$1,900; Valley \$4,000; and Phillips, \$2,900.

**Alternative D:** Economic activity associated with livestock production would not change since any increase in AUMs would not be allocated to livestock. Annual total economic benefit would increase in the planning area \$46,000 due to increases in recreation opportunities from waterfowl production. This increase includes economic activity, primarily in the retail trade and services sectors, estimated to be \$20,000. Net willingness to pay for recreation opportunities would contribute \$26,000 to total economic benefit. In relation to total output for these sectors, the increase would not be significant.

Economic activity would increase outside the planning area, including the Central Flyway Region, where an estimated 95% of the waterfowl hunting opportunities, as well as most viewing opportunities, would occur. Direct

expenditures in the recreation sector are estimated to increase \$282,000 annually. Including \$488,000 for net willingness to pay, total economic benefit would increase \$788,000 annually. Because it is not known precisely where this recreation would occur, estimates of secondary spending impacts could not be obtained.

Management costs could increase for both BLM and affected ranching operations. Over the life of the plan expenditures could total \$29.1 million (\$26 million for BLM and \$3.1 million for ranching operations). Costs would be incurred for such construction projects as nesting islands, reservoirs, land treatments, and enclosure fences. These expenditures could result in an increase in total economic activity of \$39 million in the planning area. The increase in costs for affected ranch operations would, in most cases, be offset by improved livestock productivity.

Total annual employment in the planning area would increase over the life of the plan by an equivalent of 54 jobs, virtually all attributable to the increase in management costs. These employment impacts would not be significant.

**Alternative E (Preferred):** The regional economic impacts would be similar to Alternative D, with some quantitative differences. Annual total economic benefit would increase \$39,000 due to increases in recreation opportunities from waterfowl production. This increase includes economic activity, primarily in the retail trade and services sectors, estimated to be \$17,000. Net willingness to pay for recreation opportunities would contribute \$22,000 to total economic benefit. Economic activity associated with livestock production may increase, but cannot be estimated since the allocation of any increase in AUMs would be on a case-by-case basis with improvement in riparian-wetland areas. In relation to total output for these sectors, the increase would not be significant.

Economic activity would increase outside the planning area, including the Central Flyway Region, where an estimated 95% of the waterfowl hunting opportunities, as well as most viewing opportunities, would occur. Direct expenditures in the recreation sector are estimated to increase \$242,000 annually. Including \$417,000 for net willingness to pay, total economic benefit would increase \$659,000 annually. Because it is not known precisely where this recreation would occur, estimates of secondary spending impacts could not be obtained.

Management costs could increase for both BLM and affected ranching operations. Over the life of the plan expenditures could total \$23.5 million (\$21.4 million for BLM and \$2.1 million for ranching operations). Costs would be incurred for such construction projects as nesting islands, reservoirs, land treatments, and enclosure fences. These expenditures could result in an increase in total economic activity of \$31.4 million in the planning area. The increase in costs for affected operations would, in most cases, be offset by improved livestock productivity.

Total annual employment in the planning area would increase over the life of the plan by an equivalent of 41 jobs, virtually all attributable to the increase in management costs. These employment impacts would not be significant.

## From Elk and Bighorn Sheep Habitat Management

**Alternative A (Current):** Overall there would be no significant impacts to economic conditions in the planning area. If elk and bighorn sheep harvest levels decline in order to facilitate expansion, there may be some short-term decreases in economic activity associated with decreased hunting opportunities, primarily in the Judith RA. In the long-term, expansion may result in an increase in harvest levels. Thus, regional economic activity associated with hunting could return to its former level or increase. In the long-term, there may be an increase in economic activity attributable to non-consumptive recreation opportunities, such as wildlife viewing, if elk and bighorn sheep populations expand. Changes in hunting activity, for the most part, would be contingent upon harvest levels set by the MDFWP, regardless of the amount of habitat available on BLM land.

**Alternative B:** Overall there would be no significant impacts to economic conditions in the planning area. If elk and bighorn sheep harvest levels increase in order to limit expansion, there may be some short-term increases in economic activity associated with increased hunting opportunities, primarily in the Judith RA. In the long-term, harvest levels may return to their former levels. Thus, long-term regional economic activity associated with hunting would return its former level or fall below its former level as hunting activity declines. Economic activity attributable to non-consumptive recreation opportunities, such as wildlife viewing, would not change significantly over current conditions if elk and bighorn sheep populations may not expand. Changes in hunting activity would, for the most part, be contingent upon harvest levels set by the MDFWP, regardless of the amount of habitat available on BLM land.

**Alternative C:** The impacts would be the same as those in Alternative A.

**Alternative D:** The impacts would be similar to those in Alternative A regarding recreation-related economic activity. Additionally, restrictions on mineral development could preclude potential development of two open-pit mining operations in the Little Rocky Mountains, potentially reduce long-term employment opportunities by an estimated 150 jobs as well as mining-related regional economic activity and tax revenues (see Impacts to Economic Conditions from Hardrock Mining).

**Alternative E (Preferred):** The impacts would be the same as those in Alternative A.

## From Prairie Dog and Black-Footed Ferret Management

**Alternative A (Current):** In the Phillips RA, annual total economic benefit would decrease in the short-term by \$572,000. This decline is attributable to the elimination of prairie dog shooting (\$352,000) and from losses of livestock production (\$135,000) due to a loss in AUMs in the short-term. Net willingness to pay, attributable to the elimination of prairie dog shooting, would decrease \$84,000. These declines would not be significant in relation to total output; however, losses resulting from the elimination of prairie dog shooting would be significant, representing a 9% decline in economic activity that is attributable to recreation opportunities available on BLM land. Prairie dog shooting opportunities available outside the Phillips RA, such as in the Valley RA, may increase economic activity in other communities if shooters relocate to other areas.

In the long-term, AUMs would be restored, returning livestock production to its previous level. A decline in annual economic benefit due to the elimination of prairie dog shooting would persist, resulting in a long-term decline of \$436,000. There could be a loss of potential future economic activity due to restrictions on oil and gas exploration in the area. Increases in wildlife viewing opportunities in the long-term may increase total economic benefit in the Phillips RA, potentially offsetting the decline resulting from losses of prairie dog shooting opportunities and potential losses from oil and gas restrictions.

Management costs related to prairie dog control and black-footed ferret reintroduction in the Phillips RA would total \$454,000 in the short-term. These costs would be incurred on a one-time basis only. The increase in total economic activity attributable to these costs would be \$594,000, including direct and secondary spending impacts.

BLM annual management costs would total \$98,000 for prairie dog control and ferret reintroduction. These costs would be incurred both in the short and long-term. The estimated increase in total economic activity attributable to these costs would be \$131,000, including direct and secondary spending impacts. Table 4.19 summarizes these one-time and annual costs.

In the short-term, total annual employment could increase in the Phillips RA by up to four jobs, attributable to increased short term expenditures (12 jobs), the loss of prairie dog shooting (six lost jobs) and the decline in livestock production (two lost jobs). In the long term, there would be a decrease in annual employment of four jobs, resulting from the loss of prairie dog shooting (six lost jobs) and an increase in employment associated with federal expenditures (two jobs).

**Alternative B:** In the Phillips RA, annual total economic benefit would decrease by \$217,000. This decline is attributable to the reduction of acreage available for prairie dog shooting. Total economic activity in the retail trade and services sectors would decline \$175,000. Net willingness to pay attributable to the loss of shooting opportunities would decrease \$42,000. This decline would not be significant, representing a 4% decline in economic activity that is attributable to recreation opportunities available on BLM land. Prairie dog shooting opportunities available outside the Phillips RA, such as in the Valley RA, may increase economic activity in other communities if shooters relocate to other areas. Increases in wildlife-viewing opportunities in the long-term may increase regional economic activity in the Phillips RA, potentially offsetting the decline resulting for losses of prairie dog shooting opportunities.

BLM management costs related to prairie dog control and black-footed ferret reintroduction in the Phillips RA would total \$122,000 in the short-term. These costs would be incurred on a one-time basis only. The increase in total economic activity attributable to these costs would be \$163,000, including direct and secondary spending impacts.

BLM annual management costs would total \$95,000 for prairie-dog control and ferret reintroduction. These costs would be incurred both in the short and long-term. The estimated increase in total economic activity attributable to these costs would be \$127,000, including direct and secondary spending impacts. Table 4.19 summarizes these one-time and annual costs.

In the short-term, total annual employment would increase in the Phillips RA by two jobs; increased expenditures by BLM in the planning area could create up to five jobs, offset by a decrease of three jobs attributable to reductions in prairie dog shooting opportunities. In the long-term there would be a net loss of one job; increased expenditures by BLM would generate two jobs, offset by a loss of three jobs due to reductions in prairie dog shooting.

**Alternative C:** The regional economic impacts would be similar to Alternative A. In the Phillips RA, annual total economic benefit would decrease in the short-term by \$341,000. This decline is attributable to the reduction of acreage available for prairie dog shooting (\$228,000) and from losses of livestock production (\$58,000) due to a loss in AUMs in the short-term. Net willingness to pay, attributable to the loss of shooting opportunities, would decrease \$55,000. These declines would not be significant in relation to total output; however, declines resulting from the loss of shooting opportunities would be significant, representing a 6% decline in economic activity that is attributable to shooting opportunities available on BLM land. Prairie dog shooting opportunities available outside the Phillips RA, such as in the Valley RA, may increase economic activity in other communities if shooters relocate to other areas.

**TABLE 4.19  
PRAIRIE DOG AND BLACK-FOOTED FERRET MANAGEMENT COSTS**

One-Time Costs	Alternative				
	A	B	C	D	E
<b>Federal</b>					
Prairie Dog Elimination	\$139,000	\$92,000	\$18,000	\$0	\$0
Ferret Reintroduction	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
Land Treatment	\$285,000	\$0	\$120,000	\$465,000	\$98,430*
Subtotal	\$454,000	\$122,000	\$168,000	\$495,000	\$128,430
<b>Rancher</b>					
Prairie Dog Elimination	NA	NA	NA	NA	\$58,210**
<b>Total One-Time Costs</b>	<b>\$454,000</b>	<b>\$122,000</b>	<b>\$168,000</b>	<b>\$495,000</b>	<b>\$186,640</b>
<b>Annual Costs</b>					
<b>Federal</b>					
Prairie Dog Control	\$8,000	\$5,000	\$18,000	\$24,000	\$18,500***
Ferret Reintroduction	\$90,000	\$90,000	\$90,000	\$90,000	\$90,000
<b>Total Annual Costs</b>	<b>\$98,000</b>	<b>\$95,000</b>	<b>\$108,000</b>	<b>\$114,000</b>	<b>\$108,500</b>

\*These costs would be incurred to compensate for prairie dog control on private land. Assumes a potential 5,821 private acres could be controlled or eliminated, leading to land treatments on 6,562 acres of BLM land. Estimated cost \$15/acre, total cost \$98,430.

\*\*Assumes all prairie dog towns on private land would be controlled or eliminated; estimated cost \$10/acre on 5,821 acres.

\*\*\*Prairie dog towns on BLM land would be controlled at the 1988 level. Assuming a 3 to 15% expansion of towns, the annual control costs could range from \$3,700 to \$18,500. This is based on monitoring from 1981 through 1988 and an estimated control cost of \$10/acre.

Source: BLM, 1990

In the long-term, AUMs would be restored, returning livestock production to its previous level. However, the decline in annual economic benefit would persist due to the loss of shooting opportunities, resulting in a long-term decline of \$283,000. Increases in wildlife viewing opportunities in the long-term may increase total economic benefit in the Phillips RA, potentially offsetting the decline resulting from losses of prairie dog shooting opportunities.

Management costs related to prairie dog control and black-footed ferret reintroduction in the Phillips RA would total \$168,000 in the short-term. These costs would be incurred on a one-time basis only. The increase in total economic activity attributable to these costs would be \$255,000, including direct and secondary spending impacts.

BLM annual management costs would total \$108,000 for prairie-dog control and ferret reintroduction. These costs would be incurred both in the short and long-term. The estimated increase in total economic activity attributable to these costs would be \$145,000, including direct and secondary spending impacts. Table 4.19 summarizes these one-time and annual costs.

In the short-term, annual employment could increase in the Phillips RA by up to two jobs, attributable to increased expenditures by BLM (seven jobs), the loss of shooting opportunities (four lost jobs), and the decline in livestock production (one lost job). In the long-term, there would be a decrease in annual employment of 1 job, resulting from the loss of shooting opportunities (four lost jobs) and an increase in employment associated with federal expenditures (three jobs).

**Alternative D:** In the Phillips RA, annual total economic benefit would decrease in the short-term by \$477,000. This decline is attributable to the reduction of acreage available for prairie dog shooting (\$321,000) and from losses of livestock production (\$78,000) due to a loss in AUMs in the short-term. Net willingness to pay, attributable to the loss of shooting opportunities, would decrease \$78,000. These declines would not be significant in relation to total output; however, declines resulting from the loss of shooting opportunities would be significant, representing a 6% decline in economic activity that is attributable to prairie dog shooting opportunities available on BLM land. Prairie dog shooting opportunities available outside the Phillips RA,

such as in the Judith and Valley RAs, may increase economic activity in other communities if shooters relocate to other areas.

In the long-term, AUMs would be restored, returning livestock production to its previous level. In addition, economic activity associated with prairie dog shooting could increase as the acreage available for shooting increases in the long-term. Assuming a 15% annual rate of prairie dog expansion, it would take about 15 years to restore the shooting opportunities to the current level. Increases in wildlife viewing opportunities in the long-term may further increase total economic benefit in the Phillips RA.

Management costs related to prairie dog control and black-footed ferret reintroduction in the Phillips RA would total \$495,000 in the short-term. These costs would be incurred on a one-time basis only. The increase in total economic activity attributable to these costs would be \$663,000, including direct and secondary spending impacts.

BLM annual management costs would total \$114,000 for prairie-dog control and ferret reintroduction. These costs would be incurred both in the short-term and long-term. The estimated increase in total economic activity attributable to these costs would be \$153,000, including direct and secondary spending impacts. Table 4.19 summarizes these one-time and annual costs.

In the short-term, total annual employment would increase in the Phillips RA by up to eight jobs, attributable to increased expenditures by BLM (15 jobs), the loss of shooting opportunities (six lost jobs), and the decline in livestock production (one lost job). In the long-term, there would be an increase in annual employment of three jobs, resulting from an increase in employment associated with federal expenditures.

**Alternative E (Preferred):** There would be no impact to economic conditions in the Phillips RA, with the exception of management costs. Costs related to prairie dog control and black-footed ferret reintroduction could increase \$187,000 in the short-term for both BLM (\$128,000) and ranching operations (\$58,000). These costs would be incurred on a one-time basis only. The increase in total economic activity would be \$250,000, including direct and secondary spending impacts.

BLM annual management costs could total \$109,000 for prairie dog control and ferret reintroduction. These costs would be incurred both in the short and long-term. The increase in total economic activity would be \$145,000, including direct and secondary spending impacts. Table 4.19 summarizes these one-time and annual costs. These expenditures could increase employment in the Phillips RA by up to seven jobs in the short-term and three jobs in the long-term.

## From the Judith Mountains Scenic Area ACEC

**Alternatives A (Current) & B:** There could be significant impacts to economic conditions in the Judith RA if mineral development occurs. Mineral exploration and development could conflict with, and reduce, recreation use of the area, thus potentially reducing economic activity in the retail trade and services sectors that benefit from recreation use of BLM land. Economic activity associated with mineral exploration and development could, however, offset the potential decline in recreation employment and expenditures.

**Alternative C:** Restrictions on mineral development could significantly reduce potential future economic activity associated with mineral exploration and development, such as regional expenditures, employment, and tax revenues, especially in Fergus County. It is estimated that these restrictions could preclude potential development of one small open-pit mining operation and one large open-pit operation of the type described in Appendix C, potentially reducing long-term employment opportunities by an estimated 95 jobs. Impacts are summarized in Table 4.20 and the Impacts to Economic Conditions from Hardrock Mining Section. These restrictions may encourage more recreation use of the area, thus increasing economic activity in the retail trade and services sectors that benefit most from recreation expenditures, although to what degree recreational employment and expenditures would offset potentially foregone mining employment and expenditures is unknown.

**Alternative D:** The impacts to economic conditions would be similar to Alternative C, except that economic activity associated with mineral exploration and development may be more limited. The withdrawal could significantly reduce potential future economic activity associated with mineral exploration and development, such as regional expenditures, employment, and tax revenues, especially in Fergus County. It is estimated that these restrictions could preclude potential development of two open-pit mining operations and one underground operation of the type described in Appendix C, potentially reducing long-term employment opportunities by an estimated 150 jobs. Impacts are summarized in Table 4.21 and the Impacts to Economic Conditions from Hardrock Mining Section. Validity exams would be performed on claims in the ACEC and BLM would pursue purchase of valid mining claims. Restrictions may encourage more recreation use of the area, thus increasing economic activity in the retail trade and services sectors that benefit most from recreation expenditures, although to what degree recreational employment and expenditures would offset potentially foregone mining employment and expenditures is unknown.

**Alternative E (Preferred):** There could be a significant increase in economic activity and employment in the Judith RA if mineral development occurs. There is a possibility that future Plans of Operations submitted for mineral development in the Scenic Area ACEC may not conform

**TABLE 4.20  
POSSIBLE ECONOMIC ACTIVITY FOREGONE IN THE SCENIC AREA ACEC  
ALTERNATIVE C**

	Foregone Annual Impacts			Total Foregone Over 6 Yr Prod.*
	Each Operation		Both Operations	
	Small Open Pit	Large Open Pit		
Capital Investment (one time)	\$7,500,000	\$18,000,000	\$25,500,000	\$25,500,000
Gross Revenue	\$2,900,000	\$14,600,000	\$17,500,000	\$105,000,000
Operating Costs	\$1,167,000	\$6,667,000	\$7,834,000	\$47,004,000
Jobs (Construction-1 yr)	100	100	200	200
Jobs (Production)	25	70	95	95
Total Wages	\$872,500	\$2,443,000	\$3,315,500	\$19,893,000
Tax Revenues:				
Resource Indemnity	\$14,500	\$73,000	\$87,500	\$525,000
Gross Proceeds	\$26,363	\$69,559	\$95,922	\$575,532
Metalliferous Mines License	\$38,160	\$206,640	\$244,800	\$1,468,800
Property	\$101,197	\$169,072	\$270,269	\$1,621,614
Total	\$180,220	\$518,271	\$698,491	\$4,190,946

\*Production period for both operations is estimated at 6 years.

**TABLE 4.21  
POSSIBLE ECONOMIC ACTIVITY FOREGONE IN THE SCENIC AREA ACEC  
ALTERNATIVE D**

	Foregone Annual Impacts			Foregone Annual - All Operations	Total Foregone Over Production
	Small Open Pit	Large Open Pit	Undground		
Capital Investment (one time)	\$7,500,000	\$18,000,000	\$2,300,000	\$27,800,000	\$27,800,000
Gross Revenue	\$2,900,000	\$14,600,000	\$3,575,000	\$21,075,000	\$133,600,000
Operating Costs	\$1,167,000	\$6,667,000	\$2,250,000	\$10,084,000	\$65,004,000
Jobs (Construction-1 yr)	100	100	100	300	300
Jobs (Production)	25	70	55	150	150
Total Wages	\$872,500	\$2,443,000	\$1,919,500	\$5,235,000	\$35,249,000
Tax Revenues:					
Resource Indemnity	\$14,500	\$73,000	\$17,875	\$105,375	\$668,000
Gross Proceeds	\$26,363	\$69,559	\$32,499	\$128,421	\$835,524
Metalliferous Mines License	\$38,160	\$206,640	\$54,164	\$298,964	\$1,902,112
Property	\$101,197	\$169,072	\$54,101	\$324,370	\$2,054,422
Total	\$180,220	\$518,271	\$158,639	\$857,130	\$5,460,058

\*Production period is 6 years for open pit operations and 8 years for underground operation.

with the management objectives under this alternative. This would depend upon specific factors related to the ore deposit and scenic quality. Under worst-case conditions, the restrictions could restrict potential development of a large open pit operation similar to the type described in Appendix C; potentially reducing opportunities for long-term employment, regional expenditures and tax revenues. Table 4.22 summarizes the capital investment, expenditures, employment, income and tax revenues that could potentially

be foregone if development were restricted; however, the probability of such an impact occurring is not definite. Under less than worst-case conditions, there may be only minor impacts to potential future opportunities for employment, regional expenditures, and tax revenues from mineral development. Impacts to Economic Conditions from Hardrock Mining Section. The effects on economic activity from recreation would depend on the location and extent of mineral development.

**TABLE 4.22  
POSSIBLE ECONOMIC ACTIVITY FOREGONE IN THE  
SCENIC AREA ACEC  
ALTERNATIVE E**

	Average Annual Foregone Impacts*	Total Foregone Over 6 Yr Production**
Capital Investment (one time)	\$18,000,000	\$18,000,000
Gross Revenue	\$14,600,000	\$87,600,000
Operating Costs	\$6,667,000	\$40,002,000
Jobs (Construction-1 yr)	100	100
Jobs (Production)	70	70
Total Wages	\$2,443,000	\$14,658,000
Tax Revenues:		
Resource Indemnity	\$73,000	\$438,000
Gross Proceeds	\$69,559	\$417,354
Metalliferous Mines License	\$206,640	\$1,239,840
Property	\$169,072	\$1,014,432
Total	\$518,271	\$3,109,626

\*Assumes one open-pit operation is foregone.

\*\*Production period is estimated at 6 years.

### From the Acid Shale-Pine Forest ACEC

**Alternatives A (Current), B & C:** There would be no significant impacts to economic conditions.

**Alternative D:** There would be no significant impacts to economic conditions. However, because the area has high occurrence potential for bentonite resources, there could be a loss of potential future economic activity associated with bentonite if the area is withdrawn from mineral entry. In addition, it is estimated that total economic activity would decrease \$8,000 due to the loss of AUMs in the area; this decline would be felt in Petroleum County.

**Alternative E (Preferred):** There would be no significant impacts to economic conditions.

### From the Square Butte ONA ACEC

**Alternative A (Current):** There would be no significant impacts to economic conditions. However, there could be a loss of opportunities for future economic activity associated with oil and gas exploration because the area would be closed to leasing.

**Alternative B:** There would be no significant impacts to economic conditions in the planning area. However, there

could be an increase in economic activity associated with oil and gas exploration as the area would be open to leasing. If this activity were to conflict with recreation opportunities, there could be a reduction in economic activity in the retail trade and services sectors that benefit from recreation use of BLM land.

**Alternatives C, D & E (Preferred):** There would be no significant impacts to economic conditions. However, there would be a slight increase in both the quantity and quality of recreation opportunities. Annual total economic benefit could increase \$88,000 due to increased recreation use. Total economic activity would increase \$78,000, primarily in retail trade and services in the Judith RA, while net willingness to pay would contribute \$10,000 to the increase in economic benefit. Employment could increase by two jobs due to the increase in recreation expenditures.

### From the Collar Gulch ACEC

**Alternatives A (Current) & B:** There could be significant impacts to economic conditions in the Judith RA if mineral development occurs. Mineral exploration and development could conflict with, and reduce, recreation use of the area, thus potentially reducing economic activity in the retail trade and services sectors that benefit from recreation use of BLM land. Economic activity associated with mineral exploration and development could, however, offset the potential decline in recreation employment and expenditures.

**Alternative C:** Restrictions on mineral development could significantly reduce potential future economic activity associated with mineral exploration and development, such as regional expenditures, employment, and tax revenues, especially in Fergus County. It is estimated that these restrictions could preclude potential development of a small underground mining operation of the type described in Appendix C; potentially precluding long-term employment opportunities by an estimated 55 jobs (see Impacts to Economic Conditions from Hardrock Mining). These restrictions may encourage more recreation use of the area, thus increasing economic activity in the retail trade and services sectors that benefit most from recreation expenditures; although to what degree recreation employment and expenditures would offset potentially foregone mining employment and expenditures is unknown.

**Alternative D:** The impacts to economic conditions would be similar to Alternative C, except validity exams would be performed on claims in Collar Gulch and BLM would pursue purchase of valid mining claims (see Impacts to Economic Conditions from Hardrock Mining).

**Alternative E (Preferred):** The impacts would be the same as those in Alternative A.



## From Azure Cave ACEC

**Alternative A (Current):** There would be no significant impacts to economic conditions. However, there could be a loss of potential future economic activity associated with mineral exploration and development since areas with high and moderate development potential would remain withdrawn from mineral entry. There could also be a loss of potential future economic activity associated with recreation use of the cave.

**Alternative B:** There could be a short-term increase in economic activity, primarily in the retail trade and services sectors, due to increased recreation use of the cave. However, increased use could, in the long-term, degrade the cave to the point that recreation use declines, thus negating the short-term increase in economic activity. In the long-term, there would be no significant change in economic conditions attributable to recreation use. Areas with high and moderate mineral development potential would be open to mineral entry, with the potential for future economic activity.

**Alternative C:** With regard to recreation the impacts would be similar to Alternative B, except that unrestricted use of the cave would not be allowed. Thus, there may not be a decrease in economic activity in the long-term associated with recreation use of the cave. The area would remain withdrawn from mineral entry, precluding potential future economic activity associated with mineral exploration and development.

If BLM were to develop this site for recreational use, direct expenditures could exceed \$100,000. This would generate a short-term increase in economic activity in the Phillips RA, estimated to be \$134,000, including direct expenditures and secondary spending activity. There could also be a short-term increase of three jobs attributable to these expenditures.

**Alternatives D & E (Preferred):** There would be no significant impacts to economic conditions. However, there may be a slight increase in economic activity in the Phillips RA associated with use of the cave during the summer months when the cave would be open. This increase may be offset by foregone future economic activity associated with mineral exploration and development since areas with high and moderate development potential would remain withdrawn from mineral entry.

## From the Big Bend of the Milk River ACEC

**Alternatives A (Current) & B:** There would be no significant impacts to economic conditions, although there could be a loss of opportunities for future economic activity associated with recreation use of the area.

**Alternative C:** Recreation opportunities would increase economic benefit in the Phillips RA. Annual total economic benefit could increase \$646,000. Economic activity would increase \$592,000, primarily in the retail trade and services sectors, while net willingness to pay would contribute \$54,000 to total economic benefit. This increase in economic activity would not be significant in terms of total output in the Phillips RA; however, in terms of economic activity attributable to recreation on BLM land, it represents a significant 13% increase. Total annual employment, attributable to the increase in recreation expenditures, would increase by 10 jobs, most likely in the Phillips RA.

**Alternative D:** The impacts are similar to those in Alternative C, except a No Surface Occupancy restriction could reduce opportunities for future economic activity and tax revenues associated with leasing, exploration and development.

**Alternative E (Preferred):** The impacts would be the same as those in Alternative C.

## IMPACTS TO SOCIAL CONDITIONS

This section addresses the impacts that would enhance or diminish the social well-being for recreationists, ranchers and the local business community in the planning area. There would be no impact to services or infrastructure in the planning area, except from Hardrock Mining.

## From Land Acquisition and Disposal

**Alternatives A (Current), B, C, D & E (Preferred):** The BLM acres identified for disposal contain approximately 29,000 AUMs which are currently leased to about 450 livestock operations. In most cases, the impact to the social well-being of individual livestock operations from the loss of AUMs would not be significant. Land that is disposed of could be acquired by the current permittee, another individual or by another entity such as county or state government. There could be significant impacts to the management of some livestock operations if land formerly leased from BLM was acquired by someone else, which could decrease social well-being. Uncertainty over whether land will be kept under BLM management or disposed of could create long-term planning problems for ranchers who could not count on future livestock grazing on those BLM lands. This would worsen ongoing concerns with uncertain future conditions, which could decrease social well-being.

In some cases livestock operators with private grazing leases may be affected if land is acquired by BLM and AUMs are reduced. If 115,000 acres were acquired, approximately 3,555 fewer AUMs could be permitted for livestock. The loss of grazing land could have an effect on ranch income and the social well-being of affected ranchers. Small livestock operators have the greatest potential for being affected since changes could effect their standard of living.

The potential loss of AUMs may be perceived with concern because of the effect on the ability to maintain the current ranch lifestyle. Overall, the social well-being could diminish for some ranchers (those who lose land for livestock grazing) and increase for others (those who want and are able to acquire BLM land). However, the social well-being of most area ranchers would not be affected.

The social well-being of recreationists could be enhanced if the problem of private land being closed to the public and restricted access to public land is addressed. These problems cause a loss of recreation opportunities. Recreation is important to the lifestyle needs of residents in the planning area.

The social well-being of some farmers and people associated with some local businesses could be enhanced due to an increase in the standard of living from economic activity associated with crop production in the Phillips RA.

## From Access to BLM Land

**Alternative A (Current):** The social well-being of recreationists would diminish if access is not adequately addressed and recreation quality and opportunities decline. These opportunities are an important part of many residents' lifestyles. The problems of private land being closed to the public and blocked access to public land could continue, causing a loss of recreation opportunities.

Conflicts between ranchers and recreationists could be reduced if access routes to BLM land are signed, restricted travel areas identified and legal access acquired in some areas. However, in cases where access is gained in areas of intermingled land ownership, conflicts could be aggravated where trespass on private land resulted. Overall, this alternative would enhance the social well-being of ranchers where access problems are resolved.

**Alternative B:** The impacts would be similar to those in Alternative A, except conflicts between ranchers and recreationists would not be reduced. This alternative would not change the social well-being of ranchers.

**Alternative C:** The social well-being of recreationists would be enhanced because lifestyle needs would be better met due to additional recreation opportunities. This

alternative would address increasing recreation pressure on BLM land caused by closing private land to the public and blocked access to public land.

Conflicts between ranchers and recreationists could be reduced if access routes to BLM land are signed, restricted travel areas identified and legal access acquired in some areas. However, in cases where access is gained in areas of intermingled land ownership, conflicts could be aggravated where trespass on private land resulted. Additional access could cause problems such as open gates and littering. This alternative would enhance the social well-being of ranchers where access problems are resolved and would decrease the social well-being of ranchers where new access created problems such as trespass on private land.

The social well-being of some people associated with local businesses would improve due to an increase in the standard of living from economic activity associated with recreation.

**Alternatives D & E (Preferred):** The social well-being of recreationists would be enhanced because lifestyle needs would be better met due to additional recreation opportunities. This alternative would address increasing recreation pressure on BLM land caused by private land being closed to the public and blocked access to public land.

Conflicts between ranchers and recreationists could be reduced because access routes to BLM land would be signed, restricted travel areas identified and legal access acquired in most areas. In cases where access is gained in areas of intermingled land ownership, conflicts could be aggravated where trespass on private land resulted. Additional access could cause problems such as open gates and littering. This alternative would enhance the social well-being of ranchers where access problems were resolved and decrease the social well-being of ranchers where new or additional access created problems such as trespass on private land.

The social well-being of people associated with some local businesses would improve due to an increase in the standard of living from economic activity associated with recreation.

## From Off-Road Vehicle Designations

**Alternatives A (Current) & B:** The social well-being of affected ranchers could diminish if problems such as livestock disturbance or forage loss continue. The social well-being of recreationists, particularly hunters, could also diminish if recreation opportunities are not available because of conflicts between ranchers and recreationists.

**Alternative C:** The social well-being of walk-in hunters and ATV enthusiasts would increase, while the social well-being of others who enjoy off road travel would decline due to a respective change in opportunities. An ATV area would

be provided and walk-in hunting opportunities would be increased, while opportunities to drive off the road to retrieve game would decrease.

The social well-being of affected ranchers would increase if conflicts between ranchers and recreationists are resolved in the most popular hunting areas because problems affecting livestock disturbance or forage loss would decrease.

**Alternative D:** The social well-being of walk in hunters and those hunters who go off-road only for game retrieval would increase, while the social well-being of those who enjoy off-road travel would diminish due to a respective change in the availability of preferred activities.

The impacts to social well-being of ranchers would be the same as those in Alternative C.

**Alternative E (Preferred):** The social well-being of ATV enthusiasts and others who enjoy off road travel would increase due to an increase in opportunities for these activities. Vehicle access for game retrieval would be allowed, but may be limited to specific hours. Hunting quality for walk-in hunters could be enhanced during the times vehicle access is limited.

Conflicts between ranchers and recreationists would be reduced in those areas where off-road use would be limited. However, this alternative addresses only some of the popular hunting areas. In other areas (Frenchman Creek and Cottonwood Creek) ORV use could continue to increase, causing livestock disturbance and a loss of forage. Social well-being would be enhanced for those ranchers where problems are resolved and diminish for ranchers where problems continue.

## From Oil and Gas Leasing and Development

**Alternative A (Current):** No impact to social well-being.

**Alternative B:** The social well-being of recreationists could diminish from impacts to recreation opportunities which are important to their lifestyle needs.

**Alternatives C, D & E (Preferred):** No impact to social well-being.

## From Hardrock Mining

**Alternative A (Current):** Mining exploration and new development or expansion of 18 mines could create significant impacts to population, infrastructure, social organization and social well-being. There could be

significant negative short-term impacts to housing, schools, police and fire protection, and water and sewer to communities in Fergus and Phillips Counties. In the long term, increased revenues may allow service needs to be met or expanded. Currently, declining populations and a history of mining in the planning area would enhance the ability of local communities to deal successfully with incoming population. Hardrock mining development would provide additional local employment and could reverse historic out migration trends. Mining could affect the numbers and types of local businesses, significantly increasing the social well-being of the local communities. Ongoing declines in the number and diversity of local businesses could be reversed. Specific impacts would depend upon many factors including the current community service and infrastructure capacity, the timing of development and the number and type of nonlocal employees hired. These impacts would be assessed for individual operations prior to approval of a Plan of Operations.

The social well-being of recreationists could diminish if recreation quality and opportunities decrease in the Little Rocky or Judith Mountains.

Some members of the Fort Belknap Indian Reservation are concerned about mining in the Little Rocky Mountains. Their concerns include: potential impacts to water quality and quantity; reservation residents' health; Native American cultural, religious and social practices; wildlife, including fisheries; and air quality. Cyanide waste disposal is a particular concern. The development of eight new mines in the Little Rocky Mountains would generate a great deal of concern. Employment for some reservation residents members could be provided by further mine development.

**Alternative B:** The impacts would be similar to those in Alternative A, except the social well-being of recreationists who use the Camp Creek and Buffington recreation sites could diminish significantly.

**Alternative C:** The impacts would be similar to those in Alternative A, except 3 new mines or mine expansions could be foregone; there could be 15 rather than 18 mines expanded or developed.

**Alternative D:** The impacts would be similar to those in Alternative A, except 7 new mines or mine expansions could be foregone; there could be 11 rather than 18 mines expanded or developed. Impacts to recreationists social well being would be less severe than under Alternative A.

**Alternative E (Preferred):** The impacts would be similar to those in Alternative A, except 1 new mine or mine expansion could be foregone; there could be 17 rather than 18 mines expanded or developed.

## From Riparian and Wetland Management of Watersheds

**Alternative A:** Approximately 200 ranches would be affected and some permittee costs could increase. The social well-being on some of the 140 ranches with existing AMPs could diminish if their share of the costs of implementation [are not] offset by increased production. Social well-being would be maintained or increase on most of the 60 ranches where AMPs are proposed because increased management costs would be offset, in most cases, by increased vegetation and livestock productivity.

The increased emphasis on riparian and wetland management, with \$1.3 million in permittee costs over the life of this plan, may be perceived with concern by some area ranchers because they may feel resources would be diverted from the ranching lifestyle.

The social well-being of local recreationists who view wildlife and of waterfowl hunters from outside the planning area would be enhanced because of increased opportunities.

The social well-being of the local business community would be enhanced by increased economic activity and employment which would raise the standard of living of affected individuals.

**Alternative B:** Approximately 140 ranches would be affected and some permittee costs could increase. Impacts to the 140 ranches with existing AMPs would be the same as those in Alternative A.

The increased emphasis on riparian and wetland management, with \$.8 million in permittee costs over the life of this plan, may be perceived with concern by some area ranchers because they may feel resources would be diverted from the ranching lifestyle.

The impacts to recreationists and the local business [communities] would be the same as those in Alternative A.

**Alternative C:** Approximately 300 ranches would be affected and some permittee costs could increase. Impacts to the 140 ranches with existing AMPs would be similar to those in Alternative A, except the allocation of any increases in forage to permittees would be less. Social well-being would be maintained or increase on most of the 160 ranches where AMPs are proposed because increased management costs would be offset, in most cases, by increased vegetation and livestock productivity.

The increased emphasis on riparian and wetland management, with \$2.5 million in permittee costs over the life of this plan, may be perceived with concern by some area ranchers because they may feel resources would be diverted from the ranching lifestyle.

The impacts to recreationists and the local business community would be the same as those in Alternative A.

**Alternative D:** Approximately 470 ranches would be affected and some permittee costs could increase. Impacts to the 140 ranches with existing AMPs would be similar to those in Alternative A, except any increases in forage would not be allocated to permittees. Social well-being would be maintained on most of the 330 ranches where AMPs are proposed because increased management costs would be offset, in most cases, by livestock productivity.

The increased emphasis on riparian and wetland management, with \$3.1 million in permittee costs over the life of this plan, may be perceived with concern by some area ranchers because they may feel resources would be diverted from the ranching lifestyle.

The impacts to recreationists and the local business community would be the same as those in Alternative A.

**Alternative E (Preferred):** Approximately 230 ranches would be affected and some permittee costs could increase. Impacts to the 140 ranches with existing AMPs would be similar to those in Alternative A, except any increases in forage would be allocated to permittees on a case-by-case basis. Social well-being would be maintained or increase on most of the 90 ranches where AMPs are proposed because increased management costs would be offset, in most cases, by increased vegetation and/or livestock productivity.

The increased emphasis on riparian and wetland management, with \$2.2 million in permittee costs over the life of this plan, may be perceived with concern by some area ranchers because they may feel resources would be diverted from the ranching lifestyle.

The impacts to recreationists and the local business community would be the same as those in Alternative A.

## From Elk and Bighorn Sheep Habitat Management

**Alternatives A (Current):** The social well-being of affected ranchers could diminish due to conflicts between livestock and elk which could disrupt ranch operations. The social well-being of recreationists would be enhanced because lifestyle needs would be better met with enhanced wildlife viewing and hunting opportunities.

**Alternative B:** Impacts to ranchers would be the same as Alternative A. The social well-being of recreationists would not be affected.

**Alternative C:** Impacts would be the same as Alternative A.

**Alternatives D & E (Preferred):** The social well-being of affected ranchers would be enhanced if conflicts are resolved by drawing elk away from private land. The social well-being of recreationists would be improved because wildlife viewing and hunting opportunities would improve.

## From Prairie Dog and Black-Footed Ferret Management

**Alternative A:** Eliminating prairie dog towns could enhance the social well-being of 26 ranchers by addressing concerns about prairie dog expansion and a potential loss in livestock AUMs.

Some ranchers could experience changes in their lifestyles due to restrictions on livestock grazing and range improvements associated with reintroduction of the black-footed ferret. This could diminish the social well-being of 17 ranchers within the reintroduction area.

The social well-being of recreationists would diminish if prairie dog shooting and wildlife viewing opportunities decline. For some, the opportunity to view black-footed ferrets would improve their social well-being.

The social well-being of some individuals associated with local businesses could decline by reducing the economic activity associated with prairie dog shooting.

**Alternative B:** Eliminating prairie dog towns could improve the social well-being of 33 ranchers by addressing concerns about prairie dog expansion and a potential loss in livestock AUMs.

Ranchers within the reintroduction area would not experience changes in their lifestyle. However, ranchers are concerned about the effects to the ranching way of life from outside interference with reintroduction of the black-footed ferret.

The impacts for recreationists and the local business communities would be the same as those in Alternative A.

**Alternative C:** Eliminating of prairie dog towns could improve the social well-being of 20 ranchers by addressing concerns about prairie dog expansion and a potential loss in livestock AUMs.

Ranchers are concerned about the effects to the ranching way of life from outside interference with reintroduction of the black-footed ferret and the restrictions imposed on other activities. This could diminish the social well-being for some of the 11 ranchers within the reintroduction area.

The impacts to recreationists and the local business communities would be the same as those in Alternative A.

**Alternative D:** The social well-being of some ranchers could diminish if ranch operations are disrupted with the expansion of prairie dog towns. Ranchers are concerned about prairie dog expansion and a potential loss in livestock AUMs.

Ranchers are concerned about the effects to the ranching way of life from outside interference with reintroduction of the black-footed ferret and the restrictions imposed on other activities. This could diminish the social well-being for some of the 39 ranchers within the reintroduction area by changing the way they do business.

In the long term, the social well-being of recreationists would be improved because lifestyle needs would be better met due to additional recreation opportunities for prairie dog shooting and wildlife viewing. For some, the opportunity to view black-footed ferrets would improve their social well-being.

Implementation could negatively affect the social well-being of individuals associated with some local businesses in the short term by reducing economic activity associated with prairie dog shooting.

**Alternative E (Preferred):** Controlling prairie dog towns at the 1988 level would not change the social well-being of ranchers. Ranchers are concerned about prairie dog expansion and a potential loss in livestock AUMs.

Ranchers within the reintroduction area would not experience changes in their lifestyles. However, ranchers are concerned about the effects to the ranching way of life from outside interference with reintroduction of the black-footed ferret.

The social well-being of most recreationists would not change because lifestyle needs would be met by prairie dog shooting and wildlife viewing opportunities, but the opportunity to view black-footed ferrets would improve their social well-being.

The social well-being of individuals associated with the local business community would not be affected.

## From the Judith Mountains Scenic Area

**Alternatives A (Current) & B:** The social well-being of recreationists would diminish if lifestyle needs are not met because of a loss in recreation quality (see impacts to Social Conditions from Hardrock Mining Section).

**Alternative C:** The social well-being of recreationists would be enhanced because lifestyle needs would be better met due to an increase in recreation quality. Implementation could preclude the development or expansion of 2 mines

out of 18 possible mines in the planning area (see impacts to Social Conditions from Hardrock Mining Section).

**Alternative D:** The social well-being of recreationists would be enhanced because lifestyle needs would be better met due to an increase in recreation quality. Implementation could preclude the development or expansion of 3 mines out of 18 possible mines in the planning area (see impacts to Social Conditions from Hardrock Mining Section).

**Alternative E (Preferred):** The social well-being of recreationists to the South Moccasin Mountains could decline if lifestyle needs are not met because of a loss of recreations quality. Under worst case conditions, implementation could restrict the development or expansion of 1 mine out of 18 possible mines in the planning area (see impacts to Social Conditions from Hardrock Mining Section).

### From the Acid Shale Pine Forest ACEC

**Alternatives A (Current), B, C, D & E (Preferred):** No impact to social well-being.

### From the Square Butte ONA ACEC

**Alternative A (Current):** No impact to social well-being.

**Alternative B:** The social well being of recreationists could decline if the quality of recreation declined due to mineral development.

**Alternatives C, D & E (Preferred):** The social well-being of recreationists would be enhanced because lifestyle needs would be better met with an increase in recreation quality and opportunities.

### From the Collar Gulch ACEC

**Alternatives A (Current) & B:** The social well-being of recreationists would diminish if lifestyle needs are not met because of a loss in recreation quality.

**Alternatives C & D:** The social well-being of recreationists could be enhanced because lifestyle needs could be better met due to an increase in recreation quality and opportunities. Implementation could preclude the development or expansion of 1 mine out of 18 possible mines in the planning area (see impacts to Social Conditions from Hardrock Mining Section).

**Alternative E (Preferred):** The impacts would be the same as those in Alternative A.

### From the Azure Cave ACEC

**Alternative A (Current):** Azure cave would remain closed which would negatively affect the social well-being of some recreationists.

**Alternative B:** The social well-being of recreationists would be improved in the short term because lifestyle needs would be better met due to an increase in recreation opportunities. In the long term, the attractiveness of the cave resources could decline resulting in decreased recreation opportunities and social well-being.

**Alternative C:** The social well-being of recreationists would be improved because lifestyle needs would be better met due to an increase in recreation opportunities. In the long term, the attractiveness of the cave resources could diminish and the quality of the recreation experience could decline along with social well-being. Recreation development at the cave may positively affect the social well-being of people associated with the local business community in the short and long term.

**Alternatives D & E (Preferred):** The social well-being of recreationists would be enhanced because lifestyle needs would be better met due to an increase in recreation opportunities.

### From the Big Bend of the Milk River ACEC

**Alternatives A (Current) & B:** There could be a decrease in the social well-being of some individuals due to lost opportunities to interpret cultural resources.

**Alternatives C, D & E (Preferred):** The social well-being of recreationists would be improved because lifestyle needs would be better met due to an increase in recreation quality and opportunities.

The social well-being of individuals associated with some local businesses would be enhanced due to an increase in economic activity and employment which would raise the standard of living for affected individuals.

## SUMMARY OF THE CUMULATIVE EFFECTS

### Hardrock Minerals and Oil and Gas

**Alternative A (Current):** The cumulative effects on hardrock minerals are shown in Table 4.23. Most of the high and moderate development potential land would be available for mineral development. This would be very favorable to

mineral resource development; a positive impact. The cumulative effects on other nonenergy mineral resources would be minor.

Stipulations would be applied to all oil and gas leases to protect surface resources. A No Surface Occupancy restriction, seasonal timing restrictions and controlled surface use would mitigate various surface resources. Most of the high and moderate development potential land (95%) would be available for oil and gas exploration and development with standard or special stipulations. This would be a positive impact to oil and gas exploration and development. The cumulative effects on oil and gas resources are shown in Table 4.24.

TABLE 4.23 BLM ACRES OF HARDROCK MINERAL DEVELOPMENT POTENTIAL BY MANAGEMENT CATEGORY - ALTERNATIVE A			
Development Potential	Management Category		
	Open	Restricted	Closed
High	7,775 (99%)	0 (0%)	99 (1%)
Moderate	40,256 (99%)	0 (0%)	420 (1%)
Low	29,553 (84%)	5,538 (16%)	175 (<1%)

Source: BLM, 1990

TABLE 4.24 BLM ACREAGE SUBJECT TO STANDARD STIPULATIONS, SPECIAL STIPULATIONS, NO SURFACE OCCUPANCY OR CLOSED TO OIL AND GAS LEASING IN HIGH AND MODERATE OIL AND GAS DEVELOPMENT POTENTIAL AREAS - ALTERNATIVE A				
Development Potential	Standard Stipulations	Special Stipulations	No Surface Occupancy	Closed
				High
Moderate	2,816,521	874	15,280	132,652

Source: BLM, 1990

**Alternative B:** The cumulative effects on hardrock minerals are shown in Table 4.25. All of the high and most of the moderate development potential land would be available for mineral development. This would be very favorable to mineral resource development; a positive impact. The cumulative effects on other nonenergy mineral resources would be minor.

TABLE 4.25 BLM ACRES OF HARDROCK MINERAL DEVELOPMENT POTENTIAL BY MANAGEMENT CATEGORY - ALTERNATIVE B			
Development Potential	Management Category		
	Open	Restricted	Closed
High	7,874 (100%)	0 (0%)	0 (0%)
Moderate	40,522 (100%)	0 (0%)	54 (<1%)
Low	29,648 (84%)	5,538 (16%)	80 (<1%)

Source: BLM, 1990

The maximum amount of land (97%) would be open to oil and gas leasing with resource protection provided by standard lease terms. This would have a positive impact on oil and gas exploration and development. The cumulative effects on oil and gas resources are shown in Table 4.26.

TABLE 4.26 BLM ACREAGE SUBJECT TO STANDARD LEASE TERMS, STIPULATIONS, NO SURFACE OCCUPANCY OR CLOSED TO OIL AND GAS LEASING IN HIGH AND MODERATE OIL AND GAS DEVELOPMENT POTENTIAL AREAS - ALTERNATIVE B				
Development Potential	Standard Stipulations	Special Stipulations	No Surface Occupancy	Closed
				High
Moderate	2,852,515	0	0	112,812

Source: BLM, 1990

**Alternative C:** The cumulative effects on hardrock minerals are shown in Table 4.27. Most of the high and moderate development potential land would be available for mineral development. This would be favorable to mineral resource development; a positive impact. The cumulative effects on other nonenergy mineral resources would be minor.

TABLE 4.27 BLM ACRES OF HARDROCK MINERAL DEVELOPMENT POTENTIAL BY MANAGEMENT CATEGORY - ALTERNATIVE C			
Development Potential	Management Category		
	Open	Restricted	Closed
High	7,419 (94%)	356 (5%)	99 (1%)
Moderate	34,453 (85%)	5,971 (15%)	252 (<1%)
Low	28,477 (81%)	6,659 (19%)	130 (<1%)

Source: BLM, 1990

Stipulations would protect surface resources while considering the types of oil and gas production activity in the area. Areas closed to leasing by legal designation such as WSAs, would remain closed. Other BLM land that is now closed would be available for leasing. Most of the high and moderate development potential land (92%) would be available for oil and gas exploration and development with stipulations or standard lease terms. This alternative would be generally favorable to oil and gas development. The cumulative effects on oil and gas resources are shown in Table 4.28.

**TABLE 4.28**  
**BLM ACREAGE SUBJECT TO STANDARD LEASE TERMS, STIPULATIONS, NO SURFACE OCCUPANCY OR CLOSED TO OIL AND GAS LEASING IN HIGH AND MODERATE OIL AND GAS DEVELOPMENT POTENTIAL AREAS - ALTERNATIVE C**

Development Potential	Standard Stipulations	Special Stipulations	No Surface Occupancy	Closed
High	102,866	305,692	8,652	5,150
Moderate	338,629	2,376,656	117,390	132,652

Source: BLM, 1990

**Alternative D:** The cumulative effects on hardrock minerals are shown in Table 4.29. Nearly half of the land with hardrock mineral development potential would be closed to development. This would be a significant negative impact to mineral resource development.

**TABLE 4.29**  
**BLM ACRES OF HARDROCK MINERAL DEVELOPMENT POTENTIAL BY MANAGEMENT CATEGORY - ALTERNATIVE D**

Development Potential	Management Category		
	Open	Restricted	Closed
High	5,774 (73%)	240 (3%)	1,860 (24%)
Moderate	16,167 (40%)	100 (<1%)	24,409 (60%)
Low	21,372 (61%)	5,538 (16%)	8,356 (23%)

Source: BLM, 1990

This alternative provides the maximum protection for surface resources. It would not be favorable to oil and gas exploration and development. It relies heavily on discretionary closures and No Surface Occupancy restrictions to protect surface resources. Only 36% of the high and moderate development potential land would be available for oil and gas exploration and development with stipulations or standard lease terms. The cumulative effects on oil and gas resources are shown in Table 4.30.

**TABLE 4.30**  
**BLM ACREAGE SUBJECT TO STANDARD LEASE TERMS, STIPULATIONS, NO SURFACE OCCUPANCY OR CLOSED TO OIL AND GAS LEASING IN HIGH AND MODERATE OIL AND GAS DEVELOPMENT POTENTIAL AREAS - ALTERNATIVE D**

Development Potential	Standard Stipulations	Special Stipulations	No Surface Occupancy	Closed
High	102,866	208,454	105,890	5,150
Moderate	338,629	559,357	1,928,929	138,412

Source: BLM, 1990

**Alternative E (Preferred):** The cumulative effects on hardrock minerals are shown in Table 4.31. The majority of land with hardrock development potential would be open, or open with restrictions, to development. This would generally be favorable for mineral resource development.

**TABLE 4.31**  
**BLM ACRES OF HARDROCK MINERAL DEVELOPMENT POTENTIAL BY MANAGEMENT CATEGORY - ALTERNATIVE E**

Development Potential	Management Category		
	Open	Restricted	Closed
High	7,619 (97%)	156 (2%)	99 (1%)
Moderate	35,840 (88%)	4,584 (11%)	252 (1%)
Low	28,917 (82%)	6,219 (18%)	130 (<1%)

Source: BLM, 1990

The majority of the BLM land with high development potential 312,120 out of 422,360 acres would be available for oil and gas leasing and development with standard lease terms. This would be a favorable impact to oil and gas exploration and development. The high potential land would be available with minimum permitting and administrative processing. There would be moderate potential land subject to stipulations and No Surface Occupancy restrictions which would have a minor negative impact to oil and gas exploration and development. The cumulative effect on oil and gas resources are shown in Table 4.32.

**TABLE 4.32**  
**BLM ACREAGE SUBJECT TO STANDARD LEASE TERMS, STIPULATIONS, NO SURFACE OCCUPANCY OR CLOSED TO OIL AND GAS LEASING IN HIGH AND MODERATE OIL AND GAS DEVELOPMENT POTENTIAL AREAS - ALTERNATIVE E**

Development Potential	Standard Stipulations	Special Stipulations	No Surface Occupancy	Closed
High	312,120	99,940	5,150	5,150
Moderate	1,162,361	1,648,381	41,773	112,812

Source: BLM, 1990



## Air and Water Quality

**Alternative A (Current):** The cumulative effects on air and water quality would be positive. Water quality would improve through grazing management on 1.99 million acres with riparian-wetland areas by increasing stream bank vegetation and reducing erosion. Water quality could be impacted by cyanide contamination from hardrock mining operations.

**Alternative B:** The cumulative effects on air and water quality would be positive. Water quality would improve through grazing management on 1.50 million acres with riparian-wetland areas by increasing stream bank vegetation and reducing erosion. Water quality could be impacted by cyanide contamination from hardrock mining operations.

**Alternative C:** The cumulative effects on air and water quality would be positive. Water quality would improve through grazing management on 2.45 million acres with riparian-wetland areas by increasing stream bank vegetation and reducing erosion. Water quality could be impacted by cyanide contamination from hardrock mining operations.

**Alternative D:** The cumulative effects on air and water quality would be positive. Water quality would improve through grazing management on 2.86 million acres with riparian-wetland areas by increasing stream bank vegetation and reducing erosion. Water quality could be impacted by cyanide contamination from hardrock mining operations.

**Alternative E (Preferred):** The cumulative effects on air and water quality would be positive. Water quality would improve through grazing management on 2.38 million acres with riparian-wetland areas by increasing stream bank vegetation and reducing erosion. Water quality could be impacted by cyanide contamination from hardrock mining operations.

## Soil and Vegetation

**Alternative A (Current):** The cumulative effects on soil and vegetation would be positive. There would be an improvement in the ecological status of vegetation and reduction in soil erosion from improved grazing management on 1.99 million acres with riparian-wetland areas. Prairie dog management would result in improved vegetation cover on 10,013 acres.

There would also be negative impacts to soil and vegetation from the potential farming of 68,069 acres, ORV use on 2,375,440 acres, improved public access, oil and gas exploration and development, potential bentonite mining and projected hardrock exploration and mining on 1,430 acres.

**Alternative B:** The cumulative effects on soil and vegetation would be negative. There would be limited improvement in the ecological status of vegetation and reduced soil erosion from improved grazing management on 1.50 million acres with riparian-wetland areas. Prairie dog management would result in improved vegetation cover on 6,859 acres.

There would be negative impacts to soil and vegetation from the potential farming of 68,069 acres, ORV use on 2,687,570 acres, oil and gas exploration and development, potential bentonite mining and projected hardrock exploration and mining on 1,430 acres.

**Alternative C:** The cumulative effects on soil and vegetation would be positive. There would be substantial improvement in the ecological status of vegetation and a reduction in soil erosion from improved grazing management on 2.45 million acres with riparian-wetland areas. Prairie dog management would result in improved vegetation cover on 1,330 acres.

There would be negative impacts to soil and vegetation from the potential farming of 68,069 acres, ORV use on 1,818,437 acres, oil and gas exploration and development, potential bentonite mining and projected hardrock exploration and mining on 1,330 acres.

**Alternative D:** The cumulative effects on soil and vegetation would be positive. Protecting sensitive areas from hardrock mining and oil and gas activities and limiting ORV use throughout the planning area would reduce the potential for soil erosion and vegetation damage. There would be substantial improvement in the ecological status of vegetation and a reduction in soil erosion from improved grazing management on 2.86 million acres with riparian-wetland areas.

There would be negative impacts to soil and vegetation from the potential farming of 68,069 acres, oil and gas exploration and development, potential bentonite mining and projected hardrock exploration and mining on 985 acres.

**Alternative E (Preferred):** The cumulative effects on soil and vegetation would be positive. There would be substantial improvement in the ecological status of vegetation and reduction in soil erosion from improved grazing management on 2.38 million acres with riparian-wetland areas. ORV use would be limited or closed on the most popular hunting areas, limiting damage to soil and vegetation.

There would be negative impacts to soil and vegetation from the potential farming of 68,069 acres, oil and gas exploration and development, potential bentonite mining and projected hardrock exploration and mining on 1,330 acres.

## Livestock Grazing Management

**Alternative A (Current):** The cumulative effects on livestock grazing management would be positive because of improved grazing management on 1.99 million acres with riparian-wetland areas.

**Alternative B:** The cumulative effects on livestock grazing management would be negative. No new AMPs would be implemented on riparian-wetland areas.

**Alternative C:** The cumulative effects on livestock grazing management would be positive because of improved grazing management on 2.45 million acres with riparian-wetland areas.

**Alternative D:** The cumulative effects on livestock grazing management would be positive because of improved grazing management on 2.86 million acres with riparian-wetland areas.

**Alternative E (Preferred):** The cumulative effects on livestock grazing management would be positive because of improved grazing management on 2.38 million acres with riparian-wetland areas.

## Wildlife

**Alternative A (Current):** There would be positive impacts from acquiring wildlife habitat, limiting ORV use yearlong and closing Square Butte to ORV use, protecting wildlife during oil and gas exploration and development, mitigating hardrock mining impacts, managing riparian-wetland areas, providing habitat for elk and bighorn sheep expansion, managing prairie dogs in the Valley and Phillips RAs, and protecting the wildlife values of Square Butte and Azure Cave.

There would be negative impacts from wildlife harassment with new access and unrestricted ORV use. The elimination of 9,912 acres (75%) of prairie dog towns in the Phillips RA would result in the lost opportunity to reintroduce the black-footed ferret. Mining activity could result in the possible loss of the westslope cutthroat trout in the Collar Gulch area.

Overall, the cumulative effects on wildlife would be positive.

**Alternative B:** There would be positive impacts of acquiring wildlife habitat, not gaining new access, limiting ORV use and closing Square Butte to ORV use, protecting some wildlife during oil and gas exploration and development, mitigating hardrock mining impacts, managing riparian-wetland areas, maintaining elk and bighorn sheep habitat, managing prairie dog towns in the Valley RA, and managing 6,462 acres of prairie dog towns in Phillips RA for black-footed ferret reintroduction.

There would be negative impacts from not acquiring quality wildlife habitat, wildlife harassment with unrestricted ORV use, potential impacts to wildlife on about 3,269,725 acres through unstipulated oil and gas leasing, loss of protection of sensitive wildlife habitat to hardrock mining, providing habitat for elk and bighorn sheep expansion, elimination of 6,758 acres (51%) of prairie dog towns in the Phillips RA, possible loss of the westslope cutthroat trout population in Collar Gulch, the loss of Azure Cave as an important bat hibernaculum and the loss of wildlife values on Square Butte.

Overall, cumulative effects on wildlife would be negative.

**Alternative C:** There would be positive impacts of acquiring low quality wildlife habitat, limiting ORV use yearlong and closing ORV use on 3,805 acres, protecting some wildlife during oil and gas leasing on 2,946,192 acres, mitigating hardrock mining impacts, managing riparian-wetland areas, allowing elk and bighorn sheep expansion, managing prairie dog towns in the Valley RA, managing prairie dog towns in Phillips RA for black-footed ferret reintroduction and protecting the wildlife values of Square Butte, Collar Gulch and Azure Cave ACECs.

There would be negative impacts from wildlife harassment with unrestricted ORV use and elimination of 1,229 acres (10%) of prairie dog towns in the Phillips RA.

Overall, the cumulative effects on wildlife would be positive.

**Alternative D:** There would be positive impacts of acquiring high quality wildlife habitat, limiting ORV use and closing ORV use on 21,135 acres, protecting wildlife during oil and gas leasing, mitigating hardrock mining impacts, managing riparian-wetland areas, allowing elk and bighorn sheep expansion, managing for prairie dog towns in the Judith and Valley RAs, managing prairie dog towns in the Phillips RA for black-footed ferret reintroduction and prairie dog shooting and protecting the wildlife values of Square Butte, Collar Gulch and Azure Cave ACECs.

Overall, the cumulative effects on wildlife would be positive.

**Alternative E (Preferred):** There would be positive impacts of acquiring high quality wildlife habitat, limiting ORV use yearlong (157,413 acres) and closing ORV use on 1,947 acres, protecting most wildlife during oil and gas leasing, mitigating hardrock mining impacts, managing riparian-wetland areas, allowing elk and bighorn sheep expansion, managing prairie dog towns in the Judith and Valley RAs, managing prairie dog towns in Phillips RA for black-footed ferret reintroduction and prairie dog shooting and protecting the wildlife values of Square Butte and Azure Cave.

There would be negative impacts to wildlife from harassment on 71,793 acres with new access, 1,126,858 acres with

additional access and on 1,990,501 acres (69%) through unrestricted ORV use. Mining activity could result in the possible loss of the westslope cutthroat trout in the Collar Gulch area.

Overall, the cumulative effects on wildlife would be positive.

## Forestry

**Alternatives A (Current), B, C, D & E (Preferred):** As a result of land acquisition and disposal, there could be a net gain in the annual allowable cut.

## Cultural Resources

**Alternatives A (Current) & B:** There may be some cumulative effects on cultural resources from hardrock mining. Most mining activity would occur in the isolated mountain ranges in the planning area. These areas also served as important resources for Native Americans throughout prehistory and the present. The mountain ranges were attractive to prehistoric peoples because of the resources they possess and because of the religious values associated with certain peaks and areas. The cultural resources in these areas are thus unique and in some cases, not duplicated elsewhere in the planning area.

Mitigation measures normally employed for archaeological and historic cultural properties are geared to remove information from the ground or to document and record the resource and then analyze that information. Cultural resources which contain religious values cannot as a rule be mitigated. As a result, if sites are present which have these values residual impacts would occur. Also, due to the unique nature of these archaeological resources, there are a limited number of these resources. Archaeological mitigation may be able to recover much information about these resources, but because of the small number of such resources the cumulative impacts would not be measurable.

**Alternative C:** Cumulative effects on cultural resources from hardrock mining would be slightly reduced, but similar to Alternative A. Even with this reduction, because of the limited number of possible mine locations, it is anticipated that the potential exists for residual impacts, should development occur. Designating the Big Bend of the Milk River an ACEC would have a positive effect on cultural resources.

**Alternative D:** Due to the reduction in the number of acres open for mineral entry, the likelihood of cumulative effects on cultural resources from hardrock mining would be reduced. The potential still exists, however, because of the limited number of possible locations for a mine site and the probability of cultural resources situated near or at that

location. Designating the Big Bend of the Milk River an ACEC would have a positive effect on cultural resources.

**Alternative E (Preferred):** The cumulative effects would be the same as those in Alternative C.

## Recreation

**Alternative A (Current):** Hardrock mining activity could discourage or curtail dispersed recreation use and displace some recreation use to other areas. This could have a long-term negative impact on recreation in those areas.

Riparian and wetland management would provide an estimated 58,000 visits for waterfowl hunting in states south of Montana. This would be a significant positive impact on waterfowl hunting outside the planning area.

In the short term, eliminating 10,013 acres of prairie dog towns, would eliminate a 100% of shooting opportunities in the Phillips RA.

**Alternative B:** The effects of acquisition would have a positive impact on recreation

Hardrock mining activity could discourage or curtail dispersed recreation use and displace some recreation use to other areas. This could have a long-term negative impact on recreation use in those areas.

Riparian and wetland management would provide an estimated 42,000 visits for waterfowl hunting in states south of Montana. This would be a significant positive impact on waterfowl hunting outside the planning area.

With a 6,800 acre reduction in prairie dog towns, there would be a 50% loss of shooting opportunities.

**Alternative C:** The effects of acquisition would have a positive impact on recreation.

A positive effect would result from new access to 71,793 BLM acres. Recreation use could increase by 2,300 visits. The opportunities for ORV use would decrease, while the opportunities and quality for walk-in hunting would increase.

Hardrock mining activity could discourage or curtail dispersed recreation use and displace some recreation use to other areas. This could have a long-term negative impact on recreation use in those areas.

Riparian and wetland management would provide an estimated 68,000 visits for waterfowl hunting in states south of Montana. This would be a significant positive impact on waterfowl hunting outside of the planning area.

With a 8,697 acre reduction in prairie dog towns available for shooting, there would be a 62% decrease in shooting opportunities.

**Alternative D:** The effects of acquisition would have a positive impact on recreation.

A significant positive impact on recreation use would result from new access to 71,793 acres and additional access to 1,126,858 BLM acres; recreation use could increase by 9,600 visits.

Recreation use by walk-in hunters would increase due to ORV restrictions on all but 40 acres of BLM land. Hunters supporting unrestricted ORV use may shift to other areas.

Hardrock mining activity could discourage or curtail dispersed recreation use and displace some recreation use to other areas. This could have a long-term negative effect on recreation use in those areas.

Riparian and wetland management would provide an estimated 74,000 visits for waterfowl hunting in states south of Montana. This would be a significant positive impact on waterfowl hunting outside of the planning area.

In the short term, after ferret reintroduction occurs, there could be a 86% loss of prairie dog shooting opportunities. In the long term, there would be an increase in wildlife viewing and prairie dog shooting opportunities with the expansion of prairie dog towns on BLM land.

**Alternative E (Preferred):** The effects of acquisition would have a positive impact on recreation.

A significant positive effect on recreation use would result from new access to 71,793 BLM acres and additional access to 1,126,858 BLM acres; recreation use could increase by 9,600 visits.

The opportunities for ORV use would decrease, while the opportunities for walk-in hunting would increase.

Hardrock mining activity could discourage or curtail dispersed recreation use and displace some recreation use to other areas. This could have a long-term negative effect on recreation use in those areas.

Riparian and wetland management would provide an estimated 65,000 visits for waterfowl hunting in states south of Montana. This would be a significant positive impact on waterfowl hunting outside of the planning area.

Approximately 14,091 acres of prairie dog towns would be available for shooting, provided the impacts to ferrets are not detrimental. This would have no effect on shooting opportunities.

## Visual Resources

**Alternatives A (Current) & B:** Unrestricted ORV use could cause negative impacts to the visual quality of the natural landscape.

Through mining and exploration activities there would be a negative impact on the visual quality of the natural landscape. Surface disturbing activities would affect the line, form, color, and texture of the natural landscape.

The potential for deteriorated scenic qualities exists from mining claim location, exploration and development in the South Moccasins and Judith Mountains. Mining activities could cause long term or permanent changes in the natural landscape.

**Alternatives C, D & E (Preferred):** Unrestricted ORV use could cause negative impacts to the visual quality of the natural landscape.

Through mining and exploration activities there would be a negative impact on the visual quality of the natural landscape. Surface disturbing activities would affect the line, form, color, and texture of the natural landscape.

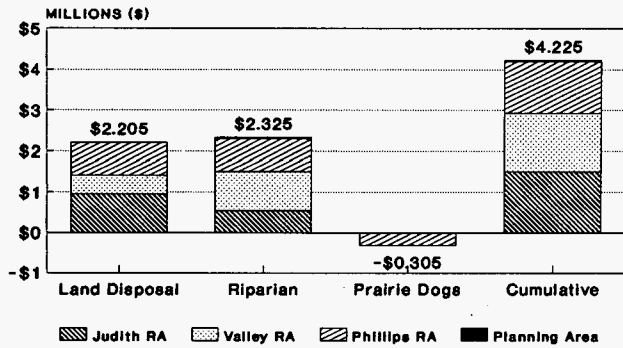
## Economic Conditions

**Alternative A (Current):** Figures 4.3, 4.4, and 4.5 show the cumulative effects by issue, for total annual economic benefit, employment and fiscal conditions.

Annual total economic benefit could increase \$4.2 million. This would not be a significant increase over current conditions in the planning area. No single issue would cause significant impacts to total annual economic activity for the planning area or any of the resource areas. However, some sectors of the economy would have significant impacts. The Phillips RA could experience a 9% decline (\$436,000) in economic benefit due to a decrease in prairie dog shooting opportunities. In addition, mineral development could result in significant increases in economic activity in the Judith and Phillips RAs during mine development and production.

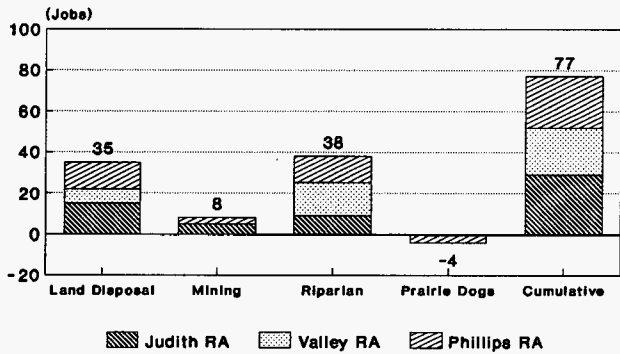
Total annual employment could increase by 77 jobs. This increase would not be significant for the planning area, less than 1%. The estimated increase includes employment attributable to exploration but not development of mineral resources. Mineral development employment is estimated in terms of peak employment under a maximum development scenario rather than on an annual basis. Peak employment from development, estimated to be 600 in the Phillips RA and 800 in the Judith RA, would represent significant increases (22% and 7% respectively) over current employment in the planning area.

**FIGURE 4.3**  
Total Annual Economic Benefit  
Alternative A



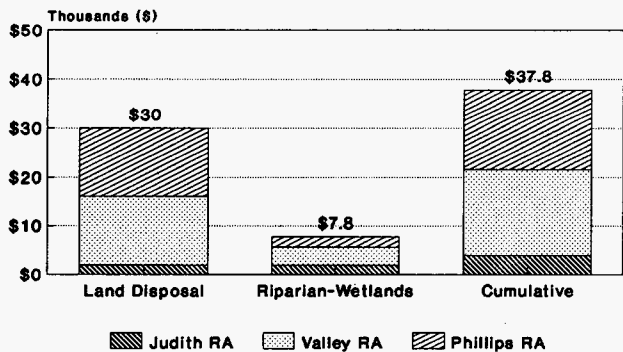
ISSUES WITH QUANTIFIED ECONOMIC IMPACTS FROM CURRENT CONDITIONS

**FIGURE 4.4**  
Total Annual Employment Impacts  
Alternative A



ISSUES WITH QUANTIFIED ECONOMIC IMPACTS FROM CURRENT CONDITIONS

**FIGURE 4.5**  
Total Annual Fiscal Impacts  
Alternative A



ISSUES WITH QUANTIFIED ECONOMIC IMPACTS FROM CURRENT CONDITIONS

Management costs are estimated to increase \$22.9 million dollars over the life of the plan. These costs would occur on a one-time basis only for BLM (\$21.4 million) and ranching operations (\$1.5 million). The increase in total economic benefit attributable to these costs would be \$30.8 million over the life of the plan. BLM would incur an estimated \$98,000 increase in annual costs for prairie dog and black-footed ferret management, resulting in an increase of \$131,000 in economic activity in the planning area.

Annual tax revenues could increase \$37,800, due to changes in land tenure and agricultural production. This is not a significant increase over current conditions. In addition, increased mineral production could result in significant increases in state and local tax revenues.

Table 4.33 summarizes the cumulative effects.

**TABLE 4.33**  
CHANGES FROM CURRENT CONDITIONS -  
ALTERNATIVE A

Economic Elements	Planning Area	Resource Area		
		Judith	Valley	Phillips
<b>Total Economic Benefit</b>				
Annual (000s \$)	4,225	1,501	1,422	1,266
One-time (000s \$)	39,000	5,200	NA	3,000
<b>Employment</b>				
Annual	77	29	23	25
<b>Population</b>				
Annual	NA	NA	NA	NA
<b>Management Costs</b>				
Annual (\$000)	98	NA	NA	NA
One-time (\$000)	22,900	NA	NA	NA
<b>Fiscal</b>				
Annual (000s \$)	37.8	3.9	17.7	16.2

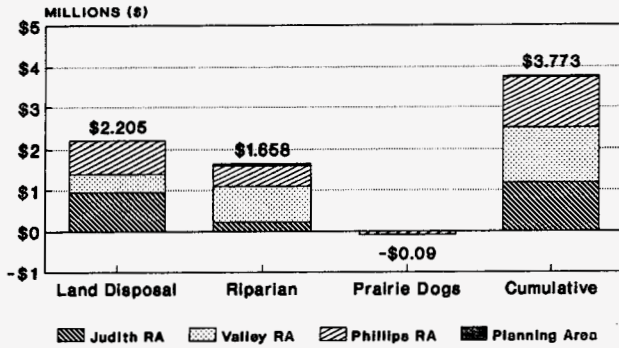
Note: NA is Not Applicable

Source: BLM, 1990

**Alternative B:** Figures 4.6, 4.7, and 4.8 show the cumulative effects by issue, for total annual economic benefit, employment, and fiscal conditions.

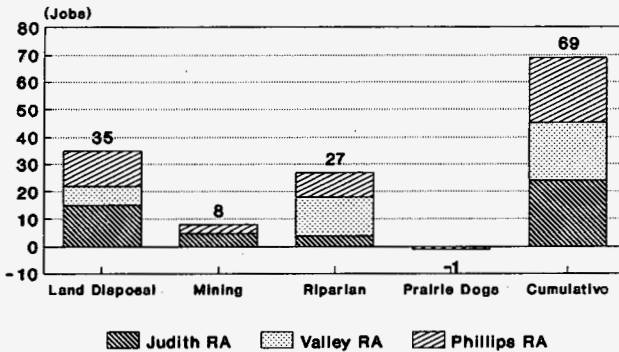
Annual total economic benefit could increase \$3.8 million. This would not be a significant increase over current conditions in the planning area. No single issue would cause significant impacts to total annual economic activity for the planning area or any of the resource areas. However, mineral development could result in significant increases in economic activity in the Judith and Phillips RAs during mine development and production.

**FIGURE 4.6**  
Total Annual Economic Benefit  
Alternative B



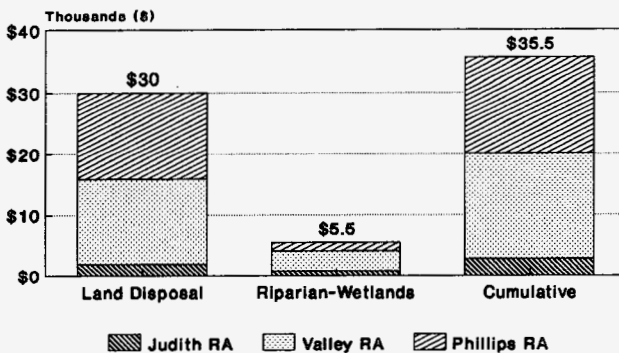
ISSUES WITH QUANTIFIED ECONOMIC IMPACTS FROM CURRENT CONDITIONS

**FIGURE 4.7**  
Total Annual Employment Impacts  
Alternative B



ISSUES WITH QUANTIFIED ECONOMIC IMPACTS FROM CURRENT CONDITIONS

**FIGURE 4.8**  
Total Annual Fiscal Impacts  
Alternative B



ISSUES WITH QUANTIFIED ECONOMIC IMPACTS FROM CURRENT CONDITIONS

Total annual employment could increase by **69** jobs. This increase would not be significant for the planning area, less than 1%. The estimated increase includes employment attributable to exploration, but not development of mineral resources. Mineral development employment is estimated in terms of peak employment under a maximum development scenario rather than on an annual basis. Peak employment from development, estimated to be 600 in the Phillips RA and 800 in the Judith RA, would represent significant increases (22% and 7%, respectively) over current employment in the planning area.

Management costs are estimated to increase **\$13.9** million dollars over the life of the plan. These costs would occur on a one-time basis for BLM (**\$13.1** million) and ranching operations (\$800,000). The increase in total economic benefit attributable to these costs would be **\$19** million over the life of the plan. BLM would incur an increase in annual costs for prairie dog and black-footed ferret management, estimated to be \$95,000, resulting in an increase of \$127,000 in total economic activity in the planning area.

Annual tax revenues could increase **\$35,500**, due to changes in land tenure and changes in agricultural production. This is not a significant increase over current conditions. In addition, increased mineral production could result in significant increases in state and local tax revenues.

Table 4.34 summarizes the cumulative effects.

**TABLE 4.34**  
CHANGES FROM CURRENT CONDITIONS -  
ALTERNATIVE B

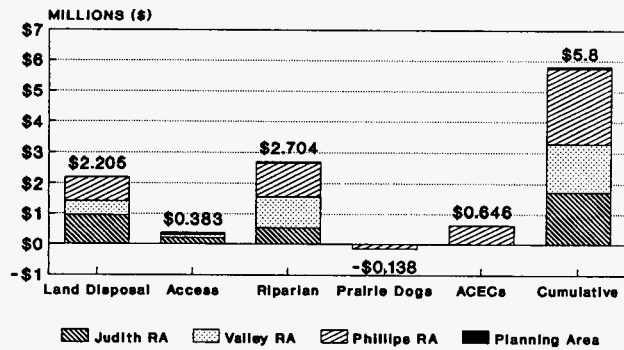
Economic Elements	Planning Area	Resource Area		
		Judith	Valley	Phillips
<b>Total Economic Benefit</b>				
Annual (000s \$)	3,773	1,198	1,325	1,223
One-time (000s \$)	27,203	5,200	NA	3,000
<b>Employment</b>				
Annual	69	24	21	24
<b>Population</b>				
Annual	NA	NA	NA	NA
<b>Management Costs</b>				
Annual (\$000)	98	NA	NA	NA
One-time (\$000)	13,922	NA	NA	NA
<b>Fiscal</b>				
Annual (000s \$)	35.5	2.8	17.3	15.4

Note: NA is Not Applicable

Source: BLM, 1990

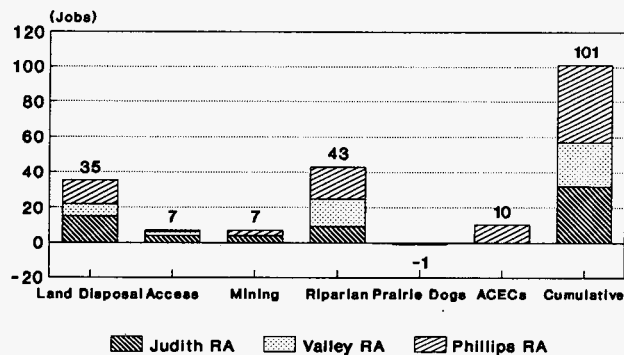
**Alternative C:** Figures 4.9, 4.10, and 4.11 show the cumulative effects by issue, for total annual economic benefit, employment, and fiscal conditions.

**FIGURE 4.9**  
Total Annual Economic Benefit  
Alternative C



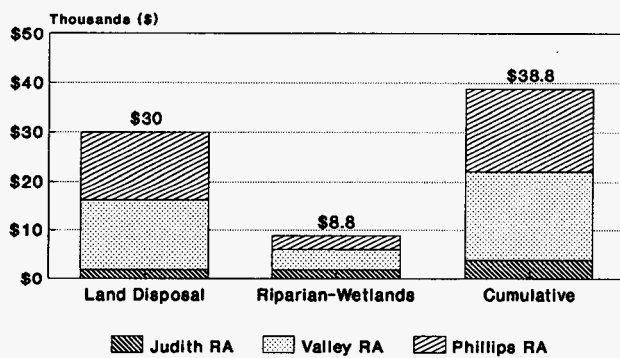
ISSUES WITH QUANTIFIED ECONOMIC IMPACTS  
FROM CURRENT CONDITIONS

**FIGURE 4.10**  
Total Annual Employment Impacts  
Alternative C



ISSUES WITH QUANTIFIED ECONOMIC IMPACTS  
FROM CURRENT CONDITIONS

**FIGURE 4.11**  
Total Annual Fiscal Impacts  
Alternative C



ISSUES WITH QUANTIFIED ECONOMIC IMPACTS  
FROM CURRENT CONDITIONS

Annual total economic benefit could increase \$5.8 million. This would not be a significant increase over current conditions in the planning area. No single issue would cause significant impacts to total annual economic activity for the planning area or any of the resource areas. However, some sectors of the economy would have significant impacts. Economic activity attributable to recreation opportunities

on BLM land would increase \$650,000 million in the planning area, a significant increase of 7%. The increase would be significant for the Judith and Phillips RAs as well: Judith, \$160,000 (4.5%); and Phillips, \$429,000 (11%). In addition, mineral development could result in significant increases in economic activity in the Judith and Phillips RAs during mine development and production.

Total annual employment could increase by 101 jobs. This increase would not be significant for the planning area, less than 1%. The estimated increase includes employment attributable to exploration, but not development of mineral resources. Mineral development employment is estimated in terms of peak employment under a maximum development scenario rather than on an annual basis. Peak employment from development, estimated to be 600 in the Phillips RA and 500 in the Judith RA at peak employment, would represent significant increases (22% and 6%, respectively) over current employment in the planning area.

Management costs are estimated to increase \$26.4 million dollars over the life of the plan. These costs would occur on a one-time basis for BLM (\$23.8 million) and ranching operations (\$2.5 million). The increase in total economic benefit attributable to these costs would be \$35.9 million over the life of the plan. BLM would incur an increase in annual costs for prairie dog and black-footed ferret management, estimated to be \$108,000, resulting in an increase of \$145,000 in economic activity in the planning area.

Annual tax revenues could increase \$38,800, due to changes in land tenure and changes in agricultural production. This is not a significant increase over current conditions. In addition, increased mineral production could result in significant increases in state and local tax revenues.

Table 4.35 summarizes the cumulative effects.

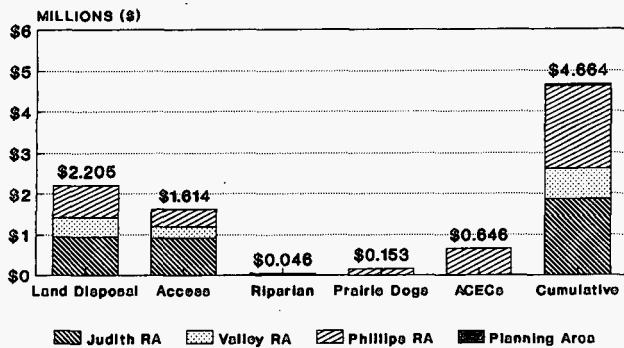
TABLE 4.35 CHANGES FROM CURRENT CONDITIONS - ALTERNATIVE C				
Economic Elements	Planning Area	Resource Area		
		Judith	Valley	Phillips
<b>Total Economic Benefit</b>				
Annual (000s \$)	5,800	1,731	1,563	2,464
One-time (000s \$)	43,400	4,500	NA	3,000
<b>Employment</b>				
Annual	101	44	25	32
<b>Population</b>				
Annual	NA	NA	NA	NA
<b>Management Costs</b>				
Annual (\$000)	108	NA	NA	NA
One-time (\$000)	26,368	NA	NA	NA
<b>Fiscal</b>				
Annual (000s \$)	38.8	3.9	18	16.9

Note: NA is Not Applicable

Source: BLM, 1990

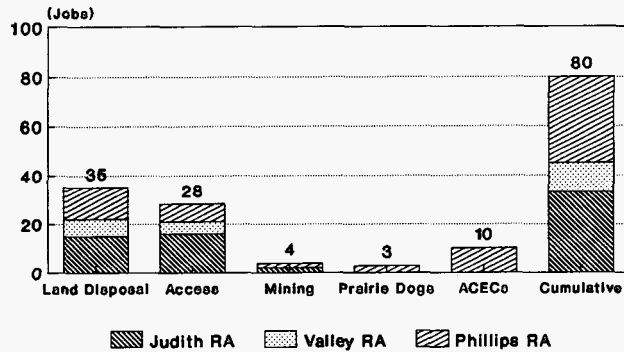
**Alternative D:** Figures 4.12 and 4.13 show the cumulative effects by issue, for total annual economic benefit and employment.

**FIGURE 4.12**  
**Total Annual Economic Benefit**  
**Alternative D**



ISSUES WITH QUANTIFIED ECONOMIC IMPACTS FROM CURRENT CONDITIONS

**FIGURE 4.13**  
**Total Annual Employment Impacts**  
**Alternative D**



ISSUES WITH QUANTIFIED ECONOMIC IMPACTS FROM CURRENT CONDITIONS

Annual total economic benefit could increase \$4.7 million. This would not be a significant increase over current conditions in the planning area. No single issue would cause significant impacts to total annual economic activity for the planning area or any of the resource areas. However, some sectors of the economy would have significant impacts. Economic activity attributable to recreation opportunities on BLM land would increase \$1.7 million in the planning area, a significant increase of 19%. The increase would be significant for each resource area as well: Judith, \$667,000 (19%); Valley, \$183,000 (11%); Phillips, \$871,000 (23%). In addition, mineral development could result in significant increases in economic activity in the Judith and Phillips RAs during mine development and production.

Total annual employment could increase by 80 jobs. This increase would not be significant for the planning area, less than 1%. The estimated increase includes employment attributable to exploration, but not development of mineral resources. Mineral development employment is estimated in terms of peak employment under a maximum development scenario rather than on an annual basis. Peak employment from development, estimated to be 400 in the Phillips RA and 300 in the Judith RA, would represent significant increases (15% and 4%, respectively) over current employment in the planning area.

Management costs are estimated to increase \$30 million dollars over the life of the plan. These costs would occur on a one-time basis for BLM (\$26.8 million) and ranching operations (\$3.2 million). The increase in total economic benefit attributable to these costs would be \$40.7 million over the life of the plan. BLM would incur an increase in annual costs for prairie dog and black-footed ferret management, estimated to be \$114,000, resulting in an increase of \$153,000 in economic activity in the planning area.

Annual tax revenues could increase \$30,000 due to changes in land tenure and changes in agricultural production. This is not a significant increase over current conditions. In addition, increased mineral production could result in significant increases in state and local tax revenues.

Table 4.36 summarizes the cumulative effects.

**TABLE 4.36**  
**CHANGES FROM CURRENT CONDITIONS -**  
**ALTERNATIVE D**

Economic Elements	Planning Area	Resource Area		
		Judith	Valley	Phillips
<b>Total Economic Benefit</b>				
Annual (000s \$)	4,664	1,867	737	2,014
One-time (000s \$)	44,500	2,000	NA	1,800
<b>Employment</b>				
Annual	80	33	12	35
<b>Population</b>				
Annual	NA	NA	NA	NA
<b>Management Costs</b>				
Annual (\$000)	114	NA	NA	NA
One-time (\$000)	30,000	NA	NA	NA
<b>Fiscal</b>				
Annual (000s \$)	30	2	14	14

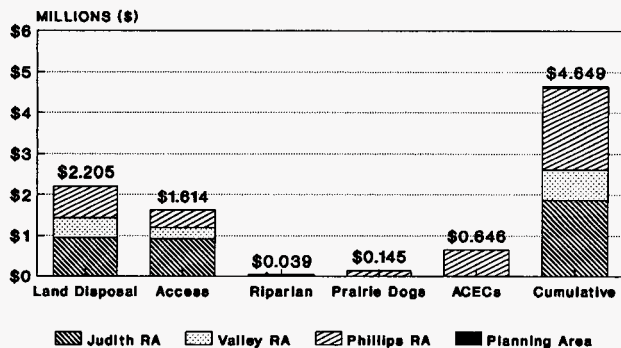
Note: NA is Not Applicable

Source: BLM, 1990



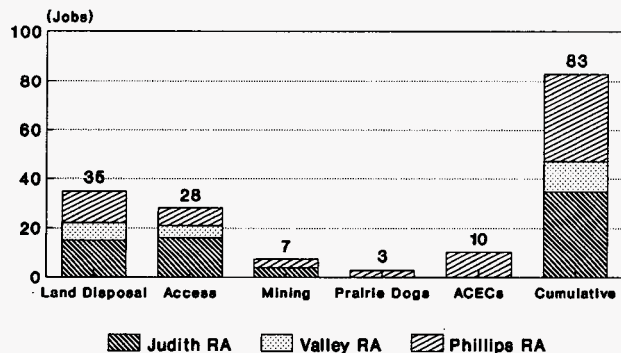
**Alternative E (Preferred):** The cumulative effects of this alternative would be similar to Alternative D, with the exception of impacts related to hardrock exploration and development. Employment, population and fiscal impacts related to hardrock exploration and development would be similar to Alternative A. Figures 4.14 and 4.15 show the cumulative effects by issue, for total annual economic benefit and employment.

**FIGURE 4.14**  
**Total Annual Economic Benefit**  
**Alternative E**



ISSUES WITH QUANTIFIED ECONOMIC IMPACTS FROM CURRENT CONDITIONS

**FIGURE 4.15**  
**Total Annual Employment Impacts**  
**Alternative E**



ISSUES WITH QUANTIFIED ECONOMIC IMPACTS FROM CURRENT CONDITIONS

Annual total economic benefit could increase \$4.6 million. This would not be a significant increase over current conditions in the planning area. No single issue would cause significant impacts to total annual economic activity for the planning area or any of the resource areas. However, some sectors would have significant impacts. Economic activity attributable to recreation opportunities on BLM land would increase \$1.7 million for the planning area, a significant increase of 19%. The increase would be significant for each resource area as well: Judith, \$667,000 (19%); Valley, \$183,000 (11%); Phillips, \$871,000 (23%). In addition, mineral development could result in significant increases in economic activity in the Judith and Phillips RAs during mine development and production.

Total annual employment could increase by 83 jobs. This increase would not be significant for the planning area, less than 1%. The estimated increase includes employment attributable to exploration, but not development of mineral resources. Mineral development employment is estimated in terms of peak employment under a maximum development scenario rather than on an annual basis. Peak employment from development, estimated to be 600 in the Phillips RA and 500 in the Judith RA, would represent significant increases (22% and 6%, respectively) over current employment in the planning area.

Management costs are estimated to increase \$23.7 million dollars over the life of the plan. These costs would occur on a one-time basis for BLM (\$21.6 million) and ranching operations (\$2.1 million). The increase in total economic benefit attributable to these costs would be \$32.5 million over the life of the plan. BLM would incur an increase in annual costs for prairie dog and black-footed ferret management, estimated to be \$109,000, resulting in an increase of \$145,000 in economic activity.

Annual tax revenues could increase \$31,000 due to changes in land tenure and changes in agricultural production. This is not a significant increase over current conditions. In addition, increased mineral production could result in significant increases in state and local tax revenues.

Table 4.37 summarizes the cumulative effects.

**TABLE 4.37**  
**CHANGES FROM CURRENT CONDITIONS -**  
**ALTERNATIVE E**

Economic Elements	Planning Area	Resource Area		
		Judith	Valley	Phillips
<b>Total Economic Benefit</b>				
Annual (000s \$)	4,649	1,867	737	2,006
One-time (000s \$)	39,978	4,500	NA	3,000
<b>Employment</b>				
Annual	83	35	12	36
<b>Population</b>				
Annual	NA	NA	NA	NA
<b>Management Costs</b>				
Annual (\$000)	145	NA	NA	NA
One-time (\$000)	23,715	NA	NA	NA
<b>Fiscal</b>				
Annual (000s \$)	31	3	14	14

Note: NA is Not Applicable

Source: BLM, 1990

## Social Conditions

**Alternative A (Current):** Changes in population would not be significant for the planning area with the exception of potential hardrock mineral development. Under a maximum development scenario, the Phillips RA could experience a 28% increase in population (1,500) and the Judith RA could experience a 12% increase (2,000) at peak employment, potentially creating significant impacts to population, infrastructure, social organization and social well-being.

Overall, this alternative would enhance the social well-being of ranchers, although some negative impacts would also occur. Positive effects to social well-being would occur because of the limited access acquisition, some ranchers could acquire livestock grazing land, enhancement of grazing management through riparian and wetland management, and the elimination of most prairie dog towns. Negative effects to social well-being would occur because some ranchers could lose livestock AUMs from land acquisition and disposal, ORV problems would not be resolved, conflicts between livestock and elk could increase, and reintroduction of the black-footed ferret could disrupt current ranch lifestyles.

The overall effect to the social well-being of recreationists would be negative. Current problems with ORV use and access to BLM land would not be resolved.

The social well-being of some farmers and people associated with some local businesses would be enhanced due to an increase in the standard of living from economic activity associated with crop production in the Phillips RA. The social well-being of people associated with some local businesses could diminish because the economic activity associated with prairie dog shooting would be reduced.

**Alternative B:** Changes in population would not be significant for the planning area with the exception of potential hardrock mineral development. Under a maximum development scenario, the Phillips RA could experience a 28% increase in population (1,500) and the Judith RA could experience a 12% increase (2,000) at peak employment, potentially creating significant impacts to population, infrastructure, social organization and social well-being.

Overall, this alternative would enhance the social well-being of ranchers, although some negative impacts would also occur. Positive effects to social well-being would occur because no additional access would be acquired, some ranchers could acquire livestock grazing land, and the elimination of some prairie dog towns. Negative effects to social well-being would occur because some ranchers would lose livestock grazing AUMs from land acquisition and disposal, ORV problems would not be resolved, conflicts between livestock and elk could increase, and reintroduction of the black-footed ferret could disrupt current ranch lifestyles.

The overall effect to the social well-being of recreationists would be negative. Current problems with ORV use and access to BLM land would not be resolved.

The social well-being of some farmers and people associated with some local businesses would be enhanced due to an increase in the standard of living from economic activity associated with crop production in the Phillips RA. The social well-being of people associated with some local businesses could diminish because the economic activity associated with prairie dog shooting would be reduced.

**Alternative C:** Changes in population would not be significant for the planning area with the exception of potential hardrock mineral development. Under a maximum development scenario, the Phillips RA could experience a 28% increase in population (1,500) and the Judith RA could experience a 7% increase (1,200) at peak employment, potentially creating significant impacts to population, infrastructure, social organization and social well-being.

Overall, this alternative would have both positive and negative effects on the social well-being of ranchers. Negative effects to social well-being would occur because some ranchers could lose livestock grazing AUMs from land acquisition and disposal, additional access could be acquired by BLM, conflicts between elk and livestock could increase, and reintroduction of the black-footed ferret could disrupt current ranch lifestyles. Positive effects to social well-being would occur by some ranchers acquiring livestock grazing land, enhancement of grazing management through riparian and wetland management, eliminating some prairie dog towns, and resolution of some ORV and access problems.

The overall effect to the social well-being of recreationists would be positive. Current problems with ORV use and access to BLM land would be addressed.

The social well-being of some farmers and people associated with some local businesses would be enhanced due to an increase in the standard of living from economic activity associated with crop production in the Phillips RA. The social well-being of people associated with some local businesses could diminish because the economic activity associated with prairie dog shooting would be reduced.

**Alternative D:** Changes in population would not be significant for the planning area with the exception of potential hardrock mineral development. Under a maximum development scenario, the Phillips RA could experience a significant increase of 20% in population (1,100) and the Judith RA could experience a 4% increase (700) at peak employment. Although the increase in the Judith RA is marginally significant at 4%, it should be noted that most of the increase would be felt in Fergus County, and would likely generate significant employment and population impacts in the county. These population increases could

potentially create significant impacts to population, infrastructure, social organization and social well-being.

Overall, this alternative would decrease the social well-being of ranchers although some positive effects would also occur. Negative effects to social well-being would occur because some ranchers would lose livestock grazing AUMs from land acquisition and disposal, additional access could be acquired by BLM, and reintroduction of the black-footed ferret could disrupt current ranch lifestyles. Positive effects to social well-being would occur by some ranchers acquiring livestock grazing land, enhancement of grazing management through riparian and wetland management, conflicts between livestock and elk could decrease, and resolution of some ORV and access problems. Some ranchers would feel implementation of this alternative would divert needed resources away from the ranching lifestyle.

The overall effect to the social well-being of recreationists would be positive. Current problems with ORV use and access to BLM land would be addressed.

The social well-being of some farmers and people associated with local businesses would be enhanced due to an increase in the standard of living from economic activity associated with crop production in the Phillips RA. This alternative could negatively affect the social well-being of some people associated with local businesses in the short term because economic activity associated with prairie dog shooting could be reduced.

**Alternative E (Preferred):** Changes in population would not be significant for the planning area with the exception of potential hardrock mineral development. Under a maximum development scenario, the Phillips RA could experience a significant increase of 28% in population (1,500) and the Judith RA could experience a 7% increase (1,200) at peak employment, potentially creating a significant impacts to population, infrastructure, social organization and social well-being.

Overall, this alternative would have both positive and negative effects on the social well-being of ranchers. Negative effects to social well-being would occur because some ranchers would lose livestock grazing AUMs from land acquisition and disposal, additional access could be acquired by BLM, and the reintroduction of the black-footed ferret could disrupt current ranch lifestyles. Positive effects to social well-being would occur by some ranchers acquiring livestock grazing land, enhancement of grazing management through riparian and wetland management, resolution of some ORV and access problems, conflicts between livestock and elk could decrease, and controlling prairie dog towns.

The overall effect to the social well-being of recreationists would be positive. Current problems with ORV use and access to BLM lands would be addressed.

The social well-being of some farmers and people associated with some local businesses would be enhanced due to an

increase in the standard of living from economic activity associated with crop production in the Phillips RA.

## UNAVOIDABLE ADVERSE IMPACTS

This section summarizes the adverse impacts that would remain if the alternatives are implemented and the mitigating measures developed by BLM are applied. Only those environmental elements with adverse impacts are discussed.

### Hardrock Minerals and Oil and Gas

**Alternatives A (Current) & B:** No unavoidable adverse impacts.

**Alternative C:** The management prescriptions for the Judith Mountains Scenic Area and Collar Gulch ACECs could preclude certain types of mining activity. This would have an unavoidable adverse impact on mineral development through the loss of development opportunities.

**Alternative D:** Large areas with No Surface Occupancy restrictions would be a negative impact to the oil and gas industry. The withdrawal of large amounts of land, with hardrock mineral development potential, would have a significant negative impact to mineral exploration and development.

**Alternative E (Preferred):** The management prescriptions for the Judith Mountains Scenic Area ACEC could preclude certain types of mining activity. This would have an unavoidable adverse impact on some hardrock mineral development opportunities.

### Wildlife

**Alternative A (Current):** Eliminating 9,912 acres (75%) of prairie dog towns in the Phillips RA would adversely affect the opportunity to reintroduce the black-footed ferret.

Hardrock mining activities would have no significant water quality degradation under normal operating conditions. If normal conditions are exceeded, the potential for surface and groundwater contamination is increased with the potential impact to the westslope cutthroat trout population in Collar Gulch Creek.

**Alternative B:** There would be unmitigated impacts to wildlife on most of 3,269,725 acres through unstipulated oil and gas leasing. Eliminating 6,758 acres (51%) of the prairie dog towns in the Phillips RA would adversely affect the opportunity to reintroduce the black-footed ferret. Mining activities could destroy the value of Azure Cave as an important bat hibernaculum.

Hardrock mining activities would have no significant water quality degradation under normal operating conditions. If normal conditions are exceeded, the potential for surface and groundwater contamination is increased with the potential impact to the westslope cutthroat trout population in Collar Gulch Creek.

**Alternative C:** Eliminating 1,229 acres (10%) of prairie dogs in the Phillips RA would adversely affect the opportunity to reintroduce the black-footed ferret.

**Alternative D:** No unavoidable adverse impacts.

**Alternative E (Preferred):** Hardrock mining activities would have no significant water quality degradation under normal operating conditions. If normal conditions are exceeded, the potential for surface and groundwater contamination is increased with the potential impact to the westslope cutthroat trout population in Collar Gulch Creek.

## Recreation

**Alternative A (Current):** No unavoidable adverse impacts.

**Alternative B:** The Camp Creek Campground and Azure Cave located in the Little Rocky Mountains, would be adversely affected by revoking the existing withdrawals.

**Alternatives C, D & E (Preferred):** No unavoidable adverse impacts.

## Visual Resources

**Alternatives A (Current) & B:** The visual quality in the Judith, South Moccasin, and Little Rocky Mountains could be adversely affected from mining claim location, development and other land uses.

**Alternatives C, D & E (Preferred):** The visual quality in the Little Rocky Mountains could be adversely affected from mining claim location, development and other land uses.

## Economic Conditions

**Alternative A (Current):** There would be a permanent loss of economic activity due to reductions in livestock production from land acquisition and disposal. There would also be a permanent loss of economic activity in the Phillips RA due to the elimination of acreage available for prairie dog shooting.

**Alternative B:** There would be a permanent loss of economic activity due to reductions in livestock production from land acquisition and disposal. There would also be a

permanent loss of economic activity in the Phillips RA due to reductions in acreage available for prairie dog shooting.

**Alternative C:** There would be a permanent loss of economic activity due to reductions in livestock production from land acquisition and disposal. There would also be a permanent loss of economic activity in the Phillips RA due to a reduction in acreage available for prairie dog shooting.

Some mineral exploration and development may be foregone in the Judith RA, resulting in lost opportunities for potential future economic activity and tax revenues.

**Alternative D:** There would be a permanent loss of economic activity due to reductions in livestock production from land acquisition and disposal.

Some mineral exploration and development may be foregone in both the Judith and Phillips RAs, resulting in lost opportunities for potential future economic activity and tax revenues.

**Alternative E (Preferred):** There would be a permanent loss of economic activity due to reductions in livestock production resulting from land acquisition and disposal.

Some mineral exploration and development may be foregone in the Judith RA, resulting in lost opportunities for potential future economic activity and tax revenues.

## Social Conditions

**Alternatives A (Current), B, C, D & E (Preferred):** Potential increases in the development of hardrock mineral resources could result in significant impacts to population, infrastructure, social organization and social well-being in the Judith and Phillips RAs.

## SHORT-TERM USE/LONG-TERM PRODUCTIVITY

This section identifies the trade-offs between short-term use and long-term productivity of the resources involved in the alternatives. Only those environmental elements affected are discussed.

### Hardrock Minerals and Oil and Gas

**Alternatives A (Current), B & C:** There would be no trade-offs between short-term use and long-term productivity of mineral and energy resources.

**Alternative D:** The withdrawal of large areas with hardrock mineral development potential would negatively affect the

short and long-term mineral production of the region. Changes in mineral economics may not allow for recovery of these resources if the withdrawal is revoked at a later date.

**Alternative E (Preferred):** There would be no trade-offs between short-term use and long-term productivity of mineral and energy resources.

### Air and Water Quality

**Alternatives A (Current), B, C, D & E (Preferred):** There is a risk of long-term loss of water quality due to heap-leach mining.

### Soil and Vegetation

**Alternatives A (Current), B, C, D & E (Preferred):** Short-term impacts would be mitigated by reclamation measures that would result in long-term soil productivity and vegetation production. There would be a risk of long-term soil productivity loss from improper farming practices on BLM land exchanged and a risk of long-term soil productivity loss as a result of open-pit mining.

### Wildlife

**Alternative A (Current):** ORV use on 2,375,440 acres would harass wildlife and reduce the long-term productivity of wildlife associated with specific habitat types. The long-term loss of prairie dog towns would reduce the likelihood of maintaining a viable population of black-footed ferrets. Mitigation of other short-term impacts would provide for the long-term maintenance of wildlife habitat.

**Alternative B:** ORV use on 2,687,570 acres would harass wildlife and reduce the long-term productivity of wildlife associated with specific habitat types. The long-term loss of prairie dog towns would reduce the likelihood of maintaining a viable population of black-footed ferrets. Mitigation of other short-term impacts would provide for the long-term maintenance of wildlife habitat.

**Alternative C:** ORV use on 1,818,437 acres would harass wildlife and reduce the long-term productivity of wildlife associated with specific habitat types. The long-term loss of prairie dog towns would reduce the likelihood of maintaining a viable population of black-footed ferrets. Mitigation of other short-term impacts would provide for the long-term maintenance of wildlife habitat.

**Alternative D:** Mitigation of short-term impacts would provide for the long-term maintenance of wildlife habitat.

**Alternative E (Preferred):** ORV use on 1,990,501 acres would harass wildlife during the hunting season and could

reduce the long-term productivity of wildlife associated with specific habitat types. Mitigation of other short-term impacts would provide for the long-term maintenance of wildlife habitat.

### Cultural Resources

**Alternatives A (Current), B, C, D & E (Preferred):** Some cultural properties could be destroyed by ORV use and mining activities.

### Recreation

**Alternative A (Current):** In the long term, no prairie dog towns would be available for shooting as a result of poisoning.

**Alternatives B, C & D:** In the long term, fewer prairie dog towns would be available for shooting.

**Alternative E (Preferred):** There would be no trade-offs between short-term use and long-term productivity of recreation.

### Visual Resources

**Alternative A (Current), B, C & D:** In the long-term, visual resources could be negatively impacted in site specific areas from oil and gas, and mining activities.

**Alternative E (Preferred):** Same as Alternative A, except management prescriptions and/or mitigating measures would help to protect the long-term visual character of the Judith Mountains ACEC.

### Economic Conditions

**Alternative A (Current):** Prairie dog and black-footed ferret management would result in a short-term loss in economic activity due to temporary reductions in livestock production.

There may be a short-term decrease in economic activity associated with hunting if elk and bighorn sheep harvest levels decline to facilitate expansion. Economic activity would increase following expansion.

**Alternative B:** There may be a short-term increase in economic activity associated with recreation use of Azure Cave. If the cave's resources are degraded from overuse, economic activity may decline.

There may be a short-term increase in economic activity associated with hunting if elk and bighorn sheep harvest levels increase to limit expansion. Economic activity would decline to its former level in the long-term.

**Alternative C:** Prairie dog and black-footed ferret management would result in a short-term loss in economic activity due to temporary reductions in livestock production.

There may be a short-term decline in economic activity associated with hunting if elk and bighorn sheep harvest levels decline to facilitate expansion. Economic activity would increase following expansion.

**Alternative D:** Prairie dog and black-footed ferret management would result in a short-term loss in economic activity due to temporary reductions in livestock production.

There may be a short-term decline in economic activity associated with hunting if elk and bighorn sheep harvest levels decline in order to facilitate expansion. Economic activity would increase following expansion.

**Alternative E (Preferred):** There may be a short-term decline in economic activity associated with hunting if elk and bighorn sheep harvest levels decline in order to facilitate expansion. Economic activity would increase following expansion.

## **IRREVERSIBLE OR IRRETRIEVABLE RESOURCE COMMITMENTS**

This section identifies the extent to which the alternatives would irreversibly limit potential uses of the land and resources or irretrievably use, consume, destroy or degrade those resources. Only those environmental elements with irreversible or irretrievable resource commitments are discussed.

### **Hardrock Minerals and Oil and Gas**

**Alternatives A (Current) & B:** There would be no irreversible or irretrievable commitment of mineral resources.

**Alternative C:** Portions of ore bodies not developed due to the protection of visual resources may not be economically recoverable in the future.

**Alternative D:** Portions of ore bodies not developed due to the large withdrawal acreages may not be economically recoverable in the future.

This alternative could result in lost revenue from drainage by fee and state oil and gas wells. In cases where the federal land could not be committed to an agreement there would be no option to drill a protective well to offset the offending well. Because of the shallow drilling depth to hydrocarbon reservoirs and moderate production rates in the planning area, expensive technology like directional and horizontal drilling is not viable.

**Alternative E (Preferred):** Portions of ore bodies not developed due to the protection of visual resources may not be economically recoverable in the future.

### **Wildlife**

**Alternative A (Current):** This alternative could allow impacts that would create irreversible or irretrievable resource commitments (westslope cutthroat trout in Collar Gulch).

The decrease in prairie dog towns would be an irreversible and irretrievable commitment of wildlife habitat, with the possible loss of ferret reintroduction because of insufficient habitat.

**Alternative B:** This alternative could allow impacts that would create irreversible or irretrievable resource commitments (westslope cutthroat trout in Collar Gulch and the bat hibernaculum in Azure Cave).

The decrease in prairie dog towns would be an irreversible and irretrievable commitment of wildlife habitat, with the possible loss of ferret reintroduction because of insufficient habitat.

**Alternative C:** This alternative could allow impacts that would create irreversible or irretrievable resource commitments (westslope cutthroat trout in Collar Gulch and fewer prairie dog towns).

**Alternative D:** There would be no irreversible or irretrievable commitment of wildlife habitat.

**Alternative E (Preferred):** This alternative could allow impacts that would create irreversible or irretrievable resource commitments (westslope cutthroat trout in Collar Gulch).

### **Visual Resources**

**Alternatives A (Current) & B:** Surface disturbing activities in the Judith, South Moccasin, and Little Rocky Mountains would create irreversible and irretrievable commitments of the scenic qualities in the area.

**Alternatives C, D & E (Preferred):** Surface disturbing activities in the Little Rocky Mountains would create an irreversible and irretrievable commitment of the scenic qualities in the area.

### **Economic Conditions**

**Alternatives A (Current), B, C, D & E (Preferred):** Losses in economic activity from reduced livestock production and the elimination of prairie dog towns would be irretrievable, but not irreversible.