TWO CALF WATERSHED MANAGEMENT

ENVIRONMENTAL ASSESSMENT
NUMBER MT-068-98-25

Prepared By

Bureau of Land Management
Lewistown Field Office
Lewistown, Montana

September 30, 1998

FINDING OF NO SIGNIFICANT IMPACT AND DECISION RECORD

Two Calf Watershed Management Plan
Bureau of Land Management
Lewistown Field Office
Lewistown, Montana

Decision: It is my decision to approve the preferred alternative/proposed action of the Two Calf Watershed Management Plan Environmental Assessment (EA) to manage livestock grazing, noxious weed populations and off highway vehicle (OHV) travel in the Two Calf Watershed.

Finding of No Significant Impact: Based on an analysis of potential environmental impacts contained in environmental assessment Number MT-068-98-25, I have determined that impacts are not expected to be significant and an environmental impact statement is not required.

Rationale for Decision: The decision to approve the preferred alternative/proposed action does not result in any undue or unnecessary environmental degradation and is in conformance with the Judith-Valley-Phillips Resource Management Plan (September, 1994) and West HiLine Resource Management Plan (1988).

David L. Mari
Lewistown Field Manager

11/17/98
Date

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Sept. 23, 1998

CHAPTER 1- INTRODUCTION AND BACKGROUND

A. Location and Topography

The Two Calf Watershed is located about 20 miles northeast of Winifred, Montana in northern Fergus County (see general location map on page 2). It contains 13,164 acres of state land, 34,388 acres of private land, 10,230 acres of land managed by the Charles M. Russell National Wildlife Refuge (CMR NWR) and 44,393 acres of public land managed by the Bureau of Land Management (BLM) (see management area map on page 3). The boundary of the watershed is formed by the Upper Missouri National Wild and Scenic River (UMNWSR) to the east, the ridge between the Woodhawk and Two Calf watersheds to the north, the ridge between the Two Calf and Dog Creek watersheds to the west and the Knox Ridge Road to the south. However, to facilitate consistent planning decisions, all of the land in the Knox Ridge grazing allotment has been included in the planning area. Therefore, much of the southern boundary of the planning area is actually the Knox Ridge grazing allotment boundary. The primary drainage in the planning unit is the Missouri River. There are four distinct divisions or secondary intermittent drainages in the watershed including Reed Coulee, Two Calf Creek, the South Fork of Two Calf Creek and Sourdough Creek. Reed Coulee and the South Fork of Two Calf Creek empty into Two Calf Creek which bisects the entire planning area from west to east and flows into the UMNWSR a few miles upstream from James Kipp Recreation Area. Sourdough Creek, in the southern portion of the Knox Ridge grazing allotment empties into Armells Creek which flows into the Missouri River just downstream from the recreation area.

The topography over most of the watershed is very rough and broken (Missouri Breaks). The land is undergoing active geologic erosion due to a diversion of the Missouri River from its former course in the Milk River drainage which occurred near the end of the last ice age nearly 10,000 years ago. The western portion of the watershed is comprised of relatively stable, gently sloping hills over sedimentary parent material.

The floodplain of the Missouri River is relatively narrow and ends abruptly at steep surrounding hills. The uplands in the "breaks" area are dissected by narrow drainages with fast falling gradients. These drainages eventually flow into Two Calf Creek, Sourdough Creek, Reed Coulee, the South Fork of Two Calf Creek, or directly into the Missouri River. Elevation in planning area varies from 2200 feet along the Missouri River to 3400 feet just north of the Peterson ranch and feedlot.

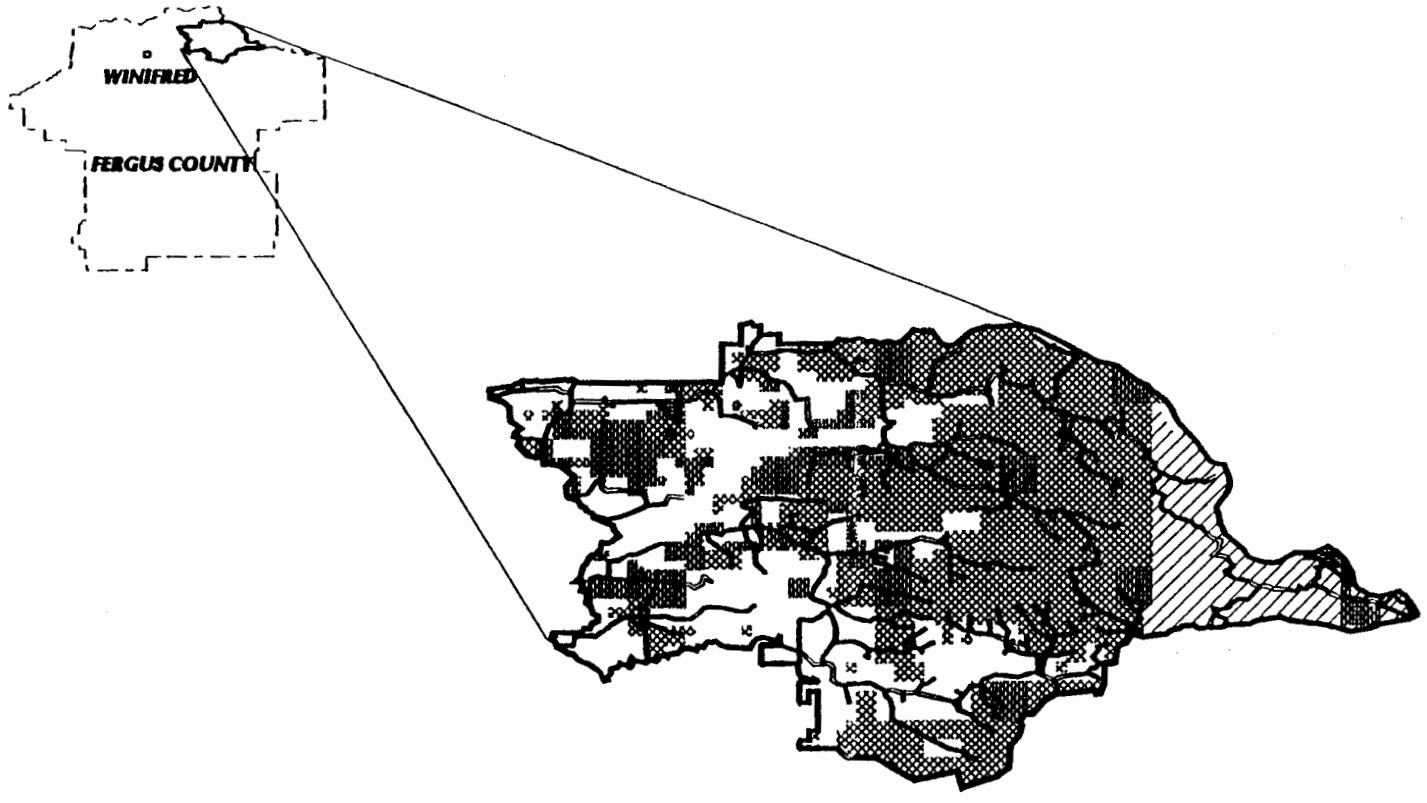
B. Background and Need for Proposed Action

The West HiLine Resource Management Plan (RMP) (1988) and Judith-Valley-Phillips RMP (1994) each specify land use plan decisions and objectives to be implemented in the Two Calf Watershed. The West HiLine RMP addresses management of BLM land within the designated corridor of the UMNWSR while the Judith-Valley-Phillips addresses management of BLM land outside of the corridor. In particular, the Judith-Valley-Phillips RMP specifies that implementation of riparian/wetland decisions shall be conducted on a watershed basis and will consider management of streams, water sources and uplands. The watersheds in the Judith Resource Area were prioritized for implementation of land use plan decisions based on multiple use criteria. The Two Calf watershed was rated as having a high priority for management and land use plan decision implementation.

TWO CALF WATERSHED - GENERAL LOCATION

LEGEND

- BLM 44,393 ACRES
- STATE 13,164 ACRES
- US FISH AND WILDLIFE SERVICE 10,230 ACRES
- US ARMY CORP OF ENGINEERS 863 ACRES
- PRIVATE 34,388 ACRES
- WATERSHED BOUNDARY
- ROADS AND TRAILS



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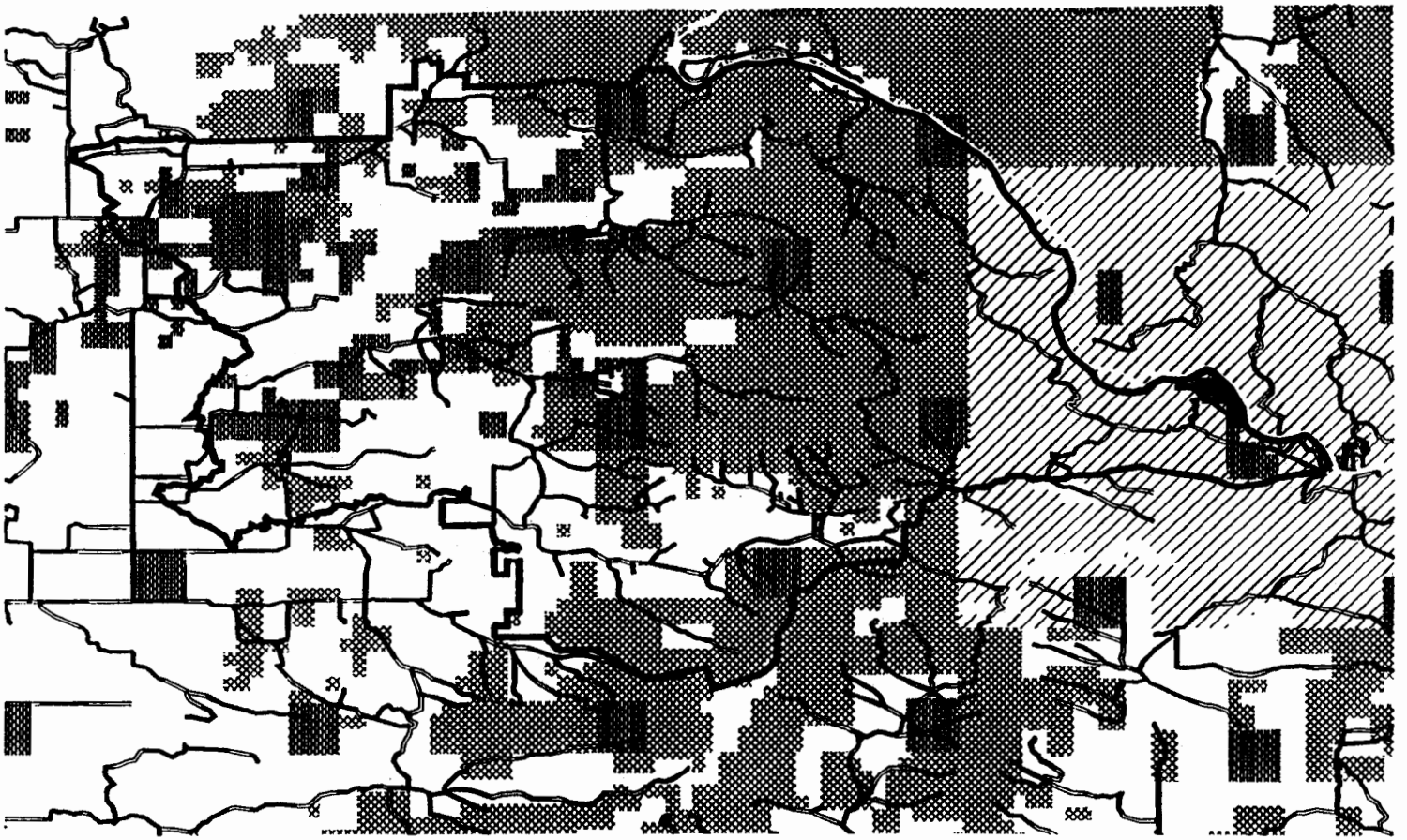


C. Direction from and Conformance with Land Use Plans

There are two Resource Management Plans (RMPs) that set forth the land use decisions and conditions guiding management of lands and minerals administered by the BLM within the Two Calf watershed. All uses and activities within the area must conform with the decisions, terms and conditions described in these plans. Appendix A describes the guidance contained in the Judith Valley Phillips (JVP) RMP - 1994 and the West HiLine RMP - 1988 that is pertinent to the Two Calf watershed.

D. Issues

The BLM interdisciplinary team, other agency personnel and the interested public identified the following core issues to be addressed in the development and analysis of the proposed and alternative action(s):

Issue #1 **Noxious weed populations, including leafy spurge and Russian knapweed, are prevalent along the Missouri River and appear to be spreading into upland areas, particularly along roads.**

Issue #2 **Off highway vehicle use, particularly during the hunting season, is creating public land user conflicts, impacting big game habitat and contributing to accelerated erosion.**

Issue #3 **The riparian area standard for the Lewistown Field Office is not being met for the majority of the riparian areas on public lands.**

Issue #4 **The upland health standard for the Lewistown Field Office is not being met for some of the upland areas on public lands.**

Issue #5 **Two Calf and Sourdough Creeks are listed by the State of Montana as water quality impaired streams and may not be meeting the water quality standard for the Lewistown Field Office.**

In addition, this group identified site specific objectives that will need to be reached to correct problems associated with each issue identified above. These site specific objectives are listed in Appendix B.

CHAPTER 2- ALTERNATIVES, INCLUDING PROPOSED ACTION

A. Introduction

The BLM Interdisciplinary Team, other agency personnel, permitted users and other interested parties developed the preferred alternative for the Two Calf Watershed to address the issues described in Chapter 1. There is also one alternative that represents continuation of current management. In addition, there is a third alternative for off highway vehicle management that represents the decisions already made in the Judith Valley Phillips Resource Management Plan.

Alternative 1 is the no action/current management alternative and represents a continuation of current management or in some instances implementation of current management decisions.

Alternative 2 represents the proposed action/preferred alternative.

Alternative 3 represents the Judith Valley Phillips Resource Management Plan decisions for off-highway vehicle management.

B. Alternatives Eliminated from Detailed Analysis

Alternatives proposing exclusive production or protection of one resource at the expense of other resources were considered but were not analyzed because BLM is mandated to manage public land on a multiple use and sustained yield basis. Alternatives such as closing all BLM land to off-highway vehicles or not managing riparian areas, etc. were eliminated from detailed analysis.

C. Alternative 1 - No Action/Current Management

Noxious Plant Management

Control efforts would be focused primarily on leafy spurge and Russian knapweed.

Cooperative Agreements with 2 grazing permittees would be continued. The Cooperative Agreement would authorize the permittees to spray noxious weeds on public lands, while the BLM would supply the chemicals.

Biological controls would be emphasized along the UMNWSR, where using chemicals can be environmentally and economically unfeasible.

All hay fed on or transported across public land would be certified weed seed free.

Inventory and monitoring efforts would continue and public awareness of noxious weeds would be heightened through education, signing and brochures.

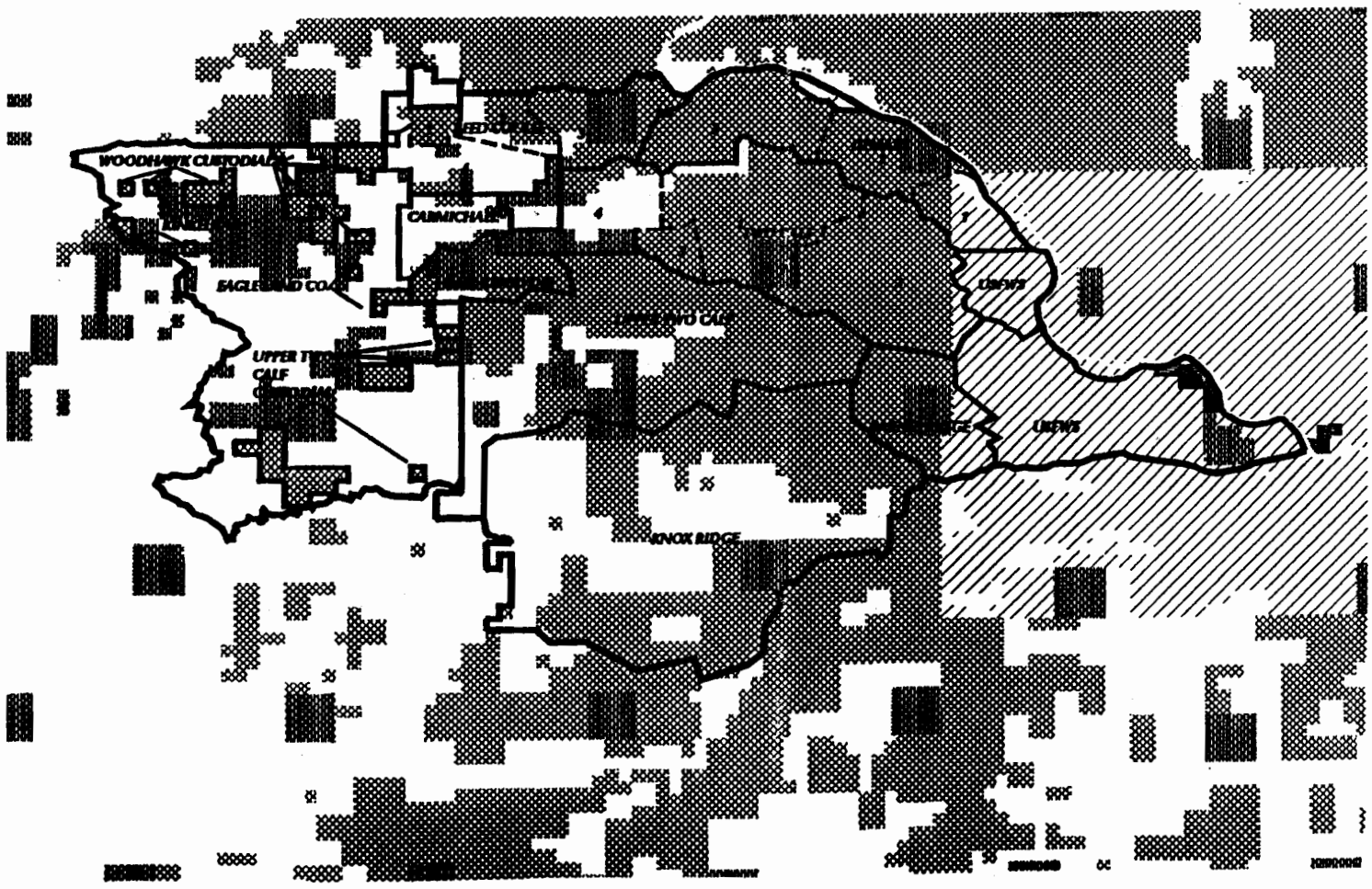
Livestock Grazing Management

Current livestock grazing management would continue in 8 allotments and portions of 3 allotments that lie within the boundary of the watershed as indicated on the map on page 6. The table on page 7 displays current livestock grazing management by allotment.

LIVESTOCK GRAZING MANAGEMENT - ALTERNATIVE 1

LEGEND

- BLM
- STATE
- US FISH AND WILDLIFE SERVICE
- US ARMY CORP OF ENGINEERS
- PRIVATE
- WATERSHED BOUNDARY
- ALLOTMENT BOUNDARIES
- PASTURE BOUNDARIES



TWOCALF WATERSHED
CURRENT LIVESTOCK GRAZING

Allotment	# Cattle	Dates of Use	BLM AUMs	Grazing System
Barnes Ridge	140	06/01 to 07/01 10/01 to 10/31	107 107	None
Carmichael.	NA	03/01 to 02/28*	79	None
Deep Reservoir	73	06/01 to 10/31	337	None
DeMars	88 NA	06/01 to 10/31 03/01 to 02/28*	390 11	3 Pasture Deferred
Eagle Land	NA	03/01 to 02/28*	44	None
Kinkelaar	NA	03/01 to 02/28*	103	None
Knox Ridge	503	05/16 to 12/15	1629	None
Reed Coulee	104 NA 11	05/01 to 10/31 03/01 to 02/28* 05/01 to 10/31	510 67 67	3 Pasture Deferred Exchange of use
Two Calf - Mac/Sheep Past Calf Pasture Calf Pasture Winter/Home Past	276 70 70 NA	06/01 to 10/31 05/01 to 05/31 10/15 to 11/15 03/01 to 02/28*	1155 45 46 24	None
Upper Two Calf	480 NA.	06/16 to 10/30 03/01 to 02/28*	1193 336	None
Woodhawk Custodial	NA	03/01 to 02/28*	437	None

* These are considered "custodial" allotments or pastures. These allotments/pastures are generally used in conjunction with private lands.

There would be no grazing management guidelines, allowable use levels or other similar stipulations in place for any of the allotments in the watershed.

No rangeland management projects would be required to continue with current livestock grazing management.

Off-Highway Vehicle Management

Motorized vehicular traffic on BLM land would not be restricted. All public land would be open to off-highway vehicular travel. Cross country travel with motorized vehicles would be permitted on public land. In the UMNWSR Corridor and Woodhawk Wilderness Study Area (WSA), all off road vehicular travel is prohibited.

Roads Open Yearlong

On public land, 94.6 miles of road in the watershed would be open to off-highway vehicular travel on a yearlong basis. These roads are identified on the map on page 3.

Roads with Seasonal Restrictions
None of the roads in the watershed would have seasonal restrictions.

Implementation
There would be nothing needed to implement this alternative

G. Alternative 2 - the Proposed Action/Preferred Alternative

Noxious Plant Management
All of the Russian knapweed infestations in the uplands would be chemically treated 2 times per year until eradicated. All of the Russian knapweed and leafy spurge infestations in the transition areas between uplands and riparian areas would be chemically treated annually. Through a Cooperative Agreement, the grazing permittees would conduct the spraying and the BLM would purchase the chemicals.

In riparian areas, point of contact chemical application could be conducted by the BLM if chemicals become available that are target specific and environmentally safe.

Biocontrol efforts would be emphasized along the UMNWSR.

Inventory and monitoring efforts would take place and public awareness of noxious weeds would be heightened through education, signing and brochures.

All hay fed on or transported across public land would be certified weed-seed free.

Prior to entering or crossing public land in the watershed, all soil disturbing equipment would be power washed to remove noxious weed seed.

Livestock Grazing Management
Livestock grazing would be managed in 7 allotments and portions of 3 allotments that lie within the boundary of the watershed. The map on page 10 displays the allotments under this alternative. Appendix C contains the pasture rotation schedule for allotments with a grazing system prescribed under this alternative. The following table displays the proposed livestock grazing management by allotment:

TWO CALF WATERSHED
LIVESTOCK GRAZING MANAGEMENT
ALTERNATIVE 2

Allotment	# Cattle	Dates of Use	BLM AUMs	Grazing System
Barnes Ridge	140	06/01 to 07/01 10/01 to 10/31	107 107	Same as Alt. 1, but apply Two Calf Watershed Grazing Management Guidelines
Carmichael	NA	03/01 to 02/28*	79	None, but apply Two Calf Watershed Grazing Management Guidelines
DeMars	88 NA	06/01 to 10/31 03/01 to 02/28*	390 11	Same as Alt.1**, but apply Two Calf Watershed Grazing Management Guidelines
Eagle Land	NA	03/01 to 02/28*	44	None, but apply Two Calf Watershed Grazing Management Guidelines
Kinkelaar	NA	03/01 to 02/28*	103	None, but apply Two Calf Watershed Grazing Management Guidelines
Knox Ridge	567	05/10 to 11/15	1629	Would be grazed in a 2 pasture deferred rotation system**. Cattle will be moved within each pasture by herding and by turning stockwater tanks on/off. Cattle only permitted in one pasture at a time. Sourdough Creek would be fenced into a riparian pasture if objectives appear to not be met. Two Calf Watershed Grazing Management Guidelines would be applied.
Reed Coulee	105 NA 11 (Exch)	05/01 to 10/31 03/01 to 02/28* 05/01 to 10/31	510 67 67	Same as Alt. 1**, but limit use in each pasture to available AUMs and apply Two Calf Watershed Grazing Management Guidelines. Pasture 1 (crested wheatgrass) will be grazed in spring or fall only.
Two Calf - Mac Pasture Sheep Fence Pasture Calf Pasture Winter/Home Pasture	221 125 NA NA	06/10 to 10/10 06/10 to 10/10 06/01 to 11/30* 03/01 to 02/28*	680 475 88 24	None in Mac and Sheep Fence Pastures. Calf Pasture to be grazed in rest rotation with private and state pastures (total aums in pasture is 140; use in pasture not to exceed 140 AUMs). Two Calf Watershed Grazing Management Guidelines would be applied to all pastures.
Upper Two Calf	556 NA	06/15- 10/30 03/01 to 02/28*	1530 336	Would be combined w/Deep Reservoir Allotment and grazed in a 3 pasture deferred rotation system**. Two Calf Watershed Grazing Management Guidelines would be applied.
Woodhawk Custodial	NA	03/01 to 02/28*	437	None, but apply Two Calf Watershed Grazing Management Guidelines.

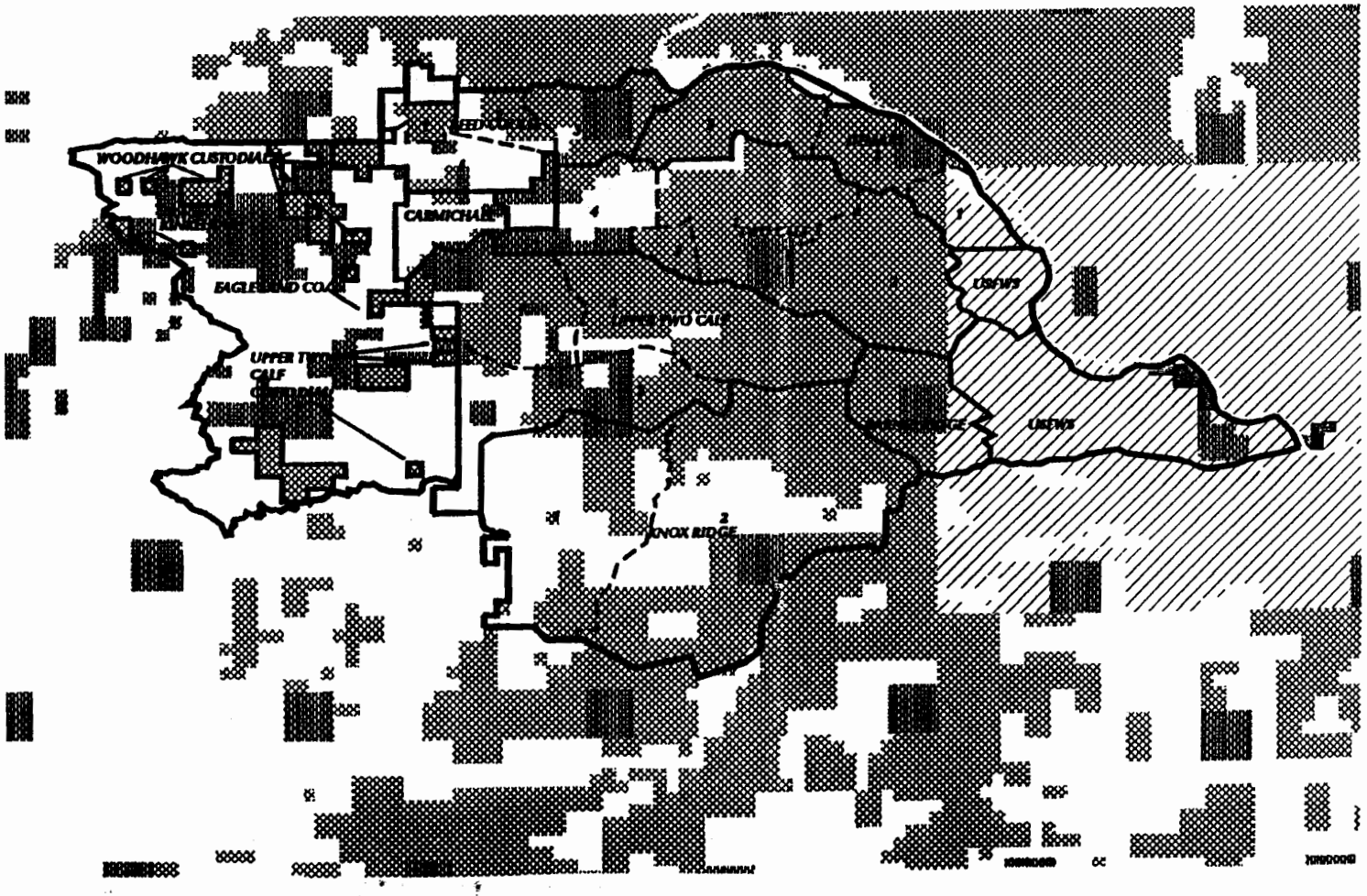
* These are considered "custodial" allotments or pastures. These allotments/pastures are generally used in conjunction with private lands.

** Pasture rotation schedules are displayed in Appendix C.

LIVESTOCK GRAZING MANAGEMENT - ALTERNATIVE 2

LEGEND

- BLM
- STATE
- US FISH AND WILDLIFE SERVICE
- US ARMY CORP OF ENGINEERS
- PRIVATE
- WATERSHED BOUNDARY
- ALLOTMENT BOUNDARIES
- PASTURE BOUNDARIES



Grazing management guidelines would be applied to all allotments in the watershed. The guidelines are listed in Appendix D. **Existing management plans would remain in effect until the proposed systems are implemented and otherwise in effect, however the guidelines would apply immediately.**

Rangeland management projects would be constructed under this alternative. The map on page 12 shows the location of these projects. The following table identifies each project and specifies agency and permittee responsibilities.

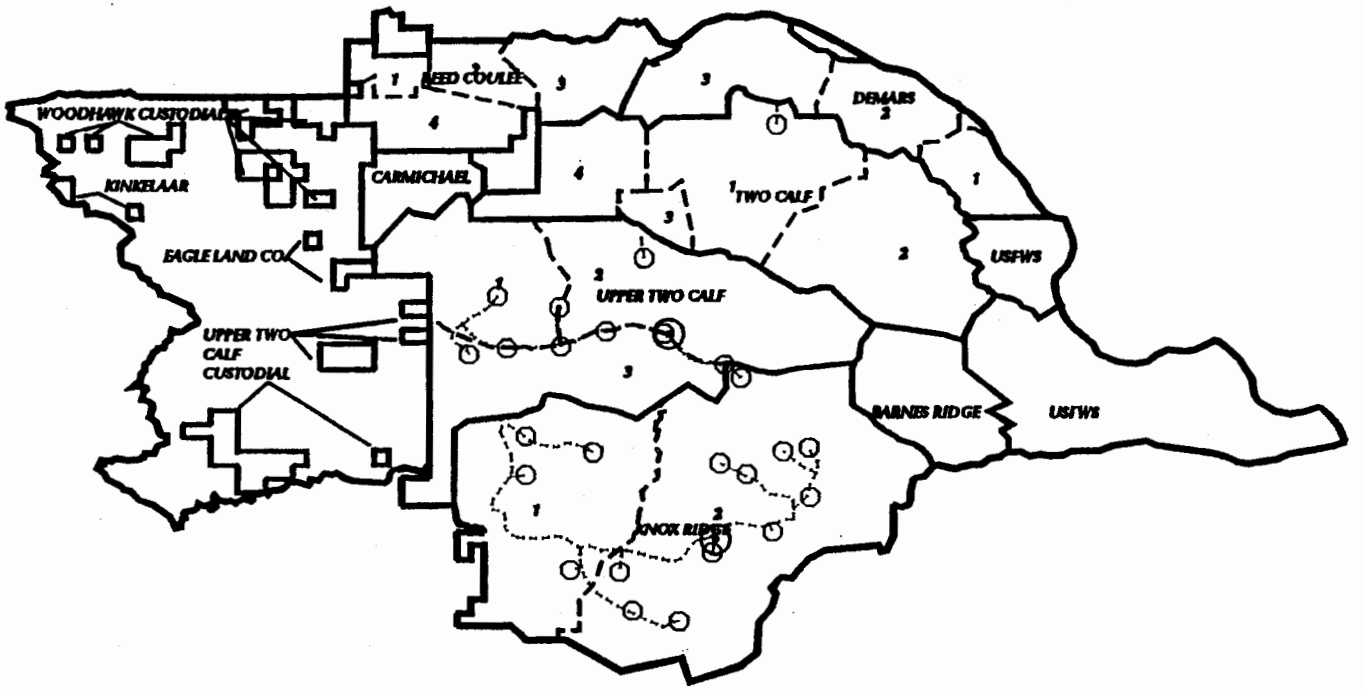
Project Name (in priority order for BLM funding)	**Total Cost**	**BLM Responsibility**	**Permittee Responsibility**	**Construction Responsibility**
Island Fence (1/2 mile)	$2000	$2000	Maintenance	BLM
Knox Ridge Fence (3.6 miles)	$14,400	$3200 (cost of materials on BLM)	$11,200 - includes materials, construction and maintenance	Permittee
Upper Twocalf Fence (8.2 Miles)	$32,800	$7400 (cost of materials on BLM)	$25,400 - includes materials, construction and maintenance	Permittee
Knox Ridge Well	$70,000	$70,000 (drill and case well)	Maintenance as necessary	BLM - Contract
Upper Two Calf Well	$70,000	$70,000 (drill and case well)	Maintenance as necessary	BLM - Contract
Knox Ridge Pipeline (19.6 Miles, 14 tanks)	$131,600	$11,400 (cost of materials on BLM). BLM design pipeline	$120,200 - materials, construction, tanks/floats, maintenance	Permittee - to BLM specifications.
Upper Twocalf Pipeline (7.6 Miles, 8 tanks)	$53,600	$10,350 (cost of materials on BLM). BLM design pipeline	$43,250 - materials, construction, tanks/floats, maintenance	Permittee - to BLM specifications.
Two Calf Pipeline Extension (1 Mile, 1 tank)	$7000	$3000 (cost of materials on BLM). BLM design pipeline	$4000 - construction, tank/float	Permittee - to BLM specifications
TOTALS (12.3 miles fence, 2 wells, 28.2 miles pipeline, 23 tanks)	**$381,300**	**$177,350 (47%)**	**$203,950 (53%)**	

Fences would be constructed to BLM specifications on public lands (3 wires total, bottom wire smooth). Maintenance of all projects would be the responsibility of the individual permittee in each affected allotment. Pipelines would be designed by the BLM and constructed to BLM specifications. Up to six tanks on the proposed pipelines could be winterized for wildlife use.

RANGE IMPROVEMENTS - ALTERNATIVE 2

LEGEND

- BLM
- STATE
- US FISH AND WILDLIFE SERVICE
- US ARMY CORP OF ENGINEERS
- PRIVATE
- WATERSHED BOUNDARY
- ALLOTMENT BOUNDARIES
- PASTURE BOUNDARIES
- Proposed Water Line
- Proposed Well
- Proposed Water Tank



Off Highway Vehicle Management
Motorized vehicular travel on BLM land would be restricted seasonally to designated roads and trails to protect vegetation and soils, maintain watershed condition and water quality, reduce user conflicts, reduce harassment of wildlife and provide wildlife habitat security.

Roads Open Yearlong
On public land, 41.2 miles of road in the watershed would be open to motorized vehicular travel on a yearlong basis. The roads in this category include the Knox Ridge Road, Lower Two Calf Road, Middle Two Calf Road, Heller Bottom Road, Power Plant Ferry Road and other roads as identified on the map on page 14.

Roads with Seasonal Restrictions
On public land, 53.4 miles of road in the watershed would be open to motorized vehicular travel, but would have seasonal restrictions to protect resource values, reduce user conflicts, prevent harassment of wildlife, provide habitat security and/or ensure visitor safety. The roads in this category are identified on the map on page 14 The identified roads would be seasonally restricted (closed to motorized vehicular travel) on an annual basis from September 1 to December 1. In addition, all off-road vehicular travel would be prohibited during the same time period.

Implementation

1. Roads open yearlong and roads with seasonal restrictions would be numbered in accordance with the Lewistown District Travel Plan.

2. All roads not numbered in accordance with the Lewistown District Travel Plan would be considered seasonally restricted.

3. Roads with seasonal restrictions would have small signs that indicate the appropriate restricted date.

4. Information signs would be placed at entry points to the watershed, along Knox Ridge Road, Middle Two Calf Road and Lower Two Calf Road.

5. Big game retrieval would be permitted from 10 am to 2 pm daily on seasonally restricted roads.

6. Except for administrative purposes, no off-road (cross country) motorized vehicular travel would be permitted on public land from September 1 to December 1.

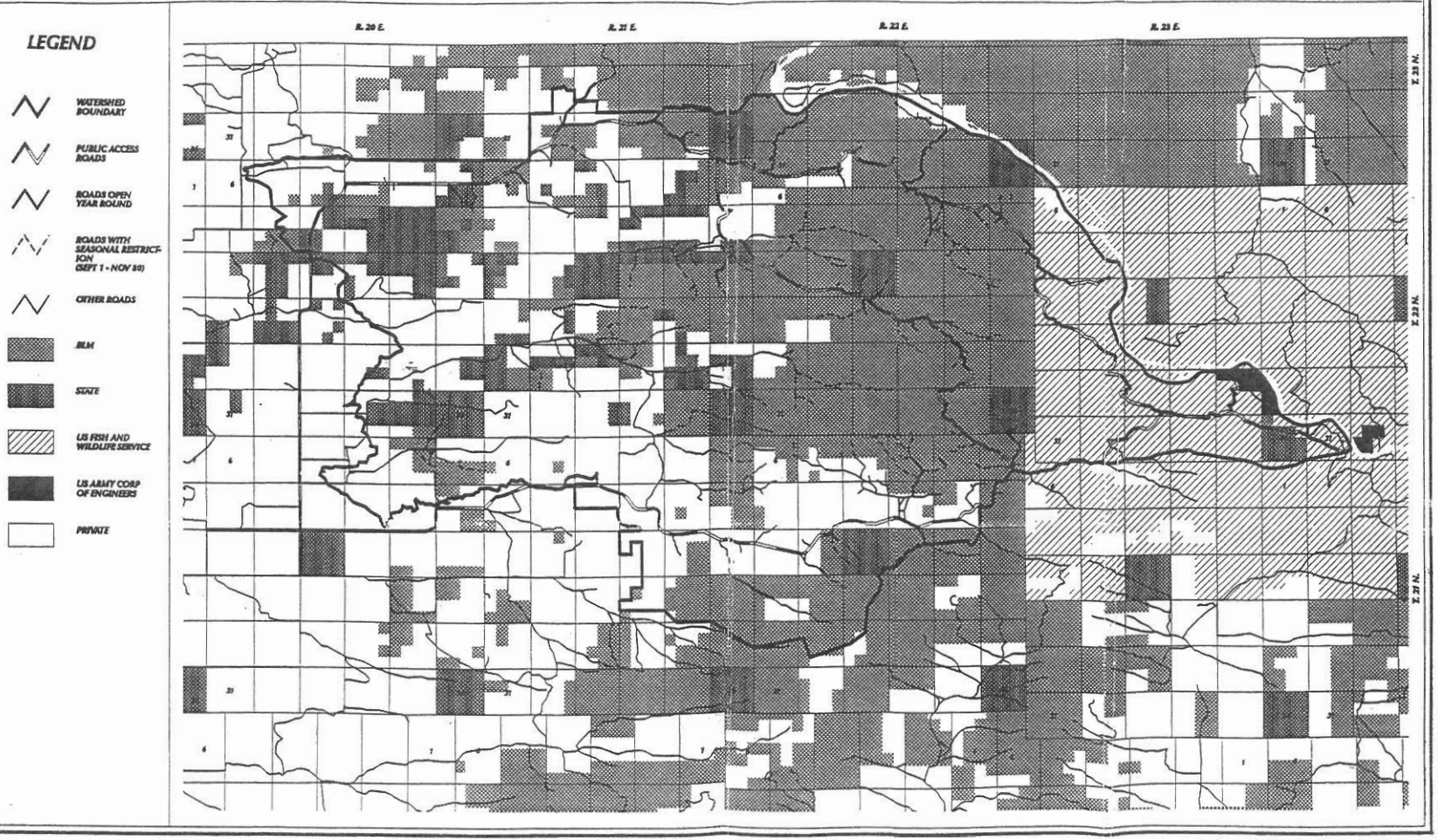
7. Administrative use of seasonally restricted roads would be permissible.

8. From September 1 to December 1, motorized vehicular access for camping would be permissible within 100 yards of open roads.

9. The non-ambulatory handicapped, as defined by Montana law, would be allowed motorized vehicular access off designated roads and trails except in the UMNWSR corridor and the Woodhawk WSA.

10. In the UMNWSR corridor and Woodhawk WSA, all off road vehicular travel would be prohibited.

MOTORIZED VEHICLE MANAGEMENT, ALTERNATIVE 2



Alternative 3 - Current Land Use Plan Direction for Off-Highway Vehicular Travel

This alternative represents implementation of off-highway vehicular management decisions on public land in the watershed consistent with management direction from the West HiLine and Judith Valley Phillips Resource Management Plans. Motorized vehicular travel on BLM land would be restricted seasonally to designated roads and trails to protect vegetation and soils, maintain watershed condition and water quality, reduce user conflicts, reduce harassment of wildlife and provide wildlife habitat security.

Roads Open Yearlong

On public land, 35.1 miles of road in the watershed would be open to motorized vehicular travel on a yearlong basis. The roads in this category include the Knox Ridge Road, Lower Two Calf Road, Middle Two Calf Road, Heller Bottom Road, Power Plant Ferry Road and other roads as identified on the map on page **16.**

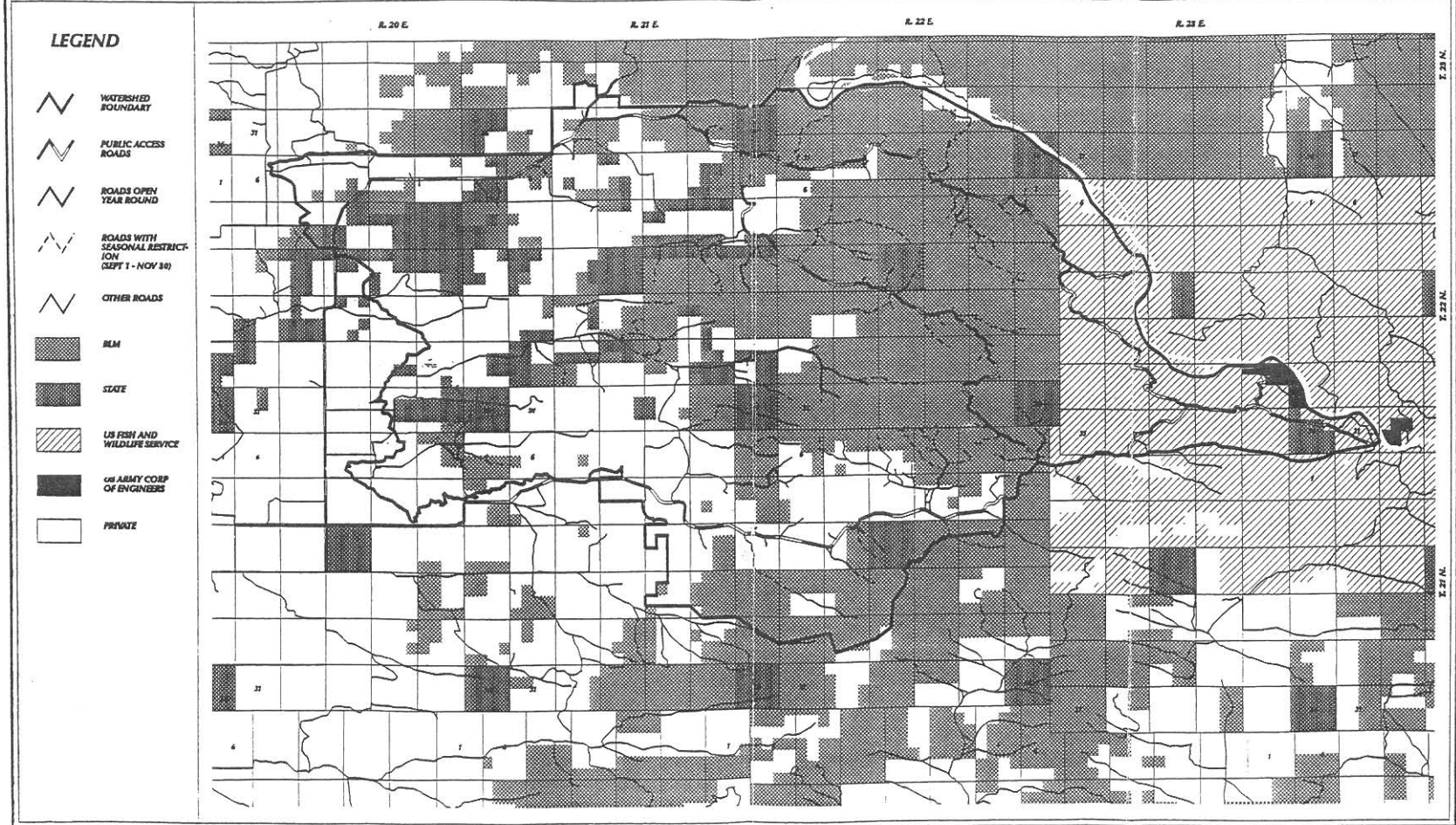
Roads with Seasonal Restrictions

On public land, 55.9 miles of road in the watershed would be open to motorized vehicular travel, but would have seasonal restrictions to protect resource values, reduce user conflicts, prevent harassment of wildlife, provide habitat security and/or ensure visitor safety. The roads in this category are identified on the map on page 16. The identified roads would be seasonally restricted (closed to motorized vehicular travel) on an annual basis from September 1 to December 1. In addition, all off-road vehicular travel would be prohibited during the same time period.

Implementation

1. Roads open yearlong and roads with seasonal restrictions would be numbered in accordance with the Lewistown District Travel Plan.
2. All roads not numbered in accordance with the Lewistown District Travel Plan would be considered seasonally restricted.
3. Roads with seasonal restrictions would have small signs that indicate the appropriate restricted date.
4. Information signs would be placed at entry points to the watershed, along Knox Ridge Road, Middle Twocalf Road and Lower Two Calf Road.
5. Game retrieval would be permitted.
6. Except for administrative purposes, no off-road (cross country) motorized vehicular travel would be permitted on public land from September 1 to December 1.
7. Administrative use of seasonally restricted roads would be permissible.
8. Vehicular access for camping would be permissible within 100 yards of roads open yearlong or during the open period on seasonally restricted roads. Exceptions could be granted on a case-by-case basis with a special permit issued by the BLM.
9. The non-ambulatory handicap, as defined by Montana law, would be allowed motorized vehicular access off designated roads and trails except in the UMNWSR Corridor and the Woodhawk WSA.
10. In the UMNWSR Corridor and Woodhawk WSA, all off road vehicular travel would be prohibited.

MOTORIZED VEHICLE MANAGEMENT, ALTERNATIVE 3



CHAPTER 3- EXISTING ENVIRONMENT

VEGETATION

The primary vegetation types in the Two Calf watershed are grasslands, sagebrush grasslands, Ponderosa Pine/Juniper and Douglas Fir/Ponderosa Pine (see map on page 20). The following descriptions describe the common vegetation types in the watershed. More detailed descriptions of plant communities and forage production by ecological site can be found in Natural Resources Conservation Service Technical Guides.

Grasslands (34,559 acres)
This vegetation type consists of primarily short and mid-grasses predominately associated with silty, sandy, claypan and thin silty ecological sites. This type occurs mainly on rolling hills at all aspects. In many instances, silver sagebrush and/or clubmoss are a significant component of the community.

Common grass species in this classification include western wheatgrass, needle-and-thread grass, green needlegrass, Sandberg bluegrass, inland saltgrass, blue grama, prairie junegrass and threadleaf sedge. Common forbs include American vetch, scarlet globemallow, fringed sagewort, cudweed sagewort, pussytoes and toadflax. Common shrubs include big sagebrush, silver sagebrush, rubber rabbitbrush, prickly pear cactus, and winterfat. Less common species include bluebunch wheatgrass, prairie sandreed, Nuttall saltbush, and skunkbrush sumac.

This vegetation type is valuable for forage production for livestock and wildlife. Many nongame birds and mammals utilize these communities throughout their lifecycle. Sharp-tailed grouse generally prefer tall residual grassland areas for yearlong use, while sage grouse may utilize the short grass areas for strutting grounds. Waterfowl use these areas in the spring, summer and fall for pair bonding, breeding, nesting, broodrearing and staging.

Sagebrush/Grass (26,147 acres)
This vegetation type includes high production and low production sites. The low production sagebrush/grass type is usually associated with areas producing less vegetation than normal or areas with plants exhibiting low vigor. In most instances these conditions can be correlated with ecological sites in early and mid seral status. The high production sagebrush/grass type is usually associated with areas producing vegetation at or above normal or areas with plants in normal to high vigor. In most instances, these conditions can be correlated with ecological sites in late seral to potential natural community status.

Western wheatgrass, prairie junegrass, Sandberg bluegrass, green needlegrass, bluebunch wheatgrass, blue grama and needle-and-thread are the most common grasses. Common forbs include broom snakeweed, American vetch, wild onion, Astragalus species, fringed sagewort, toadflax, scarlet globemallow, lomatium and scurfpea. The most prevalent shrubs are big sagebrush, silver sagebrush and greasewood.

This vegetation type is of moderate to high value as a forage base for cattle in the watershed. Antelope, mule deer, elk, sharp-tailed grouse, sage grouse, waterfowl and many species of non-game birds and mammals use this vegetation type. Antelope and mule deer use these areas yearlong and are dependent on sagebrush for winter browse. Mule deer and elk use the edges of sagebrush ridges adjacent to conifer forests yearlong. Sage grouse are dependent on the sagebrush component of this vegetation type yearlong. Sharp-tailed grouse may utilize this vegetation type yearlong, depending on habitat condition. Waterfowl use these areas heavily in the spring and summer where found adjacent or in association with reservoirs.

Ponderosa Pine/Juniper (11303 acres)
This vegetation type is found on side slopes of major and minor drainages within the watershed in association with shallow soils. Along the edges of ridges and benches, this community frequently merges with sagebrush/grasslands, which occupy deeper soils.

Ponderosa pine and juniper are the dominate species, but can be scattered, leaving open parks. Understory species are scant in the thicker ponderosa pine/juniper stands while sagebrush/grassland species are the primary understory in open timber areas and parks.

In addition to a variety of non-game species, mule deer, elk, bighorn sheep and sharp-tailed grouse use this vegetation type for food and cover. Forage production is low in the dense stands and is often limited by steep slopes. In more open stands, forage production is moderate. Burning dense stands often improves forage production and use by both wildlife and livestock but impacts wildlife escape cover. The potential for soil erosion is high following fire. Examination of old burns in the area indicate slow recovery is often the norm. Ponderosa pine and juniper provide products such as fuel, posts and poles but are of limited value for lumber.

Douglas-Fir/Ponderosa Pine (7,401 acres)
This vegetation type is found primarily on north and east facing slopes in the watershed. Other than the presence of Douglas-fir, the vegetative composition is similar to the ponderosa pine/juniper type. In dense stands, the available forage for livestock and wildlife is minimal but increase as stands become more sparse.

These areas provide excellent cover for mule deer, bighorn sheep and elk. Due to the sparse understory, few food plants are available and forage value is low.

Mixed Shrub (11,778 acres)
In the Two Calf watershed, this vegetation type includes a rose/snowberry component found in association with riparian areas, and several other shrub communities including greasewood and silver sagebrush. These components are discussed below:

The rose/snowberry component of this classification is located primarily on alluvial soils and along slopes dropping into small drainage bottoms or drainage bottoms themselves. It is typically found on overflow ecological sites. The grass/silver sagebrush vegetation type overlaps into this type on side slopes of drainages. This vegetation type also occurs as an understory component in cottonwood and/or willow classifications.

The rose/snowberry vegetation types is dominated by deciduous shrubs. Western wheatgrass, slender wheatgrass, Canada wildrye, prairie cordgrass, green needlegrass, American vetch, perennial sunflower, western yarrow, lomatium, fringed sagewort, scurfpea, hairy goldenaster and white milkweed are also common.

This vegetation type is important to many non-game mammals and birds, mule deer and sharp-tailed grouse for food and cover. When adjacent to water, this vegetation type is important as nesting cover for waterfowl. When adjacent to small grain cropland, this habitat is used by pheasants and gray partridge. Livestock forage production can be high in more open stands while dense stands are avoided by cattle.

Silver sagebrush is the dominant species on many overflow ecological sites in the watershed. It occupies alluvial soils adjacent to streams and along the river. Associated species include western wheatgrass, green needlegrass, blue grama, sweetclover, dandelion and western yarrow.

This vegetation type is often associated with the rose/snowberry and cottonwood and/or willow classifications. It provides important habitat for a variety of non-game species. Antelope, mule deer, sage grouse and sharp-tailed grouse utilize this vegetation type for food and cover. Forage production varies from high in open stands to scant in dense stands.

Greasewood is a common dominant plant on alluvial terraces along the river and small streams. It is usually associated with clay, dense clay, saline upland and saline lowland ecological sites. Understory is usually sparse and includes western wheatgrass, Sandberg bluegrass, Nuttall alkaligrass, inland saltgrass, blue grama, knotweed, seepweed and cactus. This vegetation type provides cover for mule deer, antelope, sage grouse, sharp-tailed grouse, and a variety of no-game birds and mammals. It is also provides valuable winter forage for livestock and mule deer.

Riparian (570 acres)
These vegetation types exist along creeks and the UMNWSR primarily on overflow, subirrigated or wet meadow ecological sites that are wet for long periods or where the water table is high. The understory on most of these sites is rose/snowberry. However, heavy grazing pressure can lead to an understory dominated by herbaceous species. The most common trees are cottonwood, boxelder, green ash and peachleaf willow. The most common shrubs are sandbar and yellow willow. Common associated species are the same as the rose/snowberry and/or sagebrush/grass types.

These vegetation types are use by mule deer, white-tailed deer, sharp-tailed grouse, pheasants, mourning dove and support high populations of non-game birds. Forage production is normally high.

Sparsely Vegetated/Rock/Bare Ground (5506 acres)
This vegetation type is found on lands with less than 10% ground and aerial vegetation coverage, including rock outcrops, badlands, slick spots, steep slopes, roads, developments, etc. Vegetation production levels are minimal. Use of these areas by livestock and wildlife is minimal

Croplands (5,109 acres)
Cultivated or irrigated. May produce hay or grains.

NOXIOUS PLANTS
Noxious plant infestations, including Russian knapweed and leafy spurge, on public land in the planning area are concentrated along the UMNWSR (see map on page 21). However, populations are not as significant as other areas along the river, perhaps due to the existing vegetation that offers minimal opportunity for population establishment. There has been some spread of Russian Knapweed into upland areas, particularly along Two Calf Creek and the Knox Ridge Road. Considering the amount of vehicle traffic in upland areas throughout the planning area, it is highly likely that off-river infestations will increase. All of the infested areas along the river were chemically treated in 1992. From 1993 to 1997, the BLM purchased chemicals and the grazing permittee conducted spraying in a cooperative effort to control or contain the infestations. Spraying efforts have not been particularly effective due to label restrictions, high water table limitations, and transport of seed by the river. Three species of flea beetles (insects that have proven effective for control of leafy spurge) have been released in the planning area along the UMNWSR.

VEGETATION TYPES

LEGEND

- Grassland 34,559 Acres
- Sagebrush/Grass 26,147 Acres
- Ponderosa Pine/ Juniper 11,303 Acres
- Douglas Fir/ Ponderosa Pine 7,401 Acres
- Mixed Shrub 11,768 Acres
- Herbaceous/ Mixed Shrub 20 Acres
- Deciduous Riparian 562 Acres
- Riparian 8 Acres
- Sparsely Vegetated/Rock/Bare Ground 5,506 Acres
- Cropland 5,109 Acres
- Water 173 Acres

TWO CALF WATERSHED - WEEDS INFESTATIONS

LEGEND

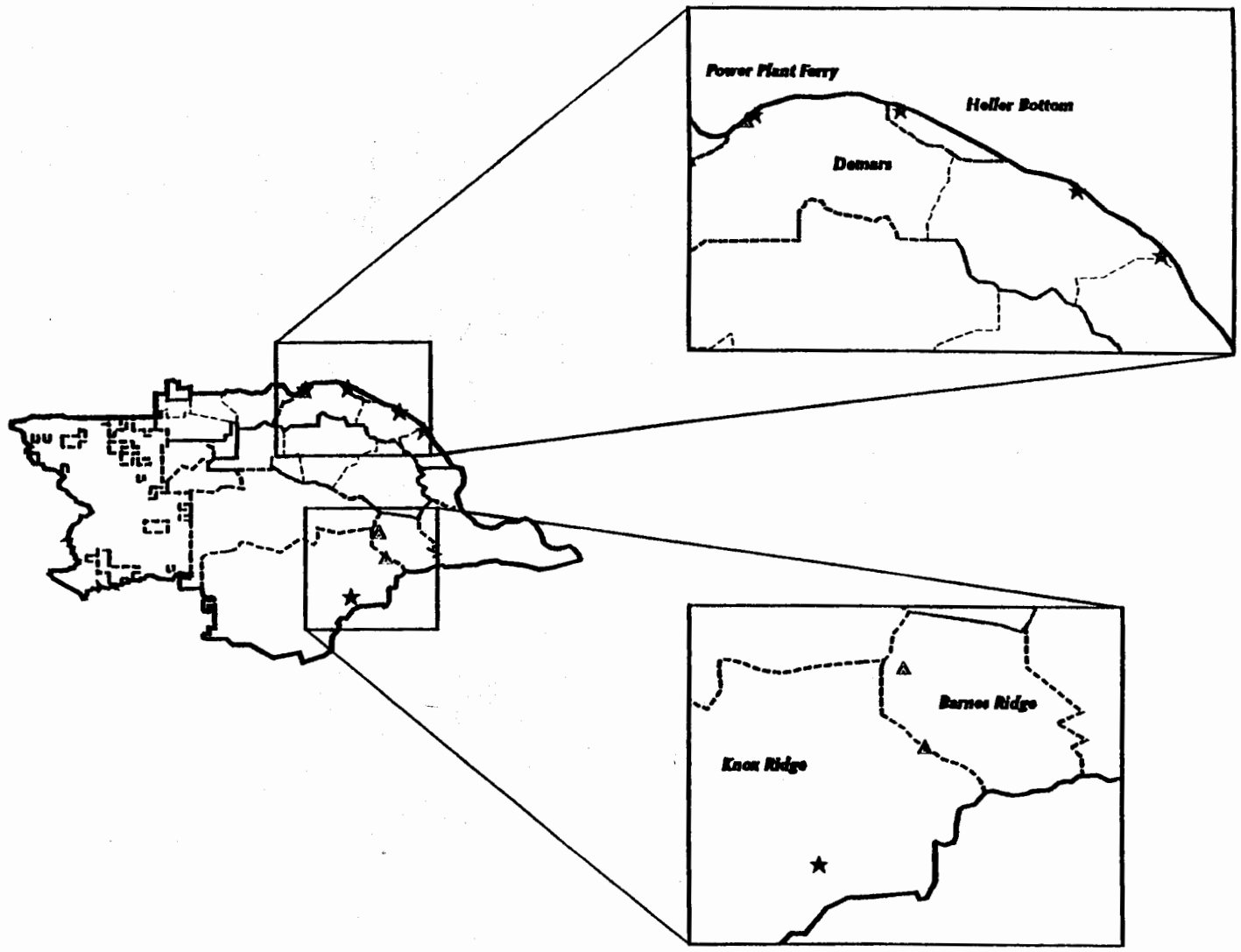
Watershed Boundary

Allotment Boundary

Pasture Boundary

Russian Knapweed

Leafy Spurge



LIVESTOCK GRAZING MANAGEMENT

There are 8 entire grazing allotments and portions of 3 grazing allotments within the boundaries of the Two Calf watershed (see map on page 6). The following 3 tables show the amount of current specified livestock grazing, allotment management and management plan status, and a summarization of actual use by allotment.

TWO CALF SPECIFIED LIVESTOCK GRAZING

Allotment Number	Allotment Name	Permittee	Number of cattle	Dates of use	Percent of public land	Preference (AUMs)
02038	Barnes Ridge	Cimrhaki, Daniel & Robert	140 140	06/01-07/01 10/01-10/31	76	214
10096	Carmichael	Tuss, Lawrence and Joyce	6	03/01-02/28	100	79
20097	Deep Reservoir	Robinson Family Partnership	73	06/01-10/31	92	337
20026	DeMars	DeMars, Tom J.	88 1	06/01-10/31 03/01-02/28	88 100	401
20029	Eagle Land	Eagle Land Company	4	03/01-02/28	100	44
20044	Kinkelaar	Kinkelaar, Wade & Deena	8	03/01-02/28	100	103
20078	Knox Ridge Road	Boyce, Cleo, Dan, et al	503	05/16-12/15	46	1629
20071	Reed Coulee	Peterson, Glenn	104 6	05/01-10/31 03/01-02/28	80 100	557
02039	Two Calf	Two Calf Company	276 70 70 2	06/01-10/31 05/01-05/31 10/15-11/15 03/01-02/28	83 63 63 100	1267
20070	Upper Two Calf	Robinson Family Partnership	480 28	06/16-10/30 03/10-02/28	55 100	1532
20031	Woodhawk Custodial	Bar OK Ranch Company	18 20	03/01-02/28 03/01-02/28	100 100	456

TWO CALF WATERSHED ALLOTMENT AND MANAGEMENT PLAN/MANAGEMENT STATUS

Allotment Name	Category	Plan	Implemented	Grazing System	Status/Comments
Barnes Ridge	I	Yes	1994	None	1 pasture - no hot season grazing.
Carmicheal	C	No	NA	NA	None - very little BLM.
Deep Reservoir	M	Yes	1984	None	1 pasture - not grazed until June 1. Alternate plan in AMP is 2 pasture deferred.
DeMars	M	Yes	1972	3 pasture deferred	Pasture rotation not rigorously followed. Some CMR included.
Eagle Land (portion)	C	No	NA	NA	None - very little BLM
Kinkelaar (portion)	C	No	NA	NA	None - very little BLM
Knox Ridge	I	No	NA	NA	Lots of potential management options.
Reed Coulee	M	Yes	1982	3 pasture deferred	Pasture rotation not rigorously followed. Some discrepancies between permitted use in AMP and grazing permit/proposed decision.
Two Calf	I	Yes	1989	3 pasture deferred	AMP now defunct since pasture sold. Some CMR included.
Upper Two Calf	M	Yes	1987	None	1 pasture - not grazed until June 16. Alternate plan in AMP is 3 pasture deferred.
Woodhawk custodial	I	No	NA	NA	None

TWO CALF ACTUAL USE

ALLOTMENT	ACTUAL USE * PREFERENCE	AVERAGE
Demars	391 AUMs	15 year average: 310 AUMs (79% of preference) last 5 years average: 329 AUMs (84% of preference)
Deep Reservoir	337 AUMs	3 year average: 284 AUMs (84% of preference)
Reed Coulee	510 AUMs	9 year average: 430 AUMs (84% of preference) last 5 years average: 421 AUMs (83% of preference)
Two Calf	1243 AUMs	4 year average: 764 AUMs (61% of preference)
Upper Two Calf	1193 AUMs	4 year average: 834 AUMs (70% of preference)

* - Actual use has been collected only on the allotments with Allotment Management Plans. The actual use preference is sometimes less than the total preference because it does not include custodial tracts.

Upland Rangelands

The tables on the following 2 pages display the upland range assessments conducted during 1997. These assessments were done at the established trend plots for each allotment and for each soil type in the Upper Two Calf allotment. Upland health is determined by assessing the biotic and physical characteristics of each site. Each site is rated as properly functioning condition (PFC), functioning at risk (FAR) or non-functioning (NF). Properly functioning condition is defined in the Montana/Dakotas Standards for Rangeland Health and Guidelines for Livestock Grazing Management, August 1997, under Lewistown standard #1. Allotments with upland health rated functioning at risk or non-functioning are not meeting the upland standard.

The seral stages were determined using the Ecological Site Inventory (ESI) method in accordance with Natural Resource Conservation Service (NRCS) guidelines and BLM policy. The ESI method is a correlation (by weight) of existing vegetation compared to the potential natural community. Categories are:

0-24%	early seral stage
25-49%	mid seral stage
50-74%	late seral stage
75-100%	potentially natural community (PNC)

Long term trend was determined using all available monitoring information for each site. This information included photos, transect readings, soil surface factor readings and professional knowledge and judgement.

Rangeland Management Projects

To date, the BLM has expended approximately $225,000 on rangeland management projects in the planning area. Many of the projects were constructed to implement grazing management practices identified in Allotment Management Plans. However, some of the reservoirs and fences were built by permittees prior to implementation of these plans. On public land, there are approximately 70 miles of pasture and boundary fence, 37 reservoirs, 20 miles of pipeline, 14 cattleguards, 3 corrals, 5 wells and one watersaver. In addition there have been 3 prescribed burns (about 140 acres) , one crested wheatgrass rejuvenation (seeding) and one sagebrush spraying (about 60 acres). Estimated replacement costs for the projects described above would be approximately $1,523,000 based on 1998 figures. In addition to the projects located on public land, there is a significant amount of fence and approximately 75 reservoirs located on private and state lands in the planning area. Existing rangeland management projects can be found on the map on page 27.

Individual project files and records can be found at the Judith Resource Area BLM office.

UPLAND RANGE ASSESSMENT

ALLOTMENT	PLOT NUMBER	UPLAND RANGE HEALTH	ECOLOGICAL SITE RATING	LONG TERM TREND
Demars pasture 2	T-1	FAR	55 - late seral	upward
pasture 3	T-1	PFC	80 - PNC	upward
Deep Reservoir	T-1	PFC	70 - late seral	upward
	T-2	FAR	40 - mid seral	static
Knox Ridge	T-1	FAR	60 - late seral	static
	T-2	PFC	50 - late seral	static
	T-3	PFC	70 - late seral	static
	T-4	PFC	60 - late seral	upward
Reed Coulee pasture 2	T-1	FAR	45 - mid seral	upward
pasture 3	T-2	PFC	70 - late seral	upward
Two Calf pasture 1	T-1	PFC	60 - late seral	static
pasture 2	T-1	FAR	56 - late seral	static
pasture 3	T-1	PFC	47 - mid seral	static
Upper Two Calf	T-1	PFC	58 - late seral	upward
	PP-1	PFC	60 - late seral	upward
	T-2			static
	soil #234	FAR		
	soil #64	PFC		
	soil #174	PFC		

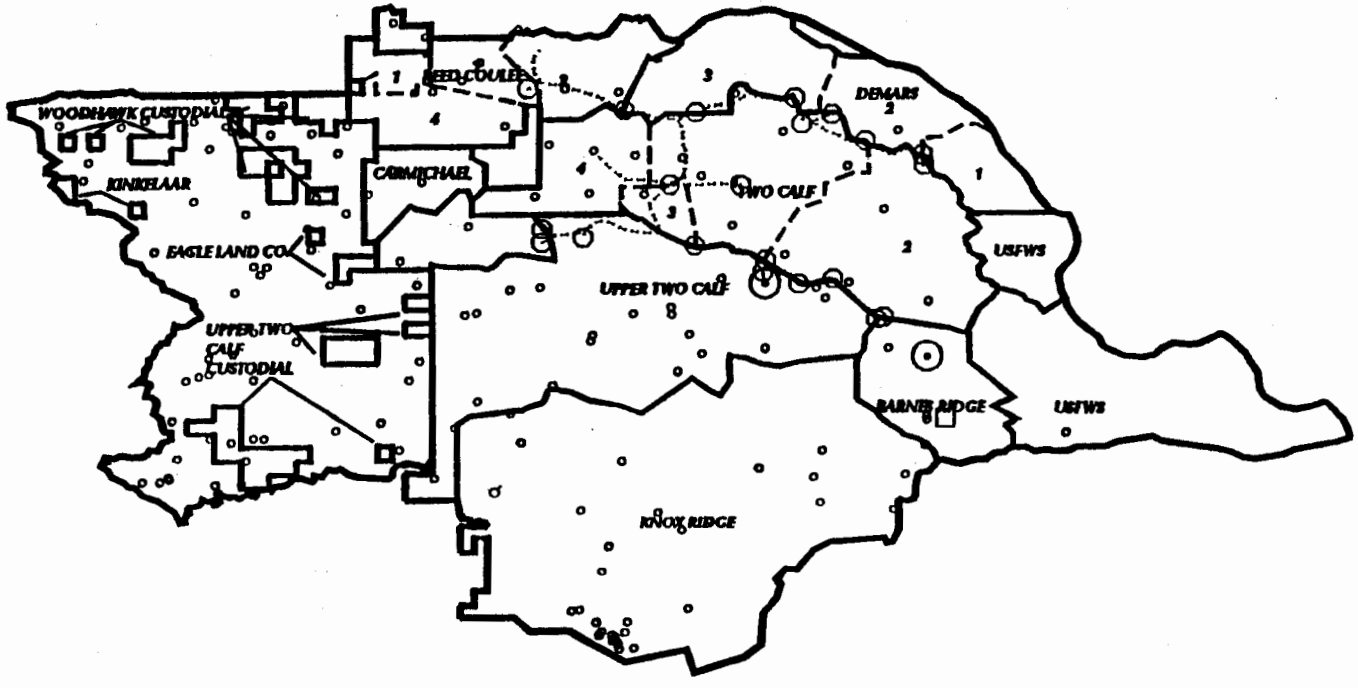
TWO CALF WATERSHED CUSTODIAL TRACTS
UPLAND RANGE HEALTH

Allotment	Location	Upland Range Health
Eagle Land Company	T22N, R21E, Sec 19, NENE,SENE	PFC
	T22N, R21E, Sec 20, NWNW, NENW	PFC
Woodhawk Custodial	T22N, R21E, Sec 6, N1/2, NWSE	FAR
	T22N, R20E, Sec 1, NW, SWNE, NWSW	FAR
	T22N, R20E, Sec 2, NENE	FAR
	T22N, R20E, Sec 3, S1/2S1/2, NESE	FAR
	T22N, R20E, Sec 4, SESW	Unknown
	T22N, R20E, Sec 5, SESE	Unknown
	T22N, R20E, Sec 7, SWNE, SESW, SWSE	Unknown
	T22N, R20E, Sec 12, NW, SE, NWNE, NENE, SENE	Unknown
	T22N, R20E, Sec 10, NWNW, NENW, NWNE	FAR
Kinkelaar	T22N, R20E, Sec 8, NESE	FAR
	T22N, R20E, Sec 15, NWNW	Unknown
Upper Two Calf	T22N, R21E, Sec 28, S1/2NW	Unknown
	T22N, R21E, Sec 29, SW	Unknown
	T22N, R21E, Sec 30, SE	Unknown
	T22N, R20E, Sec 35, S1/2SE	PFC
	T21N, R21E, Sec 5, NWSE	Unknown
	T21N, R21E, Sec 6, NWSW	PFC
	T21N, R20E, Sec 1, S1/2	PFC
	T21N, R20E, Sec 2, NE, NENW	FAR
	T21N, R20E, Sec 2, N1/2SE, NWNW	PFC
	T21N, R20E, Sec 12, N1/2NW	FAR

RANGE IMPROVEMENTS - ALTERNATIVE 1

LEGEND

- BLM
- STATE
- US FISH AND WILDLIFE SERVICE
- US ARMY CORP OF ENGINEERS
- PRIVATE
- WATERSHED BOUNDARY
- ALLOTMENT BOUNDARIES
- PASTURE BOUNDARIES
- Proposed Water Line
- Existing Well
- Existing Water Tank
- Existing Water Saver
- Spring
- Reservoirs



FIRE MANAGEMENT

Historically, wild fire occurrence in the Missouri River "breaks" (prior to the advent of modern fire suppression methods) was classified as **high frequency/low intensity**. This means that wild fires occurred on a frequent basis and therefore there was little fuel buildup. Because fuel loads were light, the fires were low intensity and usually on the ground. These frequent ground fires created a mid-seral stage forest development typical of this ecosystem.

With the introduction of modern fire suppression strategies (exclusion of fire in the natural cycle) forested areas in the planning unit are progressing from fire associated dis-climax to climax stands. In general terms, the open stands of Ponderosa pine are evolving to dense stands of mixed conifers including Ponderosa pine, Douglas fir and juniper.

In the past, the planning area has had a very high wild fire occurrence; so much that the BLM established a fire station at Knox Ridge. The naturally occurring, historically high rate was probably augmented by instances of fire trespass (arson) that were common in the area. However, during the 1960's an investigation of reported fire trespass failed to uncover any concrete evidence. There has not been a confirmed occurrence of fire trespass in the planning area since 1962.

Current land use plan guidance provides that conditional suppression tactics will be applied in the planning unit. Responses will depend on the potential of the fire and the cost effectiveness of alternative suppression tactics. Conditional suppression strategies may range from initial attack to indirect responses such as confinement or containment within a particular area or to a particular size. For example, fires may be allowed to burn out of a steep coulee or draw with a thick juniper canopy before direct control methods are undertaken. The allowable burn acreage under the conditional suppression designation is 100 acres.

WATERSHED (Hydrology and Riparian Resources)

Climate

The climate in the Two Calf watershed is semiarid continental. Temperatures are usually warm in the summer with frequent hot days. In winter, periods of very cold weather are caused by artic air moving from the north. Milder periods caused by westerly winds warming as they move downslope (chinook winds) tend to break up long cold periods. Winter snowfalls are frequent but snow cover seldom accumulates more than one foot deep because of these "chinook" winds. Average annual precipitation, based on thirty-one years of record (1961-1991), is 13.86 inches. Seventy-five percent of the annual precipitation falls as rain from April through September. April, May, and June are typically the three wettest months of the year.

Surface Water

Mean annual runoff from the watershed (160 square miles) is approximately 4.6 cubic feet per second or 3334 acre feet per year. Snowmelt in March or April produces runoff that may be the record flow for the year. Rainfall in April, May, and June usually produces a second peak which may or may not exceed the volume from snowmelt. Later rain usually does not result in noticeable runoff unless it is from intense thunderstorms. Two Calf Creek is typically dry from the end of July to the next spring's runoff. Livestock water developments in the watershed on public lands include: 47 reservoirs, five wells, and one water saver; on private and state lands are 86 reservoirs, 12 wells, and three developed springs.

The water in Two Calf Creek is generally a very hard, calcium bicarbonate type. Sodium and sulfate concentrations are also high. The water is suitable for livestock and wildlife but too high in total dissolved

solids for domestic use. The State of Montana Department of Environmental Quality (DEQ) listed Two Calf and Sourdough Creeks as a water quality impaired streams due to nutrients, metals, total dissolved solids, and suspended solids. The priority for the DEQ to develop total maximum daily load levels for these streams is low. However, at some future time these streams will have to be delisted (for all or a portion of the impairments) by supplying sufficient credible evidence or a water quality restoration plan developed to address probable causes and sources.

Ground Water

Shallow ground water (within 500 feet of the surface) is scarce or absent throughout the Two Calf watershed. Deeper water bearing aquifers include sandstones of the Judith River, Eagle, and Kootenai formations. These formations are extensively fractured and faulted in area of Two Calf Creek and are sporadic in supplying water of significant quantities (>5gpm) to wells.

Water quality is variable but generally suitable for livestock and wildlife. High TDS levels render most ground water in the Two Calf Creek watershed unsuitable for domestic use without additional treatment.

Erosion/Sedimentation

The majority of soils in the Two Calf watershed fall in the general soil association of clay loams, silty clay loams, silty clays and clays with slopes up to 45%. The remaining soils fall in the badlands and clays association with slopes up to 90%. These associations rate severe for water erosion susceptibility. Within individual allotments, natural geologic erosion is generally observed, especially in the badlands soils types. Accelerated erosion, typically active gullying and headcutting, due to livestock grazing primarily occurs near water sources and riparian areas. Non-maintained vehicle trails exhibit gullying on slopes generally greater than 25%.

Sediments produced from this natural or accelerated erosion are generally deposited in the nearest downstream reservoir. Reservoirs in the Two Calf watershed generally have a life span of less than 15 years due to sediment accumulation. Sediment that is not captured by reservoirs creates stream waters high in suspended solids.

Riparian Areas

Riparian areas are defined as the "green areas" associated with lakes, reservoirs, estuaries, potholes, springs, bogs, wet meadows, and streams (ephemeral, intermittent, or perennial). The riparian zone occurs between the upland zone and the aquatic zone. Riparian areas are characterized by water tables at or near the soil surface, and by vegetation requiring high water tables. The following table lists the more common riparian vegetation found in the region containing Two Calf Creek:

COMMON RIPARIAN SPECIES

TREES	SHRUBS	FORBS	GRASSES
cottonwood	yellow willow	horsetail	western wheat
green ash	sandbar willow	sweetclover	sloughgrass
box elder	red osier dogwood	mint	smooth brome
peachleaf willow	chokecherry	curled dock	sedges
	buffaloberry	cattail	spikesedge
	golden current	cocklebur	foxtail barley
	buffalo current		baltic rush
	snowberry		kentucky bluegrass
	rose		bulrushes
	greasewood		cordgrass
	silver sage		salt grass

Streams classified as riparian areas in the watershed include Two Calf Creek and its major tributaries, South Fork of Two Calf Creek and Reed Coulee. Portions of the Missouri River and Sourdough Creek are also included. Approximately thirty eight miles of riparian areas on public lands along these streams were inventoried for health and function as shown in the table on the following page. The inventoried polygons are shown on the map on page 32. No inventories were conducted on private or state lands in the watershed. Actual scores and stream mile lengths for each inventoried polygon can be found in Appendix E.

Sept. 23, 1998

RIPARIAN AREA HEALTH AND FUNCTION

STREAM NAME	POLYGON #	CONDITION*	ALLOTMENT NAME
Reed Coulee	1	NF	Two Calf
Reed Coulee	1A, 2	FAR	Two Calf
S. Fork Two Calf	1A, 2A**	NF	Upper Two Calf
S. Fork Two Calf	1	FAR	Upper Two Calf
S. Fork Two Calf	2, 3, 4, 5, 6	FAR	Knox Ridge
Two Calf	1A, 2A, 3A	NF	Upper Two Calf
Two Calf	1, 2, 3, 4, 5	FAR	Upper Two Calf
Two Calf	6, 7, 8	FAR	Barnes Ridge
Sourdough Creek	1 through 11	NF	Knox Ridge
Missouri River	2410 - 2421	PFC	Demars
Missouri River	2438 - 2443	PFC	Demars
Missouri River	2510 - 2520 & 2527	NF	Demars

* PFC: Proper Function Condition. Riparian areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. **The functioning condition of riparian areas is a result of interaction among geology, soil, water, and vegetation.**

* FAR: Functioning At Risk. Riparian areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

* NF: Non-Functioning. Riparian areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, etc., as listed above. The absence of certain physical attributes such as a floodplain where one should be are indicators of nonfunctioning conditions.

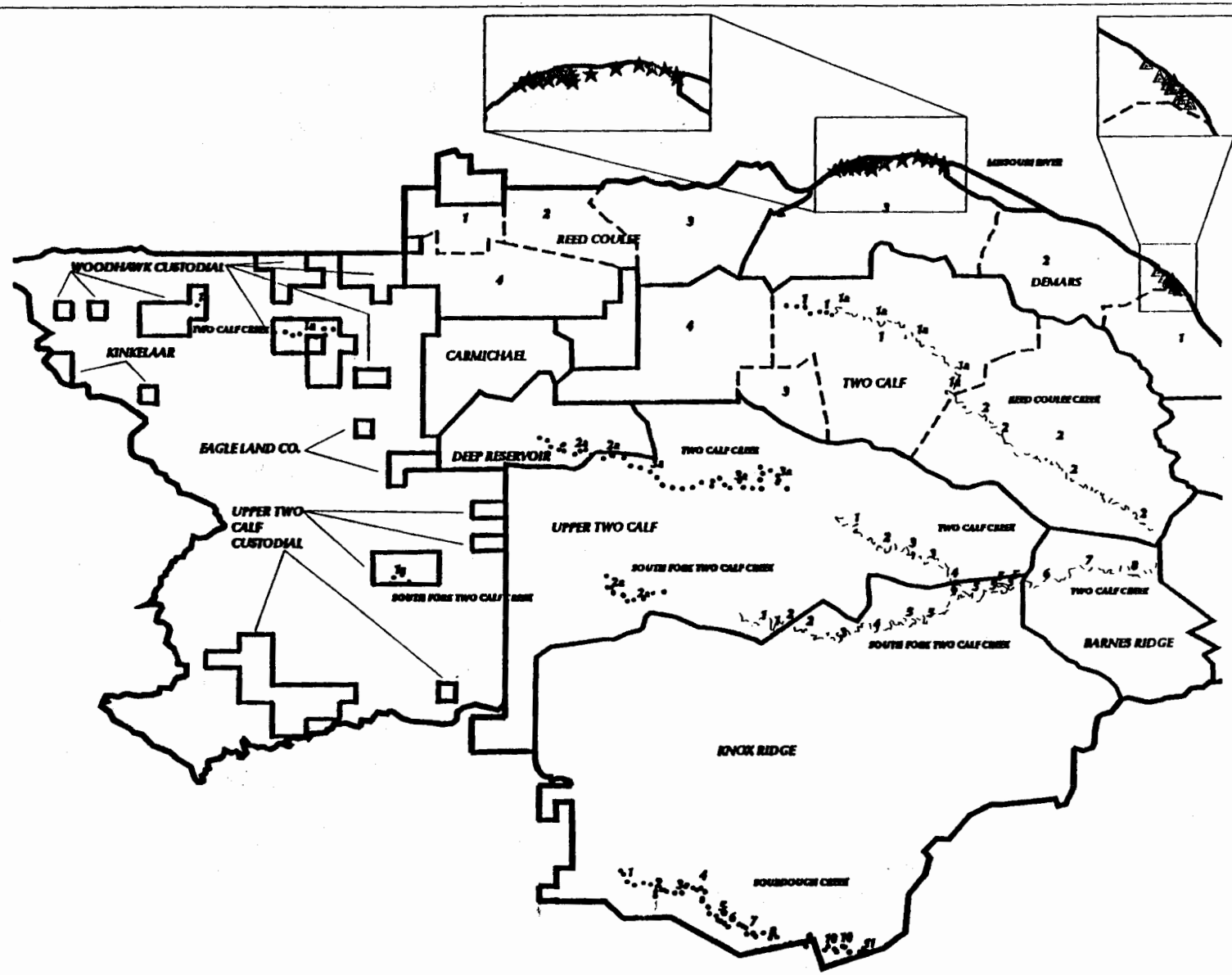
** These polygons appear to be in NF condition based on natural conditions or due to factors other than livestock grazing.

The current status of NF and FAR segments could be attributed to one or a combination of the following factors: present livestock grazing practices, past livestock grazing practices, other land use practices and geologic conditions.

RIPARIAN HEALTH

LEGEND

- WATERSHED BOUNDARY
- ALLOTMENT BOUNDARIES
- PASTURE BOUNDARIES
- Proper Functioning Condition
- Functioning At Risk
- Non-Functional
- ★ Proper Functioning Condition
- ▲ Non-Functional



SOILS

The soils in the Two Calf watershed are included in two general soil units; Thebo-Neldore and Neldore-Rock outcrop-Dilts. More detailed soil information can be found in the **Soil Survey of Fergus County, Montana.**

Thebo-Neldore

The Thebo-Neldore soils are shallow and moderately deep, well drained, gently sloping to very steep and are found on uplands and footslopes. The associated range sites are primarily dense clays, clays, and shallow clays in the 10 to 14 inch precipitation zone.

Thebo soils are found on uplands and footslopes and are moderately deep and well drained. They formed in residuum derived primarily from semiconsolidated shale. They have a clay surface layer and clay underlying material. Shale is at a depth of about 33 inches.

Neldore soils are found on uplands and are shallow and well drained. They formed in residuum derived primarily from consolidated shale. They have a clay surface layer and a clay and extremely shale clay underlying material. The shale layer is about 18 inches deep.

Of minor extent in the Thebo-Neldore unit are Gerdrum, Marvan, Vanda, Havre, Harlem, Absher, Dilts, Julin, Nobe, Pendroy and Weingart soils. The salt and alkali-affected Gerdrum, Marvan, Nobe and Vanda soils are found on terraces and fans. The Havre and Harlem soils are found on floodplains and terraces. The moderately well drained, salt and alkali-affected Absher soils are found on terraces and fans. The moderately deep Julin and Weingart soils are found on shale uplands and the shallow, well drained Dilts soils are found on shale ridges.

Neldore-Rock outcrop-Dilts

The Neldore-Rock outcrop-Dilts soils are generally shallow, gently sloping to very steep and Rock outcrop and are found on uplands. The associated range sites are primarily dense clays, clays and shallow clays in the 10-14 inch precipitation zone.

The Neldore soils have the same characteristics as described above.

The rock outcrop component is generally shale outcropping along deeply dissected drainages and on steep to very steep hillsides.

The Dilts soils formed in residuum derived primarily from consolidated acid shale. They have a clay surface layer and underlying material. Shale is at a depth of about 15 inches.

Of minor extent in this unit are the same soils as the Thebo-Neldore unit but also includes Norbert, Cabbart and Pendroy soils. The shallow Cabbart and Norbert soils are found on uplands and the Pendroy soils are found on fans and terraces.

RECREATION

Upper Missouri National Wild and Scenic River

The Upper Missouri National Wild and Scenic River (UMNWSR) is located between Fort Benton and US Highway 191 in North Central Montana. This 149 mile stretch of river flows generally west to east through Chouteau, Blaine, Fergus and Phillips Counties. It was designated a component of the National Wild and Scenic Rivers System in 1976. The UMNWSR forms the eastern boundary of the planning area from river

mile 131.5 to river mile 148.5 for a total of 17 river miles (see map on page 35). All of this segment is classified as "scenic". The unique and varied scenery was a key reason for the Upper Missouri's inclusion in the National Wild and Scenic Rivers system. In defining the boundaries of the management corridor, preservation of the area seen from the river was a prime consideration. The general lack of screening vegetation adds to the visual sensitivity of the "seen area" found within steep slopes and cliffs creating a rim-to-rim boundary (UMNWSR Corridor boundary).

Over the last ten years, an average of 2,230 visitors have registered annually for boating the Upper Missouri National Wild and Scenic River. The actual use is considerably higher since these figures represent about 60% of those using the river during the primary use season (the period between the weekend before Memorial Day through the weekend after Labor Day), and approximately 25% of those using the river during the rest of the year. Hunting use on the river has increased dramatically as access to private lands has become more restricted. Hunters register only infrequently and use numbers are much higher than recorded. Fluctuations in water levels affect floater numbers, i.e. high flows means more floaters and low flows means fewer floaters.

Of those boating the river, 31% or an annual average of 690 registered visitors depart the river at Kipp Recreation Area. This would convert to an estimated actual use of over 960 visitors who experience the river reach between river mile 131.5 and river mile 148.5 (Two Calf area). Given a float of 22 miles per day, the number of visitors along this reach would convert directly to visitor days. Over 100 visitor days are spent at other spots (usually riparian areas) along the river in the planning area by floaters that camp, hike, hunt or view wildlife. This gives an estimate of 1060 visitor days by UMNWSR floaters. There is an estimated 3 to 5% increase annually in river floaters. However, visitor use is expected to increase dramatically in the next six years in celebration of the Lewis and Clark Bicentennial.

Visual Resource Management

BLM land within the planning area has been assigned a Visual Resource Management (VRM) class based on a process that considers scenic quality sensitivity to changes in the landscape and distance zone. There are four VRM classes numbered I to IV. The lower the class number the more sensitive and scenic the area. Each class has a management objective which prescribes the level of acceptable change in the landscape. The Two Calf watershed has three classes as follows:

1) All of the public land in the section of the river corridor and lands adjacent to the corridor (below the rim) is classified as scenic and have a Class II VRM classification. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

2) Public lands on the bench between Sourdough and Two Calf Creeks have a class III VRM classification. This class allows for a moderate level of change to the characteristic landscape. Management activities may attract attention but should not dominate the view of the causal observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape..

3) Public lands in the remainder of the uplands (generally above the UMNWSR corridor rim) have a Class IV classification. This class allows for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic element.

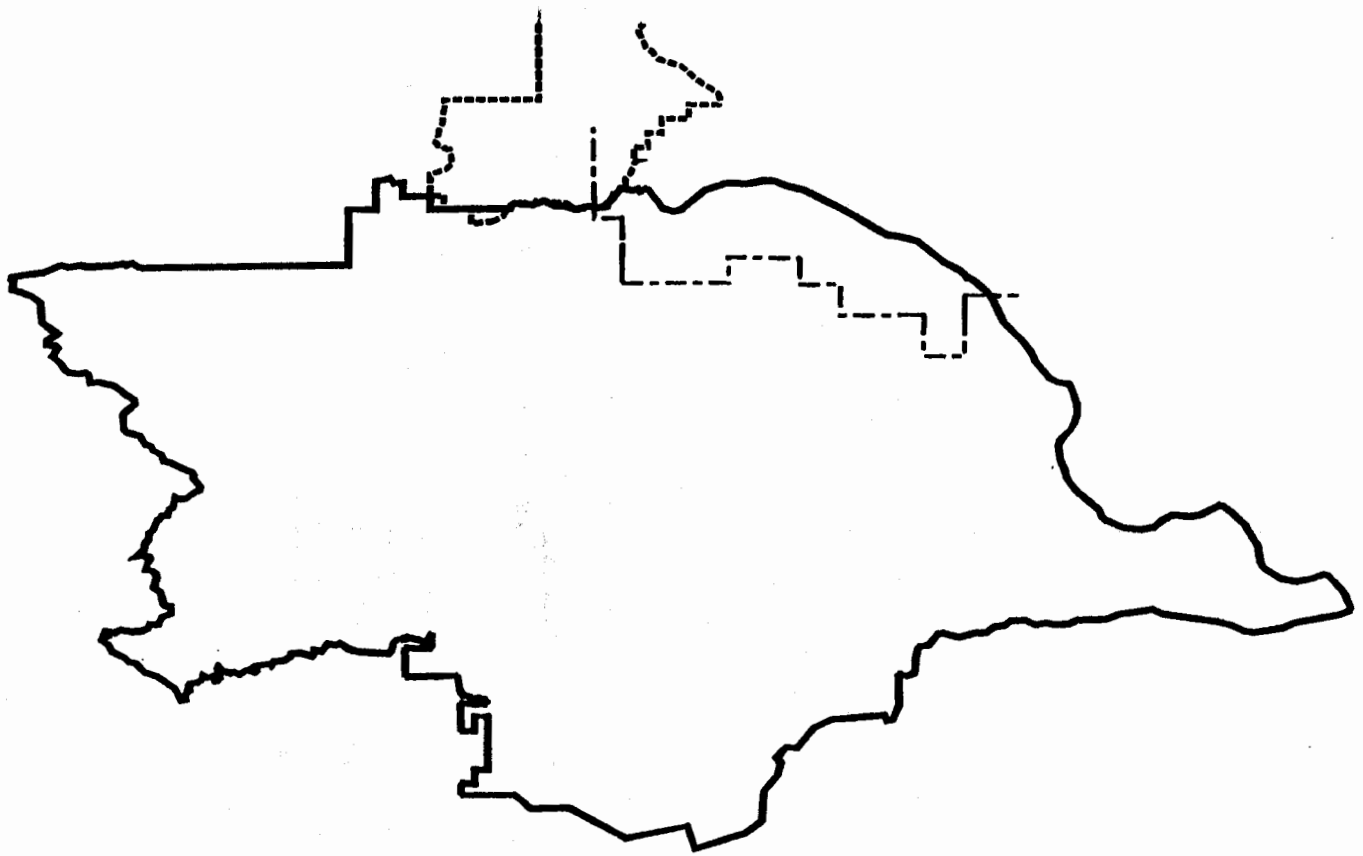
TWO CALF, WOODHAWK WSA AND UMNWSR BOUNDARIES

LEGEND

TWO CALF WATERSHED BOUNDARY

WOODHAWK WILDERNESS STUDY AREA BOUNDARY

UPPER MISSOURI NATIONAL WILD AND SCENIC RIVER BOUNDARY



National Historic Trails

The UMNWSR is the foremost component of the Lewis and Clark National Historic Trail. The visitor days attributed to this trail are included in the visitor days identified in the Upper Missouri National Wild and Scenic River section. The Lewis and Clark National Historic Trail was designated a segment of the National Historic Trail System in 1978. The Lewis and Clark Expedition was one of the most dramatic and significant episodes in the history of the United States. It stands, incomparably, as our Nation's epic in documented exploration of the American West. This portion of the 8000+ mile journey was on the Missouri River. The expedition passed through this area in May 1805 and on the return trip in July 1806. There is a May 25, 1805 Lewis and Clark campsite at river mile 133.

Watchable Wildlife Area

The entire UMNWSR was designated a Watchable Wildlife Area in 1990. It was given this designation because of the abundant, unique and diverse wildlife populations that abound along the UMNWSR. Visitors come from around the world to view the wildlife found in the area. The visitor use numbers are included in the floater numbers mentioned above.

Woodhawk Wilderness Study Area

There are 92.3 acres of the Woodhawk Wilderness Study Area (WSA) in the planning area. (see map on page 35. The Missouri Breaks Wilderness Suitability Study (1987) found none of this study area as suitable for wilderness. However, Section 603 of FLPMA directs BLM to manage lands under wilderness review by Interim Management Policy and Guidelines (IMP). This states "During the period of review of such areas and until Congress has determined otherwise, the Secretary shall continue to manage such lands according to his authority under this Act and other applicable law in a manner so as not to impair the suitability of such areas for preservation as wilderness... (emphasis added)" This language is referred to as the "nonimpairment" mandate. Visitor use to this portion of the WSA in the planning area is minimal and is covered under Other Recreational Activities.

Missouri Breaks Back Country Byway (MBBCB)

The Missouri Breaks Back Country Byway has approximately 62 miles within the planning area. The Back Country Byway was established in 1993. It traverses one of the most geologically unique and historically significant areas in Montana. There has been no vehicle counter on the roads, but letters and phone calls of interest indicate that over 400 visitors used the roads to enjoy the portion of the Back Country Byway in the planning area.

Outfitting

In 1997, there were 14 outfitters that were permitted to float the UMNWSR and 4 outfitters that were permitted for hunting on the public lands in the area. Outfitter numbers and use on the river fluctuate depending on water levels. At the present time, use of the lower section of the river is low but all indications are that there will be an increase in future use. Visitor days from river outfitters in 1997 was 192. These visitor days for float outfitters are included in the numbers mentioned above in the Upper Missouri National Wild and Scenic River section. Only 3 of the hunting outfitters were active in 1997. There has been interest in this area by other outfitters. Hunting outfitters had 10 visitor days and are included in Other Recreational Activities.

Hunting and Other Recreational Activities

The planning area receives visits from rock hounds, history buffs, wildlife viewers and other associated recreationists. However, because the area supports several big game species and upland game birds, the major recreation use in the uplands is hunting. The road system (see map on page 3) in and adjacent to the planning area, provides access for hunters to enjoy hunting activities on the public land. There has been

a significant increase in hunters in the last five years. Hunters frequent the area during archery and general big game hunting season as well as upland game bird season and also use the area during special hunts in pursuit of bighorn sheep and mountain lion. It is estimated that all of these activities provide 2530 visitor days on public land in the planning area.

Total Visitor Use

It is a estimated there are 1060 visitor days from floaters, 400 visitor days attributed to the Scenic Byway and an additional 2530 visitor days from other recreational activities for a total of 3990 recreation visitor days enjoyed in the Two Calf planning area.

CULTURAL-PREHISTORIC/HISTORIC RESOURCES

Cultural resources are broadly defined by BLM as any cultural property or traditional lifeway value. Cultural properties are definite locations of past human activity, occupation or use. Traditional lifeway values are the traditional systems of religious belief, cultural practice or social interaction that are not closely identified with definite locations (FEIS-JVP, pg 131).

The prehistoric period began around 14,000 years ago and ended around 1855 with the signing of the Blackfeet-Stevens Treaty. The inhabitants of this area were mostly hunters and gatherers utilizing the natural resources (plants and animals) for subsistence activities (FEIS-JVP, pg 131).

According to Ruebelmann (1983), prehistoric sites (properties) in the pine breaks are found on the tops of ridges, at the ends of fingers which extend out beyond the rims of major valleys, on valley terraces, and on erosional remanants such as hills, knolls, and buttes. Prehistoric site density is considered low and estimated at 2-3 sites per section (Ruebelmann, 1983-pg 48).

Later in the historic period, homesteading brought settlers into the planning area by the thousands. The region was quickly settled by Germans and Scandinavians from the midwest, as well as by eastern European immigrants like Bohemians and Yugoslavs (FEIS-JVP, pg 132).

Historic period properties in the study area are primarily related to homesteading and ranching. There are historic accounts of early explorers, traders and trappers using the area. However, specific locations with physical evidence of their use is lacking. Consequently, most historic period properties are related to the homesteading era or later.

ECONOMIC AND SOCIAL CONDITIONS

The public lands in the Two Calf watershed play an important role in local livestock operations. Typically, most of the ranches in the watershed are cow/calf operations where in the winter gestating cows are fed hay on private range and farm lands. Calving occurs from mid-February through April. As private rangelands become snow-free and grasses begin to grow in April, the cow/calf pairs are transitioned from hay to grass. In the spring, between May 1 and June 1, the cattle are moved to the BLM grazing allotments in the watershed. In the fall, between October 1 and November 1, the cattle are gathered and returned to private rangelands where the calves are weaned and shipped to feedlots.

The public lands in the watershed are grazed by 11 permittees that utilize 6243 Animal Unit Months (AUMs). Assuming that each cow/calf unit uses the public lands for five months of seasonal grazing, would mean that approximately 1250 Animal Units (cattle) graze the public lands in the watershed. Therefore, gross receipts from livestock that are grazed on public lands in the watershed would be expected to be about $537,000. This would translate into approximately $1,154,550 in local economic activity annually (purchases of production items, financial services, sales, etc.).

Public lands in the watershed also provide a considerable amount of recreational opportunity such as camping, hunting, fishing and sightseeing. Visitors attracted to the area by these opportunities spend money on goods and services such as food, lodging, transportation, clothing and outfitter services.

According to information collected for the Judith Valley Phillips and West HiLine Resource Management Plans, local residents and other public land users exhibit attitudes and values typical of a rural farm/ranch-oriented society in the western United States. Residents value the rural character of the area, wide open spaces, naturalness and solitude. Positive aspects of the area include the independence and industriousness of the local people, the lack of urban problems, relaxed pace and personal freedom. Residents have a strong sense of heritage. These people have grown with the area, have seen changes occur and are extremely concerned about any management decisions that would potentially disrupt their lifestyles. Perceived threats to the existing lifestyle revolve around changes in land use that would affect the local way of life. Recreational opportunities represent a necessary portion of the local lifestyle and are not perceived as a severely conflicting land use.

FORESTRY

Most of the timber in the watershed is concentrated on north facing slopes. Moisture appears to be the most limiting factor that prevents tree establishment, but high temperatures and radiation on south facing slopes also contribute. Most of the timbered areas are populated by ponderosa pine and juniper or ponderosa pine and Douglas fir. The stands are generally healthy, but growth is limited due to climatic and site characteristics.

Forest product harvest (sawtimber, posts, poles, firewood) has occurred throughout the watershed. In the past four to five years, there has been increased demand for commercial cutting in this type of habitat. However, because most of the commercial timber in the watershed is located in pockets on steep slopes, its value does not warrant the cost of utilizing specialized harvesting equipment and techniques.

GEOLOGY

The surface geology of the planning area is that of upper cretaceous Bearpaw Shale formation of the Montana Group. There are narrow occurrences of older Judith River and Claggett formation exposed along the trace of thrust faults in the northern half of the area. The Bearpaw Shale consists of gray to black and greenish black marine shale containing beds of bentonite and lumpy concretions. The overall thickness is 800 to 1,000 feet and is underlain by 6,000 feet of older sedimentary formations ranging from lower cretaceous to Cambrian in age. There are few alluvial deposits in this general area since most of the older Pleistocene gravels have been eroded away and the area was not glaciated during the Pleistocene era.

Most of the lands involved have high occurrence potential for oil and gas. T21N., R22E., Section 6, is moderate potential. Current lands status plats do not show any active federal leases. The lands were nominated for lease in 1988 and that is the most recent date posted on the oil and gas plats. While the area has a history of continued leasing interest exploratory wells are few and far between - three of the townships have only one well test in them. The nearest producing fields are the Leroy Gas field (10 miles northwest) and Cat Creek Oil field (45 miles southeast). In 1984 an 8" gas pipeline was installed across the Missouri river providing access to market for wells that had been shut in since 1968. The lack of a transportation system is the primary reason for limited drilling. Other leasable mineral resources present in the area are coal and bentonite. The development potential for these is low due to the distance to any available market and high costs of mining. The area has low occurrence potential for locatable and saleable minerals. The entire area of the planning unit that lies within the UMNWSR corridor and the Woodhawk WSA is withdrawn from locatable mineral entry under the Mining Law of 1872.

PALEONTOLOGY

An inventory of the river corridor was conducted in 1984. The Bearpaw Formation contains both vertebrate (plesiosaur) and invertebrate (amonite) fossils. The breaks terrain along the river allows good exposure of buried sedimentary layers and there is potential for future discovery of articulated skeletal remains of scientific importance. The area will continue to be of interest to both professional and amateur collectors.

WILDLIFE

The Two Calf Watershed offers an array of habitat types that support a wide variety of wildlife species. As noted earlier, only portions of the watershed are managed by BLM; much of the land in the watershed is privately owned land. It should also be noted that while BLM manages the habitat for the large diversity of wildlife species, Montana Department of Fish, Wildlife, and Parks (FWP) actually manages the animals and population levels. Most of the data in regard to big game and upland game is derived from FWP management plans and objectives for any particular area. These objective numbers are set through their offices with input from the public.

Antelope, mule-deer, white-tailed deer, Rocky Mountain elk, and bighorn sheep are the big game species occurring in the Two Calf Watershed. Antelope herd size for the watershed indicate that the populations are below the objective numbers set by MT Dept of FWP. Harvest numbers have been reduced in order to permit the population to increase. The deer herd size is also below the objective level. Habitat appears sufficient to carry objective levels. The decline of mule deer appears to be caused by a variety of factors including: high harvest levels over several years; large percentage of winter kill for consecutive years, high mountain lion populations; and possibly disease. Again, harvest numbers have been reduced to permit the population to increase. The harvest of female mountain lions is proposed to be increased to help reduce total take on mule deer. In the recent past, the elk population in the watershed had been at very high numbers which resulted in depredation to private lands. The elk population has been greatly reduced through increases in permits and is currently low. FWP would like to slightly increase the elk population again. (Stivers, personal communication, 1997). The bighorn sheep population appears to be static to slightly increasing and healthy at this point. Maps of the big game habitat in the watershed can be found on pages 41, 42, 43 and 44. There are 8 Cole browse transects and 2 Daubenmeier transects in the watershed. These were originally established to monitor shrubs in high deer use areas. The transects were last read in 1990.

There is a Habitat Management Plan (HMP) written for the area just south of Knox Ridge Road to Sourdough Creek. The HMP was finalized in June, 1982. The primary goal of the HMP was to improve the quality and quantity of hunter recreation days through increased deer harvest. The method prescribed to achieve that goal was to improve palatability and availability of mule deer forage by conducting prescribed burns of dense forest canopy. The burns were conducted in 1982 and 1983. It was suggested in the HMP that the quantity of browse peaks at 13 years post fire and remains productive for at least 28 years. However, an evaluation conducted in 1988 (6 years post fire) indicated concern for the canopy coverage and frequency of chokecherry and snowberry. The evaluation stated that resprouting had occurred on both shrubs but frequencies had declined by 65% for chokecherry and by 70% for snowberry. There was a 360% increase in forbs during that same time which did meet the objectives of the HMP. The transects were last read in 1990 and don't show a marked increase from 1988 numbers.

The diverse habitat types provide for small mammal species richness with large number of rodents and some rabbits. Rabbit populations are thought to be down at this point but may be on the rise again. The rabbit and rodent populations provide a good prey base for raptors and other predators. These include red fox, coyote, badger, bobcat, and mountain lion.

Waterfowl utilize the small reservoirs, springs, and drainages in the watershed in the spring and during seasonal migrations. Some limited nesting habitat exists in the uplands but is plentiful along the UMNWSR where large populations can be found.

The area has significant and various raptor nesting habitat. A variety of habitats occur for species which can be found on the watershed area such as cliff nesters like the golden eagle and prairie falcon; tree nesters like the Swainson's Hawk, red tailed hawk, great-horned owl; and ground nesters like the burrowing owls and northern harrier.

Nongame bird species diversity is high within the watershed. Neotropical migratory birds (birds that summer in North America and utilize winter habitat south of the United States) including western meadowlark, lark bunting, loggerhead shrike and western tananger, breed and nest in the area. There is growing concern for grassland bird species due to declines in grassland habitat. These species include loggerhead shrike, Sprague's pipit, Bairds sparrow and others.

The tiger salamander is the only salamander occurring in the watershed. The woodhouse's toad, western chorus frog, and possibly the northern leopard frog all occur in the area. There is some concern for the populations of northern leopard frog which appear to be in a sharp decline. Spiny softshell and snapping turtles live along the UMNWSR and have been well documented. Snakes found in the area include the western rattlesnake, racer, gopher snake, and two species of garter snake. There is an extensive inventory being done along the UMNWSR to assess the species and abundance of amphibians and reptiles.

The hoary bat, big brown bat, little brown bat, long eared bat, long-legged bat, and Townsend's big eared bat may occur in the watershed, however none have been found. These bats roost during the day in trees, crevices of cliff walls or in shallow caves. They forage for insects at night and some can eat their weight in insects each night. Water sources are important for bats for foraging and drinking. Some of these species are non-migratory which means they hibernate in local suitable caves. None of these bats have been found in the area. During the winter, the migratory bats will usually leave as food sources diminish but they will return in the spring.

There are no known fisheries in the watershed with the exception of the UMNWSR. One location in the Deep Reservoir Allotment may be a potential warm water fishery. However, the drainage is very steep which would make stocking the reservoir very difficult. Fish species in the UMNWSR include paddlefish, pallid sturgeon, shovelnose sturgeon, goldeye, sauger, walleye, catfish and numerous smaller fish. The pallid sturgeon is listed as an endangered species and work is ongoing to increase the population levels. This work is conducted by FWP. Young pallid sturgeons were reintroduced into the UMNWSR in 1998. There is a recovery plan available for the pallid sturgeon and efforts are ongoing to comply with the recommendations in that plan.

There are three threatened and endangered species which potentially occur in the watershed. These are the bald eagle, pallid sturgeon, and peregrine falcon. The pallid sturgeon is discussed above. There are bald eagles nesting on the UMNWSR but at this time are not known to nest within the watershed boundary. However, the area is used by eagles for foraging during the summer and during seasonal migrations in the spring and fall. Bald eagles require large riverside trees for roosting and nesting habitat.

The peregrine falcon has not been documented in the watershed, however adults should be returning to the UMNWSR after 5 years of releases. The young falcons were released on the UMNWSR to the west of the planning area and should return as adults to locate nest sites and breed. Therefore it would not be unlikely to see peregrine falcons in the area.

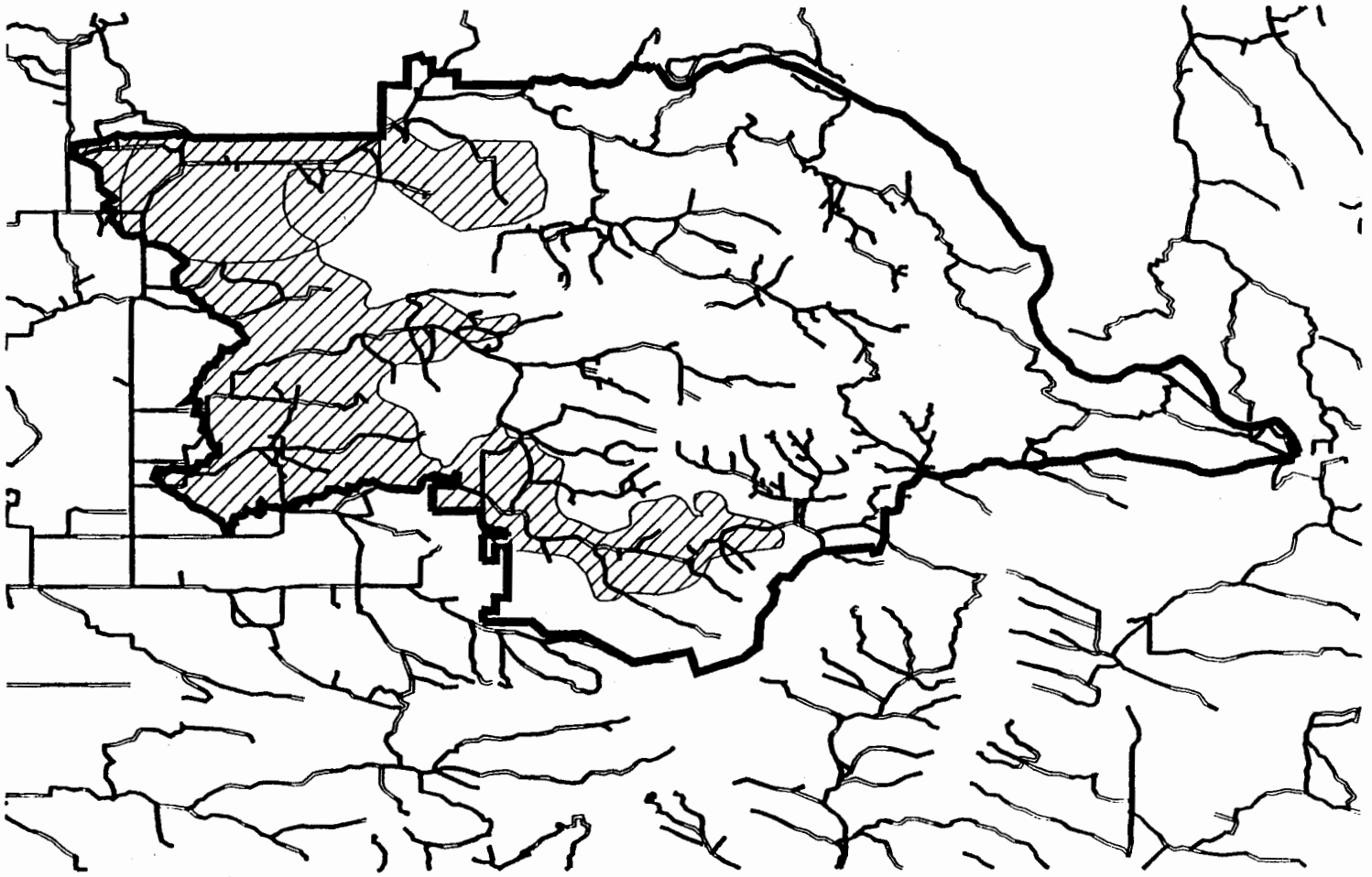
ANTELOPE HABITAT

LEGEND

WATERSHED BOUNDARY

ROADS AND TRAILS

ANTELOPE HABITAT 30,594 ACRES



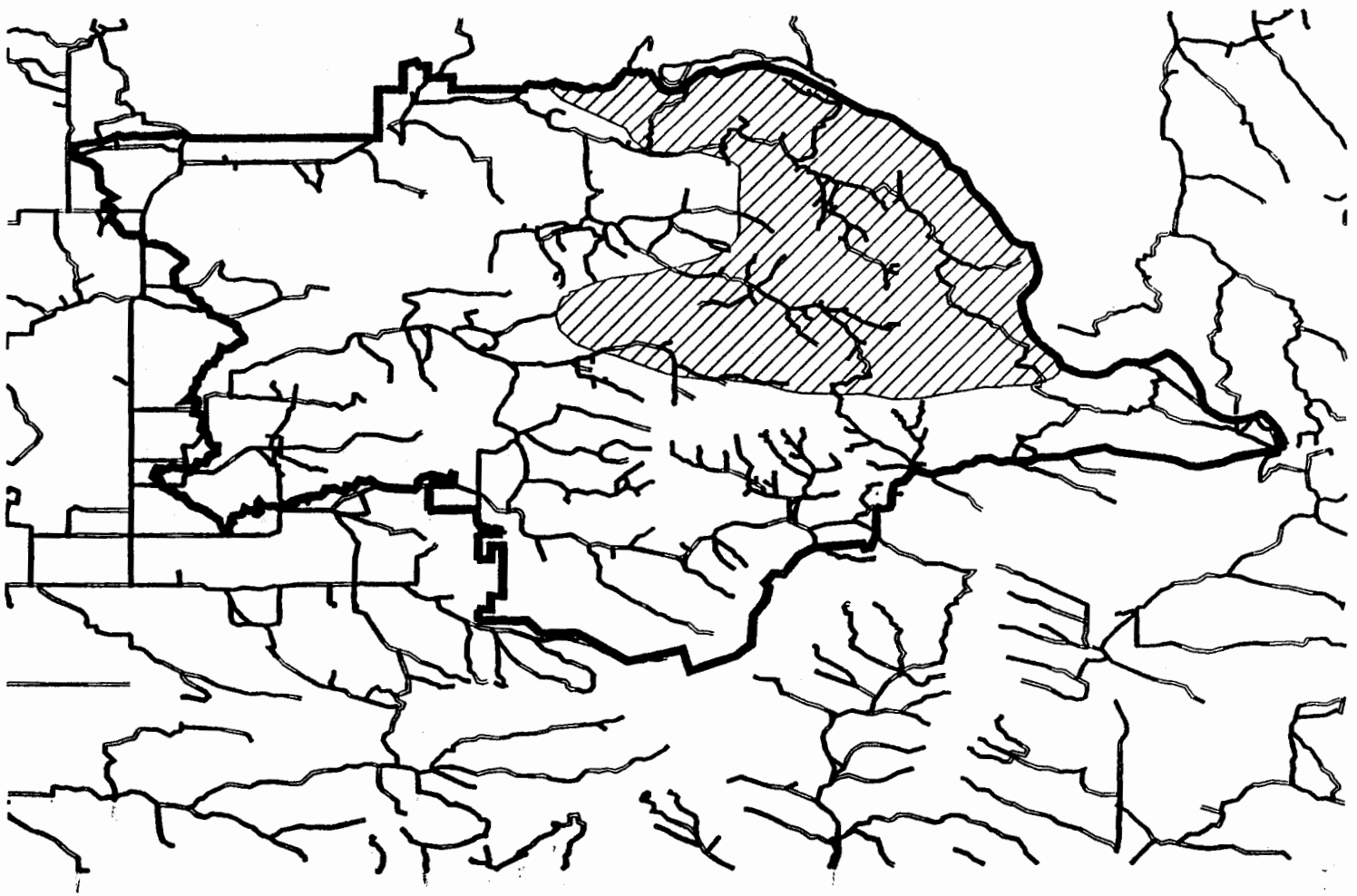
BIG HORN SHEEP HABITAT

LEGEND

WATERSHED BOUNDARY

ROADS AND TRAILS

BIG HORN SHEEP HABITAT
27,138 ACRES



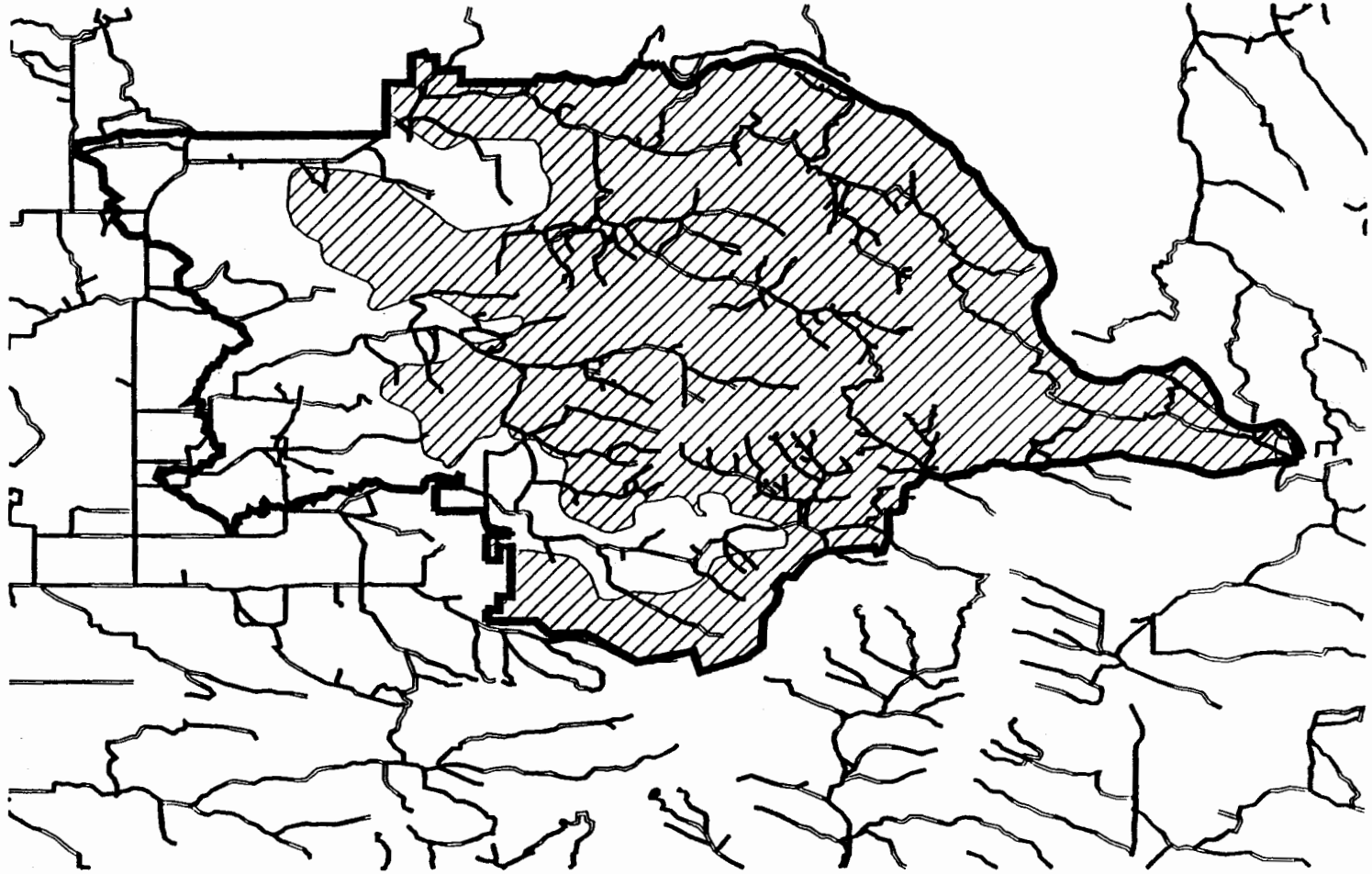
ELK HABITAT

LEGEND

WATERSHED BOUNDARY

ROADS AND TRAILS

ELK HABITAT
72,548 ACRES



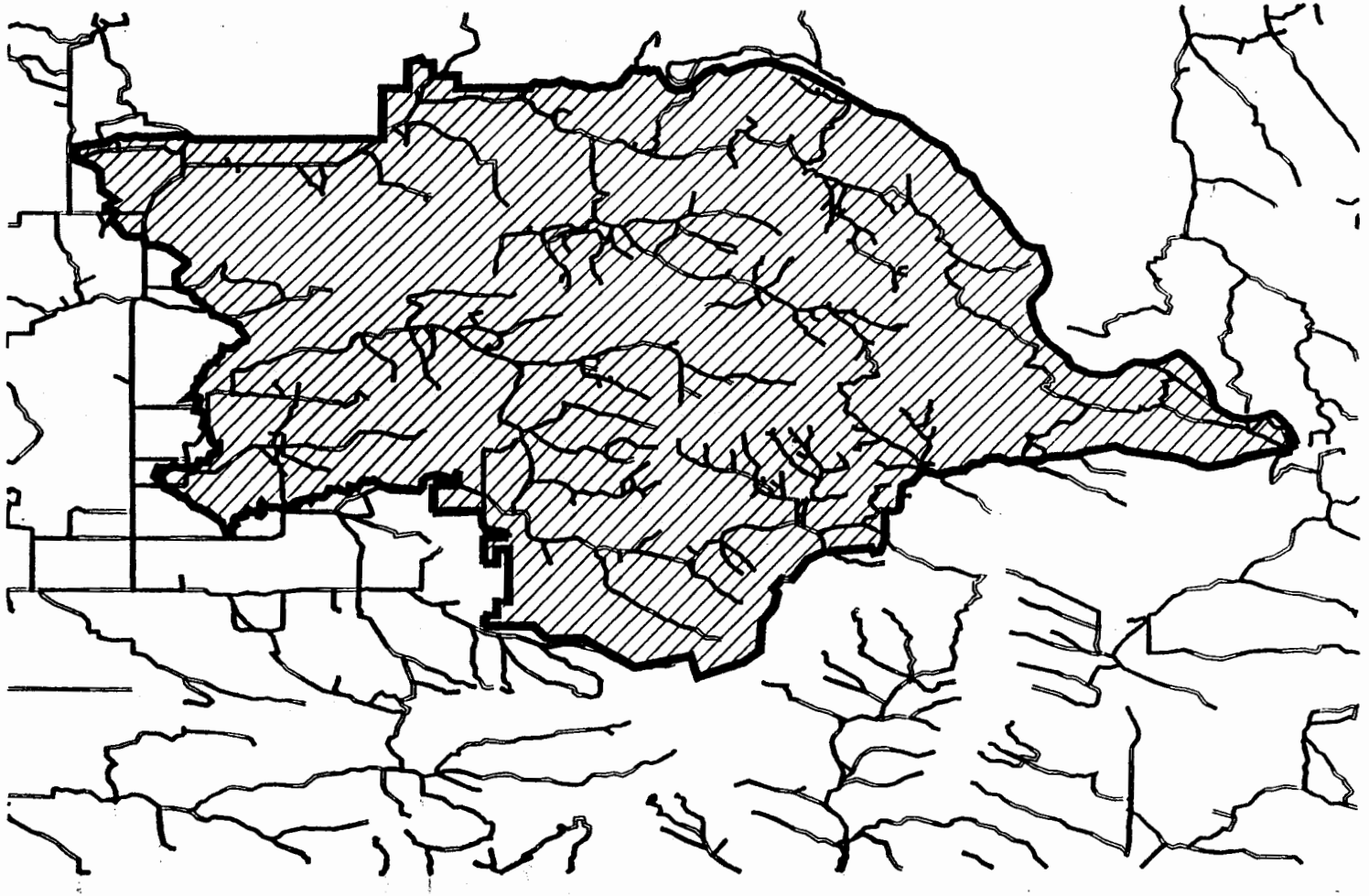
MULE DEER HABITAT

LEGEND

WATERSHED BOUNDARY

ROADS AND TRAILS

MULE DEER HABITAT
102,486 ACRES



One candidate species, the mountain plover, may occur in the watershed. They are primarily found on prairie dog towns or very short grass where visibility is high. A herbaceous stubble height of less than 2" is preferred by this bird. It has not been documented in the watershed but potential habitat exists.

LANDS/REALTY

The BLM will pursue acquisitions in the planning area through exchange or purchase with willing landowners as opportunities arise. Acquisitions could include private, state or other land that would attain a public land pattern that balances multiple resource values and brings about better manageability. Specifically, a parcel private land in T.23N., R.22E. SW Section 26 was identified in the Upper Missouri National Wild and Scenic River Plan as being a high priority to acquire for river access, but all of the private holdings along the UMNWSR are of interest.

There are several parcels of public land in the planning unit that are identified as disposal tracts and are available for exchange or sale to facilitate individual exchange proposals. Appendix F identifies these parcels.

CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

A INTRODUCTION

This chapter describes the environmental, social and economic consequences of implementing the alternatives presented in chapter 2. There are no anticipated unavoidable adverse effects or irreversible and irretrievable commitments of resource associated with the alternatives.

There would be no impact to any of the following critical elements from any of the actions/alternatives: Air quality, Areas of Critical Environmental Concern, prime and unique farmlands, floodplains, Native American concerns, solid and/or hazardous waste, environmental justice and/or drinking and ground water quality.

B. IMPACTS BY ALTERNATIVE

This section describes the environmental consequences from implementing the alternatives presented in Chapter 2. The impacts are discussed for each environmental element by alternative. There are some impacts that are common to all alternatives or form the basis for the analysis by alternative as follows:

Wildlife/Habitat/Threatened and Endangered Species

The following analysis is common to all motorized vehicle management alternatives and uses all affected habitat in the planning area regardless of land ownership. There are 72,540 acres of elk habitat, 102,486 acres of mule deer habitat and 27,138 acres of bighorn sheep habitat in the planning area. Elk (as well as deer and sheep) are particularly susceptible to disturbance during hunting seasons and calving seasons. The number of miles and locations of roads open within elk habitat can positively or negatively affect the quality of habitat. Essentially, the habitat quality declines as the density of roads increases. In the planning area there are roads down almost every ridge and they are used frequently by hunters. This situation negatively affects the animals because they essentially have no where to hide from people. Associated effects to elk include: greater number of bulls being harvested which reduces the number of bigger, older (trophy) bulls; animals being forced away from high quality habitat into lower quality habitat; high stress during the rutting season leading to lower spring calving numbers; and poor health entering the winter. Mule deer are also affected by the roads in similar ways but the degree of impact is somewhat lessened due to their behavior. There are fewer roads within the bighorn sheep habitat but they are also susceptible to similar disturbance especially during the hunting season.

The impact analysis from actions for OHV management was completed based on a 1/2 mile buffer zone from the road. The impact analysis also considers all land ownership whether it can be affected or not by road closures. The roads which can not be closed either permanently or seasonally due to land ownership are shown on the habitat maps and included in the analysis.

Cultural Resources

Threats to cultural properties which may be influenced by BLM activities include erosion, vandalism or illegal collection, project development, access and off-road vehicular travel. Among these threats, project developments which are undertaken or approved by BLM are the easiest to control since their potential impacts are specifically considered before the action is taken. Vandalism can also be addressed in a direct fashion through the actions of law enforcement and the concerned public.

Erosion is a natural process and the natural enemy of archaeological and historical properties. It can not be eliminated but some actions may influence its timing and location. Erosion can also be considered beneficial at times - when it results in the discovery of a significant cultural property. In general, however,

a reduction in the rate of erosion would be considered beneficial to cultural properties.

Unregulated access can facilitate improper use such as vandalism and increase erosion. Off-road vehicular traffic can directly impact cultural properties or indirectly affect them by increasing erosion. In general we may therefore conclude that controlling vehicular access is a way to address vandalism and influence erosion.

In summary, we can make the following generalizations for impact analysis:
1. Authorized project developments are not a serious threat since they are specifically considered before implementation.
2. Reduction of erosion would positively benefit cultural properties.
3. Limiting off road vehicular traffic and reducing access through seasonal restrictions would positively benefit cultural properties.

ALTERNATIVE 1 - NO ACTION/CURRENT MANAGEMENT

Cultural Resources
Cultural properties would suffer from erosion and vandalism at the current rate.

Wildlife/Habitat/Threatened and Endangered Species
Elimination of any noxious plants would have a positive impact on most wildlife species by providing more native forage. However this alternative does not aggressively eliminate noxious weeds and would generally not significantly benefit wildlife.

With the exception of the DeMars and Reed Coulee allotments, most of the pastures would be grazed by cattle season long without rest periods for plants to rejuvenate . Residual cover is necessary for wildlife forage, especially during the winter months and in the spring nesting season. There are few areas which would be rested or deferred. Without grazing guidelines, it would be very difficult to ensure that the vegetative communities would stay in or move toward healthy conditions.

In many instances, the riparian areas would continue to degrade, which would have a negative impact on wildlife. Most wildlife species are dependent on water and riparian areas during a portion of the year. It is crucial to provide healthy riparian areas for wildlife.

All of the roads in the planning area (221.7 miles) would be open to motorized vehicular traffic on a yearlong basis which would negatively impact approximately 60,483 acres of elk habitat and 86,370 acres of mule deer habitat (see maps on pages 48 and 49) This represents 83% of all elk habitat and 84% of all mule deer habitat within the planning area.

ELK HABITAT, ALTERNATIVES 1, 2 AND 3, W/O SEASONAL RESTRICTION

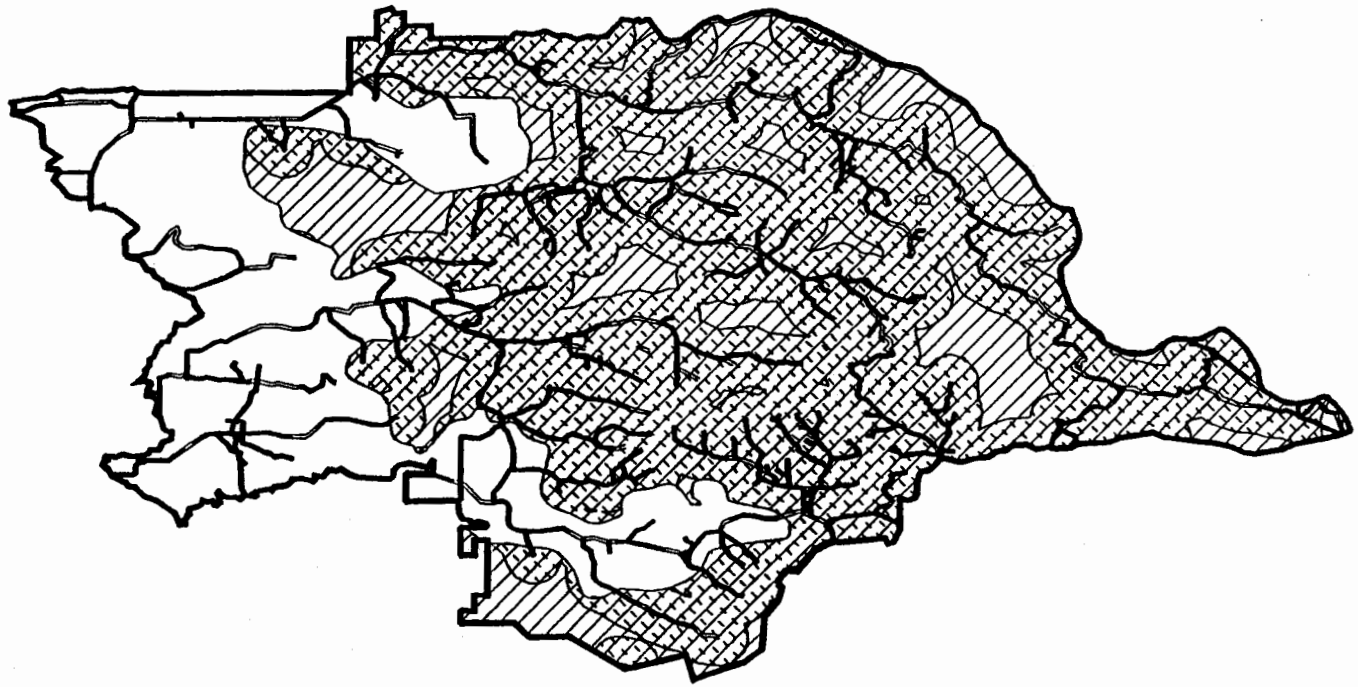
LEGEND

WATERSHED BOUNDARY

ROADS LEFT OPEN 221.7 MILES OF ROAD

ELK HABITAT 72,540 ACRES

HABITAT EFFECTED DUE TO ROADS 60,438 ACRES



DEER HABITAT, ALTERNATIVES 1, 2 AND 3, W/O SEASONAL RESTRICTION

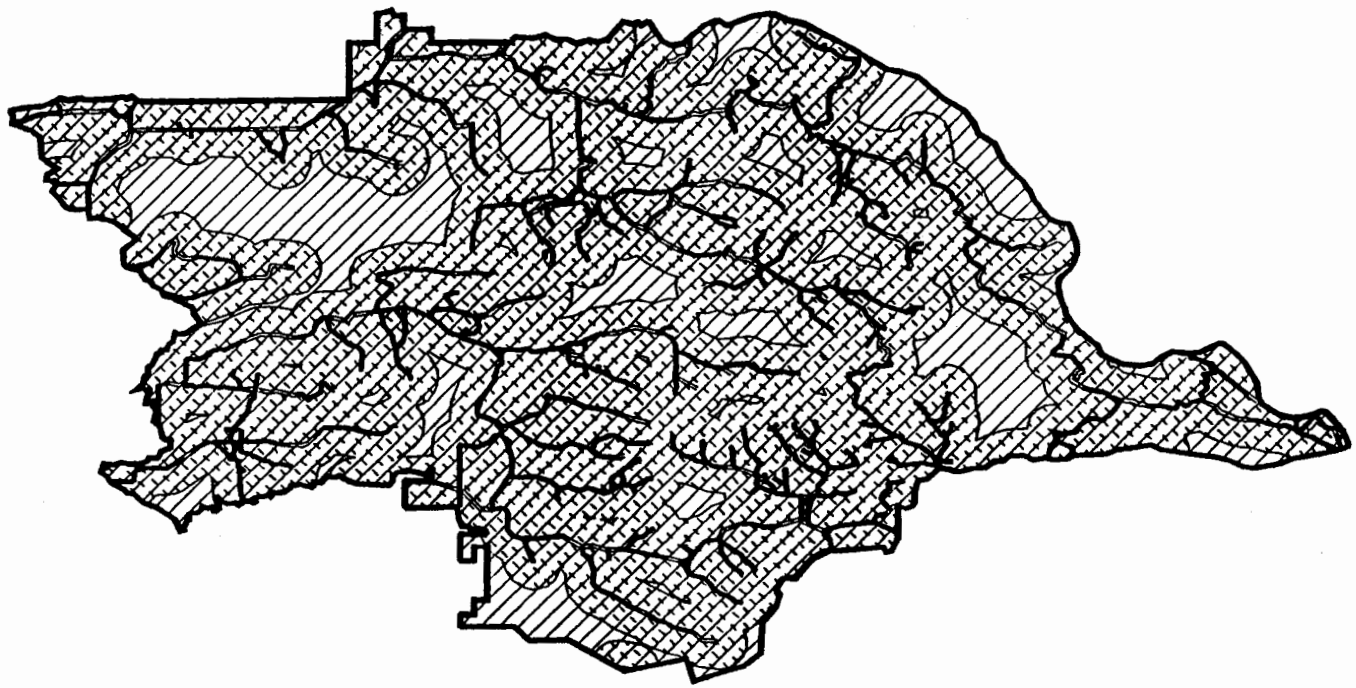
LEGEND

WATERSHED BOUNDARY

ROADS LEFT OPEN
221.7 MILES OF ROAD

MULEDEER HABITAT
102,486 ACRES

HABITAT EFFECTED DUE TO ROADS
86,870 ACRES



Rangeland Health - Uplands

If noxious weeds remain at the current level, upland range health, erosion, sedimentation and ecological site ratings would remain in current class or continue to slightly improve. With the exception of the leafy spurge infestations along the riparian areas of the UMNWSR, noxious weed populations are currently impacting range health only minimally throughout the watershed

If the current livestock grazing management continues, upland range health, erosion, sedimentation and ecological site ratings would remain in current class or continue to slowly improve. All available information indicates long term trend is either static or slightly upward throughout the watershed.

If OHV use continues at the current level, upland range health and ecological site ratings would remain in current class or continue to slowly improve. There is potential for increased soil erosion with current management if OHV use were to increase throughout the watershed.

Riparian Area Health

Riparian area health would not be affected for any action proposed to manage noxious plants under this alternative.

The anticipated increase in off road travel has the potential to negatively impact riparian areas. Ruts left from travel across or along riparian areas would increase erosion/sedimentation. Also, additional sediment delivered from the uplands caused by off road travel could increase erosion in the stream channels, thus degrading the riparian areas.

Riparian health is improving in the Barnes Ridge allotment due to the implementation of a grazing system three years ago. The Sourdough Creek portion of the Knox Ridge allotment is improving slightly due to the riding and herding efforts of the permittee. These trends are expected to continue. The riparian health in the other allotments in the watershed would remain static since no range improvements or changes in grazing systems are proposed. On the currently existing 19.9 miles of non-functioning riparian areas, grazing guidelines #2, 3, and 5 (Appendix D) would not be achieved. The 17.6 miles of riparian areas classified as "functioning-at-risk" would remain static and not progress toward "proper functioning condition". The objectives of issue # 3 (Appendix B) would also not be satisfied.

Livestock Grazing

Significant impacts could be expected in the long term if noxious weed populations continue to expand and replace native vegetation, thereby reducing the forage base.

Under this alternative, there would continue to be some disruption in grazing patterns from OHV use, particularly during the hunting season.

No additional livestock management would be necessary under this alternative, therefore current management practices would remain in place and there would be no impacts to livestock grazing.

Forestry

No impacts would be anticipated from management actions proposed for noxious weeds, livestock grazing or OHVs.

Climate

Actions proposed to manage noxious weeds, OHVs and livestock grazing would have no measurable impact

to climate.

Surface Water
Surface water conditions would not be affected for any action proposed to manage noxious plants under this alternative.

Currently only slight erosion from vehicular traffic is occurring. However, anticipated increases in off road travel has the potential to increase erosion, especially on steep slopes, thus increasing sediment delivery to surface waters. This increased sediment could be captured in stock ponds, decreasing useful life of the structure, or reach the UMNWSR, degrading water quality.

This alternative would result in no change in grazing systems or range improvements. Rangeland health in the watershed is static or in a slight upward trend Therefore, no change is anticipated in the hydrology, quantity, or quality of surface waters in the watershed.

Ground Water
Ground water conditions would not be affected for any action proposed to manage noxious plants under this alternative.

No impacts or benefits would occur to ground water as a result of any OHV management actions proposed under this alternative

No new ground water developments are proposed in this alternative to manage livestock. No other actions in this alternative will impact the quantity, quality, or hydrology of ground waters in the watershed.

Recreation
Presently, the majority of the visitors who recreate in the watershed use OHVs for hunting and other outdoor activities. The use of 4 wheel drive vehicles and other OHVs is increasing locally and nation wide. The lack of off highway restrictions in the watershed provides opportunities for this segment of the population to enjoy their vehicles and associated outdoor activities. No off highway vehicle seasonal restrictions on 94.6 miles of BLM roads is a positive impact on hunters who use off highway vehicles to recreate in the watershed, but would be detrimental to recreationists that desire a more natural experience.

There would be no restrictions on big game retrieval which would permit successful hunters to drive off road and would be a positive impact to those individuals.

Recreation visitors to the watershed who are physically challenged or elderly would be able to use OHVs to recreate. Many locals have always been able to drive 4 wheel vehicles unrestricted on public land and feel now that they are older or not capable of walking they should continue to be able to go where they have all their life. This alternative would be a benefit to those individuals.

Road closures reduce the harvest of big game and allow deer and elk to reach an older age structure. This alternative has no road closures and would allow few big game animals to reach an older age which would be a negative impact on visitors who desire an opportunity to harvest an older animal which many consider to be a quality experience. The presence of vehicles in this alternative would have a negative impact on visitors who desire the opportunity for solitude while hunting.

The presence of noxious weeds reduces habitat for wildlife which could be a negative impact on hunters and wildlife viewers. The control of noxious weeds would be a positive impact on hunters and wildlife

viewers.

This alternative would allow livestock to graze along portions of the UMNWSR during the float season. In areas where floaters camp in the presence of livestock, a negative impact to visitors could occur where floater/livestock conflicts occur.

Livestock would be present in the majority of the watershed during the hunting season. The presence of livestock where hunters camp and/or hunt could create recreation/livestock conflicts and be a negative impact to visitors. Livestock use in this alternative could contribute to lower quality habitat conditions. This could result in fewer wildlife to view and hunt which would be a negative impact to recreationists.

Visual Resource Management

No seasonal restrictions on 94.6 miles of public roads during hunting season could cause existing two track roads to become very visible. Many of these roads are in the area between Sourdough and Two Calf Creeks which has a VRM Class III. Activities may attract attention but should not dominate the view of the casual viewer. In many situations a well worn road could dominate the view and be a negative impact to the VRM Class III.

The use of OHV's off road could cause ground and vegetative disturbance creating ruts and erosion that could dominate the view and be a negative impact to the VRM Class III.

The presence of vehicles would attract attention and dominate the view in the short term This is a negative impact to VRM.

Not signing the area would be a positive impact on VRM.

Noxious weeds on the UMNWSR are visible and do change the basic elements of color for predominant natural features of the characteristic landscape. Weeds attract the attention of visitors who are aware of the presence of non native vegetation and are a negative impact on those visitors. To visitors who are unaware of noxious weeds there is little to no negative impact from their presence.

The presence of weeds in the rest of the watershed is minimal and does not draw the attention of the casual viewer. There would be no impacts to VRM from this alternative.

There would be no impact to VRM from the presence of livestock and livestock management facilities with this alternative. However, areas that are heavily grazed, such as around water sources, detract from the natural setting and would be a negative impact to VRM.

Wilderness

The lack of adequate signing to inform the public of the location of the Woodhawk WSA results in visitors driving motorized vehicles in the study area. This creates a negative impact. Only a small portion of the WSA is in the watershed so the impacts to the WSA attributes would be minimal.

There are no impacts to wilderness from this noxious weed management activities as there are no weeds in the WSA.

There are no impacts to wilderness from livestock grazing in this portion of the WSA.

Wild and Scenic Rivers
There are only three roads that enter the UMNWSR corridor and can be seen from the river. They are in the section classified as "scenic". This classification allows the river to be "accessible in places by roads" so there would be no impacts to the wild and scenic rivers designation from actions described for OHV management.

Noxious weeds detract from the natural values for which the river was designated as wild and scenic. The control of weeds would be a positive impact on the wild and scenic river designation.

Actions proposed for livestock management in this section of the river has no impacts on the wild and scenic river designation.

Economic/Social Conditions
Some impact to the agricultural community could be expected as noxious plants replace native species and forage base is depleted. In the long term, less livestock could be grazed in the watershed. The same impacts could be realized if the forage base became depleted due to degradation of rangeland and riparian area health. There would be no impact to the social well being of recreationists that desire minimal off highway vehicle restrictions, however the recreationist that desires a walk in or solitary experience could be impacted by off highway vehicles.

ALTERNATIVE 2 - PROPOSED ACTION/PREFERRED ALTERNATIVE

Cultural Resources
Impacts would be similar to but less than Alternative 1. The reduction in impacts would result from seasonal road closures and seasonal off road closures.

Wildlife/Habitat/Threatened and Endangered Species
There would be positive impacts to wildlife by aggressively eliminating noxious weeds. This alternative would provide more native habitat for wildlife species especially on the UMNWSR.

The proposed grazing system(s) would have a positive impact on wildlife species. The deferred rotation systems proposed and grazing management guidelines would allow for rest during a portion of the growing season each year. In the allotments with season long grazing, the grazing guidelines should ensure good rangeland health. The upland should exhibit improvement in vegetative condition which would be good for predators, upland game species and neotropical migratory birds.

The proposed livestock grazing management would improve the riparian habitat which is crucial for many non-game species, waterfowl, pheasants, and big game species.

The proposed fences would have little impact on wildlife because they are to be 3 wire which allows movement in and around pastures. There would be short term impacts to wildlife during construction of the fences by displacing them from the area.

The proposed wells would have no impact on wildlife except for short term displacement from the immediate area during drilling.

The proposed pipelines would impact wildlife. Again, there would be some displacement of wildlife during

construction of the pipeline. There would be some vegetation removed from the pipeline route which would have a minor negative impact on available browse plants such as sage brush. A maximum disturbed area of 10 to 15 feet would facilitate the least amount of vegetative removal.

There are numerous tanks which would be placed in the allotments to facilitate livestock watering. The additional water would benefit wildlife by providing water which is not currently available during the grazing season. There would also be some negative impact to wildlife because the additional water should provide better disbursement of cattle into areas which have not been previously grazed by livestock. All the tanks would have bird escape ramps installed to reduce the possibility of birds and small mammals drowning. Up to six of the tanks in the watershed would be available for winter water for wildlife. This would benefit the big game which remain in the area yearlong.

The proposed winter tanks would be located away from the private lands so it would be expected that elk may begin to use the BLM lands more and depradation on croplands could be reduced.

The road management plan should also help hold more animals on the BLM lands in the watershed and provide increased hunting opportunities to the general public.

There would be 170.9 miles of roads left open yearlong under this alternative which would negatively impact approximately 50,920 acres of elk and 76,647 acres of mule deer habitat (see maps on pages 55 and 56). Implementing seasonal restrictions would result in a benefit to wildlife. Approximately 70% of the elk habitat and 74% of the mule deer habitat within the planning area would be impacted by roads.

Rangeland Health - Uplands

If noxious weeds decrease in the watershed, upland range health, erosion, sedimentation and ecological site ratings would remain in current class or continue to improve. Noxious weeds are currently impacting range health only minimally throughout the watershed with the exception of the leafy spurge infestations along the riparian areas of the UMNWSR.

By applying the grazing management guidelines (Appendix D) and the proposed grazing systems, upland range health that is currently properly functioning (PFC) should remain. Upland range health that is currently functioning at risk (FAR) should improve to properly functioning condition within 10-15 years. Soil erosion condition class and amount of bare ground should decrease with the proposed action. Desirable bunchgrass species should have the opportunity to increase. There would be small localized areas at the sites of the new proposed livestock watering tanks where upland range health would be negatively impacted.

By restricting vehicular access during the hunting season, the off road travel would decrease. This would decrease soil erosion and amount of bare ground. The potential spread of weeds would be decreased. The upland range health and ecological site ratings would remain in current class or continue to improve.

Riparian Area Health

Riparian area health would not be affected for any action proposed to manage noxious plants under this alternative, except perhaps along the UMNWSR, where there are some significant infestations.

The potential for increased off road travel in riparian areas would be reduced in this alternative. Since current impacts are slight, benefits derived through this alternative would be subtle and difficult to measure.

ELK HABITAT, ALTERNATIVE 2, SEP 1 - NOV 30 RESTRICTION

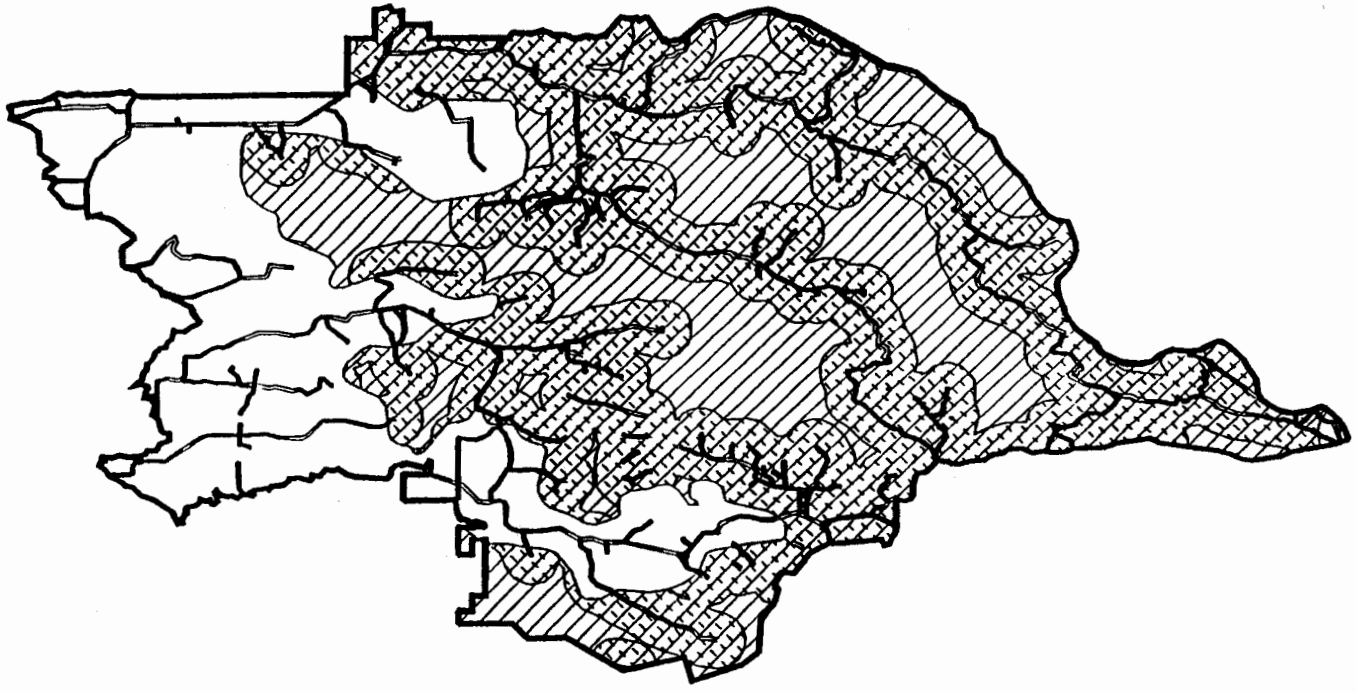
LEGEND

WATERSHED BOUNDARY

ROADS LEFT OPEN
170.9 MILES OF ROAD

ELK HABITAT
72,540 ACRES

HABITAT EFFECTED DUE TO ROADS
50,920 ACRES



DEER HABITAT, ALTERNATIVE 2, SEP 1 - NOV 30 RESTRICTION

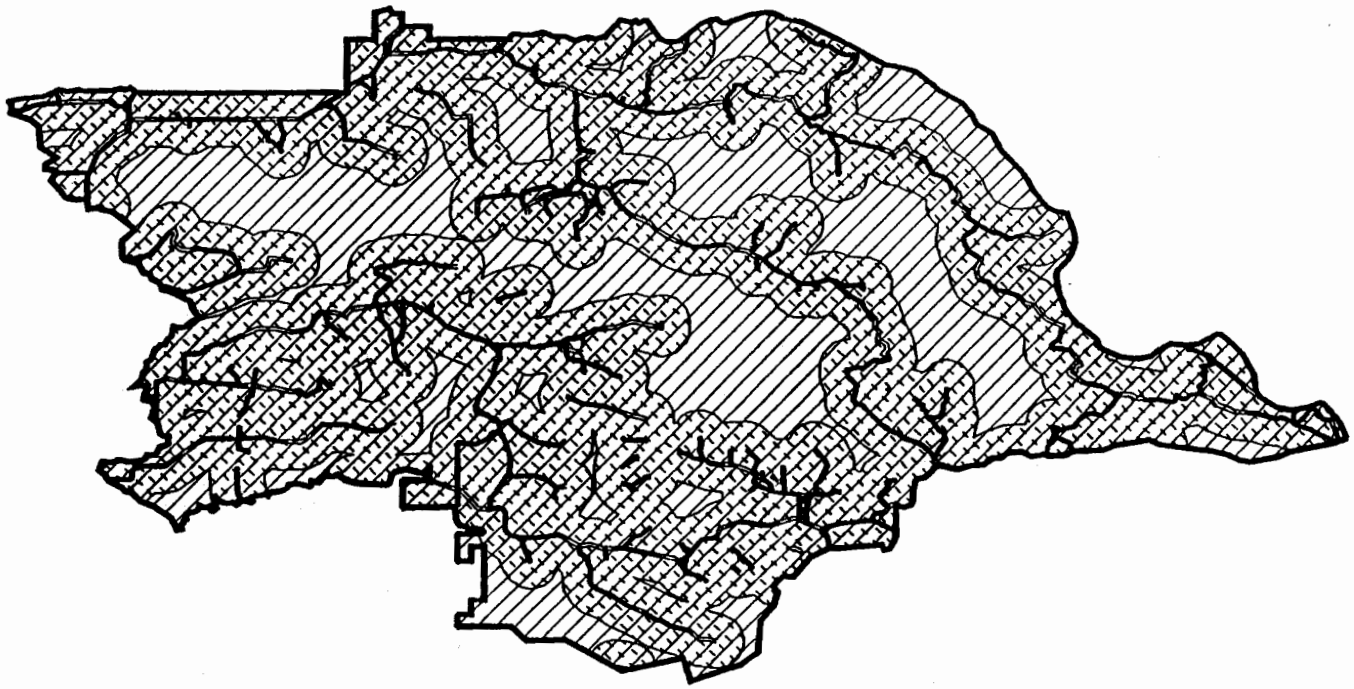
LEGEND

WATERSHED BOUNDARY

ROADS LEFT OPEN
170.9 MILES OF ROAD

MULEDEER HABITAT
102,486 ACRES

HABITAT EFFECTED DUE TO ROADS
76,647 ACRES



Proposed livestock grazing systems would maintain the upland health while improving riparian health. Increased riparian vegetation should result in erosion-sedimentation patterns progressing toward more natural conditions. An increase in plants with deep binding root masses would better protect stream banks from erosion while trapping sediment at point bars. The channel should start progressing toward a more narrow and deeper configuration thus reducing sediment delivery from the watershed to the Missouri River. Changes in sedimentation rates would be subtle and not easily measured.

The proposed livestock grazing actions would result in more hot season rest in the riparian areas of the watershed. Once implemented, these actions would result in a rapid increase in herbaceous species and a slower increase in woody species in the riparian areas. Approximately 75% of the non-functioning riparian areas are in the Knox Ridge and Upper Two Calf allotments. Most improvement in riparian health would therefore occur in these two allotments. The improvement would exhibit significant progress toward meeting guidelines # 2, 3, & 5 (Appendix D) and the objectives of Issue # 3 (Appendix B). Those stream segments which are now classified as a gully type channel would not show improvement from the actions of this alternative. They require a longer time frame than this plan encompasses to significantly improve.

Livestock Grazing

In the short term, minor impacts to the forage base from noxious weed population expansion would be anticipated, primarily along the river. However as biological controls become established in significant populations, this impact should decline and eventually be negligible.

Under this alternative, there would continue to be some disruption in grazing patterns from OHV use, particularity during the hunting season, however significantly less than under alternative 1.

There would be additional livestock management required under this alternative, primarily due to rotating cattle to comply with grazing systems and guidelines. The construction of fences, pipelines and wells would require maintenance in addition to that already being conducted. Some impacts to grazing operations would be anticipated if guidelines were exceeded. The affected permittee would be required to move cattle and could reach guidelines prior to the end of the grazing season. If this occurred, the affected permittee would have to lease pasture or move cattle onto private lands outside of the affected allotment. The grazing permittees would also have to spend more time observing the condition of the vegetation and conducting monitoring.

Forestry

The availability of forest resources to be included in timber and woodland commercial and casual sales could be affected by seasonal road closures as buyers would be required to comply with restrictions.

Climate

Actions proposed to manage noxious weeds, OHVs and livestock grazing would have no measurable impact or benefit to climate.

Surface Water

Surface water conditions would not be affected for any action proposed to manage noxious plants under this alternative.

This alternative imposes off road travel restrictions thus eliminating the potential for increased impacts to surface waters. Impacts should remain at current levels or slightly improve. Changes to surface water quantity or quality would be subtle and difficult to measure.

This alternative proposes no changes in livestock AUMs. Proposed range improvements and changes in grazing systems would shift some livestock use from riparian areas to uplands. This shift would not impact surface water runoff from the uplands since the range improvements should result in better distribution of livestock. Decreasing hot season use by livestock in the riparian areas should result lower peak flows, longer flow duration and improved water quality. However, changes in water quality and flow would be subtle and not easily measured in ephemeral and intermittent streams.

Ground Water

Ground water conditions would not be affected for any action proposed to manage noxious plants under this alternative.

No impacts or benefits would occur to ground water as a result of any OHV management actions proposed under this alternative.

Proposed range improvements include two wells in the Eagle Sandstone aquifer. Both would be artesian at the surface and would supply pipelines and stock tanks in the Knox Ridge and Two Calf allotments. As long as the wells were not allowed to flow uncontrolled, no impacts to ground water would be expected.

Recreation

This alternative would seasonally close (September 1 - December 1) 53.4 miles of the existing roads on BLM managed land in the watershed (see map on page 14). This reduction of 56 % of the roads and trails available to visitors who use OHV's for hunting will be a major impact on their opportunities to pursue big game species. Particularly impacted would be local residents who have used OHV's on these roads as a method of hunting all their life. While the negative impacts to these individuals would be much greater than alternative # 1 , they would be less than alternative # 3.

This alternative would allow game retrieval from 10 am to 2 pm daily on seasonally restricted roads. This would have a negative impact on successful hunters who would have to pack game to a road. The negative impacts to these individuals would be much greater than alternative # 1 and alternative # 3 where game retrieval would be permitted without restrictions. Allowing game retrieval would benefit hunters who don't want to pack game, but a negative impact to visitors wanting solitude and an area to hunt where motorized vehicles do not spook the game.

This alternative could also have a negative impact to physically challenged or elderly visitors who are unable to walk. However, non-ambulatory handicapped, as defined by Montana law allows motorized vehicular access off designated roads and trails except in the UMNWSR corridor and the Woodhawk WSA which should reduce the negative impact on those individuals.

The use of road closures as an alternative to elk permit restrictions would provide an increase in the opportunity to draw special tags for elk. Either sex elk tags in this hunting unit are considered to be a once in a lifetime opportunity to hunt elk bull elk with a rifle. This would be a benefit to many hunters even though they would be restricted to open roads.

This alternative should allow big game species to reach an older age and should have a positive impact on hunters who desire an opportunity to harvest an older animal which many consider to be a quality experience. The absence of motorized vehicles on 56 % of the roads and trails and all BLM managed lands would have a positive impact on visitors who desire the opportunity for solitude while hunting.

Road numbering would be a positive impact by assisting visitors in the awareness of road closures.

Restricting vehicular camping to a distance of 100 yards of open roads would be a negative impact to visitors wanting to camp off road, but, benefit to hunters that desire to camp alone. This alternative has identified a number of short spur roads as open to allow for additional areas for hunters to camp. This would allow hunters to camp off the main roads and be a benefit. Restricting camping to within 100 yards of open roads would eliminate vehicle travel off roads during inclement weather and would improve visitor safety. Visitor safety could also be improved since hunters would less likely camp where other hunters may be shooting at game.

The presence of noxious weeds reduces habitat for wildlife which could be a negative impact on hunters and wildlife viewers. The control of noxious weeds would be a positive impact on hunters and wildlife viewers.

This alternative would allow livestock to graze along portions of the UMNWSR during the float season. In areas where floaters camp in the presence of livestock, a negative impact to visitors could occur.

Livestock could be present in the majority of the watershed during the hunting season. The presence of livestock where hunters camp and/or hunt could create recreation/livestock conflicts and be a negative impact to some recreationists.

Livestock grazing management in this alternative should contribute to improved habitat conditions. This should result in more wildlife to view and hunt which would be a positive impact to some recreationists.

Visual Resource Management

The seasonal closure of 53.4 miles of roads should allow many of the roads and trails to vegetate and be less visible. The seasonal closures to off road vehicles should also reduce the potential for ground and vegetative disturbance. The reduction in disturbance will be a positive impact to VRM.

The use of signs to control OHV management could draw the attention of the casual viewer and could be a negative impact. The type, location and number of signs will determine the impact on the class II VRM.

Noxious weeds on the UMNWSR are visible and do change the basic elements of color for predominant natural features of the characteristic landscape.

Weeds attract the attention of visitors who are aware of the presence of non native vegetation and is a negative impact on those visitors. To visitors who are unaware of noxious weeds there is little to no negative impact from their presence. Management actions proposed to control noxious weeds under this alternative would generally benefit VRM.

The presence of weeds in the rest of the watershed is minimal and does not draw the attention of the casual viewer. There would be no impacts to VRM from this alternative.

Livestock developments including wells, pipelines and fences are allowed in the VRM IV classifications. However, these developments could be a negative impact if they draw the attention of the casual viewer in the Class III VRM areas. Placement and location are important to ensure minimal impact to the VRM III classification.

Wilderness
Signs would identify the wilderness boundary and should reduce the use of OHV"s in the WSA. This would be a positive impact to the wilderness values.

There would be no impacts to wilderness in this portion of the WSA from actions proposed for livestock grazing management or noxious weed management.

Wild and Scenic Rivers
There are only three roads that enter the river corridor and can be seen from the river. They are in the section classified as "scenic". This classification allows the river to be "accessible in places by roads" so there would be no impacts to the wild and scenic rivers designation from actions described for OHV management.

Noxious weeds detract from the natural values for which the river was designated as wild and scenic. The control of weeds would be a positive impact on the wild and scenic river designation.

Actions proposed for livestock management in this section of the river has no impacts on the wild and scenic river designation.

Economic/Social Conditions
Under this alternative, some grazing permittees would be required to conduct spraying of noxious weeds. The cost and lifestyle disruption associated with this action would be minimal.

Additional management costs to livestock operators would be expected under this alternative. These costs would include rangeland project construction and maintenance and management effort associated with following grazing systems and guidelines.

There could be a shift in the type of hunting activity that occurs on BLM land in the watershed to relatively more walk in hunting, but the impacts to economic conditions due to OHV management would be negligible.

ALTERNATIVE 3 - CURRENT LAND USE PLAN DIRECTION FOR OFF-HIGHWAY VEHICULAR TRAVEL

Cultural Resources
Impacts would be similar to Alternatives 1 & 2, but less than either other alternative. The reduction in impacts would result from more miles of seasonal road closure and therefore less access than either alternative 1 or 2.

Wildlife/Habitat/Threatened and Endangered Species
There would be 162 miles of roads left open seasonally which negatively impact approximately 49,907 acres of elk and 75,505 acres of mule deer habitat (see maps on pages 61 and 62). The seasonal restriction would result in a positive impact on wildlife. This represents 68% of the elk habitat and 73% of the mule deer habitat within the planning area impacted by roads. The difference between Alternative 2 and 3 is not a great difference in the road management issue for wildlife.

Rangeland Health - Uplands
Same as Alternative 2

Riparian Area Health, Surface Water, Ground Water, Climate
Same as Alternative 2

ELK HABITAT, ALTERNATIVE 3, SEP 1 - NOV 30 RESTRICTION

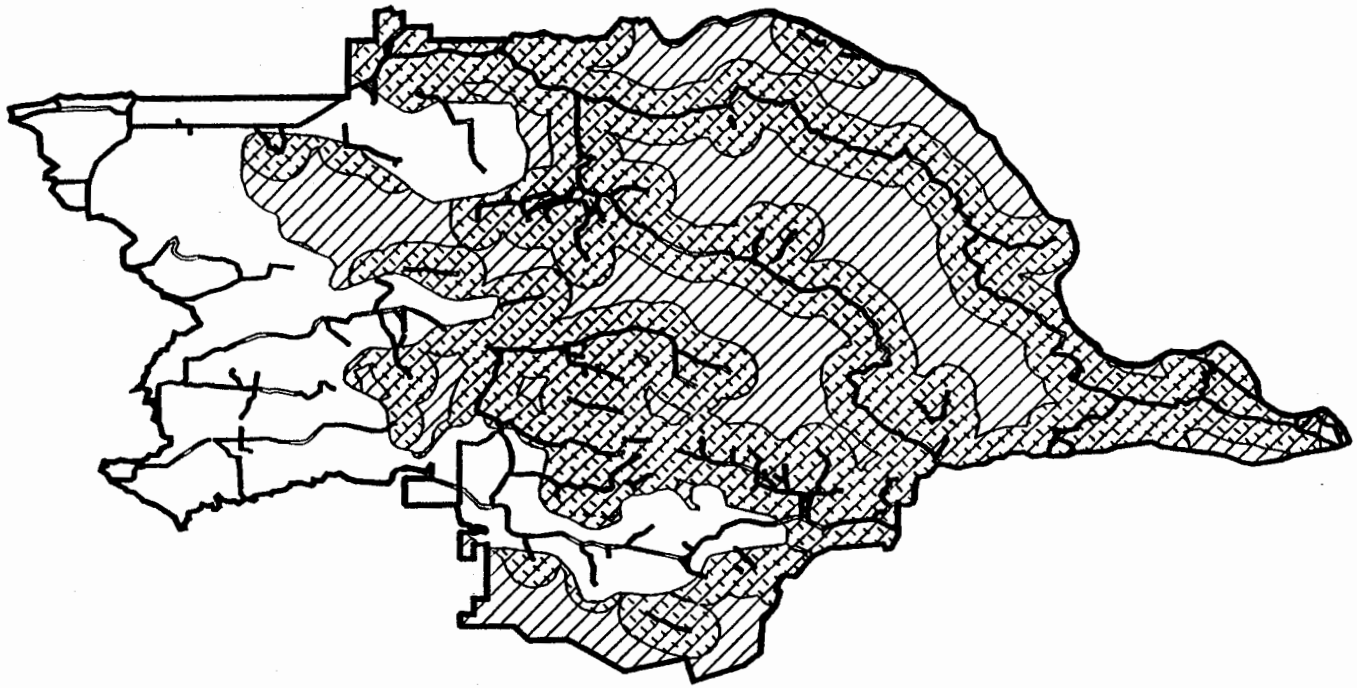
LEGEND

WATERSHED BOUNDARY

ROADS LEFT OPEN
162 MILES OF ROAD

ELK HABITAT
72,540 ACRES

HABITAT EFFECTED DUE TO ROADS
49,907 ACRES



DEER HABITAT, ALTERNATIVE 3, SEP 1 - NOV 30 RESTRICTION

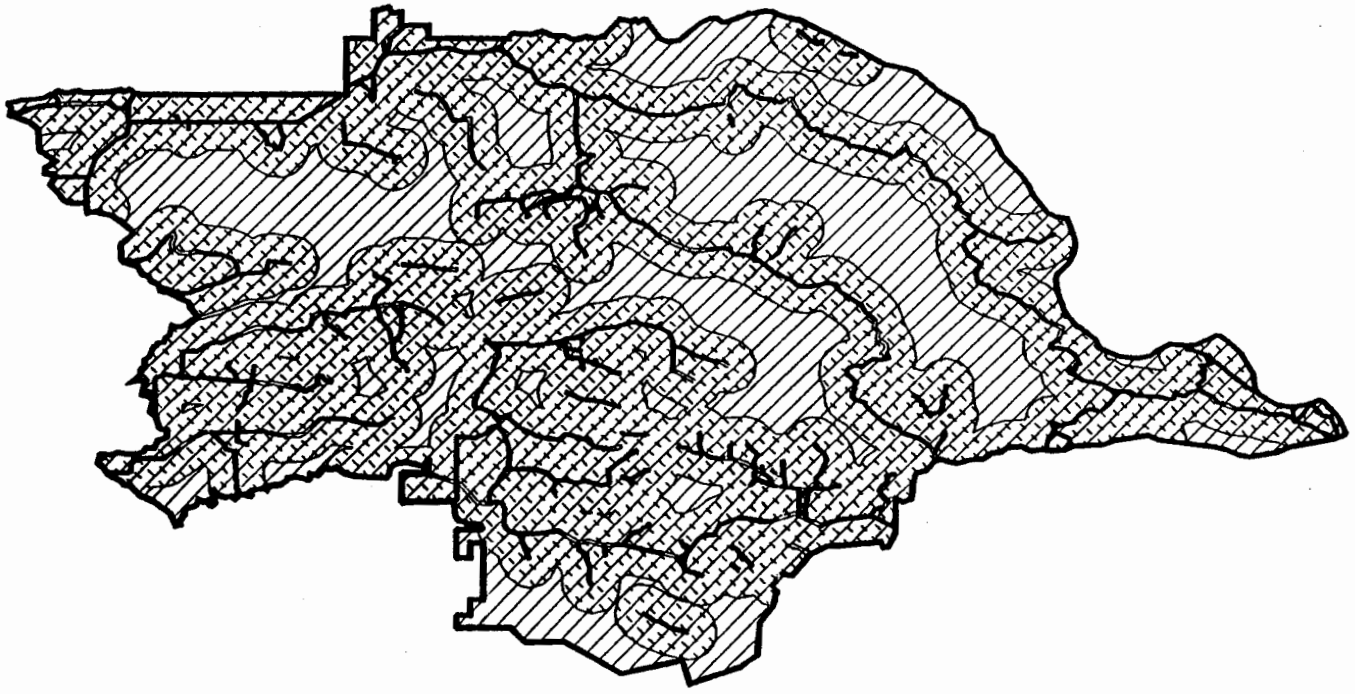
LEGEND

WATERSHED BOUNDARY

ROADS LEFT OPEN
162 MILES OF ROAD

MULE DEER HABITAT
102,486 ACRES

HABITAT EFFECTED DUE TO ROADS
75,505 ACRES



Livestock Grazing
Under this alternative, there would continue to be some disruption in grazing patterns from OHV use, particularity during the hunting season, however significantly less than under alternative 1, and slightly less than under alternative 2.

Forestry
Same as Alternative 2

Recreation,Visual Resource Management, Wilderness, Wild and Scenic Rivers
Same as Alternative 2, but somewhat more restrictive.

Economic/Social Conditions
There could be a shift in the type of hunting activity that occurs on BLM land in the watershed to relatively more walk- in hunting, but the impacts to economic conditions due to OHV management would be negligible.

C. MONITORING AND EVALUATION
Monitoring will be conducted in two distinct forms. Short term monitoring will be the responsibility of the grazing permittees. It will be their responsibility to constantly monitor utilization levels and stubble heights in identified key areas to ensure that pasture changes are consistent with established guidelines. The permittees have been given lead responsibility because they are in the best position to continuously evaluate the variables affecting the vegetation in the watershed.

Longer term monitoring tied to progress toward meeting objectives will be the responsibility of the BLM in consultation with the grazing permittees and other interested parties. This monitoring information will be the basis for evaluations and changes in grazing management. All key areas are found on the map on page 66. The following parameters will be observed and collected:

A. Actual Use
Actual use data will be collected by pasture. Turnout and removal dates will be tracked so that the AUMs used in each pasture may be evaluated. The permittee will be responsible for submitting actual use reports to the BLM at the end of each grazing season. However, the BLM may also collect actual use data through more direct means such as counting and aerial observation.

B. Utilization
Herbaceous utilization data will be collected from key upland areas. The data will be collected by BLM personnel on an annual basis using the ocular estimate by plot method (Interagency Technical Reference 4400-3).

C. Soil Surface Factor
Soil Surface Factor will be collected every 5 years from key upland areas. The data will be collected by BLM personnel using the Montana Modified Method.

D. Rangeland Health - Upland
Upland health information will be collected by the BLM every 5 years from key areas using the qualitative procedures developed in Idaho and used to collected the baseline data.

E. Ecological Site Inventory
Ecological site inventories will be conducted at key upland areas by the BLM every 5 years using NRCS Ecological Site Inventory Methods.

F. Rangeland Health - Riparian Areas

1. Residual Vegetation - Residual vegetation levels will be determined on palatable obligate and faculative wetland graminoids at key areas along the UMNWSR and the intermittent creeks in the watershed (see key area map on page). This data will be collected by BLM personnel on an annual basis using the Stubble Height Method (Interagency Technical Reference 4400-3).

2. Riparian Inventory/Functioning Condition - Key riparian areas along the intermittent creeks (see key area map on page) will be re-inventoried and functioning condition determined every 5 years using the Riparian Wetland Research Program inventory form (long form). Data will be collected by BLM personnel.

3. UMNWSR Riparian Community Cover Classes - Riparian community cover classes will be determined at key areas along the UMNWSR (see map on page). This data will be collected annually utilizing the UMNWSR Monitoring Form.

G. Climate

Precipitation data is a key consideration used to interpret other monitoring data. This information will be collected annually from gauges in Winifred, Montana.

H. Off-Highway Vehicle Management

The proposed seasonal restrictions and yearlong closures in the WSA would be monitored annually by BLM personnel, primarily in the course of conducting other duties.

I. Noxious Weeds

Noxious weed populations and control efforts would be monitored on an annual basis by BLM personnel, primarily while conducting other activities.

J. Evaluation

It is expected that the grazing systems, guidelines and monitoring data will be evaluated continuously. All parties involved should be aware of the objective status. After 5 years from implementation of individual allotment grazing systems, an extensive evaluation will be completed on progress toward meeting objectives.

CHAPTER 5 - CONSULTATION AND COORDINATION

The BLM core interdisciplinary team which analyzed and prepared the alternatives for this environmental assessment includes:

Jim Sparks - Team Leader
Joe Frazier - Hydrologist
Terry Holst - Rangeland Management Specialist
Michelle Williams - Wildlife Biologist
Kaylene Patten - Facilitator
Loretta Park - Realty Specialist
Buck Damone - Outdoor Recreation Planner
Vinita Shea - Rangeland Management Specialist
Sharon Gregory - Range Technician
Gary Warfield - Geographic Information Specialist
Stanley Jaynes - Archeaologist

Sept. 23, 1998

Grazing permittees and other interested parties that participated in meetings and provided input for this environmental assessment include:

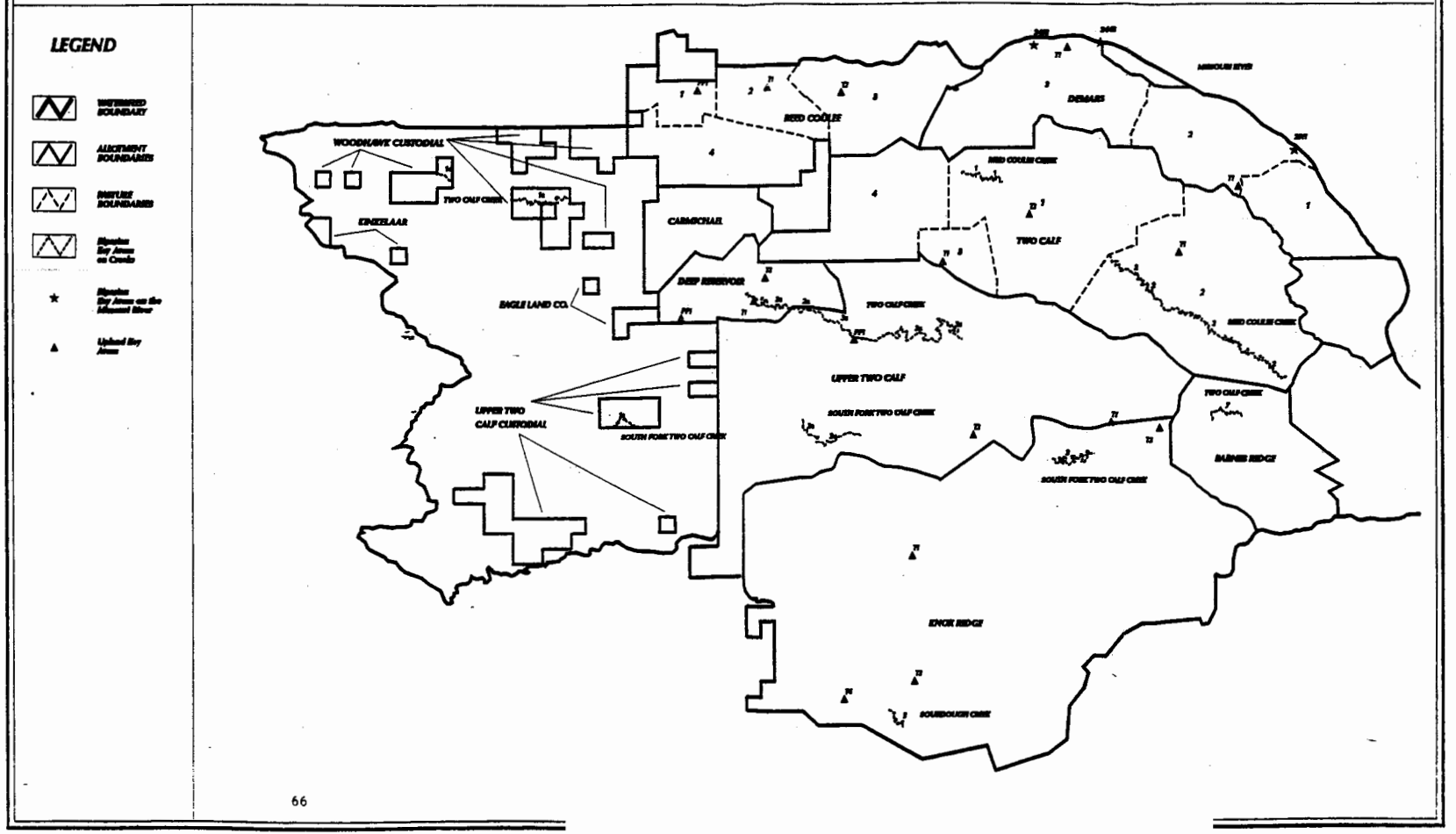
Wayne Peterson	Cleo Boyce	Rod Linhart	Lyle Shammel
Bill Meeks	Mark Peterson	Stan Meyer	Kevin Tuss
Dan Boyce	Tom DeMars	Hugo Turek	Perry Norskog
Diane Robinson	Kraig Meeks	Keith Meckling	Perry Johnston
Mark Peterson	Ralph Rogers	Don Obie	
Glenn Peterson	Jim Arthur	Lester Morgan	
Diane Robinson	Scott Meeks	Matt Knox	
Dan Cimrhakl	Tom Ford	Abby Ehlert	

Other State, Federal and County government officials that participated in meetings and provided input for this environmental assessment include:

Kathy Bailey - Fergus County Commissioner
Joe Spika - Fergus County Commissioner
Vern Petersen - Fergus County Commissioner
Bill Haglan - Charles M. Russel National Wildlife Refuge
Bill Berg - Charles M. Russel National Wildlife Refuge
Larry Ulibarri - Charles M. Russel National Wildlife Refuge
Tom Stivers - Montana Department of Fish, Wildlife and Parks
Barny Smith - Montana Department of State Lands
Ted Hawn - Natural Resources Conservation Service

Complete records of team meetings are available for review at the Lewistown Field Office (BLM), in Lewistown, Montana.

WATERSHED KEY AREAS



APPENDIX A
LAND USE PLAN GUIDANCE

- **Energy Mineral Resources** - No surface occupancy restrictions will be used to protect critical paleontology sites and archaeology sites. Seasonal and distance restrictions will be included in oil and gas leases to mitigate impacts to wildlife habitat **(JVP)**

  The UMNWSR Corridor is closed to mineral leasing. Exploration activity will avoid, to the maximum extent possible, the "seen area" of the management corridor, and will utilize accepted principals of landscape architecture to minimize temporary and permanent visual impacts **(West HiLine)**.

- **Non-energy Mineral Resources** - Federal minerals are available for exploration and development unless withdrawn **(JVP)**. The entire UMNWSR management corridor is withdrawn from location under the mining laws **(West HiLine)**.

- **Paleontology** - Major paleontological resources of scientific interest will be protected **(JVP, West HiLine)**.

- **Soils** - Soil productivity will be maintained or improved by increasing vegetation cover and reducing erosion **(JVP, West HiLine)**.

- **Water Resource Management** - Surface and groundwater quality will be maintained to meet or exceed state and federal water quality standards **(JVP, West HiLine)**.

- **Vegetation Management** - The ecological status will be improved or maintained to achieve a plant community of good (late seral) to excellent (potential natural community) on 80% of the BLM lands within 15 years of implementation of activity plans **(JVP)**.

  Public lands that are in satisfactory (good and excellent) ecological condition will be maintained. Public lands with unsatisfactory (poor and fair) ecological condition will be managed according to multiple use objectives based on ecological site potential for specific uses **(West HiLine)**.

  About 40% of the vegetation will continue to be allocated to livestock grazing and about 60% will continue to be allocated to watershed protection and wildlife forage and cover **(JVP)**.

  The quality and quantity of summer wildlife forage will be improved by improving the reproduction and availability of palatable forbs for deer and antelope. Deer and antelope winter range (especially woody species) will be maintained and/or improved. Existing sagebrush stands will be maintained at a canopy cover of 15 to 50% with an effective height over 12 inches **(JVP)**.

  The quality and quantity of nesting, brood rearing and winter habitat for upland game birds and waterfowl nesting habitat will be improved by providing residual upland grass and forb cover **(JVP)**.

  Land will be managed for succulent vegetation production, including a variety of forbs, and big and silver sagebrush will be maintained on sage grouse wintering and nesting areas with a canopy coverage of 15 to 50% and an effective height of 12 inches. Woody vegetation will be maintained or improved for sharp-tailed grouse cover **(JVP)**.

- **Riparian and Wetland Management** - Riparian-wetland areas will be maintained or improved based on proper functioning condition and desired plant community. Riparian-wetland objectives will be initially accomplished through livestock grazing methods at current stocking levels. If grazing methods are not successful in meeting management objectives, necessary actions will be taken to meet those objectives **(JVP)**.

  All manageable riparian areas will have management plans implemented to maintain, restore or improve riparian areas to achieve a healthy and productive ecological condition for maximum long term benefits and values **(West HiLine)**.

  Livestock grazing in specialized, high use recreation sites along the UMNWSR will be controlled through fencing and/or selective grazing **(West HiLine)**.

  Temporary livestock exclosures, to protect riparian communities, may be necessary when other management actions do not allow seedling establishment of riparian species. Alternate water sources would be provided if primary sources are denied (sic). They would only be in place until riparian species are vigorous enough to withstand proper grazing use as determined by monitoring. Where feasible, riparian pastures will be established to allow rehabilitation of riparian areas while still allowing proper use of AUMs **(West HiLine)**.

  Pastures with riparian areas will not be grazed by livestock during the hot season more than 1 year out of 3 in order to maintain or improve riparian communities to a satisfactory condition **(West HiLine)**.

- **Land Treatments** - Land treatments will be used to meet watershed, grazing management and wildlife objectives but will be applied only where grazing management alone will not accomplish the desired result **(JVP, West HiLine)**.

- **Noxious Plants** - Noxious plants will be controlled or eradicated through integrated pest management in order to maintain native rangelands **(JVP, West HiLine)**.

- **Wildlife and Fisheries Management** - Suitable habitat for all wildlife species will be maintained or enhanced. The emphasis for habitat maintenance and development will be on present and potential habitat for sensitive, threatened and/or endangered species, nesting waterfowl, crucial wildlife winter ranges, non-game habitat and fisheries **(JVP)**.

  Habitat for wildlife will be maintained and enhanced. The emphasis for habitat maintenance and development will be placed on present and potential habitat for sensitive, threatened and/or endangered species, nesting waterfowl, game birds, fisheries and crucial big-game winter ranges **(West HiLine)**.

- **Prairie Dog Management** - Prairie dog towns will be maintained or managed based on the values or problems encountered **(JVP)**.

- **Elk and Bighorn Sheep Management** - Habitat will be provided for elk in the Missouri Breaks consistent with the MT Dept of FWP Elk Management Plan. Habitat will be provided to maintain and expand (where suitable forage is available) bighorn sheep in the Missouri Breaks **(JVP)**.

- **Recreation** - The recreational quality of BLM land and resources will be maintained and/or enhanced to ensure enjoyable recreational experiences. Recreation emphasis will be to develop and maintain opportunities for dispersed recreational activities such as hunting, scenic and wildlife viewing and driving for pleasure.

  The UMNWSR will be managed to protect and preserve the remarkable scenic, recreational, geological, fish and wildlife, historic, cultural and other values as directed by Congress in the Wild and Scenic Rivers Act and amendment for the Upper Missouri **(West HiLine)**.

  Recreational opportunities will be provided to the broadest possible cross section of users. Chances for recreational activities will be available to floaters motorized water users (with seasonal restrictions), hunters, fishermen, sightseers, rock hounds. photographers hikers day use picnickers and many others. Visits to the UMNWSR should be a safe, informative experience.

- **Off-Road Vehicle Use** - BLM will restrict ORV use on BLM land yearlong or seasonally to designated roads and trails or close specific areas to protect resource values ie, protect vegetation and soils to maintain watersheds and water quality, reduce user conflicts, and reduce harassment of wildlife and provide habitat security. **(JVP)**

  The Missouri Breaks area will be restricted seasonally to protect fragile soils, reduce user conflicts, and maintain and improve water quality. **(JVP)**

  ORV use would be limited to designated roads and trails in the UMNWSR Corridor **(West HiLine)**.

  Permits may be issued on a case-by-case basis for administrative vehicular use in areas with restrictions **(West HiLine)**.

- **Visual Resource Management** - Activities will be managed to comply with VRM policies **(JVP, West HiLine)**.

- **Cultural** - Cultural resources will be properly managed through a systematic program of identification and evaluation. The level of conflict between cultural resources and other land and resource uses will be reduced in compliance with existing laws/regulations **(JVP, West HiLine)**.

  Cultural resources will be enhanced and protected and traditional cultural values will be protected **(West HiLine)**.

- **Fire Management** - Fire will be managed in the manner most cost effective and responsive to resource management objectives. **(JVP)**.

  Prescribed fire will be utilized only under specific conditions and may be administered on an individual basis in grassland, sagebrush and/or conifer types to improve wildlife habitat and vegetation production. **(JVP)**.

  Intensive suppression of wildfire will be applied to areas with high resource values, improvements, recreation sites, administrative sites sagebrush and juniper, fire sensitive woody riparian species, and/or cultural values and may also be used to prevent fire from spreading to adjoining private property and structures **(JVP)**.

Conditional suppression will be applied to areas with low resource values or to areas not warranting intensive suppression actions and costs. Conditional suppression actions will be used in Grass/shrub fuel types, Missouri Breaks fuel types and Mountain timber fuel types **(JVP)**.

All wildfire within the UMNWSR Corridor will receive an initial attack unless a modified suppression plan is in effect **(West HiLine)**.

- **Forest Management** - Minor Forest products may be harvested from the Breaks on a selected sustained yield basis with wildlife habitat objectives in mind **(JVP)**.

  Recreational use of forest products within the UMNWSR Corridor will be limited to dead-and-down material **(West HiLine)**.

- **Lands** - Resource values will be protected or enhanced when considering applications or requests for Rights of Ways, leases and permits. Acquisitions will be pursued as opportunities arise through exchange or purchase will willing proponents and/or sellers.
- **Access to BLM Land** - Access will be pursued to BLM land where no legal public access exists or where additional access to major blocks of BLM land is needed.

- **Signing** - Appropriate signs and posters will be used to promote safety and convenience for visitors and users, define boundaries, identify management practices, provide information about geographic and historic features and protect vulnerable land areas and resources from misuse.

APPENDIX B
SITE SPECIFIC OBJECTIVES BY ISSUE

ISSUE #1 **NOXIOUS WEED POPULATIONS, INCLUDING LEAFY SPURGE AND RUSSIAN KNAPWEED, ARE PREVALENT ALONG THE MISSOURI RIVER AND APPEAR TO BE SPREADING INTO UPLAND AREAS, PARTICULARLY ALONG ROADS.**

1. Within ten years, decrease the Russian knapweed infestations (as identified on the Two Calf weed map on page 21) in the uplands from 4 sites to zero sites.

2. Control or reduce the number of noxious weed infestations on the UMNWSR within ten years at specific locations as mapped on Two Calf map.

3. Limit or reduce the 7.67 acres of Russian knapweed and Leafy spurge, on the island located in T23N, R23E, SW 1/4 Section 31 along the Missouri River.

4. Continue to decrease the spread of Noxious weed infestations in the Two Calf Watershed.

ISSUE #2 **OFF HIGHWAY USE, PARTICULARLY DURING THE HUNTING SEASON, IS CREATING PUBLIC LAND USER CONFLICTS, IMPACTING BIG GAME HABITAT AND CONTRIBUTING TO ACCELERATED EROSION.**

1. Reduce motor vehicle access during the period of September 1 to December 1 from 94.6 public miles to at most 55 public miles within one year.

ISSUE #3 **THE RIPARIAN AREA STANDARD FOR THE LEWISTOWN FIELD OFFICE IS NOT BEING MET FOR THE MAJORITY OF THE RIPARIAN AREAS ON PUBLIC LANDS.**

A. UMNWSR Corridor

1. Improve or maintain riparian area(s) health along the UMNWSR to proper functioning condition by achieving the desired plant community described at each of the following key areas (see key area map on page 65):

a. Key Area R-1 (MRA Polygon #2418)

Short Term (within 5 years)
Increase willow species (sandbar and yellow willow) seedlings from the current combined canopy cover class of "T" (.1 to 1 %) to a "1" (5 to 15 %) and sapling/mature willow species

(sandbar and yellow willow) from the current combined canopy cover class of "1" (5 to 15 %) to a "2" (15 to 25 %).

Long term (within 20 years)
Establish a stand of pole and/or mature cottonwoods with a combined canopy cover of at least "2" (15 to 25 %) from the existing stand of saplings with a current canopy cover class of "1" (5 to 15 %).

b. Key Area R-2 (MRA Polygon # 2442)

Short Term (within 5 years)
Maintain sandbar willow saplings/mature at a combined canopy cover of "10" (95 to 100 %).

Long term (within 20 years)
Establish a stand of saplings/pole cottonwoods with a combined canopy cover of at least "1" (5 to 15 %) from the existing stand of seedlings with a current canopy cover class of "p" (1 to 5 %).

c. Key Area R-3 (MRA Polygon # 2511)

Short Term (within 5 years)
Increase desirable woody species (sandbar willow, yellow willow, peachleaf willow or plains cottonwood) seedlings from the current canopy cover class of a "T" (.1 to 1 %) to a canopy cover class of at least "2" (15 to 25 %).

Long term (within 20 years)
Establish plains cottonwood saplings at a canopy cover class of at least "1" (5-15 %).

B. Intermittent Streams

1. Improve or maintain riparian area(s) health along Reed Coulee, Twocalf Creek, South Fork of Twocalf Creek and Sourdough Creek by achieving the desired plant community and/or physical conditions described at the key areas. The key areas are shown on the map on page 65.

a. Within 5 years, increase the combined canopy cover of four plant life forms from the current canopy cover class as follows:

Key Area	Creek	Allotment	Current Canopy Cover Class Code	Objective Canopy Cover (within 5 Years) Class Co
Polygon #1	Reed Coulee	Two Calf	7	8
Polygon #2	Reed Coulee	Two Calf	8	9
Polygon #1a	Two Calf	Woodhawk	7	8
Polygon #2a	Two Calf	Deep Reservoir	8	9
Polygon #3a	Two Calf	Upper Two Calf	8	9
Polygon #1a	S. Fk Two Calf	Upper Two Calf	5	8
Polygon #2a	S. Fk Two Calf	Upper Two Calf	4	8
Polygon #5	Sourdough	Knox Ridge	7	8

b. Within 5 years, reduce the amount of human-induced bare ground from the current percentage as follows:

Key Area	Creek	Allotment	Current Amount Human Induced Bare Ground (%)	Objective % Human-Induced Bare Ground (within 5 Yr)
Polygon #1	Reed Coulee	Two Calf	10	less than 5
Polygon #1a	Two Calf	Woodhawk	10	less than 5
Polygon #2a	Two Calf	Deep Reservoir	12	less than 5
Polygon #3a	Two Calf	Upper Two Calf	10	less than 5
Polygon #1a	S. Fk Two Calf	Upper Two Calf	25	less than 10
Polygon #2a	S. Fk Two Calf	Upper Two Calf	18	less than 15
Polygon #5	Sourdough	Knox Ridge	6	less than 5

c. Within 5 years, reduce the amount of human-induced streambank alteration from the current percentage as follows:

Key Area	Creek	Allotment	Current % Human-induced Streambank Alteration	Objective % Human-induced Streambank Alteration (within 5 Yrs)
Polygon #1	Reed Coulee	Two Calf	20	less than 15
Polygon #1a	Two Calf	Woodhawk	70	less than 35
Polygon #2a	Two Calf	Deep Reservoir	70	less than 35
Polygon #3a	Two Calf	Upper Two Calf	60	less than 35
Polygon #7	Two Calf	Barnes Ridge	40	less than 35
Polygon #1a	S. Fk Two Calf	Upper Two Calf	30	less than 15
Polygon #2a	S. Fk Two Calf	Upper Two Calf	90	less than 35
Polygon #5	Sourdough	Knox Ridge	20	less than 15

d. Within 10 years, increase the percentage of the stream banks with a deep, binding root mass from the current percentage as follows:

Key Area	Creek	Allotment	Current % Streambanks w/ Deep, Binding Rootmass	Objective % Streambanks w/ Deep, Binding Rootmass
Polygon #1	Reed Coulee	Two Calf	35-64%	65-84%
Polygon #1a	Two Calf	Woodhawk	35-64%	65-84%
Polygon #2a	Two Calf	Deep Reservoir	35-64%	65-84%
Polygon #7	Two Calf	Barnes Ridge	less than 35	35-64%
Polygon #1a	S. Fk Two Calf	Upper Two Calf	35-64%	65-84%
Polygon #5	S. Fk Two Calf	Knox Ridge	35-64%	65-84%
Polygon #2a	S. Fk Two Calf	Upper Two Calf	less than 35%	35-64%
Polygon #5	Sourdough	Knox Ridge	less than 35%	35-64%

ISSUE #4 **THE UPLAND HEALTH STANDARD FOR THE LEWISTOWN FIELD OFFICE IS NOT BEING MET FOR SOME OF THE UPLAND AREAS ON PUBLIC LANDS.**

UPLAND AREAS

1. Improve or maintain upland area health by achieving the conditions described at each key area (see key area map on page 65):

   a. Within 5 years, improve to stable (< 21) or maintain as stable the soil erosion condition class rating (soil surface factor) as follows:

Allotment	Pasture	Key Area	Current SSF	5 Year Objective SSF
Reed Coulee	2	T - 1	38	< 21
Reed Coulee	3	T - 2	18	Maintain
DeMars	2	T - 1	31	< 21
DeMars	3	T - 1	12	Maintain
Deep Reservoir	N/A	T - 1	22	< 21
Deep Reservoir	N/A	T - 2	18	Maintain
Knox Ridge	N/A	T - 1	21	< 21
Knox Ridge	N/A	T - 2	25	< 21
Knox Ridge	N/A	T - 3	23	< 21
Knox Ridge	N/A	T - 4	11	Maintain
Two Calf	1	T - 1	23	< 21
Two Calf	2	T - 1	26	< 21
Two Calf	3	T - 1	12	Maintain
Upper Two Calf	N/A	T - 1	14	Maintain
Upper Two Calf	N/A	PP-1	Unk	< 21
Upper Two Calf	N/A	T - 2	Unk	< 21

   b. Within 5 years, reduce or maintain the amount of bare ground as follows:

Allotment	Pasture	Key Area	Current Bare Ground Category	5 Year Objective Bare Ground Category
Reed Coulee	2	T - 1	31 - 50 %	16 - 30 %
Reed Coulee	3	T - 2	51 - 75 %	16 - 30 %
DeMars	2	T - 1	16 - 30 %	Maintain
DeMars	3	T - 1	16 - 30 %	Maintain
Deep Reservoir	N/A	T - 1	16 - 30 %	Maintain
Deep Reservoir	N/A	T - 2	31 - 50 %	16 - 30 %
Knox Ridge	N/A	T - 1	31 - 50 %	16 - 30 %
Knox Ridge	N/A	T - 2	16 - 30 %	Maintain
Knox Ridge	N/A	T - 3	31 - 50 %	16 - 30 %
Knox Ridge	N/A	T - 4	16 - 30 %	Maintain
Two Calf	1	T - 1	31 - 50 %	16 - 30 %
Two Calf	2	T - 1	31 - 50 %	16 - 30 %
Two Calf	3	T - 1	31 - 50 %	16 - 30 %
Upper Two Calf	N/A	T - 1	16 - 30 %	Maintain
Upper Two Calf	N/A	PP-1	31 - 50 %	16 - 30 %
Upper Two Calf	N/A	T - 2	16 - 30 %	16 - 30 %

c. Within 5 years, improve biotic community diversity by increasing desirable bunchgrass species (green needlegrass and/or bluebunch wheatgrass)composition by weight from the current combined amount to the amount specified:

Allotment	Pasture	Key Area	Current % Desirable Bunchgrass Species	5 Year Objective %
Reed Coulee	2	T - 1	Trace	10 %
Reed Coulee	3	T - 2	15 %	Maintain
DeMars	2	T - 1	20 %	Maintain
DeMars	3	T - 1	25 %	Maintain
Deep Reservoir	N/A	T - 1	10 %	Maintain
Deep Reservoir	N/A	T - 2	Trace	5 %
Knox Ridge	N/A	T - 1	5 %	10 %
Knox Ridge	N/A	T - 2	5 %	10 %
Knox Ridge	N/A	T - 3	10 %	Maintain
Knox Ridge	N/A	T - 4	20 %	Maintain
Two Calf	1	T - 1	15 %	Maintain
Two Calf	2	T - 1	Trace	10 %
Two Calf	3	T - 1	15 %	Maintain
Upper Two Calf	N/A	T - 1	10 %	Maintain
Upper Two Calf	N/A	PP-1	15 %	Maintain
Upper Two Calf	N/A	T - 2	0 %	5 %

ISSUE #5 **TWO CALF AND SOURDOUGH CREEKS ARE LISTED BY THE STATE OF MONTANA AS WATER QUALITY IMPAIRED STREAMS.**

1. On Two Calf Creek reduce water quality impairments from 1 to 0 within 15 years.

2. On Sourdough Creek reduce water quality impairments from 3 to 0 within 15 years.

APPENDIX C
PASTURE ROTATION SCHEDULES
PREFERRED ALTERNATIVE

Reed Coulee Allotment - 115 Cattle

115 Cattle	**Pasture 1 (Crested)**	**Pasture 2**	**Pasture 3**
Year 1	May 1 to June 6	June 6 to August 3	August 3 to October 31
Year 2	September 24 to Oct. 31	May 1 to June 28	June 28 to September 24
Year 3	May 1 to June 6	September 2 to Oct. 31	June 6 to September 2

Knox Ridge Allotment - 566 Cattle

566 Cattle	**Pasture 1**	**Pasture 2**
Year 1	May 10 to July 20 *	July 20 to November 15*
Year 2	September 12 to November 15*	May 10 to September 12*

* - Dates are set based on the amount of AUMs in each pasture. Actual pasture move dates will be based on the Two Calf Watershed Guidelines and progress toward meeting objectives.

DeMars Allotment - 91 Cattle

91 Cattle	**Pasture 1**	**Pasture 2**	**Pasture 3**
Year 1	June 1 to June 19	June 20 to August 12	August 13 to October 31
Year 2	August 20 to September 7	September 8 to October 31	June 1 to August 19
Year 3	October 13 to October 31	June 1 to July 24	July 25 to October 12

Upper Two Calf Allotment - 557 Cattle

557 Cattle	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Pasture 1	**6/16 - 7/26**	**8/21 - 9/30**	**8/1 - 9/10**	**5/16 - 6/26**	**9/21 - 10/30**	**7/1 - 8/10**
Pasture 2	**7/27 - 9/15**	**5/16 - 7/4**	**9/11 - 10/30**	**6/27 - 8/15**	**6/16 - 8/4**	**8/11 - 9/30**
Pasture 3	**9/16 - 10/30**	**7/5 - 8/20**	**6/16 - 7/31**	**8/16 - 9/30**	**8/5 - 9/20**	**5/16 - 6/31**

APPENDIX D
TWO CALF WATERSHED GRAZING MANAGEMENT GUIDELINES
ALTERNATIVE 2 (PROPOSED ACTION)

Guidelines for grazing management are preferred or advisable practices to ensure that site specific objectives, and thus the standards for rangeland health, can be met or significant progress can be made toward meeting the objectives and standards. The guidelines are provided to maintain or improve resource conditions in upland and riparian habitats. In both habitats, the guidelines focus on establishing and maintaining proper functioning conditions and reaching site specific objectives.

TWO CALF WATERSHED GUIDELINE # 1

When provided, supplemental salt and/or minerals will be placed a minimum of 1/4 mile from riparian areas (including both creeks and reservoirs) and stock water tanks. Salt and/or mineral placement locations will be rotated periodically, but not less than each grazing season.

TWO CALF WATERSHED GUIDELINE # 2

Adequate vegetative stubble heights will remain on identified key species along riparian areas at the end of the grazing season to provide streambank stability, trap and filter sediment, improve water quality and to facilitate meeting site specific objectives. Average vegetative stubble height guidelines on herbaceous species along intermittent creeks will apply as follows:

Creek Name	Key Area	Key Species	Average Stubble Height
Reed Coulee	Polygon # 1 Polygon # 2	prairie cordgrass, western wheatgrass, needle spike-rush, sharp bullrush	Avg. 4 in. stubble height
Two Calf	Polygon # 1a Polygon # 2a Polygon # 3a	prairie cordgrass, western wheatgrass, sharp bullrush	Avg. 4 in. stubble height
S. Fk Twocalf	Polygon # 1a Polygon # 2a	prairie cordgrass, western wheatgrass, sharp bullrush	Avg. 4 in. stubble height
Sourdough	Polygon # 5	prairie cordgrass, western wheatgrass, sharp bullrush	Avg. 4 in. stubble height

Average vegetative stubble height guidelines on herbaceous species along the Missouri River will apply as follows:

Key Area	Key Species	Average Stubble Height
R-1 (MRA Polygon # 2418) R-2 (MRA Polygon # 2442) R-3 (MRA Polygon # 2511)	Any obligate and/or facultative wetland graminoid	Avg. 4 in. stubble height

TWOCALF WATERSHED GUIDELINE # 3
Woody species allowable browse levels will be implemented to insure that site specific objectives can be met. Allowable browse level guidelines on key woody species will apply as follows:

Key Area	Key Species	Average Stubble Height
R-1 (MRA Polygon # 2418) R-2 (MRA Polygon # 2442) R-3 (MRA Polygon # 2511)	Willows, cottonwoods, dogwood, green ash and/or boxelder	25 percent of available leaders (current years growth).

TWOCALF WATERSHED GUIDELINE # 4
Utilization target levels will be implemented on upland areas to insure that site specific resource objectives are met. Average target utilization guidelines on key herbaceous species (bluebunch wheatgrass and/or green needlegrass) in upland areas will apply as follows:

Allotment	Key Area	Target Utilization
All Allotments	All Key Areas	Average utilization of 50 % by weight

TWOCALF WATERSHED GUIDELINE # 5
Season long or yearlong grazing use will not occur unless it has been demonstrated to be consistent with achieving healthy, properly functioning ecosystems and site specific objectives.

TWOCALF WATERSHED GUIDELINE # 6
Native plant species will be utilized for reclamation of disturbances.

TWOCALF WATERSHED GUIDELINE # 7
Scheduled pasture move dates must be accomplished in 3 days or less

TWOCALF WATERSHED GUIDELINE # 8
Any deviation from annual scheduled use must be applied for by the permittee and approved by the BLM authorized officer prior to such use taking place. The guidelines for upland utilization, riparian area stubble heights and woody species browse and progress toward meeting site specific objectives will be evaluated when reviewing requests for deviation from annual scheduled use.

TWOCALF WATERSHED GUIDELINE # 9
During periods of drought or at the earliest possible time when it becomes apparent that drought conditions are likely, the BLM and grazing permittee will meet to discuss and arrange management changes needed to reduce resource impacts and continue progress toward meeting site specific objectives.

TWOCALF WATERSHED GUIDELINE # 10
Pasture rotation dates are considered mandatory pasture movement dates. Earlier or later move dates could be required or permitted based on resource or livestock condition or if the guidelines for upland utilization, riparian area stubble heights and woody species browse are exceeded or are yet to be reached.

TWOCALF WATERSHED GUIDELINE # 11
Actual use billing may be permitted if requested, but not prior to full implementation of plan on an allotment basis.

The guidelines described above are considered best management practices necessary to achieve objectives identified in this plan and to maintain or improve rangeland resources. Herbivore use that exceeds these guidelines will reduce BLM/permittee ability to maintain proper range conditions. The success of these

guidelines is dependent on active involvement by the grazing permittee(s) in the day-to-day management of allotments. Unexpected circumstances do not reduce the tremendous importance of active permittee livestock management in the Two Calf Watershed.

If the guidelines are exceeded and overuse does occur, corrective action should be implemented during the next grazing season to insure that such use does not occur again and prevent necessary vegetative recovery from taking place. In such instances, prior to the next grazing season, the permittee(s) and BLM Manager should cooperatively develop these corrective adjustments. The recommended management adjustments identified below are a tool that can be used, modified, or added to, on a case by case basis. The BLM would prefer that the grazing permittee(s) suggest corrective actions needed to maintain vegetative health and vigor while still meeting livestock management needs. If however, a cooperatively developed corrective adjustment cannot be reached, the following adjustments will be applied:

Prescribed Stubble Height for Riparian Species = 4 inches

Actual Stubble Height (inches)	Corrective Adjustment
3 to 4 inches any one year	Discuss situation w/permittee
3 to 4 inches 2 consecutive years	5 inch stubble height next year
3 to 4 inches > than 2 consecutive years	6 inch stubble height the next year
2 to 3 inches any one year	5 inch stubble height the next year
2 to 3 inches 2 consecutive years	6 inch stubble height the next year
2 to 3 inches > than 2 consecutive years	Rest the pasture the following year
2 inches or less in any one year	Rest the pasture the following year

Prescribed Riparian Woody Species Browse Level = 25% current year growth

Actual Browse Level (% current year growth)	Corrective Adjustment
30 to 60% of current year growth removed any one year	10% or less the next year
30 to 60% of current year growth removed 2 or more consecutive years	Rest the pasture the following year
60% or greater of current year growth removed in any one year	Rest the pasture the following year

Upland Species Utilization Level = 50% by Weight

Actual Utilization Level (%)	Corrective Adjustment
Exceeds prescribed level by more than 10% but less than 25%	Adjust utilization to 40% the next year
Exceeds prescribed level by more than 25%	Rest the pasture the following year

APPENDIX E
RIPARIAN AREA HEALTH AND FUNCTION

STREAM NAME	POLYGON #	CONDITION *	SCORE **	ALLOTMENT NAME	STREAM REACH LENGTH (MILES)
Reed Coulee	1	NF	58	Two Calf	1.0
	1A	FAR	78		3.0
	2	FAR	71		4.9
S.F. Two Calf	1A	NF	40	Upper Two Calf	0.8
	2A	NF	23		1.5
	1	PFC	87		1.0
	2	PFC	87	Knox Ridge	1.0
	3	PFC	87		1.5
	4	PFC	89		1.0
	5	PFC	89		1.6
	6	PFC	80		1.0
Two Calf	1A	NF	57	Woodhawk Custodial	1.8
	2A	NF	52	Deep Reservoir	1.5
	3A	NF	56	Upper Two Calf	4.3
	1	FAR	75		1.1
	2	FAR	75		1.3
	3	FAR	75		1.4
	4	FAR	75		0.7
	5	FAR	71		1.8
	6	FAR	71	Barnes Ridge	1.0
	7	FAR	60		0.9
	8	FAR	65		1.5
SourDough Creek	1	NF	57	Knox Ridge	0.6
	2	NF	49		0.7
	3	NF	47		0.7
	4	NF	57		0.9
	5	NF	51		0.7
	6	NF	57		0.9
	7	NF	57		0.8

	8	NF	59		0.8
	9	NF	55		0.6
	10	NF	45		1.0
	11	NF	45		0.8
Missouri River	2410-2421	PFC	***	DeMars	0.6
	2438-2443	PFC	***	DeMars	0.6
	2510-2520. 2527	NF	***	Demars	0.5

* PFC: Proper Function Condition. Riparian areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. **The functioning condition of riparian areas is a result of interaction among geology, soil, water, and vegetation.**

* FAR: Functioning At Risk. Riparian areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

* NF: Non-Functioning. Riparian areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, etc., as listed above. The absence of certain physical attributes such as a floodplain where one should be are indicators of nonfunctioning conditions.

**SCORING: 80%-100% PFC, 60%-79% FAR, <60% NF

*** Score based on repeated monitoring visits and professional judgement rather than numerical rating

APPENDIX F
PUBLIC LAND DISPOSAL LIST
TWO CALF WATERSHED

Township/Range	Section	Subdivision
T.21N., R.20E.	Section 1	S1/2
	Section 2	Lots 1, 2, 3, 4, S1/2NE, N1/2SE
	Section 12	N1/2NW
T.21N., R.21E.	Section 5	NWSE
	Section 6	Lot 6
	Section 11	NESW
	Section 17	NWNE
	Section 22	SENW
T.21N., R.22E.	Section 5	SESW
T.22N., R.20E.	Section 4	SESW
	Section 5	SESE
	Section 35	S1/2SE
T.22N., R.20E.	Section 15	NWNW
T.22N., R.21E.	Section 4	NESW*, S1/2SW*
	Section 5	S1/2SE*
	Section 9	N1/2NW*, SESE*
	Section 17	NWSE, S1/2SE
	Section 18	NESW
	Section 19	E1/2NE
	Section 20	N1/2N1/2
	Section 26	SENW
	Section 28	S1/2NW
	Section 29	SW
	Section 30	SE

Public lands identified with a * in the above table are currently segregated from appropriation under the public land law for possible inclusion in Phase III of the Two Crow exchange. At this time, it is not known if these lands will be needed to equalize values.