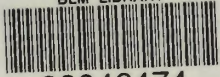
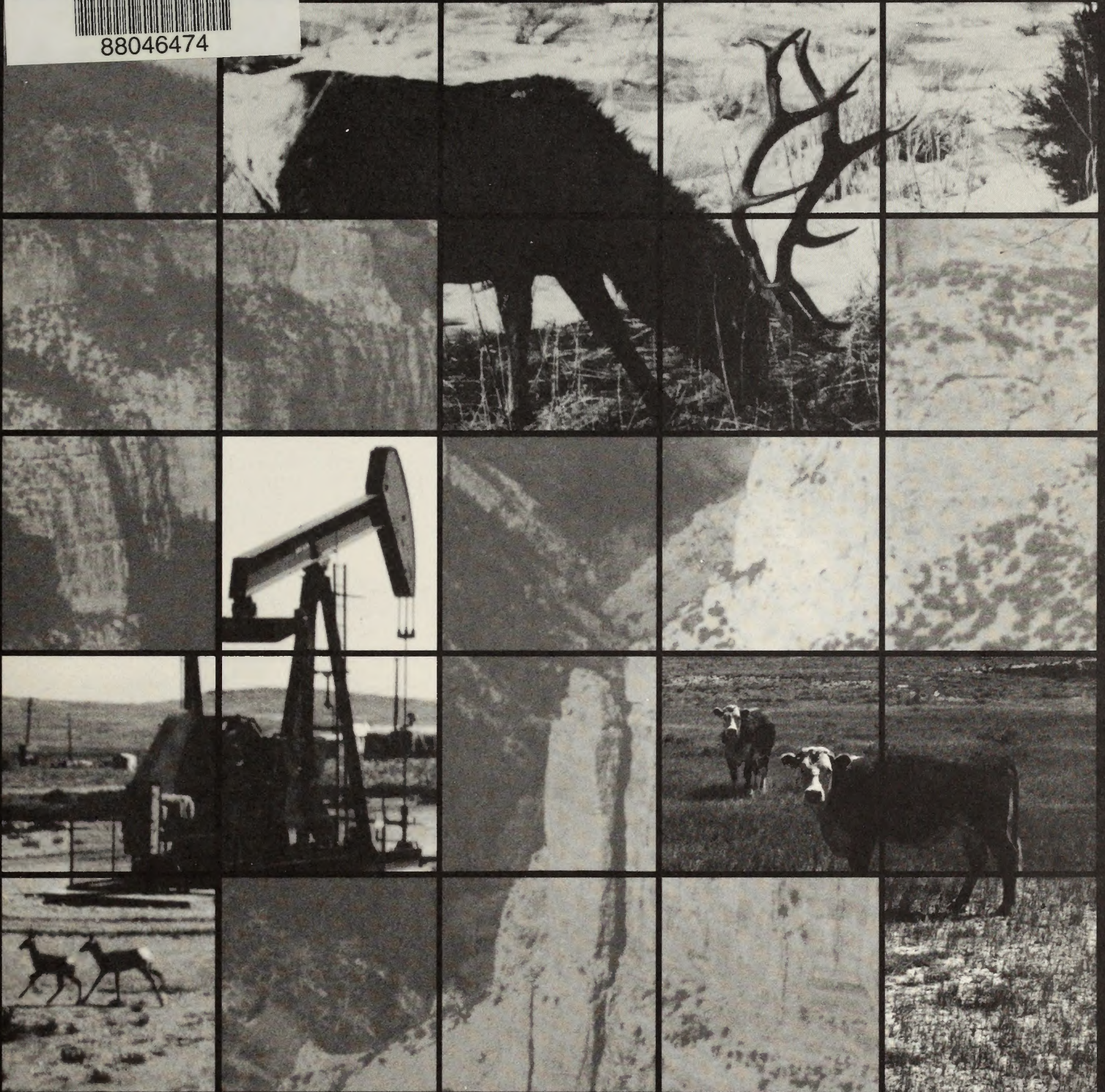


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WASHAKIE

**Resource Management Plan
Draft Environmental Impact Statement**

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DRAFT
**RESOURCE MANAGEMENT PLAN/
ENVIRONMENTAL IMPACT STATEMENT
FOR THE WASHAKIE RESOURCE AREA**

Portions of Big Horn, Hot Springs, and Washakie counties, Wyoming

Lead Agency: U.S. Department of the Interior, Bureau of Land Management

Type of Action: Administrative

Abstract

This draft Resource Management Plan/Environmental Impact Statement (RMP/EIS) addresses alternatives for managing approximately 1.23 million surface acres and about 1.6 million acres of federal mineral estate administered by the Washakie Resource Area, Worland District, Bureau of Land Management. The plan focuses primarily on four resource management issues relating to vegetative resources, special management area designations, water resources, and resource accessibility.

Five alternatives that address each issue have been considered: continuation of present management (Alternative A), three other alternatives with differing emphasis on resource management (Alternatives B, C, D), and the Bureau's preferred alternative which allows resource use with more emphasis on the protection of the natural environment.

When the RMP is produced in final form, it will provide a comprehensive framework for managing and allocating resources on the public land in the Washakie Resource Area. Further information regarding this draft RMP/EIS can be obtained from the address below. Comments will be accepted for 90 days following the date that the Environmental Protection Agency publishes the notice of filing of this draft in the *Federal Register*. Comments should be addressed to:

Area Manager
Washakie Resource Area
Bureau of Land Management
P.O. Box 119
Worland, Wyoming 82401
Telephone (307) 347-9871



United States Department of the Interior

Bureau of Land Management
Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003

Dear Reader:

This Draft Resource Management Plan/Environmental Impact Statement (RMP/EIS) outlines alternatives for managing the public land in the Washakie Resource Area. These alternatives are designed to resolve four land management issues that were identified during the planning process. The environmental consequences of the alternatives have also been analyzed.

Please review the document and direct any written comments you may have to: Area Manager, Washakie Resource Area, P.O. Box 119, Worland, Wyoming 82401. The comment period begins the day the notice of filing is published in the *Federal Register* by the Environmental Protection Agency and ends 90 days later. You should retain this Draft RMP/EIS because of the possibility that the Final RMP/EIS will be published in abbreviated form. If that occurs, you will need this document for reference.

Through your participation in this effort, we can move forward together toward a common goal of improved public land management in the Washakie Resource Area.

Sincerely,

Hillary A. Oden
State Director

United States Department of Justice

OFFICE OF THE ATTORNEY GENERAL
WASHINGTON, D. C. 20530



The Department of Justice is pleased to announce the appointment of [Name] as [Title]. [Name] has served in various capacities within the Department and has demonstrated exceptional skill and dedication. [Name] will be reporting to the [Title] on [Date].

[Signature]
[Name]
[Title]

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**RESOURCE MANAGEMENT PLAN/
ENVIRONMENTAL IMPACT STATEMENT**
for the
WASHAKIE RESOURCE AREA
WORLAND DISTRICT, WYOMING

Prepared By:

U.S. Department of the Interior
Bureau of Land Management
1986

Killary A. Oden
Wyoming State Director

9-3-86

Date

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RESOURCE MANAGEMENT PLAN
ENVIRONMENTAL IMPACT STATEMENT
for the
WASHAKIE RESOURCE AREA
WYOMING DISTRICT WYOMING

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
1988

[Signature]
2-3-88
DATE



Summary

INTRODUCTION

This draft Washakie Resource Management Plan (RMP) and Environmental Impact Statement (EIS) addresses future management options for approximately 1,234,000 acres of public land surface and 1,603,000 acres of federal mineral estate administered by the Bureau of Land Management (BLM) through its Washakie Resource Area Office in Worland, Wyoming. The Washakie Resource Area encompasses parts of Hot Springs, Washakie, and Big Horn Counties in north-central Wyoming.

When completed, the Washakie RMP will provide a framework for managing the public lands and resources and allocating their uses in the resource area. Specifically, this RMP/EIS document is focused primarily on resolving four key resource management issues. These issues are: vegetative resources (how should vegetation be managed and allocated to consumptive and non-consumptive uses); special management area designation (what values or resources warrant management priority and emphasis under special management designations); water resources (how can surface and ground water supplies and qualities be protected from adverse affects resulting from surface disturbing activities); and resource accessibility and manageability (how can public lands and resources be managed to allow for appropriate types and levels of use or to provide protection, if needed).

SUMMARY OF ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Alternatives

Five RMP alternatives are analyzed in detail in this document. All the alternatives are multiple-use oriented. Each alternative provides for resource production and environmental protection. Table 1 is a summary comparison of the management prescriptions in the five alternatives.

The Preferred Alternative generally allows resource use with greater emphasis on protection of the natural environment than Alternatives A or B. The Preferred Alternative is made up of the management prescriptions for wild horses and watershed management from Alternative D, a combination of leasable mineral prescriptions from Alternatives B, C, and D, and the remaining resource management prescriptions from Alternative C.

Alternative A is the continuation of current management, except for the range management program, where the alternative reflects both the "proposed action" and "no action." With this alternative, the existing management and uses of the public lands and resources would continue at their present levels.

SUMMARY

Alternative B emphasizes developing and using natural resources. It still provides for environmental protection but the major emphasis is on resource development.

Alternative C provides more emphasis on the protection of the environment than either Alternative A or Alternative B, but it still allows resource use. Alternative C is the same as the Preferred Alternative with three exceptions: the management prescriptions for leasable minerals (oil and gas), wild horses and watershed.

Alternative D emphasizes the protection and enhancement of environmental quality. It limits

uses and development of resources that do not protect or enhance the quality of the natural environment.

Environmental Consequences

A detailed summary of the environmental consequences of the management prescriptions is found in Table 2, Summary Comparison of Impacts. (Table 2 is reprinted in Chapter 4, Environmental Consequences, for the convenience of the reader.)

SUMMARY

TABLE 1
SUMMARY COMPARISON OF MANAGEMENT ACTIONS

	Management Common to All Alternatives	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Minerals Management	<p>All public lands not formally closed to leasing are open for consideration for exploration and development of oil and gas.</p> <p>Contingency plans for the release of hydrogen sulfide (H₂S) would be required for all drilling proposals which would penetrate a known or suspected H₂S bearing formation.</p> <p>Tar sands on post-Combined Hydrocarbon Leasing Act leases could be developed at the rate of about 10 acres per year.</p> <p>The coal screening process has not been conducted. Interest in exploration or leasing would be handled on a case-by-case basis, according to existing guidance.</p> <p>All public lands not withdrawn or segregated from mineral entry would be open for exploration and development of locatable minerals. Abandoned mine sites would be recommended for reclamation.</p> <p>Sales and free use of salable minerals would continue from existing pits.</p> <p>Important geologic landmarks would be protected through the use of surface protection stipulations and discretionary management authority.</p>	<p>Approximately 99% of the federal mineral estate would be open to oil, gas, and tar sand leasing. Of this, about 5% would be leased with a permanent "no surface occupancy" stipulation and another 61% would be leased with a seasonal "no surface occupancy" stipulation.</p>	<p>Approximately 99% of the federal mineral estate would be open to oil, gas, and tar sand leasing. Of this, about 6% would continue to be leased with a permanent "no surface occupancy" stipulation, and another 61% would continue to be leased with a seasonal "no surface occupancy" stipulation.</p>	<p>Same as Alternative A</p>	<p>Oil, gas and tar sand would be leased. Approximately 16% of the federal mineral estate would be leased with a permanent "no surface occupancy" stipulation. About 52% would be leased with a seasonal "no surface occupancy" stipulation, and 32% would be leased with other standard surface protection stipulations.</p>	<p>Approximately 99% of the federal mineral estate would be open to oil, gas, and tar sand leasing. Of this, about 49% would be leased with a permanent "no surface occupancy" stipulation, and the remaining 50% would be leased with other standard surface protection stipulations.</p>
	<p>Approximately 99% of the federal surface would be open to geophysical exploration, but would be restricted by vehicle use limitations of various kinds. Less than 1% would be closed to geophysical exploration.</p> <p>The entire Spanish Point Karst ACEC would be closed to mineral leasing and geophysical exploration.</p>	<p>Geophysical exploration proposals would continue to be reviewed on a case-by-case basis. Exploration on about 68% of the resource area would be affected by surface protection measures and vehicle use limitations, including "no surface occupancy". The remaining 32% of the resource area would be restricted by various surface protection measures.</p>	<p>Same as Alternative A</p>	<p>Approximately 99% of the federal surface in the resource area would be open to geophysical exploration, but would be restricted by vehicle use limitations of various kinds. Less than 1% would be closed to geophysical exploration.</p>	<p>Approximately 10% of the federal surface in the resource area would be closed to geophysical exploration. The remaining 90% of the federal surface would be open to geophysical exploration after a case-by-case review, but would be restricted by vehicle use limitations of various kinds.</p>	
	<p>Same as the Preferred Alternative</p>	<p>Same as the Preferred Alternative</p>	<p>Same as the Preferred Alternative</p>	<p>Same as the Preferred Alternative</p>	<p>Same as the Preferred Alternative</p>	

SUMMARY

TABLE 1 (Continued)
SUMMARY COMPARISON OF MANAGEMENT ACTIONS

	Management Common to All Alternatives	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Lands and Realty Management	Disposal and acquisition of public lands would be considered on a case-by-case basis under each of the alternatives.	Existing transportation and utility corridors would be designated for existing and future rights-of-way grants. Approximately 250 acres not in corridors would be classed as exclusion areas and 368,000 acres would be classed as avoidance areas.	All areas would continue to be open to rights-of-way, although sensitive areas would be avoided when possible.	Existing transportation and utility corridors would be designated for existing and future rights-of-way grants. Approximately 250 acres not in corridors would be classed as exclusion areas and 750 acres would be classed as avoidance areas.	Same as the Preferred Alternative	Existing transportation and utility corridors would be designated for existing and future rights-of-way grants. Approximately 250 acres not in corridors would be classed as exclusion areas and 938,000 acres would be classed as avoidance areas.
	Public water reserves withdrawn under Secretarial Order 107 & other classification orders would be re-viewed for retention. Withdrawals would be terminated on those that do not meet retention requirements.	Classification and Multiple Use Act classifications in Hot Springs County would be terminated.	Lands classified under the Classification and Multiple Use Act would continue to be managed pursuant to the terms of the classification.	Same as the Preferred Alternative	Same as the Preferred Alternative	Same as the Preferred Alternative
Forest Management	Cottonwood would not be harvested or sold for fuel wood in riparian areas along low-lying ephemeral streams. Timber harvesting on commercial forest land would be conducted in a manner that would benefit watershed or wetland/riparian habitat. Backlogs of precommercial thinning projects would be eliminated. Regular thinning of overstocked stands would continue.	A maximum of 1 million board feet of forest products would be harvested from about 130 acres, annually, for about ten years.	The administrative site withdrawal associated with Worland's golf course would be re-terminated.	Same as Alternative A	Same as the Preferred Alternative	Same as the Preferred Alternative
		A maximum of 375 thousand board feet of forest products would be harvested from about 40 acres annually for about 10 years.	The administrative site withdrawal associated with Worland's golf course would be re-terminated.	A maximum of 1.2 million board feet of forest products would be harvested from about 150 acres, annually, for about ten years.	Same as the Preferred Alternative	A maximum of 700 thousand board feet of forest products would be harvested from about 90 acres, annually, for about ten years.

SUMMARY

TABLE 1 (Continued)
SUMMARY COMPARISON OF MANAGEMENT ACTIONS

	Management Common to All Alternatives	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Forest Management (Continued)	Backlogs of reforestation projects would be eliminated. Silvicultural practices would be allowed in elk calving areas if they benefit habitat.					
Wild Horse Management		All wild horses would be removed from the Zimmerman Springs area.	The wild horse herd would remain in the Zimmerman Springs area and horse numbers would continue to increase. Forage would not be allocated to wild horses. Livestock grazing capacity would not be adjusted because of horses. A wild horse herd management plan would not be written and a wild horse herd management area would not be designated.	Same as the Preferred Alternative	A wild horse herd management area would be designated and a herd management area plan would be written. Forage would be allocated to wild horses and livestock AUMs would be adjusted accordingly. Wild horse numbers would be limited to 30 animals.	Same as the Preferred Alternative
Range Management	All "I", category allotments and some "M" and "C" would be monitored. Monitoring would continue after adjustments. Approximately 1,400 existing range projects would be maintained. Authorized grazing use would be adjusted for the 300-500 acres taken out of production each year by mineral patents, other disposals and other permanent uses.	The maximum authorized level of livestock grazing use would be 143,000 AUM's, annually, on the Resources Area's 307 allotments, until data is available to support adjustments.	The maximum authorized livestock grazing use would be 143,000 AUMs annually, on the Resource Area's 307 allotments.	Authorized grazing use levels would increase to an estimated 182,000 AUMs per year at the end of 18 years from RMP implementation. Livestock grazing would occur on all 307 allotments in the Resource Area until adequate data is available to support adjustment.	Same as the Preferred Alternative	Authorized livestock grazing use would be about 114,000 AUMs, annually. Grazing would be eliminated on an undetermined number of allotments.
					Riparian areas along Nowater Creek would be fenced to exclude wild horses and protect wetland/riparian habitat.	

SUMMARY

TABLE 1 (Continued)
SUMMARY COMPARISON OF MANAGEMENT ACTIONS

	Management Common to All Alternatives	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Range Management (Continued)	<p>Approximately 2,000 AUMs of forage would be allocated to trailing in specific stock driveways. Public access to facilitate range management would be acquired in specific locations.</p> <p>Any range project proposal would be subject to economic and environmental analyses.</p>	<p>An average of 3 AMP's (new plans or revisions of existing plans on "I" category allotments) would be worked on, annually.</p> <p>Priority would be given to implementation of range projects on "I" category allotments. Projects on "M" and "C" category allotments may also be developed.</p>	<p>Existing allotment management plans would be maintained. No new plans would be written.</p> <p>No new range projects would be developed except on those areas covered by existing allotment management plans.</p>	<p>Eighteen existing allotment management plans would be implemented and maintained. New AMP's grazing systems or development plans would be developed annually on "I" category allotments.</p>	<p>Same as the Preferred Alternative</p>	<p>A maximum of 3 AMP's would be written or revised annually, on "I" category allotments.</p>
		<p>Livestock grazing would be managed in wetland/riparian areas to allow improvement of habitat conditions. About 185 miles of fencing needed to protect wetland/riparian habitat would be built at the rate of about 10 miles, annually. New grazing systems would be implemented to restore and enhance wetlands.</p> <p>Seasons of use would be established on allotments that currently have no use designated.</p> <p>Adjustments in season of use and kind and class of livestock would be made to improve vegetative resources. Emphasis</p>	<p>No new range projects would be developed except on those areas covered by existing allotment management plans.</p>	<p>Livestock grazing would be managed in wetland/riparian areas to allow improvement of habitat conditions. About 185 miles of fencing needed to protect wetland/riparian habitat would be built at the rate of about 5 miles, annually.</p>	<p>Same as the Preferred Alternative</p>	<p>Livestock grazing would be managed in wetland/riparian areas to allow improvement of habitat conditions. About 185 miles of fencing needed to protect wetland/riparian habitat would be built at the rate of 15 miles, annually.</p>
		<p>Seasons of use would be established on allotments that currently have no use designated.</p> <p>Management practices such as changes in the season of use and use of key forage species would be implemented to improve range condition.</p>	<p>"I" category allotments would receive priority for the funding of range projects and development of grazing management systems. Some private construction of range projects in "C" and "M" category allotments would be authorized, subject to specific constraints.</p>	<p>Seasons of use would be established on allotments that currently have no use designated.</p> <p>Management practices such as changes in the season of use and use of key forage species would be implemented to improve range condition.</p>	<p>Same as the Preferred Alternative</p>	<p>Same as the Preferred Alternative</p>

SUMMARY

TABLE 1 (Continued)
SUMMARY COMPARISON OF MANAGEMENT ACTIONS

Management Common to All Alternatives	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Range Management (Continued)	<p>would be placed on adjusting spring grazing and on allotments without designated seasons of use.</p> <p>Approximately 500 acres of aspen stands would be protected from livestock grazing, at the rate of about 25 acres per year.</p> <p>Adjustments in grazing use on "I" category allotments would be based on monitoring or by agreement between BLM and the allotment holder.</p> <p>Range would be managed for good or better condition on 960,000 acres over the long-term.</p>	Monitoring of existing AMPs would continue.	Monitoring studies would be established to determine adjustments in grazing use.	Same as the Preferred Alternative	<p>Approximately 500 acres of aspen stands would be protected from livestock grazing, at a rate of about 90 acres per year.</p> <p>Monitoring studies would be used to determine the level of adjustment needed in each allotment.</p> <p>Range would be managed to attain and maintain good or better condition.</p>
Cultural Resource Management	<p>The archeological district nomination for Paint Rock Canyon would be completed.</p> <p>Salvage projects and emergency site stabilization on known sites would be undertaken.</p> <p>Important paleontological sites would be protected through the use of surface and subsurface protection stipulations and discretionary management authority.</p>				
Wilderness Management	See Wilderness Supplement				

SUMMARY

TABLE 1 (Continued)
SUMMARY COMPARISON OF MANAGEMENT ACTIONS

	Management Common to All Alternatives	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Off-Road Vehicle Management		<p>Limitations on ORV use would be applied throughout the Resource Area. About 6,700 acres would be closed to vehicle use. No areas would be designated open for ORV use.</p>	<p>Existing interim vehicle limitations would be adopted for ORV management. The remainder area would remain open for ORV use.</p>	<p>Limitations on ORV use would be applied to about 666,700 acres in the resource area. About 250 acres would be closed to ORV use and 567,000 acres would be designated open.</p>	<p>Same as the Preferred Alternative</p>	<p>Limitations on ORV use would be applied throughout the resource area. About 124,000 acres would be closed to vehicle use. No areas would be designated open for ORV use.</p>
Recreation Management	<p>The Castle Gardens and Middle Fork campgrounds and the Lone Tree Trailhead would be maintained.</p> <p>Existing recreational access would be maintained.</p> <p>Special recreation use permits would be issued to authorize organized recreational use.</p> <p>Recreation use of caves would be managed under a cave management plan.</p>	<p>Restrictions on recreational use would be limited to applicable ORV and cave use restrictions, and management plans written for special recreation management areas.</p> <p>Two Special Recreation Management Areas would be designated; one on the West Slope of the Bighorn Mountains, of 241,000 acres, another on the Bighorn River from Hedding of the Waters to Shell Creek, of about 59,000 acres.</p> <p>Recreational facilities would be developed at Castle Gardens, the Middle Fork camping area, and on Deep, Otter, and Medicine Lodge creeks.</p> <p>Cave use permits would be issued to qualified users.</p> <p>Access to caves would be obtained under certain circumstances.</p> <p>Acquisition of legal and/or physical access would be considered for recreational activities.</p>	<p>Restrictions on recreational use would be limited to applicable ORV restrictions and the use of caves.</p> <p>Special recreation management areas would not be designated. Existing recreation management plans would be maintained. Instead, the entire resource area would be designated as an extensive recreation management area.</p> <p>New recreational facilities would not be developed.</p> <p>Cave use permits would continue to be issued to qualified users.</p>	<p>Same as Alternative A</p>	<p>Same as the Preferred Alternative</p>	<p>Same as the Preferred Alternative</p>

SUMMARY

TABLE 1 (Continued)
SUMMARY COMPARISON OF MANAGEMENT ACTIONS

	Management Common to All Alternatives	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Recreation Management (Cont.)		<p>The Billy Miles Habitat Unit Agreement would be updated and renewed.</p> <p>A signing program would be implemented to facilitate use in certain areas.</p>			Same as the Preferred Alternative	Same as the Preferred Alternative
Fish & Wildlife Habitat Management	<p>The West Slope and Bighorn River Habitat Management plans would be fully implemented.</p> <p>Wetlands would be managed to maintain and improve habitat through implementation of changes in livestock grazing systems and specific practices contained in habitat management plans.</p> <p>Wildlife habitat management would emphasize protection of habitat from destruction or negative impacts, and would encourage habitat development or manipulation.</p>	<p>Certain areas within the Resource Area would be managed to allow peregrine falcon and antelope to be reintroduced.</p> <p>Vehicle, horseback, and pedestrian access would be limited in crucial habitats to aid in their protection.</p>	<p>Access controls would occur only in specific situations and in specific habitats.</p>	Same as Alternative A	Same as the Preferred Alternative	Same as the Preferred Alternative
Threatened and Endangered Wildlife Species	<p>Habitat or potential habitat for threatened and endangered species, and sensitive species identified by the State of Wyoming, would be protected and managed to benefit those species.</p>	<p>Chemical control of pests would be restricted in the Spanish Point Karst ADEC, but would be allowed elsewhere with appropriate restrictions to protect food chains, habitat and wetlands.</p> <p>Wetland/riparian zones would be protected by fencing. About 185 miles of needed fencing would be built at the rate of about 2 miles annually.</p>	<p>Chemical control of pests would be allowed resource area-wide with appropriate restrictions.</p>	Same as Alternative A	Same as the Preferred Alternative	Same as the Preferred Alternative

SUMMARY

TABLE 1 (Continued)
SUMMARY COMPARISON OF MANAGEMENT ACTIONS

	Management Common to All Alternatives	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Threatened and Endangered Species (Cont.)	A clearance or a biological assessment would be prepared for any activity proposed in endangered, threatened, or sensitive species habitat.	Water discharges from mining, wastewater treatment, etc., would be regulated. Discharges would not be allowed in some areas.	Water discharges from mining, wastewater treatment, etc., would be regulated.	Same as Alternative A	Same as the Preferred Alternative	Same as the Preferred Alternative
Hazardous Waste Management	Regulated hazardous wastes that are discharged on public lands would be secured, disposed of or otherwise remedied in accordance with EPA, BLM, and State regulations.	The Spanish Point Karst Area would be designated an area of critical environmental concern.	Water discharges from mining, wastewater treatment, etc., would be regulated. Discharges would not be allowed in some areas.	Same as Alternative A	Same as the Preferred Alternative	Same as the Preferred Alternative
Watershed Management	All watershed projects would be maintained on a priority basis. Oil and gas exploration wells and geophysical drill holes that produce water may be acquired by BLM, developed, and managed for livestock, wildlife, or recreation. All water-related projects would be filled with the Wyoming State Engineers Office to obtain valid water rights.	Special wildfire suppression restrictions would be applied above sinking stream segments and caves to protect water quality and watershed values. Chemical control of pests would be restricted in the Spanish Point Karst ACEC, but would be allowed elsewhere with appropriate restrictions to avoid water pollution. Protection of watersheds would include the use of BPPs and other management actions.	Water discharges from mining, wastewater treatment, etc., would be regulated.	Same as Alternative A	Same as the Preferred Alternative	Same as the Preferred Alternative

SUMMARY

TABLE 1 (Continued)
SUMMARY COMPARISON OF MANAGEMENT ACTIONS

Management Common to All Alternatives		Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Watershed Management (Cont.)	<p>Management of the Spanish Point Karst ACEC would emphasize watershed protection by restricting or prohibiting certain activities. Withdrawals from mineral leasing and mining claim location would be pursued for the entire ACEC.</p> <p>The reduction of soil erosion and sediment yields would be emphasized on about 391,000 acres sensitive watersheds in the Kirby, Nowater, and East Fork Nowater, Creek drainages.</p>	<p>Management of the Spanish Point Karst ACEC would continue within the framework of existing management practices and surface protection stipulations.</p>	<p>Management of the Spanish Point Karst ACEC would entail the use of standard stipulations and existing management practices for surface protection as well as special stipulations for protection of subsurface values.</p>	<p>Management of the Spanish Point Karst ACEC would emphasize watershed protection by restricting or prohibiting certain activities. "No surface occupancy" stipulations would be applied to hydrocarbon leases.</p>	<p>Same as the Preferred Alternative</p> <p>Same as the Preferred Alternative</p>
Fire Management	<p>Reclamation and soil stabilization actions and livestock grazing controls would be applied to burned areas.</p> <p>Prescribed burns would be used to achieve vegetation management objectives.</p> <p>Limited suppression of wildfires would occur in wetland/riparian areas.</p>	<p>Full suppression of all wildfires would continue resource area-wide, with some restrictions within sensitive areas.</p>	<p>Same as the Preferred Alternative</p>	<p>Same as the Preferred Alternative</p>	<p>Same as the Preferred Alternative</p>

SUMMARY

TABLE 2
SUMMARY COMPARISON OF IMPACTS

Causal Relationships and Impacts Common to All Alternatives	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Air Quality Air quality would be affected by mineral development, lands and reentry actions, timber management practices, grazing management activities, ORV use, wildlife developments, and fire control. Only acceptable reductions in air quality would be anticipated from any of the alternatives.	Smoke and dust would increase from more timber slash burning, and construction of range projects along the west slope of the Bighorn Mountains. Amounts of other air contaminants would be similar to those caused by Alternative A, (Existing Management).	Air contaminants would include suspended particulates, hydrogen sulfide, sulfur dioxide, nitros oxides, and vaporous hydrocarbons. Suspended particulates would be caused by surface disturbances, sulfur dioxide would be caused by flaring hydrogen sulfide; and vaporous hydrocarbons would be released around oil and gas production facilities.	This alternative would cause the most smoke from burning timber slash and the most dust from construction activities and vehicle travel. Here too, however, only acceptable reductions in air quality would be anticipated. Other air contaminants would be similar to those caused by Alternative A.	Impacts would be the same as with the Preferred Alternative.	Management Prescriptions would cause more smoke than Alternative A but less than Alternative C or the Preferred Alternative.
Soil Surface disturbing activities cause on-site and off-site impacts. Off-site soil impacts include sedimentation in drainages and down-slope soil contamination. On-site impacts include soil compaction and erosion.	Eventually soil loss would be reduced by an estimated 13% compared to levels expected from Alternative A. Changes in livestock grazing would be the primary cause for the reduced soil loss.	Estimated total accelerated soil loss would be about 1.1 million tons per year. The primary soil impact would result from livestock grazing.	Total accelerated soil loss would eventually be about 3% less than with Alternative A.	Impacts would be the same as with the Preferred Alternative.	Total accelerated soil loss would be reduced by an estimated 30% from levels caused by Alternative A. Changes in livestock grazing management would be the primary cause for the reduced soil loss.
Water Generally, the same activities that affect soils and vegetation also affect surface water.	Surface water quality would improve. Long-term sediment delivery to the Bighorn River would be reduced by an estimated 12% from existing levels. The risk of penetrating caves and karstic waterways by exploratory drilling would be reduced compared to Alternative A, B, or C.	Surface water quality would improve slightly from existing levels as a result of implementing 18 AMPs. Sediment delivery to the Bighorn River would be expected to decline by about 7% from existing levels.	Sediment delivery to the Bighorn River would be reduced by an estimated 8% from existing levels.	Long-term levels of sediment delivery to the Big Horn River would be about the same as with the Preferred Alternative. The risk of penetrating caves and karstic waterways by exploratory drilling would be greater than with the Preferred Alternative.	Sediment delivery to the Bighorn River would decline by an estimated 20% compared to existing levels.

SUMMARY

TABLE 2 (Continued)
SUMMARY COMPARISON OF IMPACTS

	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Causal Relationships and Impacts Common to All Alternatives	<p>The timber harvest level would allow a greater diversity of forest stands than Alternative A. Approximately 15% of the timber base would be maintained for old growth timber. The loss of timber from natural mortality, fire, disease, etc. would be reduced to between 100 and 150 MBF/yr. It is estimated that 20% of the rangeland would be in excellent condition, 40% in good condition, 14% in fair condition, 1% in poor condition, and 25% unclassified. Greater improvement in wetland/riparian areas would occur with this alternative than with either Alternative A or B.</p>	<p>The timber harvest level would result in greater diversity of the forest stands. Old growth, over-mature stands would eventually be reduced to approximately 5-10% of the timber base. The loss of timber from natural mortality, fire, etc., would be reduced to approximately 15-100 MBF/yr. An estimated 50% of the rangeland would eventually be in excellent condition, 20% in good condition, 10% in fair condition, and 20% would remain unclassified. Wetland/riparian habitat would be restored and improved faster than with Alternative A.</p>	<p>Overall the impacts would be nearly the same as those described for the Preferred Alternative. Site specific differences would occur within the allotments occupied by wild horses. Here upland vegetative cover would remain at about current levels and wetland/riparian areas would be degraded because there would continue to be trampling of vegetation, soil compaction, and forage use in wetland/riparian areas. Generally, wetland values would be degraded as compaction, sedimentation, peak water-flows, and erosion continues, resulting in lower water tables. These impacts would be insignificant compared to the cumulative environmental consequences of the management prescriptions for the entire resource area.</p>	<p>The timber harvest level would result in greater diversity of forest stands than Alternative A, but less than with the other alternatives. Old growth, over-mature stands would eventually be reduced to approximately 35-40% of the timber base. The loss of timber from natural mortality, fire, insects, etc. would be about 250-300 MBF/yr. An estimated 25% of the rangeland would eventually be classified in excellent condition, 45% in good condition, 7% in fair condition, and 25% unclassified. This alternative would provide the greatest potential for rapid restoration and improvement of all wetland/riparian areas.</p>
Vegetation	<p>Vegetation is also affected by surface disturbing activities, e.g., construction of drill pads, roads, pipelines, power lines, as well as forage consumption by livestock and wildlife, and loss of forage by fire on timber harvest. Implementation of grazing systems would result in a long-term improvement in range condition.</p>	<p>Continuation of current timber management would result in a loss of a large amount of timber on productive forest lands. Old growth and over-mature timber would remain on almost 80% of the timber base. This would perpetuate a loss of timber productivity and a decline in diversity of stand age and size class. Approximately 600 MBF/yr of timber would be lost to decay, disease, insects, etc. An estimated 10% of the rangeland would continue in excellent condition, 40% in good condition, 20% in fair condition, 5% in poor condition, and 25% unclassified. Overall, wetland/riparian habitat condition would stabilize and gradually improve as a result of continued implementation of new grazing practices within revised AMPs, the construction of protective fencing around wetland/riparian zones, and implementation of Habitat Management Plans.</p>	<p>Wildlife impacts would be the same as those described for the Preferred Alternative.</p>	<p>Livestock grazing management would accelerate the improvement of big game habitat and sage grouse habitat. The long-term abandonment of elk habitat would be less than with Alternative A but the amount of temporary abandonment would be slightly more, primarily due to increased timber harvest.</p>
Fish and Wildlife	<p>Actions which excavate, bury, overturn, clear, or grade previously undisturbed terrestrial habitat displace animals, increase stress, and cause some mortality to big game, small mammals, reptiles, and birds. The construction of drill pads, roads, pumping stations, pipelines, power lines, reservoirs, fences,</p>	<p>Most big game crucial winter and winter range would continue to deteriorate because of competition with livestock. Minerals and forestry actions would cause long-term abandonment of 12,000 acres of elk crucial winter range and 24,000 acres of elk winter range. Big game summer habitat, yearlong</p>	<p>Livestock grazing management would accelerate the deterioration of big game habitat and sage grouse habitat. Although the long-term abandonment of elk crucial winter range and elk winter range would be about the same as Alternative A, temporary abandonment would be greater.</p>	<p>Livestock grazing management would accelerate the improvement of big game habitat and sage grouse habitat. The long-term abandonment of elk habitat would be less than with Alternative A but the amount of temporary abandonment would be slightly more, primarily due to increased timber harvest.</p>

SUMMARY

TABLE 2 (Continued)
SUMMARY COMPARISON OF IMPACTS

	Causal Relationships and Impacts Common to All Alternatives	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Fish and Wildlife (Cont.)	<p>Spring developments, and communication sites make unusable wildlife habitat until site reclamation is completed. Loss of habitat would be expected to continue primarily in the sagebrush or grass vegetative type due to and gas activity and in timber areas due to timber harvest. Livestock grazing would affect fish and wildlife habitat throughout the resource area, especially in crucial habitat and wetland/riparian areas.</p> <p>In addition to direct loss of habitat by physical disturbance, some wildlife would abandon habitat temporarily or permanently because of its proximity to human disturbance, noise, noxious odors, soil and water contamination, or use by other animals.</p>	<p>Term by 6,000 and 4,000 acres, respectively. Generally, big game summer habitat, yearlong habitat, elk calving habitat, and elk spring, fall, and rutting habitat would all continue to deteriorate. Sage grouse habitat would also continue to deteriorate slowly.</p>	<p>habitat, elk calving habitat and elk spring, fall, and rutting habitat would all continue to deteriorate. Sage grouse habitat would also continue to deteriorate slowly.</p>			
Visual	<p>Visual character would be affected by mineral exploration and development (especially oil and gas activities) really actions, timber activities, livestock grazing, OKV use, recreation use, and watershed projects that change the line, texture, form, and color in ways that contrast with the natural surroundings.</p>	<p>Visual impacts associated with utility lines would generally be concentrated in utility corridors where they would cause less contrast with their natural surroundings than would occur with Alternative A. Visual impacts caused by timber activities on an additional 90 acres/yr would be greater than with Alternative A. Elsewhere, visual quality would be restored as range condition improves and watershed projects are established to stabilize soils.</p>	<p>The area's aesthetics would be affected by activities that change the line, texture, form, and color that contrast with the natural surroundings.</p>	<p>Visual impacts associated with utility lines would be similar to those described for the Preferred Alternative. Timber activities would cause greater visual impacts on the west slope of the Big Horn Mountains than any other alternative. In the long-term visual quality would also be restored on a greater portion of the resource area as more ABEs are implemented and range land conditions improve.</p>	<p>Visual impacts would be the same as those described for the Preferred Alternative.</p>	<p>Visual impacts associated with mineral activities, rights-of-way, timber activities, and recreation use would generally be concentrated in unrestricted areas where they would cause less visual contrast with their surroundings than would occur with the other alternatives.</p>

SUMMARY

TABLE 2 (Continued)
SUMMARY COMPARISON OF IMPACTS

Causal Relationships and Impacts Common to All Alternatives		Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Outdoor Recreation	Noise, odors, noxious fumes, hazardous chemicals, access restrictions, and surface disturbances would all affect recreation activities because the opportunities for certain types of recreation would be lost or the recreation experience would be degraded.	Recreation use would continue at near 270,000 user days per year. Approximately 8% of the Resource Area would remain in the semi-primitive nonmotorized, 74% in the semi-primitive motorized, 9% in the roaded natural, and 9% in the rural recreation opportunity spectrum classification.	Total recreation use would increase by an estimated 5% primarily as a natural increase in waterbased use. Semi-primitive nonmotorized and semi-primitive motorized recreation opportunities would decline while roaded natural recreation opportunities would increase compared to Alternative A.	Cumulative recreation impacts would be similar to those described for the Preferred Alternative. However, the less stringent minerals management prescription on the ACEC would increase the risk of penetrating caves by directional drilling compared to no leasing with the Preferred Alternative. Drilling could alter the microclimate, introduce pollutants, change the aesthetics, possibly close or flood passageways, and change the recreation experience of regionally or nationally significant caves.	Total recreation use would increase by a negligible amount (about 3%). Semi-primitive nonmotorized and roaded natural recreation opportunities would increase while semi-primitive nonmotorized recreation opportunities would decline slightly.
Cultural Resources	With each alternative most surface disturbing activities would be precluded by a Class III pedestrian inventory to identify cultural resources. Adverse impacts would continue to occur from trespass actions, illegal collecting, vandalism, failure to recognize or report important sites, and natural and accelerated erosion.	Same as impacts common to all alternatives.	Same as impacts common to all alternatives.	Same as impacts common to all alternatives.	Same as impacts common to all alternatives.
Wilderness	See Wilderness Supplement				
Wild Horses	Range condition within the wild horse area would improve or remain static; damage to range development would be reduced by an	Wild horses would continue to damage range developments such as fences or water sources. Upland basal vegetation cover would remain at	Impacts would be the same as with the Preferred Alternative.	Impacts would be the same as with Alternative A.	Impacts would be the same as with the Preferred Alternative.

SUMMARY

TABLE 2 (Continued)
SUMMARY COMPARISON OF IMPACTS

	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative O
Causal Relationships and Impacts Common to All Alternatives					
Wild Horses (Cont.)	<p>estimated 50 percent; and competition for forage would be reduced. Watershed condition would improve and erosion would decline by an estimated 5 tons/acre/year. Erosion due to peak flows would also be reduced. Since the use of wetland areas would be reduced by about 25 percent; less vegetation would be grazed or trampled and less soil would be compacted. Upland and riparian wildlife habitats would improve in the long-term.</p>	<p>about current levels. Wild horses would continue to cause erosion of 3 to 5 tons/acre/year. This would cause soil productivity to decline and peak water flows to increase. Sedimentation of wetlands would also increase. Wetland/riparian areas would be degraded because there would continue to be trampling of vegetation, soil compaction, and forage use in wetland/riparian areas. Generally, wetland values would be degraded as compaction, sedimentation, peak water flows and gully erosion continues, resulting in lower water tables.</p>	<p>The level of mineral exploration, development, and production activities would be about the same as with Alternative A.</p>	<p>The level of mineral exploration, development, and production activities would be about the same as with Alternative A.</p>	<p>Mineral exploration, development, and production activities would decline by less than 10% compared to Alternative A. About 1/3 of the wildcat wells drilled within the last 10 years would not have been permitted with this alternative.</p>
Land Uses	<p>The level of activity associated with coal, bentonite, gypsum, sand, and gravel exploration, development, and production would be similar among the alternatives. The number of lands and realty authorizations would be similar for each alternative although the locations could differ among alternatives. Stock trail use would be authorized with all alternatives and existing AMPS would be updated and modified. Timber harvest would be characterized by two-stage shelterwood harvest of mixed conifer and clearcutting of lodgepole pine. Precommercial thinning would occur on</p>	<p>Based on the level of activities over the past 10 years, about 90 wildcat wells and 310 wells within KGSS would be drilled within the next 10 years.</p>	<p>The level of mineral exploration, development, and production activities would be about the same as with Alternative A.</p>	<p>The level of mineral exploration, development, and production activities would be about the same as with Alternative A.</p>	<p>Mineral exploration, development, and production activities would decline by less than 10% compared to Alternative A. About 1/3 of the wildcat wells drilled within the last 10 years would not have been permitted with this alternative.</p>
	<p>Up to 143,000 AUMS of livestock grazing use would be permitted annually. There would be more summer, fall, and winter grazing use. The reduction of spring livestock use would reduce the supply of spring range. All wild horses would be removed from the Zimmerman Springs area. Approximately 1 million board feet of timber would be harvested from about 130 acres annually. Total recreation use would increase by an estimated 24%. All categories of recreation use would increase on each special recreation management area. Most</p>	<p>Up to 143,000 AUMS of livestock grazing use would be permitted annually. Spring grazing use would occur on 37 allotments, combined spring and other seasons of use on 126 allotments, summer use on 22 allotments, and fall and winter use on 28 allotments. As many as 80 wild horses would remain in the Zimmerman Springs area. An average of 375 MBF of timber would be harvested from about 40 acres annually. Total recreation use would continue at near 270,000 user days/year. Most of this use would continue to occur within the West Slope</p>	<p>Livestock grazing use could gradually increase from 143,000 AUMS to 182,000 AUMS, depending on implementation of grazing systems, development of range projects, etc. Spring use would occur on about 10% of the allotments, combined spring and other seasons of use on about 20% of the allotments, summer use on about 50% of the allotments, and fall and winter use on about 20% of the allotments. All wild horses would be removed from the Zimmerman Springs area. An average of 700 MBF of timber would be harvested from about 90 acres annually. Total recreation use would increase by about 3% from existing levels although recreation use on the West Slope</p>	<p>A maximum of 30 wild horses would continue to use the Zimmerman Springs area. Other land use impacts would be similar to those described for the Preferred Alternative.</p>	<p>Allowed grazing use would be reduced by up to 29,000 AUMS by eliminating all spring use and reducing or eliminating livestock grazing when it conflicts with other uses or values. Maximum authorized livestock use would be 114,000 AUMS. All wild horses would be removed from the Zimmerman Springs area. An average of 700 MBF of timber would be harvested from about 90 acres annually. Total recreation use would increase by about 3% from existing levels although recreation use on the West Slope</p>

SUMMARY

TABLE 2 (Continued)
SUMMARY COMPARISON OF IMPACTS

	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative O
<p>Causal Relationships and Impacts Common to All Alternatives</p> <p>450 acres of commercial forest land and timber stands in 20-30 year age class.</p>	<p>of this use would occur within the West Slope Recreation Use Area and fishing, hunting, and trapping would be the predominant recreation activities.</p>	<p>Recreation Use area. Fishing, hunting, and trapping, would continue to be the predominant recreation activities.</p>	<p>harvested from about 150 acres. Total recreation use would increase by 5% from existing levels. Most of this use would be hunting, fishing, and trapping.</p>		<p>Special Recreation Management area and fishing, hunting, and trapping would decline slightly because of seasonal access restrictions.</p>
<p>Land Uses (Cont.)</p>					
<p>Socio-economics</p> <p>Mineral exploration and development, farming, ranching, and tourism and recreation related businesses would remain the area's major economic activities. Government employment sector, followed by agriculture, services and retail, and mining. The socioeconomic impacts of mineral activities, except for tar sand development, would be essentially the same for all alternatives and would change very little from current levels. In the agricultural sector, only the livestock portion would be affected. The economic activity generated by any of the timber management alternatives would account for less than 0.1% of total local business activity and related employment. Changes in hunting, fishing, and trapping would result in no more than 0.4% change in regional business activity or employment. None of the alternatives would cause significant economic impacts to the local economy, although some individuals or businesses may experience a noticeable impact from various alternatives.</p>	<p>The level of livestock sales, resulting regional business activity, and employment from livestock grazing are expected to remain the same as with Alternative A. Total annual output value from timber harvest would be over \$200,000 higher than with present management. Employment increases would total about 4.5 man years in the timber sector and 6 man years for the total economy. Recreation user expenditures would increase by an estimated 12% and increase annual business activity by about \$1.6 million by the fifth year of implementation.</p>	<p>Since this alternative continues present management, no significant social or economic changes would be expected.</p>	<p>Cumulative net annual change during the 18 year adjustment period would cause area sales to increase at least \$22.6 million, regional business activity by almost \$44.5 million, and labor requirements by roughly 72 workers. Annual post adjustment differences between Alternative A and B includes over \$2 million in additional area sales and almost \$4.4 million in increased regional business activity.</p>	<p>Impacts would be the same as with the Preferred Alternative.</p>	<p>During the first 18 years, net sales related to agriculture and recreation would decline more than \$22 million and net business activity would decline by about \$44 million. Subsequent net area employment would drop by a total of about 40 workers. Following the five year adjustment period for recreation use, annual net differences between Alternative O and A would include over \$1 million in net sales and about \$360,000 more in net business activity. Related employment levels are not expected to change beyond the adjustment period.</p>

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1 Purpose Of and Need For Action

INTRODUCTION

This Resource Management Plan/Environmental Impact Statement evaluates alternative land use plans for the management of public lands and resources in the Washakie Resource Area. Each alternative analyzed in detail represents a complete and reasonable plan which could be used to guide the management of the Washakie Resource Area.

The process for the development, approval, maintenance, and amendment of RMPs and their associated EISs was initiated under the authority of section 202(f) of the Federal Land Policy and Management Act of 1976 (FLPMA) and section 202(c) of the National Environmental Policy Act of 1969 (NEPA). The process is guided by Bureau of Land Management planning regulations in Title 43 of the Code of Federal Regulations, part 1600 (43 CFR 1600), and Council on Environmental Quality Regulations (40 CFR 1500).

Development of the RMP represents the land-use planning phase of the planning system, and as such, prescribes the future resource and land use management for the public lands in the Washakie Resource Area. It is this process of resource and land use allocations that guides activity planning and daily operations.

The activity planning phase of the system incorporates the resource use decisions of the RMP into the specific management guidance for administering the resource area. During activity planning, the management prescriptions in the resource management plan are applied to specific local areas in developing activity plans (e.g., allotment management plans, habitat management plans), in issuing use authorizations, in identifying mitigation needs, and in other similar plans and actions.

After it is completed, the Washakie RMP will be kept current through minor maintenance,

amendments, or revisions, as demands on resources change, as the resources themselves change, or as new information is acquired.

PURPOSE AND NEED

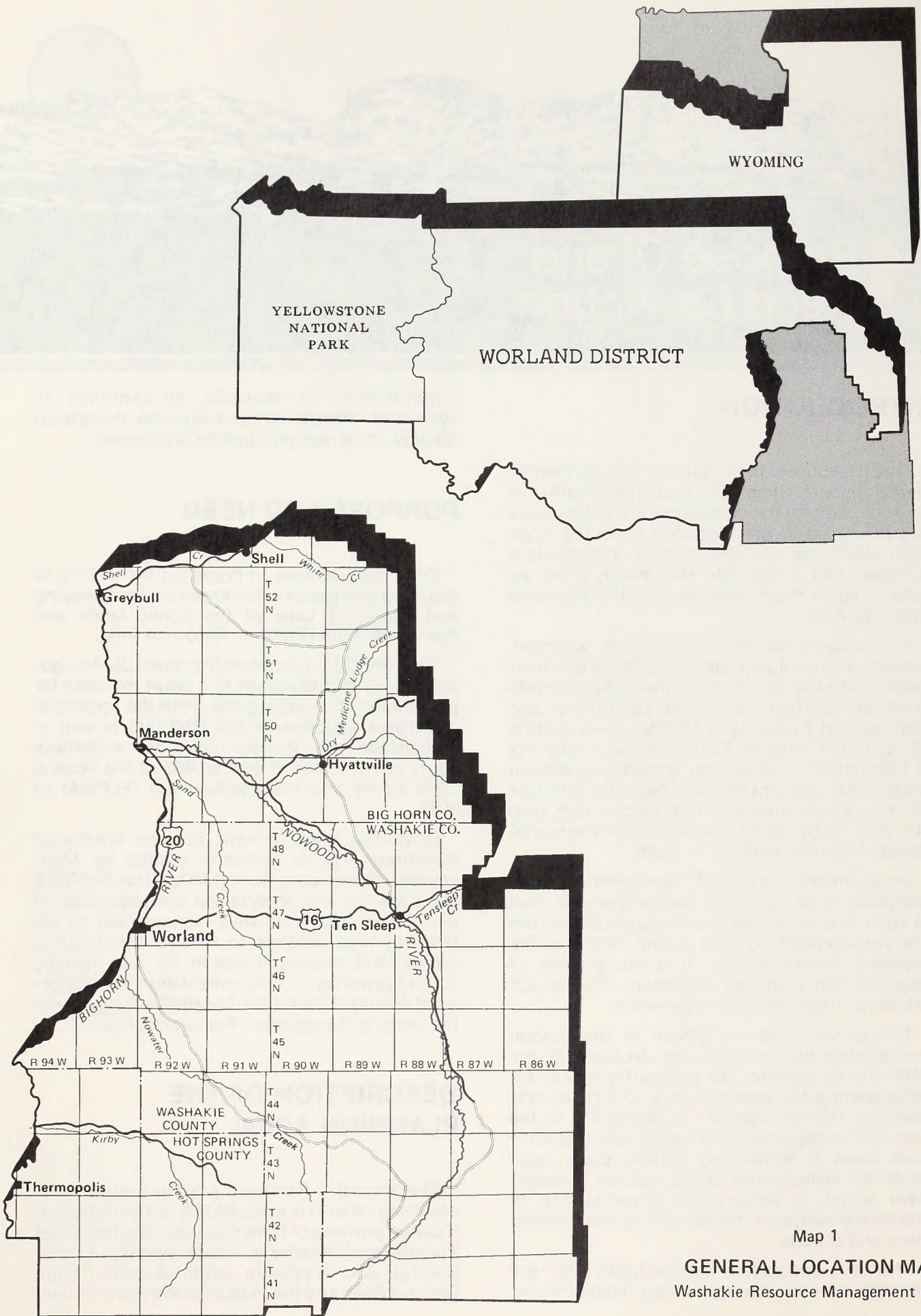
The major purpose in preparing the RMP is to provide a comprehensive framework for managing and allocating uses of the public lands and resources in the Washakie Resource Area.

This RMP/EIS complies with present BLM rangeland policy and responds to a court mandate for preparation of a grazing EIS. With the appended wilderness supplement, the RMP/EIS is also in compliance with Bureau policy for wilderness study as mandated in section 603 of the Federal Land Policy and Management Act (FLPMA) of 1976.

Resource management for the Washakie Resource Area is currently guided by Management Framework Plans (MFPs). This RMP/EIS will consider and analyze the consequences of the current and alternative management of the resource area; attempt to resolve the resource issues; and provide direction for site specific activity planning and implementation of management actions in the future. The RMP will supersede the existing Management Framework Plans.

DESCRIPTION OF THE PLANNING AREA

The Washakie Resource Area in north-central Wyoming (Map 1) is in the BLM's Worland District. It covers portions of three counties: Big Horn, Hot Springs, and Washakie. Those portions of Hot Springs and Washakie counties east of the Bighorn River and the portion of Big Horn County



Map 1
GENERAL LOCATION MAP
 Washakie Resource Management Plan

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east of the Bighorn River and south of Shell Creek are within the resource area. Lands in the Wind River Indian Reservation and the Bighorn National Forest within the area described above are excluded from the planning area.

In the resource area, a total of about 1.23 million acres of land surface (Map 2 in map pocket) and 1.6 million acres of mineral estate (Map 3 in map pocket) are under BLM management. About 63 percent of the area's total surface acreage is public land. Within the resource area, the counties have varying amounts of public lands: Big Horn County about 370,000 acres (30 percent of the public surface in the resource area), Hot Springs County about 173,000 acres (14 percent of the public surface), and Washakie County about 691,000 acres (56 percent of the public surface). The public lands are used primarily for mineral development, livestock grazing, and recreational use. An additional 724,000 acres of private and state lands are within the boundaries of the resource area. Most of the private land was originally patented under agricultural land laws.

The major urban center is Worland, with a 1980 population of 6,391. Smaller towns in the resource area include East Thermopolis, Ten Sleep, Hyattville, Shell, and Manderson. Subdivisions adjacent to public lands in the Washakie Resource Area are located in Canyon Creek near the town of Ten Sleep, on the Bighorn River near Hot Springs State Park, and in the Shell Valley between the towns of Greybull and Shell in Big Horn County.

The climate of the Washakie Resource Area is representative of the Big Horn Basin. Higher elevations generally have cooler temperatures and more moisture than do the lower elevations. The higher elevations have a typical mountain climate — cooler summers, cold winters, winter snows, spring rains, and frequent intermittent summer showers. The lower elevations have a typical semi-desert climate — hot summers, cold winters with frequent mild days, and low precipitation. Moisture comes in winter snows and spring rains. Severe thundershowers occasionally occur throughout the area. Snow generally makes the higher elevations inaccessible during the winter and early spring. The lower elevations are accessible yearlong.

In general, throughout the Washakie Resource Area, 35 to 40 percent of the total annual precipitation is received during May and June, the critical moisture period for optimum plant growth. Climatological data indicates that the moisture distribution pattern between years in the Basin is quite erratic.

Although the average summer temperatures (the average of the daily high and low temperatures) for the lower elevations in the planning unit are relatively mild (ranging from 66 degrees in June to 70 degrees in August), daily high temperatures of 100+ degrees occur almost every summer. Normally, the highest temperatures occur in July and August, the warmest months of the year. Average summer temperatures in the higher elevations of the area are markedly cooler, averaging six to ten degrees cooler than the temperatures at lower elevations.

Winter temperatures normally are mild at lower elevations, averaging 16 degrees in January, the coldest month of the year. Although the exception rather than the rule, lows of 37 and 45 degrees below zero have been recorded along the Bighorn River. The lowest winter temperatures for this area normally range between 20 and 25 degrees below zero.

For the most part, winds are absent to light over the entire resource area. A majority of the winds are associated with localized storms which pass through the area. In the lower elevations, the spring months (April, May and June) are the windiest months of the year. The winter months are probably the windiest at the higher elevations.

The frost-free period varies in direct proportion to elevation. Along the Bighorn River which lies around the 4,000 foot elevation zone (msl), the frost-free growing period varies from 126 to 144 days. At the upper elevations (8,000 to 9,000 feet), the frost-free growing period ranges from 66 to 84 days.

Lack of moisture is one of the most critical factors affecting vegetation growth in the lower elevations of the area. In the higher country, this factor is not as critical, although when coupled with a short, frost-free growing season, the combined effects take on serious proportions.

THE PLANNING PROCESS

Action Steps in the Planning Process

The RMP process consists of nine action steps, which are described below and illustrated in Figure 1.

Step 1: Identification of Issues

Step 1 is intended to identify resource management problems, conflicts, or opportunities that

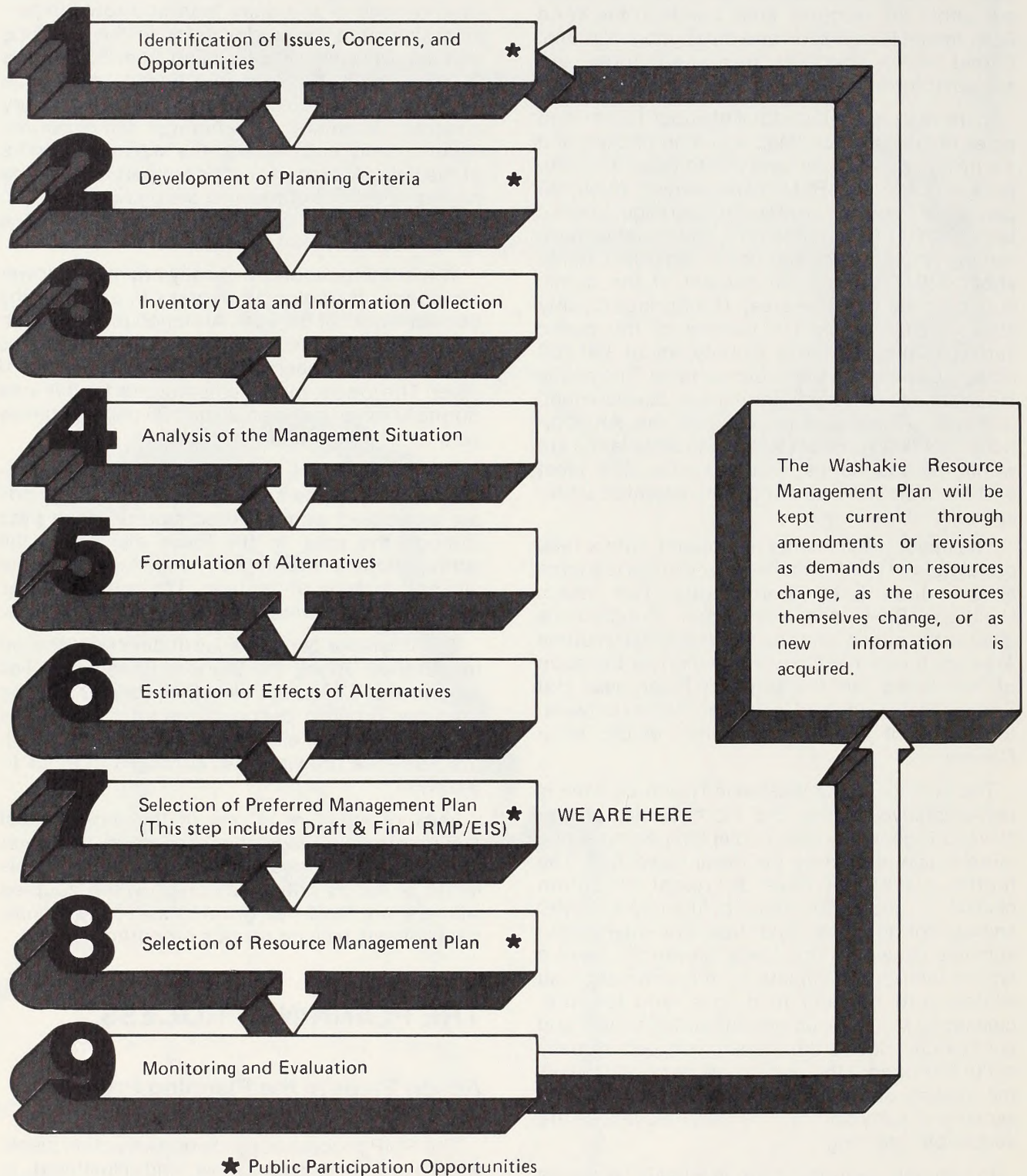


Figure 1
**STEPS IN THE RESOURCE MANAGEMENT
 PLANNING PROCESS**

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can be resolved through the planning process. The BLM managers and specialists from the Washakie Resource Area and Worland District staffs held several internal scoping meetings. The public, other federal agencies, and state and local governments were also asked to participate in the scoping process. Information from these sources was combined by BLM into four general land-use planning issues appropriate for resolution in the RMP/EIS process.

Step 2: Development of Planning Criteria

Step 2 involves development of criteria to identify the standards, guidelines, and constraints that would apply to the planning process. These criteria are the “sideboards” that were applied by the specialists so that their work was focused on resolution of the issues. The original criteria were made available to interested parties for review. Criteria were revised as the planning issues were defined.

Step 3: Inventory and Data Collection

Step 3 allows for the collection of various kinds of issue-related resource, environmental, social, and economic data. During this phase, soil surveys were completed, and limited information was collected on range conditions and wildlife habitat. Information was also obtained from grazing lessees regarding management opportunities and

typical operations of individual ranches. Existing information was used for all other aspects of the plan.

Step 4: Analysis of the Management Situation

The analysis of the management situation (MSA) supports all the subsequent steps in planning. Each specialist on the interdisciplinary team wrote a detailed analysis of his or her program (area of responsibility), in terms of the four parts of the MSA listed below. The MSA is available for review at the Washakie Resource Area office.

The MSA consists of four parts:

1. The physical profile describes each resource, the present demands on the resource, and the social and economic condition of the planning area. This section serves as the basis for the affected environment discussion.
2. Current management describes current management practices by resource and the status of on-going programs. This section serves as the basis for the description of the no action alternative and identifies the basis for the planning issues.
3. Implications of current management describes current conflicts or problems. This section relates to the discussion of the environmental consequences of the “no action” alternative.

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4. The objectives and alternatives describe opportunities for BLM to resolve the planning issues and to meet future needs. This section is the range of alternatives.

Step 5: Formulation of Alternatives

Five alternatives, which are described in Chapter 2, were formulated by an interdisciplinary team.

Alternative A, the "no action" alternative, continues present management. Alternatives B, C, and D place emphasis on various levels of resource use and environmental protection. The preferred alternative is a combination of alternatives B, C, and D.

Step 6: Analysis of Effects of Alternatives

In step 6, the physical, biological, social, and economic effects of implementing each alternative are assessed. This step is the environmental impact analysis required by NEPA. The analysis is presented in Chapter 4.

Step 7: Selection of the Preferred Management Plan

Selection of the preferred management plan was based on public input and coordination, current BLM management policies and directions, and analysis of the impacts of each alternative. The Wyoming State Director, in conjunction with other BLM managers, selected a combination of parts of Alternatives B, C and D as the preferred management plan because they believe this plan offers the best opportunity for balanced management and for resolving the issues in the resource area.

Step 8: Selection of the Proposed Resource Management Plan

Based on the results of public review and comment, the Wyoming State Director will select a proposed resource management plan and publish it along with a final EIS. The selection and approval of the resource management plan is made after a 30 day protest period on the proposed plan. Any person who participated in the planning process and who has an interest which is or may be adversely affected by adoption of the plan may protest its approval. A protest may raise only those issues which were submitted for the record during the planning process.

Step 9: Monitoring and Evaluation

Step 9 involves monitoring the selected plan after it is implemented and evaluating the results of implementation. Data on long-term trends and resource conditions will be collected and analyzed to determine the effectiveness of the plan. Monitoring of the plan's effectiveness will continue indefinitely from the time the plan is implemented and may result in revisions of the plan or any portion of it as changing conditions dictate.

Issues addressed in the Washakie RMP/EIS

Four issues are addressed in this document. These issues were based on the input of BLM personnel and the public, and on interagency consultation. The issues are listed below with their related planning questions. The planning questions relate to necessary decisions or resource allocations that the RMP/EIS must answer.

Issue 1: Affects on Vegetative Resources

There are conflicting demands for consumptive and nonconsumptive uses of the vegetative resources in the Washakie Resource Area. The basic problem is providing for resource values such as watershed protection, plant maintenance and wildlife habitat while allowing consumptive uses such as livestock grazing, timber harvest, off-road vehicle use, and vegetation removal during oil and gas development or mining. Questions that must be answered in the plan include:

1. Where and under what conditions should timber management be pursued?
2. Should a wild horse herd be maintained in the Zimmerman Springs herd area and, if so, at what level?
3. What livestock stocking levels are appropriate and what accommodations need to be made in order to provide for big game populations?
4. What management practices and resource development projects will help achieve management objectives for public lands in "I" category allotments in the Washakie Resource Area?
5. What areas are suitable for livestock grazing? What management practices should apply and where should they be applied?

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6. Where and in what condition should elk habitat be managed in the Washakie Resource Area?
7. What management practices or restrictions are needed to maintain or improve habitat for elk, mule deer, antelope, sage grouse, and trout? In what areas of the resource area will these management practices or restrictions be applied?
8. What management practices should be applied to provide essential habitat for threatened and endangered or sensitive wildlife species? In what areas of the resource area should these practices be applied?
9. What vegetative uses and management practices should be allowed on wetland/riparian and aquatic habitat?
10. What watershed management practices are needed to reduce soil erosion in the Kirby Creek and Nowater Creek drainages?
11. Where and under what conditions should fire be used as a vegetative management tool?

Issue 2: Special Designations

There are areas, values or resources in the Washakie Resource Area that meet the criteria for protection and management under special management designations, including wilderness or Outstanding Natural Areas (ONAs). There are unique resources or values that are in danger of being lost or that may be considered hazardous which would be suitable for special management emphasis under designation as Areas of Critical Environmental Concern (ACECs). Questions that need to be answered in the plan regarding those areas include:

1. Which wilderness study areas should be recommended for wilderness designation?
2. What management practices or restrictions are needed to protect unique values in wilderness study areas that would not be recommended for wilderness designation?
3. What special designation, if any, should be applied to the Tres Charros/Bad Medicine and the Great X Cave systems? What should be the management emphasis for those cave systems?
4. What special designation, if any, should be applied to the Madison and Big Horn Formation recharge zones in the area of the Upper Dry Medicine Lodge and Trapper

Creek drainages? What should be the management emphasis for those recharge zones?

5. What other areas should be designated for special management? What designations are appropriate? What should the management emphasis be for those areas?

Issue 3: Affects on Water Resources

There is concern that surface disturbing and other activities, especially grazing, mineral development, and Off-Road Vehicle (ORV) use, may be directly or indirectly affecting ground and surface water supplies in the Washakie Resource Area. Questions that need to be answered in the plan include:

1. What conditions of use should be applied to activities that cause or have the potential to cause adverse affects to surface and sub-surface water quality and quantity?
2. What remedial actions should be taken to improve water quality in situations where surface or ground water quality is at an unsatisfactory level?

Issue 4: Adequacy of Resource Accessibility and Manageability

The value of some resources is enhanced by accessibility or usability. In order for a resource to be used, it must be accessible (in terms of legal and physical access) and manageable (in terms of ability to apply constraints or requirements to benefit other resources). There are resources or land areas, such as oil and gas, tar sand, or scattered tracts of public lands, which should be managed in a manner that assures their availability for public use. Conversely, there are also resources which could be damaged or destroyed by too much access or by access at inappropriate times. These resources, such as visual, cultural or wildlife values, must be managed to preserve their integrity. Questions that need to be answered in the plan include:

1. Where should utility corridors be established?
2. Which public land tracts are potentially suitable for disposal (transfer from BLM administration by exchange, state indemnity selection, etc.)? Which non-public land tracts may be suitable for acquisition through exchange or easement?
3. Where should physical or legal access, or both, be acquired?

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4. Which areas of Federal coal in the resource area are acceptable for development and for further consideration for leasing?
5. What areas should be leased for oil, gas or tar sand development? Where should "no surface occupancy" or other conditions of use be applied to leases? What special conditions should apply to tar sand mining? What areas could be leased for mineral development without special conditions?
6. What areas are so important for some forms of recreation that only certain types of human activities can be tolerated? What are those forms of recreation? What are those activities?
7. Where should recreation use, including ORV use, be authorized and under what conditions should it be permitted?

PLANNING CRITERIA

Planning criteria are the constraints or ground rules that are developed to guide and direct the development of the resource management plan. Planning criteria were used to guide the collection and use of inventory information, the analysis of the management situation, the formulation of alternatives, the analysis of alternatives, and the selection of the preferred alternative.

Alternative Formulation Criteria

The following planning criteria were used in formulating the alternatives. The planning criteria for the other planning steps are available for review at the Washakie Resource Area office.

- “Short-term” refers to a period of ten years or less. “Long-term” is a period of ten years or more, but less than 50 years.
- A range of alternatives for livestock use, including no livestock grazing, should be considered.
- All alternatives should provide all habitat components in sufficient amounts to support Wyoming Game and Fish Strategic Plan population goals for all wildlife species.
- All alternatives should allow for some increase in vegetative cover in the East Fork Nowater Creek, Kirby Creek and Nowater Creek watersheds.
- Watershed alternatives should provide for the development of needed surface use restrictions.
- Collectively, the alternatives should consider a range of timber harvest levels, each of which should allow for recreation and wildlife uses.
- In all alternatives, range development projects should help meet allotment and multiple resource management objectives.

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- Fire management objectives should be considered in each alternative. Those objectives should help meet other resource management objectives.
- All alternatives should assume a continuation of oil and gas leasing. However, the levels and locations of leasing and the kinds of stipulations required may vary among the alternatives.
- At least one alternative should provide for removal of all wild horses from the Washakie Resource Area.
- Other alternatives should provide for wild horse use and attempt to protect soil, water and vegetative resources.
- All alternatives should maintain or improve wetland/riparian habitat.
- All alternatives should provide for the protection or enhancement of essential habitat for threatened & endangered wildlife species.
- At least three alternatives should be considered for each wilderness study area, including all wilderness, no wilderness (no action), and partial wilderness.
- All alternatives should consider protection of caves through management actions and should include consideration of special management emphasis to protect caves.
- All alternatives should consider protection of West Slope canyons from adverse affects of oil and gas development, forestry, grazing and recreational activities.
- All alternatives should consider management of Madison Formation recharge zones through the use of some form of special management.
- All alternatives should provide for maintaining existing water quality and quantity while attempting to meet other resource management objectives.
- Different levels of recreational use should be considered, ranging from maximizing use to reducing recreational use in order to enhance other resources and values.
- Designation of Special Recreation Management Areas (SRMAs) should be considered.
- All alternatives analyzed in detail should be reasonable and attainable within future budget levels and available personnel.

Evaluation Criteria for Alternatives

Additional planning criteria were used to evaluate the reasonableness of the various alternatives once they were developed. These criteria include:

- Availability of public land for use and development of commodities, including:
 - leasable minerals,
 - locatable minerals,
 - salable minerals,
 - timber harvest,
 - areas suitable for livestock grazing,
 - lands suitable for disposal, and
 - utility and transportation corridors.
- Impacts on surface values, including:
 - wildlife habitat condition,
 - wilderness characteristics,
 - watershed (soil and water),
 - wetland/riparian habitat,
 - range vegetative condition, and
 - recreational opportunities.
- Management efficiency or effectiveness.
- Consistency with federal, state, and local plans.
- Social and economic impacts.
- Implementation requirements.
- Compatibility with adjoining land uses.
- Compliance with laws, regulations, and policy.

Evaluation Criteria for Hydrocarbon Potential

A special set of criteria was developed relative to the leasing of hydrocarbons (oil, gas, tar sand, coal, oil shale) to aid in the development of alternatives. The Washakie Resource Area was divided into regions of high, moderate, and low potential for hydrocarbon occurrences. This delineation was made by inference from available geologic information, reports of past production, and input from the minerals industry. The resulting broad classifications were used in the design of alternatives, to minimize the impact on the development of hydrocarbons or to minimize the impacts of hydrocarbon development on other resources, values and uses, while following the management prescriptions for each alternative. Because they are so broad, these classifications

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are not intended to predict future activity nor the location of new discoveries. The estimates of oil and gas activity that are presented under each alternative in Chapter 4 were developed from analysis of past activity and production in the specific areas to be closed or restricted under each alternative.

Special Evaluation Criteria for Public Land Withdrawal and Classification Orders in Effect On and After January 1, 1981

On February 10, 1986, Federal Court Judge Joseph H. Pratt issued a preliminary injunction order, in the National Wildlife Federation (NWF) vs. Robert F. Burford, et. al. (Civil Action No. 85-2238 D.C.D.C.). This order instructs the BLM to manage public lands in conformity with the express conditions contained in land withdrawal and land classification orders that were in effect from January 1, 1981, to date. For the purposes of this EIS, that requirement of Judge Pratt's order will be satisfied by addressing all of those withdrawals and classifications, including any that have been terminated, in the description and analysis of Alternative A (the continuation of existing management or "no action"). The descriptions and analyses of all other alternatives, including

the Preferred Alternative, are to be consistent with the objectives of each respective alternative, i.e., if any of the withdrawals and classifications would be terminated under a given alternative(s), they must be addressed accordingly in the appropriate alternative(s).

It should be understood that Judge Pratt's preliminary injunction order does not preclude the BLM from considering alternative allocations of the affected public lands and their resources to different uses. Nor does it preclude the BLM from making land use planning decisions that would allocate them to different uses. It does, however, preclude BLM from "implementing" a decision that would be contrary to withdrawal and classification orders as they existed on and after January 1, 1981, unless or until the pending litigation is resolved. Thus, BLM could take no action on the lands involved that would be contrary to the withdrawals and classifications until the law suit is settled and, then, only if the action is consistent with the Court's decision.

The BLM has appealed the preliminary injunction order. If the appeal is successful, those actions that were taken to terminate withdrawal and classification orders between January 1, 1981, and February 10, 1986, will have been effective. Such prior termination actions in the Washakie Resource Area, that are affected by the preliminary injunction order, are noted where appropriate in this EIS.



2 Alternatives Including the Proposed Action

ALTERNATIVE FORMULATION

The basic goal in formulating RMP alternatives is to identify various combinations of public land uses and resource management practices that respond to the planning issues. Each alternative represents a complete and reasonable plan to guide future management of public land and resources. One alternative represents “no action,” which is a continuation of present management. Other alternatives are to provide a range of choices for solving the problems identified as being the result of present management. They were formulated by placing varying degrees of emphasis on environmental protection or resource use.

The BLM resource management planning regulations and Council on Environmental Quality (CEQ) regulations, based on the National Environmental Policy Act (NEPA), require the analysis of alternatives to determine the impacts they would cause and to compare the differences among the alternatives. It is that analysis that permits managers to choose the alternative, or combination of alternatives, that becomes the preferred alternative.

This chapter presents five resource management alternatives including the Bureau’s preferred alternative. The preferred alternative generally allows resource use with greater emphasis on protection of the natural environment than Alternatives A or B. It is made up of the management prescriptions for wild horses and watershed management from Alternative D, a combination of leasable mineral prescriptions from Alternatives B, C, and D, and the remaining resource management prescriptions from Alternative C. Alternative A is the continuation of current management. Alternative B emphasizes developing and using natural resources; it does provide for environmental protection, even though the major emphasis is on resource use. Alternative

C allows resource use with more emphasis on protection of the natural environment. Alternative D emphasizes the protection and enhancement of environmental quality and limits uses and development of resources that do not protect or enhance the quality of the natural environment.

MANAGEMENT COMMON TO ALL ALTERNATIVES

Some management actions described in this section reflect ongoing management that is deemed adequate and would remain unchanged no matter which alternative is chosen as the preferred alternative. Other management actions in this section were developed as parts of the various alternatives. The characteristics of those actions are such that they will remain the same under any alternative. Thus, the following management guidance is applicable to, and constitutes a part of, each alternative. It is presented here to avoid repetition.

Minerals Management

Leasable Minerals

Among the leasable minerals found in the resource area are oil, gas, coal, tar sand, and oil shale. Only oil, gas and tar sand are discussed in detail in the various alternatives.

Oil and Gas. All public lands not formally closed to leasing are open for consideration for exploration and development of oil and gas. Any decisions reached in the RMP that would affect oil and gas leasing or add restrictions to oil and gas exploration and development activities are subject to valid existing rights. Once an oil and gas lease has been issued, it constitutes a valid

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existing right and BLM cannot unilaterally change the terms and conditions of that lease. However, reasonable and necessary stipulations may be added; but they may not be inconsistent with the original intent of the lease. Therefore, in each alternative where consideration is given to applying permanent “no surface occupancy” restrictions on oil and gas activities or closing an area to oil and gas leasing, existing leases would not be affected and the decisions could not be fully implemented until a lease expires and the new restrictions are added to new leases issued for the same area.

Contingency plans for the release of hydrogen sulfide gas (H₂S or “sour gas”) are required for all drilling proposals which would penetrate a known or suspected H₂S-bearing formation. These plans provide for detection of H₂S, countermeasures to control the release, and, if necessary, controlling access to the drill site, notifying appropriate law enforcement agencies, and evacuating the public in the expected radius of exposure.

Tar Sand. Oil and gas leases on about 5,100 acres in the Spanish Point Karst Area were issued after enactment of the Combined Hydrocarbon Leasing Act (CHLA) of 1981. As a result, an estimated six tar sand deposits projected to exist in the leased area can be developed through strip mining or other means under the right granted by the leases. It is assumed that prospective tar sand deposits would be developed in the short-term (through about 1992 when the leases expire) at the rate of about 10 acres per year. Any leases held by production of tar sand (or oil and gas) on the expiration date would remain in effect. Leases not developed would expire. The decision to re-lease or not, and what stipulations would apply, would be in conformance with the management prescriptions in the selected alternative.

Coal. Coal leasing and development is not an issue for the RMP. The coal in this area of Wyoming has either unknown or low development potential in the foreseeable future. No leasing and development interest was identified by anyone during the call for coal resource information, the issue identification process, or during the alternative formulation process. Therefore, the coal screening process, including the application of unsuitability criteria, has not been conducted at this time. This does not imply, however, that coal exploration, leasing and development is incompatible with this plan. Coal exploration would be allowed under the guidance established for surface disturbing activities presented in Appendix A. If an application for a coal lease is received sometime in the future, an appropriate

land-use and environmental analysis, including the coal screening process, will be conducted to determine whether or not the coal areas applied for are acceptable for development and for leasing consideration. The RMP will be amended as necessary.

With the exception of Big Horn County, the federal coal lands in the Washakie Resource Area (see Map 20, Chapter 3) are not within a designated coal production region. Federal coal leasing in areas outside of designated regions may be considered apart from the competitive leasing process set out in 43 CFR 3420.3 through 3420.5-2. This is essentially done on a case-by-case basis, called “Leasing on Application,” under the appropriate provisions of 43 CFR 3425 (note that the sale and issuance of federal coal leases under these provisions is still done through a competitive bidding process).

Currently, Big Horn County is within the boundaries of the Powder River Coal Production Region. While a public recommendation has been made to remove the county from the region, a decision is still pending. Should the county be removed from the region, coal exploration and consideration for leasing would be handled as described in the paragraph above. Should Big Horn County be retained in the coal region, exploration would still be allowed as described above. However, the completed Washakie RMP will not identify or make any federal coal lands in the county available for leasing consideration. Thus, in the event the county remains in the coal region, any future consideration of federal coal leasing in that area would first depend upon identified development potential, substantiated interest in development, environmental analysis and amendment of the RMP (including conduct of the coal screening process) to determine any federal coal areas that are acceptable for development and for leasing consideration. Leasing consideration would then be conducted under the competitive leasing process described in 43 CFR 3420.3 through 3420.5-2.

Locatable Minerals

All public lands not formally withdrawn or segregated from mineral entry are open for exploration and development of locatable minerals. Only bentonite and gypsum are discussed in detail because they are the primary locatable minerals found in the Washakie Resource Area. Discretionary management of locatable minerals is limited. If necessary, areas of special interest or high sensitivity would be formally withdrawn from mineral entry through a lengthy process. In other

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situations, the regulations listed in 43 CFR 3809 and agreements made with the State of Wyoming pursuant to those regulations would be applied to reduce unnecessary and undue degradation of resources as a result of mining. It is expected that bentonite reserves would continue to be developed on a large scale and the development of gypsum would also continue but in very isolated locations and on a very small scale under all alternatives.

Approximately 47,000 acres are withdrawn or are pending withdrawal from mineral location to protect resources from damage by mining. Additional areas may be proposed for withdrawal from mineral location on a case-by-case basis since withdrawal is a valid technique for protection of areas with special values.

Abandoned mine sites would be recommended for reclamation under the Abandoned Mined Land Program (Map 4).

Salable Minerals

Sales and free use of salable minerals, such as sand and gravel, would occur in existing pits along the Bighorn and Nowood rivers and near Manderson and Ten Sleep. Any new material extraction sites would be subject to site specific analysis.

Important geologic landmarks, including fourteen known sites, would be protected through the

use of surface protection stipulations and discretionary management authority. (A list of geologic landmarks and their locations is on file at the Washakie Resource Area Office.)

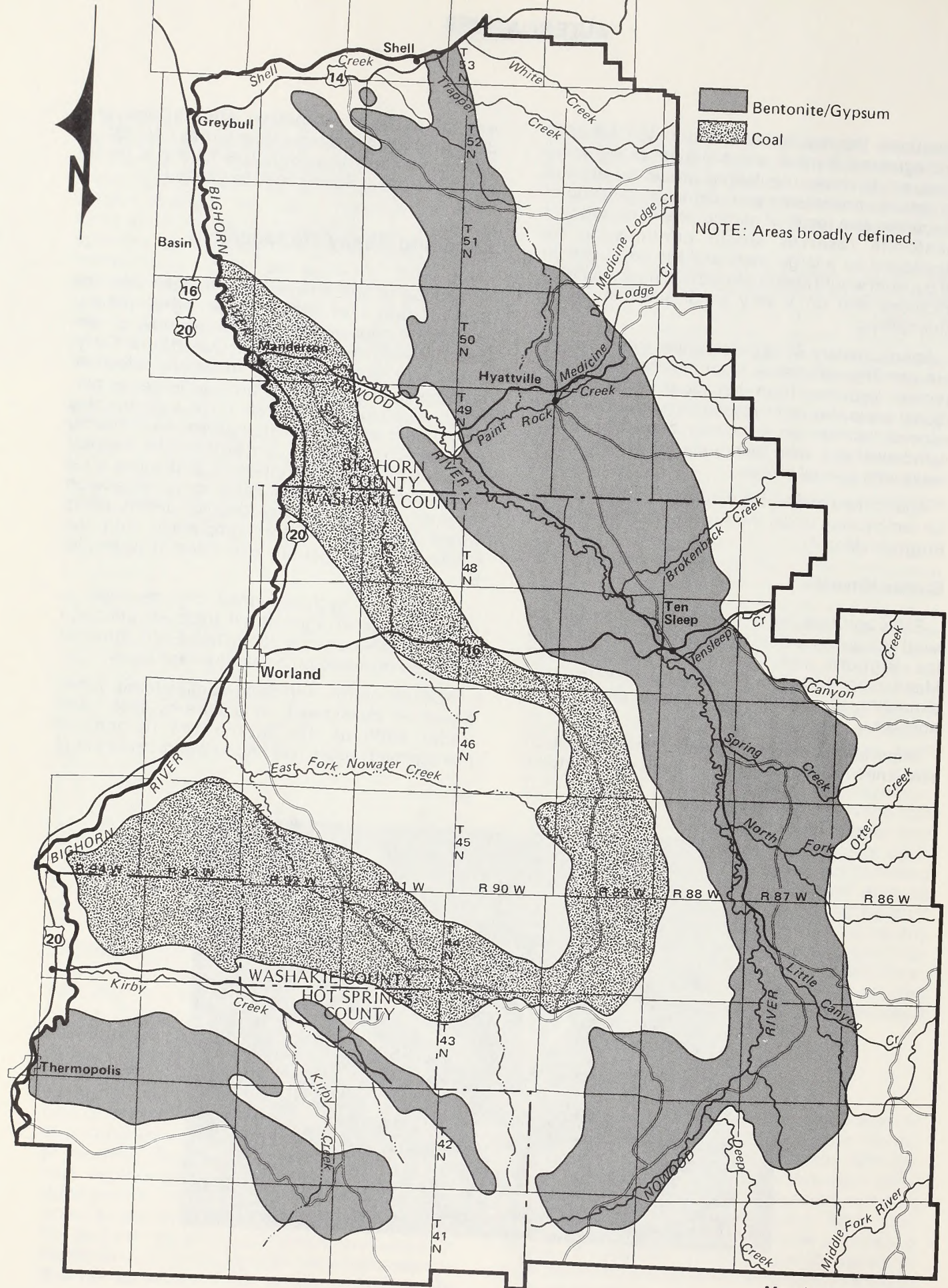
Land and Realty Management

Disposal of public lands (e.g., transfer from the administration of the BLM to other federal agencies, or local or state governments, or disposal through methods such as Desert Land Entry, public sale, exchange, State indemnity selection, or Recreation and Public Purposes leases or patents) would be considered on a case-by-case basis under each of the alternatives. Areas having tracts which may have future potential for disposal are shown on Map 5. Appendix B includes a list of tracts which may be suitable for consideration for disposal. Prior to any disposal action, lands would be evaluated for compliance with the disposal criteria that are also listed in Appendix B.

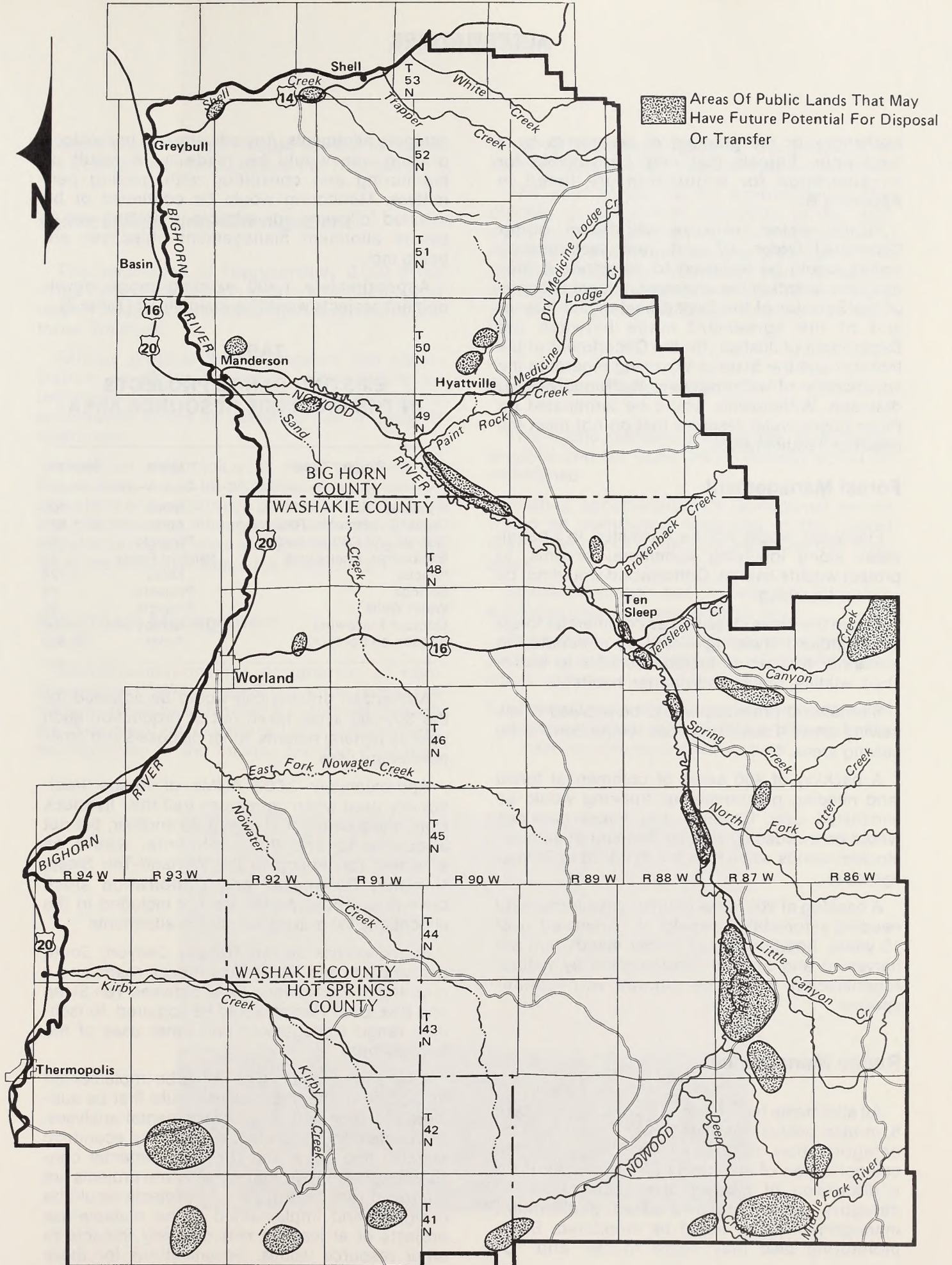
Disposal or exchange may also be used to resolve cases of agricultural trespass, although no cases are currently identified. Each situation would be reviewed on a case-by-case basis.

Acquisition of non-BLM-administered lands would be considered on a case-by-case basis under each of the alternatives to achieve management objectives. Acquisition could entail

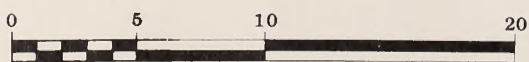




Map 4
MINERALS MANAGEMENT
 Areas Where Abandoned Mine Sites
 May Occur
 Washakie Resource Management Plan



Map 5
LAND AND REALTY MANAGEMENT
 Potential Future Land Transfer
 Washakie Resource Management Plan



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exchanges or the granting of easements by a landowner. Parcels that may be suitable for consideration for acquisition are listed in Appendix B.

Public water reserves withdrawn under Secretarial Order 107 and other classification orders would be reviewed to determine if they meet the retention requirements of legal opinions of the Solicitor of the Department of the Interior and of the agreement made between the Department of Justice (for the Department of the Interior) and the State of Wyoming regarding the adjudication of water rights in the Bighorn River drainage. Withdrawals would be terminated on those public water reserves that do not meet the retention requirements.

Forest Management

Fuelwood would not be harvested in riparian areas along low-lying ephemeral streams, to protect wildlife habitat. Cottonwood would not be sold for fuelwood.

Within the areas classified as commercial forest land, timber harvesting would be conducted in a manner that would include benefits to watershed, wildlife, or wetland/riparian habitat.

Silvicultural practices would be allowed in elk calving areas if such practices would benefit the calving areas.

A backlog of 450 acres of commercial forest land needing precommercial thinning would be eliminated over 10 years and future backlogs would be avoided by regular thinning of all overstocked stands when they reach the 20 to 30 year age class.

A backlog of 200 acres of unstocked forest land needing reforestation would be eliminated over 10 years. Additionally, all timber stands that are harvested and are not reestablished by natural regeneration would be planted with conifer species.

Range Management

All allotments have been categorized. (See Map 6, in map pocket, for allotments, Appendix C for categorization criteria, Appendix D for the categorization of allotments and Appendix E for a discussion of grazing management.) All "I" category allotments and existing allotment management plans would be monitored. Some monitoring also may occur in "M" and "C"

category allotments. Any adjustments in livestock grazing use would be made as a result of monitoring and consulting with grazing permittees. Monitoring would be continued or be initiated following adjustments in grazing use to assure allotment management objectives are being met.

Approximately 1,400 existing range development projects would be maintained (Table 3).

TABLE 3
EXISTING RANGE PROJECTS
IN THE WASHAKIE RESOURCE AREA

Project Type	Units	Number
Pipelines	Miles	105
Dams, Catchments, Reservoirs	Acres	1,827
Corrals and Cattleguards	Projects	69
Exclosures, Enclosures	Miles of Fence	24
Fences	Miles	1,124
Springs	Projects	45
Water Wells	Projects	91
Contour Furrowing	Acres	1,100
Sagebrush Spraying	Acres	35,340

Authorized grazing use would be adjusted for the 300-500 acres taken out of production each year by mineral patents, other disposals and other permanent uses.

Approximately 2,000 AUMs of forage traditionally used when permittees trail their livestock from one pasture or allotment to another, but not allocated to specific allotments, would be allocated for trailing in the Worland-Ten Sleep, Nowater, Rome Hill, and Cottonwood stock driveways. These AUMs are not included in the allocations for grazing within the allotments.

Public access on the Trapper Canyon, South Brokenback, and North Brokenback roads and a crossing of the Nowood River between Ten Sleep and Box Elder Ranch would be acquired, to facilitate range management and other uses of the public lands.

Any range projects that would be implemented under any of the alternatives would first be subjected to economic and environmental analyses. Adequate information to determine the economic benefits and costs and the environmental consequences would be collected before projects are approved for construction. All projects would be designed and implemented to be multiple-use projects or at least to minimize any impacts to other resource values. Specifications for these

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projects are contained in BLM Manual 1740 and the BLM Manual Handbooks in the 1740 series.

Cultural Resource Management

The nomination of approximately 2,000 acres in the Paint Rock Canyon area as an archeological district would be completed after additional inventories are made.

Salvage projects and emergency site stabilization on about 15 known sites would be undertaken. Additional sites needing salvage or stabilization would be identified during Class III inventories.

Important paleontological sites, including 75 known sites, would be protected through the use of surface and subsurface protection stipulations and discretionary management authority. (A list of paleontological sites and their locations is on file at the Washakie Resource Area Office.)

Wilderness Management

Recommendations for designation or non-designation of Wilderness Study Areas (WSAs) as wilderness will be submitted to Congress through the Director of the Bureau of Land Management, the Secretary of the Interior and the President.

Whatever decision is made by Congress will be common to all alternatives addressed in the RMP.

The descriptions of the alternatives in this chapter do not include references to the management prescriptions that would occur on the nearly 68,000 acres in wilderness study areas. The detailed analyses of wilderness study areas and management prescriptions related to the WSAs are in the Wilderness Supplement to the RMP/EIS.

Recreation Management

The Castle Gardens and Middle Fork campgrounds and the Lone Tree Trailhead would be maintained.

Existing opportunities for recreational access would be maintained, especially in the Laddie Creek, Paint Rock Creek and Upper Nowood River areas.

Special recreation permits would be issued to authorize organized recreational use.

Recreational use of caves would be managed under a cave management plan. Goals of the plan would include:

1. Promoting the significance and importance of cave resources through interpretive and educational programs and techniques.



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2. Protecting and maintaining cave resources, including wildlife species and habitat in and around caves, by interpreting, restricting, and/or prohibiting nonconforming uses.
3. Enhancing user experiences and opportunities by managing use at levels compatible with resource carrying capacity and protection.
4. Ensuring visitor protection and safety.

Recreational use would be managed to maintain or improve wetland habitat conditions along intensively used streams and reservoirs.

Fish and Wildlife Habitat Management

The West Slope Habitat Management Plan (HMP) would be expanded to include those portions of the Washakie Resource Area not presently covered by the plan.

The West Slope and Bighorn River Habitat Management Plans would be fully implemented, including completion of the projects listed in Table 4.

TABLE 4
PROJECTS IDENTIFIED IN
HABITAT MANAGEMENT PLANS

Project Type	Number of Projects	
	West Slope ¹	Bighorn River ¹
Surveying	5	7
Water Wells	10	0
Wildlife Guzzlers	150	0
Riparian Exlosures	75	6
	(750 acres)	(310 acres)
Other Fence Projects	70	5
	(10 miles)	(5 miles)
Spring Developments	25	0
Reservoir Developments	20	0
Pothole Developments	0	1
Vegetation Plantings & Seedings	0	1
Prescribed Burning	3	0
	(500 acres)	

¹ Wildlife Habitat Management Plan.

Wetlands would be managed to maintain and improve habitat through implementation of changes in livestock grazing systems and specific practices contained in the West Slope and Bighorn River HMPs. Specific practices may include such

things as plantings, fencing, installing structures, using buffer zones, controlling water levels, and preventing siltation. Habitat which would be involved is estimated to include:

- 70 miles of sport fisheries streams,
- 120 miles of perennial streams,
- 450 miles of intermittent/ephemeral streams,
- 80 springs, and
- 170 reservoir sites.

Wildlife habitat management would be accomplished through protection of habitat from destruction or negative impacts, and by habitat development or manipulation. The goal of habitat management would be to increase habitat quality, concurrent with an increase in habitat availability for the majority of wildlife species. Protection of habitat would be accomplished through such methods as improving range condition; increasing animal security by controlling access; designating seasons of use in important wildlife habitat, or reducing disturbances; providing buffer zones; and eliminating competing uses on important areas, such as livestock grazing on parturition areas during calving seasons. Specific numbers, types, and locations of projects and conditions of their development would be prescribed in habitat management plans to solve problems and meet management objectives. Wildlife-related guidelines for vegetation manipulation are listed in Appendix F. Techniques that would be used to develop or manipulate habitat include the following:

- Land acquisition,
- Farming,
- Prescribed burning,
- Protection or development of water sources,
- Fence construction,
- Fence maintenance,
- Island development,
- Timber management,
- Access management,
- Construction of artificial structures, and
- Management of other resource activities to conserve forage and protect habitat.

The improvement of existing habitat quality does not include an allocation of forage to wildlife. Allocations of forage would not be conducted until monitoring has been completed. For wildlife, the improvement of forage availability and habitat condition are more meaningful than forage

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allocation. An increase in habitat quality would be reflected first in healthier wildlife populations and then in increased numbers of wildlife. This eventually translates into more animals and more opportunities for wildlife-related recreation.

Threatened and Endangered Wildlife Species

Approximately 536,000 acres that provide habitat or potential habitat for threatened and endangered species (three species—bald eagle, peregrine falcon and black-footed ferret) and sensitive species identified by the State of Wyoming (66 individual species and one group of species—bats) would be protected and managed to benefit those species. (Refer to the glossary for descriptions of the sensitive species categories. A list of the sensitive species is on file at the Washakie Resource Area Office. Refer, also, to Map 27 in Chapter 3.) Some or all of the 536,000 acres could be designated in the future by the U.S. Fish and Wildlife Service as critical habitat for threatened and endangered species.

Whenever activities would be proposed in endangered, threatened, or sensitive species habitat, the BLM would complete either a clearance (for minor actions and projects) or a

biological assessment (for major actions or projects requiring an EIS) to determine if approval for the action or project should be granted. Any action that would affect an endangered or threatened species or its habitat would necessitate consultation with the U.S. Fish and Wildlife Service, as required by Section 7 of the Endangered Species Act of 1973, as amended.

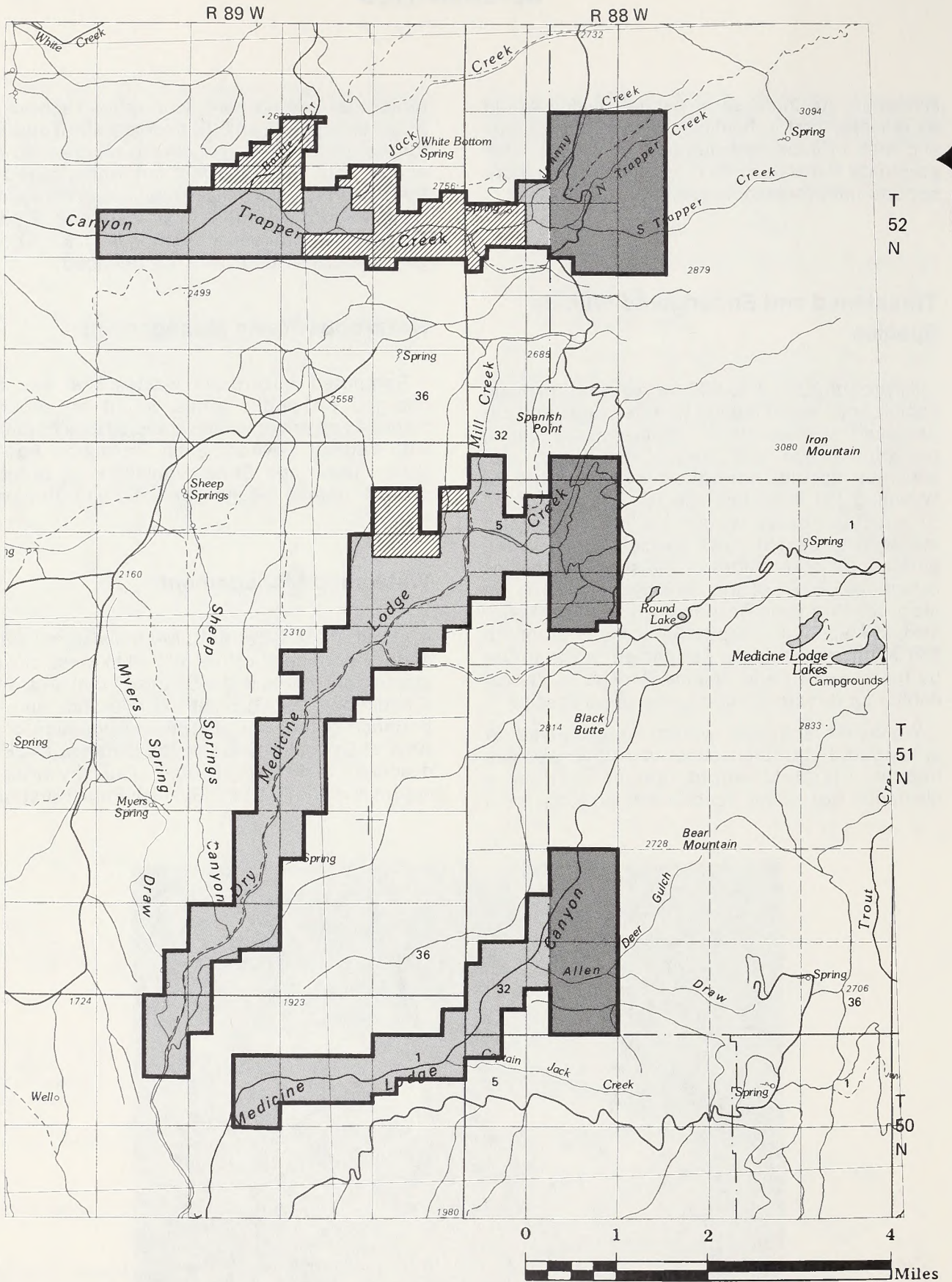
Hazardous Waste Management





Regulated hazardous wastes that are discharged on public lands would be secured, disposed of, or otherwise remedied in accordance with Federal Environmental Protection Agency (EPA), BLM, and State regulations in order to protect human health, welfare, and the environment.

Watershed Management

About 11,200 acres of BLM-administered public surface or mineral estate related to karst, sinking streams and caves in the Spanish Point area (Map 7 and Appendix G) meet the relevance and importance criteria for potential designation of an Area of Critical Environmental Concern (ACEC), described in 43 CFR 1610.7-2. Thus, by virtue of approval of the RMP, the Spanish Point Karst Area





-  ACEC Boundary
-  BLM Administered Surface and Subsurface
-  USFS Surface/BLM Administered Subsurface
-  Private Surface/BLM Administered Subsurface

Map 7
WATERSHED MANAGEMENT
Spanish Point Karst ACEC
 Washakie Resource Management Plan

ALTERNATIVES - PREFERRED ALTERNATIVE

would be designated as an ACEC, to highlight the need for special management of the area and to focus management attention on the resource values of the area which are at risk. Within the boundaries of the ACEC are lands in the national forest system and privately owned surface. The designation of an ACEC would pertain to the surface and mineral estate managed by the BLM and to the BLM-administered federal mineral estate under private and forest system lands. The non-BLM-administered surface would not be affected by the designation of the ACEC.

Streams in west slope canyons, including White, Trapper, Medicine Lodge, Dry Medicine Lodge, Paintrock, North Brokenback, Canyon, Otter, Little Canyon and Deep Creeks, would be managed to maintain their natural flow patterns. To prevent watershed deterioration and sedimentation of these pristine stream systems, the Wyoming Standard Stipulations for Surface Disturbing Activities would be applied.

All watershed projects would be maintained on a priority basis. Projects with the highest priority for maintenance, from a watershed standpoint, are the following:

- Seventeen reservoirs or detention dams would be repaired and about 50 acres of habitat associated with their sediment pools would be fenced (Table 5).
- Spreader dikes would be repaired to maintain 900 acres of spreader capacity in the Wild Horse Draw drainage.

Oil and gas exploration wells and geophysical drill holes that produce water may be acquired by BLM, developed, and managed for livestock, wildlife, or recreation purposes when they meet the criteria listed in Appendix H.

The BLM would file with the Wyoming State Engineer's Office to obtain valid water rights on all water-related projects. All existing projects have been filed on through the Wyoming Water Division No. 3 adjudication. The State is now in the process of adjudicating water rights associated with those projects.

Fire Management

Reclamation and soil stabilization actions would be applied to burned areas. Additionally, livestock grazing would be controlled on burned areas, through the use of such methods as fencing.

Prescribed fire would be used to achieve management objectives, especially on Allotment Management Plans (AMPs) and Habitat Manage-

ment Plans (HMPs). Prescribed burning would be conducted in a manner that would avoid violation of the Wyoming Ambient Air Quality Standards.

Limited suppression of wildfires would occur in wetland/riparian areas.

TABLE 5
RESERVOIRS OR DETENTION DAMS IN NEED OF REPAIR TO IMPROVE WATERSHED MANAGEMENT

Township	Location		Name
	Range	Section	
50	95	2 NWSE	Lostwell
50	91	15 NWNW	Pete
48	90	30 NESW	Hidden Dome No. 2
47	91	24 NWNW	Kelly's Dee
47	90	19 SWNE	Doc's Tinker
47	90	21 NWSW	Old
47	90	15 NWSE	Otter
47	90	11 NESE	Big Cottonwood
47	89	24 SENW	Tensleep Stock Trail
47	89	35 SENE	Rice No. 1
46	89	30 SWNE	Rattlesnake
46	89	28 NWNW	Rice No. 2
46	88	28 NESW	Kimball Flat
45	89	33 SENW	Buffalo Detention Dam
44	88	3 NWNW	Joe's
44	88	22 NENW	New
44	88	22 NWSW	Dode

DESCRIPTION OF ALTERNATIVES ANALYZED IN DETAIL

This section describes five resource management alternatives, including the Preferred Alternative. See Table 1 for a summary comparison of these alternatives.

Preferred Alternative

The Preferred Alternative generally allows resource use with greater emphasis on protection of the natural environment than Alternatives A or B. The Preferred Alternative is made up of the management prescriptions for wild horses and watershed management from Alternative D, a combination of leasable mineral prescriptions from Alternatives B, C, and D, and the remaining resource management prescriptions from Alternative C.

ALTERNATIVES - PREFERRED ALTERNATIVE

Mineral Management

Oil and Gas. Oil, gas, and tar sands would be leased with the Wyoming BLM Standard Stipulations for Surface Disturbing Activities, or future modifications of those stipulations. Additional stipulations may be applied at the time of leasing to mitigate impacts not covered by the Wyoming BLM standard stipulations (Map 8 and Appendix A).

—Approximately 11,200 acres in the Spanish Point Karst ACEC (about 1 percent of the federal mineral estate) would not be leased (Table 6).

—Approximately 86,100 acres (6 percent of the federal mineral estate) would be leased with a permanent “no surface occupancy” stipulation (standard stipulation number 4) to protect important wildlife habitat, and cultural and recreation sites.

—Approximately 985,600 acres (61 percent of the federal mineral estate) would be leased with a seasonal “no surface occupancy” stipulation (standard stipulations number 2a or 2b) to protect important wildlife habitat.

—Approximately 520,000 acres (33 percent of the federal mineral estate) would be leased

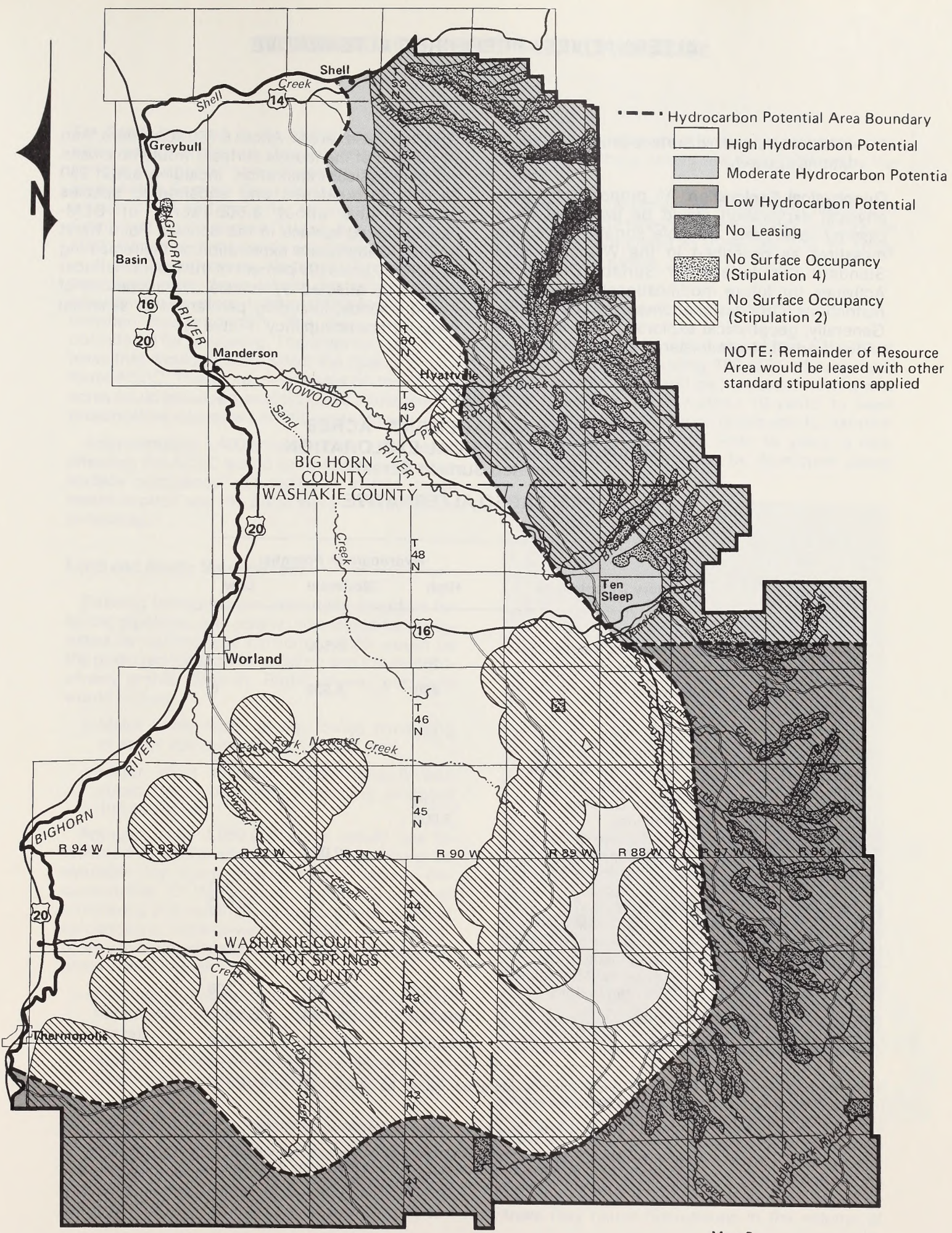
TABLE 6
MINERALS MANAGEMENT - ACRES OF OIL AND GAS LEASE RESTRICTIONS BY HYDROCARBON POTENTIAL
PREFERRED ALTERNATIVE

Category	Lease Stipulation	Hydrocarbon Potential ¹ Mineral Estate Acres (Estimated)		
		High	Moderate	Low
Lease Restrictions (General)				
No Lease ²		0	11,200	0
Permanent No Surface Occupancy ²		400	35,700	50,000
Seasonal No Surface Occupancy		524,600	184,000	277,000
Lease Under Other Stips		437,000	57,100	26,000
<i>(Note: Numbers rounded)</i>				
Specific Areas with No Surface Occupancy Lease Restrictions				
Permanent:				
West Slope Canyons	4 ³		35,600	47,900
Middle Fork Powder River	4			900
T&E Species Nesting Area	4	250		
Castle Gardens Campground	4	110		
Bates Battlefield	4			1,040
Medicine Lodge Archeological Site	4		100	
Seasonal:				
Sage Grouse Leks	2c	9,450	2,770	1,890
Elk Calving Areas	2c		5,400	12,200
Sage Grouse Habitat	2b	337,000	92,900	62,100
Crucial Elk Winter Range	2a	4,800	78,800	41,200
Elk Winter Range	2a	173,300	4,000	159,500

¹ Refer to “Evaluation Criteria for Hydrocarbon Potential” in Chapter 1 for a description of the methodology used to determine hydrocarbon potential.

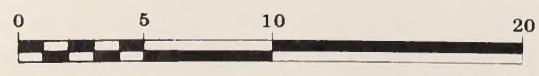
² “No lease” or “no surface occupancy” stipulations would be phased in over the life of the plan by application of those restrictions on leases as they are considered for renewal or first-time issue. These stipulations would not be applied retroactively to existing leases.

³ Refer to Appendix A, “Wyoming BLM Standard Stipulations for Surface Disturbing Activities”, for a description of lease stipulations.



- Hydrocarbon Potential Area Boundary
- High Hydrocarbon Potential
- Moderate Hydrocarbon Potential
- Low Hydrocarbon Potential
- No Leasing
- ▨ No Surface Occupancy (Stipulation 4)
- ▨ No Surface Occupancy (Stipulation 2)

NOTE: Remainder of Resource Area would be leased with other standard stipulations applied



Map 8
**Preferred Alternative
 MINERALS MANAGEMENT
 Oil and Gas Leasing**
 Washakie Resource Management Plan

ALTERNATIVES - PREFERRED ALTERNATIVE

with other standard surface protection stipulations applied.

Geophysical Exploration. All proposals for geophysical exploration would be evaluated on a case-by-case basis. Suitable surface protection measures as described in the Wyoming BLM Standard Stipulations for Surface Disturbing Activities (or future modifications), and access restrictions (ORV designations) would be applied. Generally, geophysical exploration would not be allowed on BLM-administered surface in oil and

gas "no lease" areas. About 6,750 acres (less than 1 percent of the federal surface) would be closed to geophysical exploration, including about 250 acres of threatened and endangered species habitat and about 6,500 acres of BLM-administered surface in the Spanish Point Karst ACEC. Geophysical exploration on the remaining 1,227,250 acres (99 percent of the federal surface) would be affected by vehicle use limitations of various kinds, including permanent or seasonal "no surface occupancy" (Table 7).

TABLE 7
MINERALS MANAGEMENT - ACRES
OPEN TO GEOPHYSICAL EXPLORATION
(Estimated Surface Acres)
PREFERRED ALTERNATIVE

Category Descriptions	Hydrocarbon Potential		
	High	Moderate	Low
Closed ¹			
Spanish Point Karst ACEC		6,500	0
T&E Species Habitat	250		
Total Closed	250	6,500	0
Limited ²			
ORV Play Area	130		
Permitted/Licensed Use			
West Slope Canyons		40,300	47,900
Existing Roads & Trails			
Castle Gardens	110		
Wetlands	3,000		
Time or Season of Use			
Medicine Lodge		12,000	
Designated Roads & Trails			
Middle Fork			900
Upper Nowood			32,000
Laddie Creek		4,700	
Designated Roads & Trails and/or Season of Use			
Crucial Wildlife Habitat or Fragile Soils	404,000	114,000	171,200
Total Limited	407,240	170,700	252,000
Total Open	333,000	44,500	20,000

NOTE: All geophysical exploration would be subject to ORV use designations (see table 8).

¹ "Closed" applies to areas that are not open for leasing of oil and gas.

² "Limited" applies to areas open for leasing of oil and gas but subject to Wyoming BLM Standard Stipulations for Surface Disturbing Activities including permanent or seasonal "no surface occupancy."

ALTERNATIVES - PREFERRED ALTERNATIVE

Tar Sand. Included in the above acreage under other surface protection stipulations or under "no surface occupancy" stipulations are about 55,000 acres in the Spanish Point Karst area which were leased for oil and gas prior to enactment of the Combined Hydrocarbon Lease Act (CHLA) of 1981. Deposits of tar sands are projected to exist in those leased areas. Because of constraints associated with those leases, tar sands cannot presently be developed. When those leases expire between now and 1991, the areas would be considered for re-leasing. There are no pre-CHLA lease that would directly affect the Spanish Point Karst ACEC. Therefore, new leases on the 55,000 acres could be issued, subject to the management prescriptions contained in this alternative.

Approximately 1,400 acres in post-CHLA leases affecting the ACEC would be re-leased with a "no surface occupancy" stipulation if, in fact, those leases expired and the areas were considered for re-leasing.

Land and Realty Management

Existing transportation and utility corridors for roads, pipelines, and power lines would be designated as right-of-way corridors which would be the preferred location for existing and future right-of-way grants (Map 9). Right-of-way corridors would include:

- Major linear rights-of-way zones consisting of about 250 miles (40,000 acres), and
- Major short segment linear rights-of-way zones (as in oil fields) consisting of about 105,000 acres.

Approximately 1,089,000 acres would not be included in designated corridors but would be available for rights-of-way under certain circumstances. Of this amount, about 250 acres of threatened and endangered species habitat would be classed as right-of-way exclusion areas. Right-of-way avoidance areas would total about 368,000 acres consisting of:

- Potential threatened and endangered species habitat and wetland/riparian habitat (250,000 acres),
- Semi-primitive nonmotorized Recreation Opportunity Spectrum (ROS) areas (117,300 acres), and
- Cultural Resource Sites (750 acres).

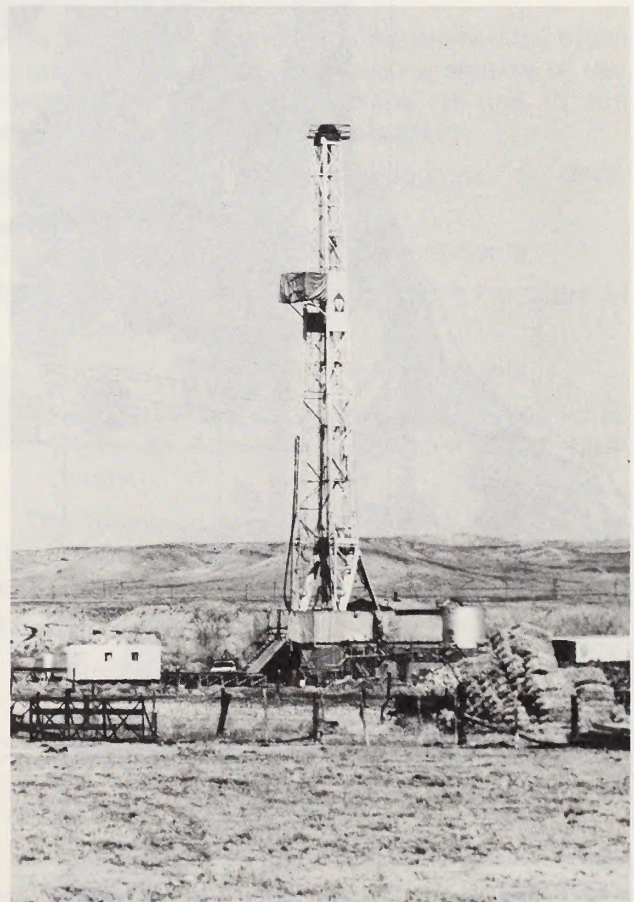
Classification and Multiple Use Act retention and disposal classifications (orders W-12616 and W-12617) on approximately 144,500 acres in Hot Springs County would be terminated. Dis-

cretionary management activity in areas formerly covered by these orders would be dictated by the RMP.

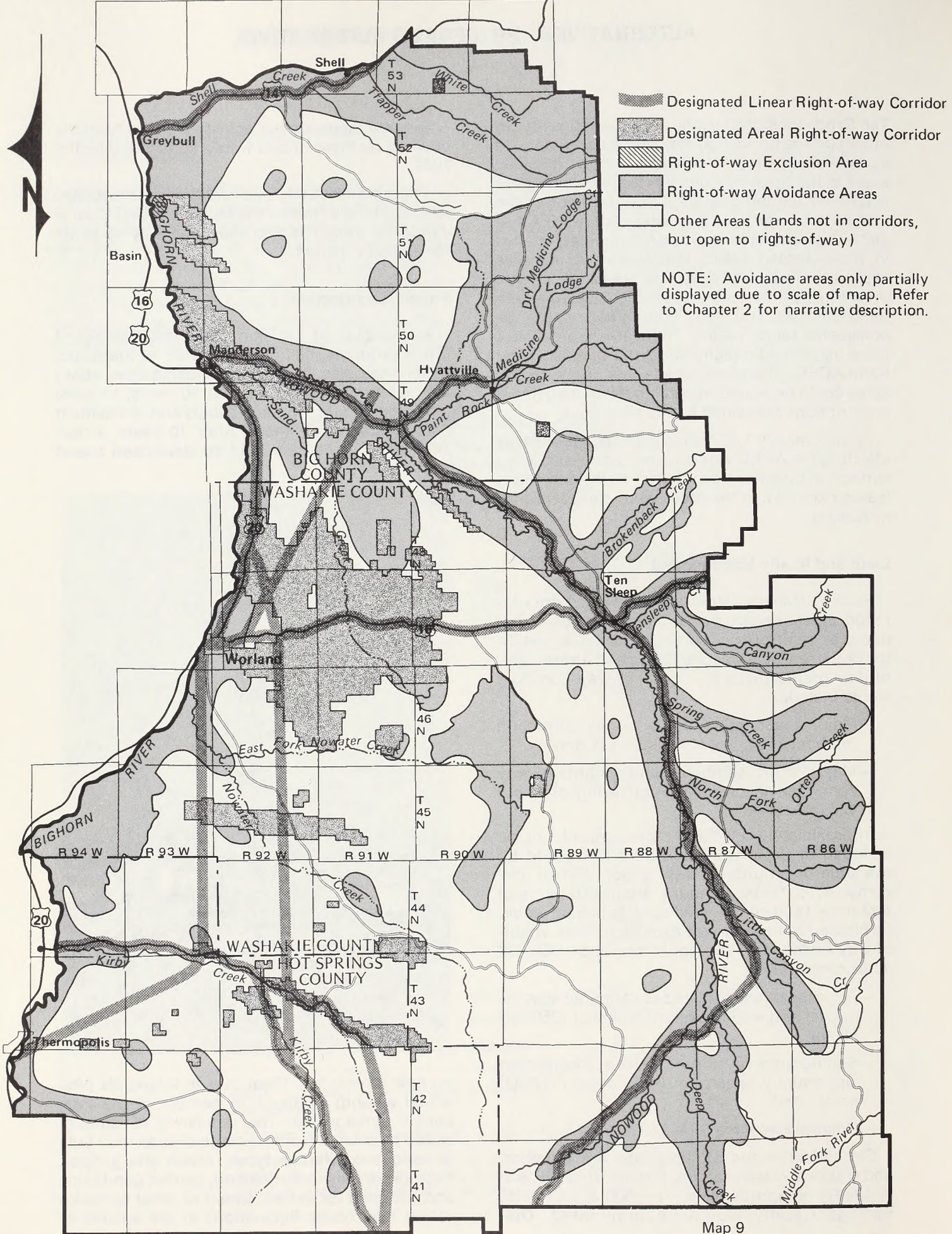
The administrative site withdrawal associated with Worland's Green Hills Municipal Golf Course would be terminated to allow the City to apply for an R&PP patent.

Forest Management

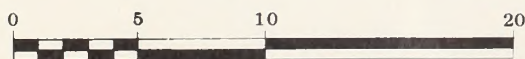
A maximum of 1 million board feet (MMBF) of forest products including 100 MBF of fuelwood, posts and poles, would be harvested from about 130 acres annually, for about 10 years, to meet local demand for timber products and to maintain healthy stands of timber. After 10 years, a new allowable cut figure would be developed based



on new inventories. Clear-cuts in lodgepole pine would amount to about 15 percent of the total annual acreage cut. The remaining 85 percent would be selective or two-stage shelterwood cuts in various coniferous types, aspen and juniper. Factors such as local demand, market conditions and the need for enhancement of other resource values may cause fluctuations in the volume of



Map 9
**Preferred Alternative and Alternative C
 LANDS AND REALTY MANAGEMENT
 Corridor Designation**
 Washakie Resource Management Plan



ALTERNATIVES - PREFERRED ALTERNATIVE

timber harvested in any one year. Harvest levels would not exceed the long-term sustained yield of the forest base. Harvests would be designed to:

- Improve wildlife cover and other habitat conditions,
- Maintain existing levels of thermal cover for wildlife,
- Increase forage production for wildlife or livestock,
- Compensate for loss of wildlife habitat because of natural tree mortality,
- Harvest stands with heavy tree mortality and fuels accumulation,
- Increase aspen cover,
- Increase timber stand diversity and age structure,
- Augment water yields on a temporary basis,
- Reduce fire danger,
- Increase recreational opportunities in healthy, vigorous timber stands,
- Provide fuelwood cutting opportunities, and
- Improve health and vigor of vegetation in stream buffer stands.

Special management techniques would be applied to obtain the management goals of timber production and enhancement of other resource values if traditional forms of logging are not possible or if stands are not purchased when offered for sale. These may include:

- Helicopter logging,
- Burning instead of logging,
- Disease treatment by spraying, and
- Spraying of grasses and shrubs to eliminate competition with tree species.

Wild Horse Management

All the wild horses in the Zimmerman Springs Wild Horse Herd Area (Map 6 in the map pocket) would be removed from the area and be made available for adoption through BLM's Adopt-A-Horse Program or be relocated to a designated Wild Horse Herd Management Area in the Worland District. Removal would reduce competition with livestock in the Zimmerman Springs area and would reduce damage to range developments, soil and vegetation.

Range Management

This alternative serves as the proposed action for the range management program.

Authorized livestock grazing use would not exceed 143,000 AUMs annually.

Livestock grazing would continue on all 307 allotments administered by the Washakie Resource Area until adequate data is available to support adjustments. Season of use and kind and class of livestock would be adjusted to improve vegetative resources on a case-by-case basis or as AMPs are developed on the allotments. These adjustments would allow for good or better range condition on an estimated 960,000 acres, over the long-term. Various management actions would be implemented to accomplish these objectives. Among the actions that may be used are those listed in Appendix E.

Seasons of use would be established on those allotments that currently have no season of use designated. Projected seasons of use in the allotments would occur as follows:

1. No particular season designated, no allotments,
2. All spring, 5 percent of the allotments,
3. Combination spring and other, 17 percent of the allotments,
4. Summer, 36 percent of the allotments,
5. Fall and winter, 42 percent of the allotments. (Refer to Appendix D for details on allotments.)

The following are the types and estimates of new projects that would be implemented, with funding priority given to "I" category allotments:

- 200 miles of fence,
- 70 spring developments,
- 60 reservoirs,
- 100 miles of water pipeline,
- 10 water catchments,
- 8,100 acres of sagebrush spraying, and
- 26,000 acres of prescribed fire treatment.

Subject to prior approval and under the supervision of the BLM, construction of livestock management facilities, implementation of grazing management systems, and the control of sagebrush and juniper stands through chemical or mechanical means or through the use of prescribed fire would be allowed on "M" category

ALTERNATIVES - PREFERRED ALTERNATIVE



allotments, through the use of private funds. Facilities and practices must be consistent with the objectives of maintaining or improving current satisfactory range condition and forage production.

Construction of livestock management facilities using private funds, and the development of grazing systems would be allowed on "C" category allotments, subject to prior approval and supervision by BLM. Any projects permitted must be consistent with the management objectives of the allotment.

Eighteen existing AMPs are in various stages of implementation or revision. Implementation would continue until completion. Each year some of the 18 would be revised or new AMPs on "I" category allotments would be started. However, the total number worked on (existing and new) would average three AMPs per year.

Adjustments in grazing use on "I" category allotments would be made following monitoring of the allotments or by agreement between the BLM and the holder of the allotment. The monitoring would include actual use, utilization, and climate to estimate the level of needed adjustments. All affected parties would be consulted to determine the intensity of monitoring needed, location of monitoring studies, and to develop specific allotment objectives that any changes in management need to meet.

Adjustments in grazing use may include one or more of the following:

- Changes in season of use,

- Changes in class and kind of livestock,
- Changes in grazing management, and
- Changes in current use levels.

Additional projects needed to implement the changes (if any) would be identified. Monitoring studies (condition and trend studies) needed to determine long-term adjustment and, if necessary, to measure long-term changes in range condition would be identified.

Livestock grazing would be managed in wetland/riparian areas to allow steady, long-term restoration and improvement of degraded habitat conditions. About 185 miles of fence would be built around wetland/riparian areas, at the rate of about 10 miles per year, to improve management and to reduce problems on perennial and ephemeral streams, reservoirs, and springs. New grazing systems would be implemented to restore and enhance wetlands.

Approximately 500 acres of aspen stands throughout the Resource Area would be protected from livestock grazing at the rate of about 25 acres per year. Priority areas for protection are the Brokenback, Onion Gulch, and Upper Alkali Road areas. Methods of protection include use of rest/rotation grazing systems, establishment of salt stations away from aspen stands, and fencing.

Off-Road Vehicle Management

Approximately 6,700 acres would be closed to vehicular travel to protect karst areas and threatened and endangered species habitat (Map 10 and Table 8).

ALTERNATIVES - PREFERRED ALTERNATIVE

TABLE 8
OFF-ROAD VEHICLE MANAGEMENT - ORV DESIGNATIONS
PREFERRED ALTERNATIVE and ALTERNATIVE C

Designation	Location	Acres
Closed	Spanish Point Karst ACEC	6,500
	T&E Species Habitat	250
Total Closed		6,750
Limited		
ORV Play Area	Pits Motorcycle Area	125
Permitted/Licensed Use	Paint Rock Canyon	5,050
Existing Roads & Trails	Castle Gardens	110
	Wetlands	5,000
	Crucial Wildlife Habitat; Fragile Soils	620,435
Time or Season of Use	Medicine Lodge Habitat Unit	4,300
Designated Roads & Trails	Upper Nowood; Laddie Creek; Middle Fork	44,000
Designated Roads & Trails and/or Season of Use	Crucial Wildlife Habitat; Fragile Soils	544,460
Total Limited		1,227,450
Total Open		0

Approximately 1,227,300 acres would be designated as limited, with regard to vehicle use, to protect crucial habitat, fragile soils, wetlands, etc.

No areas would be designated as open without limitation to vehicular travel, (i.e., unrestricted use of vehicles would not be allowed).

Recreation Management

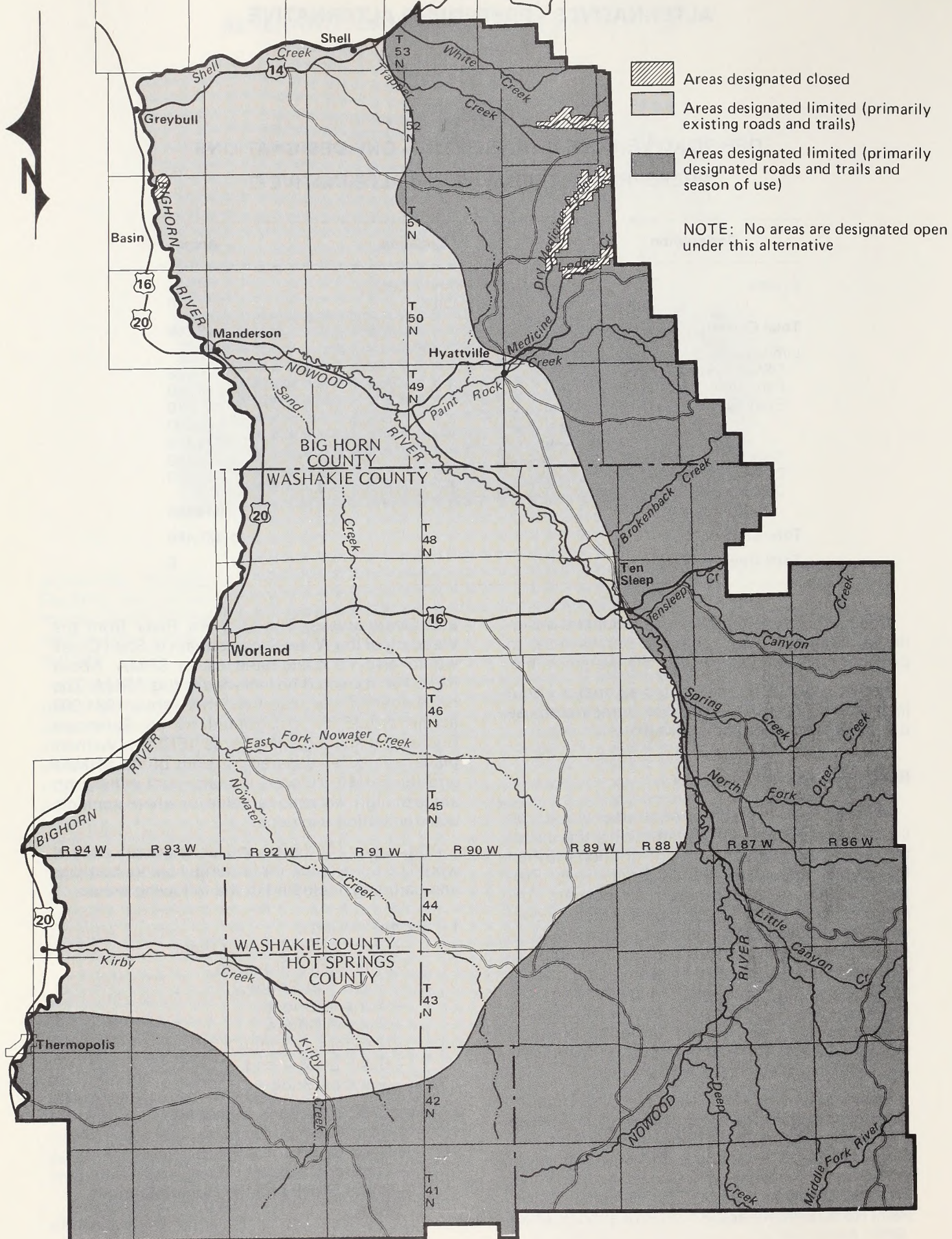
Restrictions on recreational use would be limited to applicable ORV restrictions, the use of the caves, and management prescriptions written for special recreation management areas. Protecting cave resources, such as delicate formations, and providing for user safety would enhance the recreation experience. This would be accomplished with controls such as limiting party size, timing of use to avoid crowding, and closing caves to use during periods of high water runoff. Prescriptions written for special recreation management areas would include directing recreational use, protecting important resources, and reducing conflicts with other uses.




Portions of the west slope of the Bighorn Mountains would be designated as a Special Recreation Management Area (SRMA) (Map 11). About 241,000 acres would be designated, including the following west slope canyons: White, Trapper, Medicine Lodge, Dry Medicine Lodge, Paint Rock, Brokenback, South Brokenback, Otter

and Deep creeks. The Bighorn River from the Wedding of the Waters downstream to Shell Creek would also be designated as an SRMA. About 59,000 acres would be included in this SRMA. The remainder of the resource area (about 934,000 acres) would be designated as an Extensive Recreation Management Area (ERMA). Activity plans would be prepared for both of the SRMAs and the ERMA to focus management activity on areas of high recreational value, or where conflicts with recreation use occur.

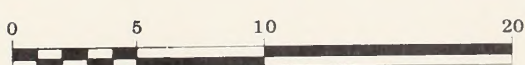
Acquisition of legal and/or physical access would be considered for hunting, fishing, boating, and camping, including in the following areas:

1. Bighorn River:
 - Tract 4817—Sulphur Plant,
 - Winchester Diversion,
 - South Flat Bridge,
 - Worland Bridge,
 - Rairden Bridge,
 - Manderson Bridge,
 - Basin Bridge, and
 - Greybull Bridge.
2. West Slope Canyons, including:
 - Otter Creek,
 - Deep Creek,
 - Trapper Creek,
 - White Creek and the Horse Mountain area,





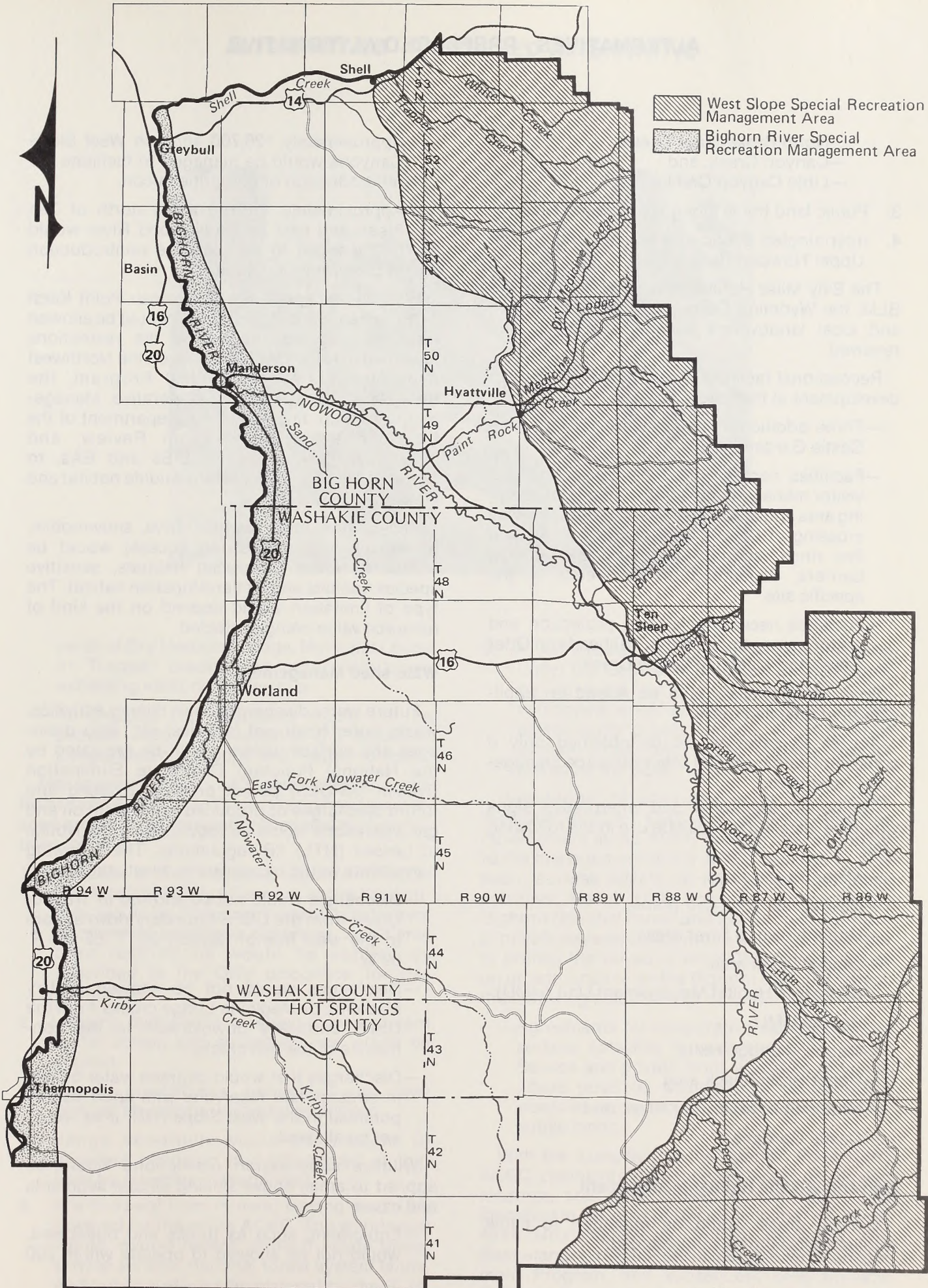
-  Areas designated closed
-  Areas designated limited (primarily existing roads and trails)
-  Areas designated limited (primarily designated roads and trails and season of use)

NOTE: No areas are designated open under this alternative

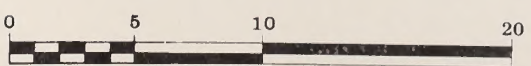


Map 10
Preferred Alternative and Alternative C
OFF ROAD VEHICLE MANAGEMENT
 Washakie Resource Management Plan

-  West Slope Special Recreation Management Area
-  Bighorn River Special Recreation Management Area



Map 11
 Preferred Alternative and Alternatives C & D
RECREATION MANAGEMENT
 Special Recreation Management Areas
 Washakie Resource Management Areas



ALTERNATIVES - PREFERRED ALTERNATIVE

- North Brokenback Creek,
- Canyon Creek, and
- Little Canyon Creek.

- Public land tracts along the Nowood River.
- Intermingled public and private lands in the Upper Nowood River area.

The Billy Miles Habitat Unit Agreement among BLM, the Wyoming Game and Fish Department, and local landowners would be updated and renewed.

Recreational facilities would be considered for development at the following sites:

- Three additional camp/picnic spaces at the Castle Gardens campsite.
- Facilities necessary for site protection and visitor management at the Middle Fork camping area and the Cherry Creek Stock Driveway crossing of Deep Creek, which may include fire rings, sanitary facilities, and vehicle barriers; depending on the needs of the specific site.
- Facilities necessary for site protection and visitor management at the Trailheads on Otter Creek and Medicine Lodge Creek.

Cave use permits would be issued on application, to qualified users.

Access to caves would be obtained only if consistent with cave and other resource management objectives.

Additional directional and interpretive signs would be installed to facilitate use in the following areas:

- Major travel routes,
- New access routes or points,
- Upper Nowood River area,
- Laddie Creek area,
- Billy Miles Habitat Management Unit (HMU),
- Renner HMU,
- Medicine Lodge HMU,
- Upper Brokenback area,
- Middle Fork of Powder River, and
- Castle Gardens.

Fish and Wildlife Habitat Management

Certain areas would be managed to allow wildlife species to be reintroduced:

—Approximately 126,700 acres in West Slope Canyons would be managed to facilitate the reintroduction of peregrine falcon.

—Approximately 190,700 acres north of Ten Sleep and east of the Nowood River would be managed to facilitate the reintroduction of pronghorn antelope.

With the exception of the Spanish Point Karst ACEC, chemical control of pests would be allowed resource area-wide subject to the restrictions identified in Records of Decision on the Northwest Area Noxious Weed Control Program, the Rangeland Grasshopper Cooperative Management Program, findings of the Department of the Interior's Pesticide Program Review, and subsequent programmatic EISs and EAs, to protect food chains, important wildlife habitat and wetlands.

Access (including 4-wheel drive, snowmobile, horseback, and pedestrian access) would be limited in areas of crucial habitats, sensitive species habitats and wetland/riparian habitat. The type of limitation would depend on the kind of resource value being protected.

Watershed Management

Future water discharges from mining activities, waste water treatment facilities, etc., into drainages and surface waters would be regulated by the National Pollutant Discharge Elimination System (NPDES) permit process. Existing and future discharges of produced water from oil and gas operations would be regulated by the Notice to Lessee (NTL) 2B regulations. The following constraints would be applied in all situations:

- Discharges would not be allowed in Trapper Creek from the USFS boundary downstream to the west line of Section 21, T. 52 N., R. 89 W.
- Discharges would not be allowed in Dry Medicine or Medicine Lodge creeks from the USFS boundary downstream to the confluence of the two creeks.
- Discharges that would degrade water quality in streams and reservoirs with sport fishery potential in the West Slope HMP area would not be allowed.

Wildfire suppression restrictions would be applied to areas above sinking stream segments and caves:

- Equipment, such as trucks and bulldozers, would not be allowed to operate within 200

ALTERNATIVES - PREFERRED ALTERNATIVE



yards of Dry Medicine Lodge, Medicine Lodge or Trapper creeks and other tributaries exhibiting karst characteristics.

—Air-dropped fire retardants would not be allowed within 200 yards of Dry Medicine Lodge, Medicine Lodge and Trapper creeks.

Management of the 11,200 acres in the Spanish Point Karst ACEC (Map 7) would emphasize watershed protection. Proposed management prescriptions include:

1. All roads and vehicle trails (about 8 miles) in Dry Medicine Lodge Canyon, above the dugway, would be closed and rehabilitated where accelerated erosion is occurring. Additional ORV restrictions would be applied as described in the ORV discussion for this alternative.
2. Logging restrictions on steep slopes, stream buffer zones, and equipment use would be applied.
3. Use of insecticides, herbicides and silvicultural chemicals would be prohibited.
4. Range condition would be brought to excellent condition and maintained at that level by intensive management.
5. A withdrawal from mineral leasing would be pursued for the entire ACEC. The withdrawal would involve federal mineral estate under private surface, national forest system lands, and public surface administered by the BLM.

6. A withdrawal from mining claim location under the General Mining Law of 1872 would be pursued for the entire ACEC. The withdrawal would involve the federal mineral estate under private surface, national forest system lands, and public surface administered by the BLM.

Regulation of activities such as logging, livestock grazing, ORV use, and oil and gas development in the ACEC is especially important to the management of the ACEC because of probable adverse affects on the ACEC from those activities. About 3,000 acres of surface in the Bighorn National Forest and 1,800 acres of surface in private ownership are within the ACEC. In order to protect the values of the ACEC from activities on private lands or on the Bighorn National Forest, the following action would be undertaken:

—Agreements for cooperative management of surface activities in watersheds on Forest Service and private lands would be obtained where possible. Management prescriptions would be compatible with those proposed for public lands.

With the exception of the Spanish Point Karst ACEC, chemical control of pests would be allowed resource area-wide subject to the restrictions identified in Records of Decision on the Northwest Area Noxious Weed Control Program, the Rangeland Grasshopper Cooperative Management Program, and subsequent programmatic EISs and EAs, to reduce the possibilities of water pollution.

ALTERNATIVES - PREFERRED ALTERNATIVE

Management actions would emphasize the reduction of soil erosion and sediment yields on approximately 391,000 acres of sensitive watersheds (Map 12). These watersheds are (in descending priority):

- Kirby Creek,
- Nowater Creek, and
- East Fork Nowater Creek.

Management actions would include the use of Best Management Practices (BMPs) (Appendix I) to increase vegetative cover, primarily through changes in livestock management, and to stabilize watersheds with water flow and sediment control structures.

Sites that fail to respond to grazing management would have contour furrowing or seeding projects

applied to improve vegetative cover and condition.

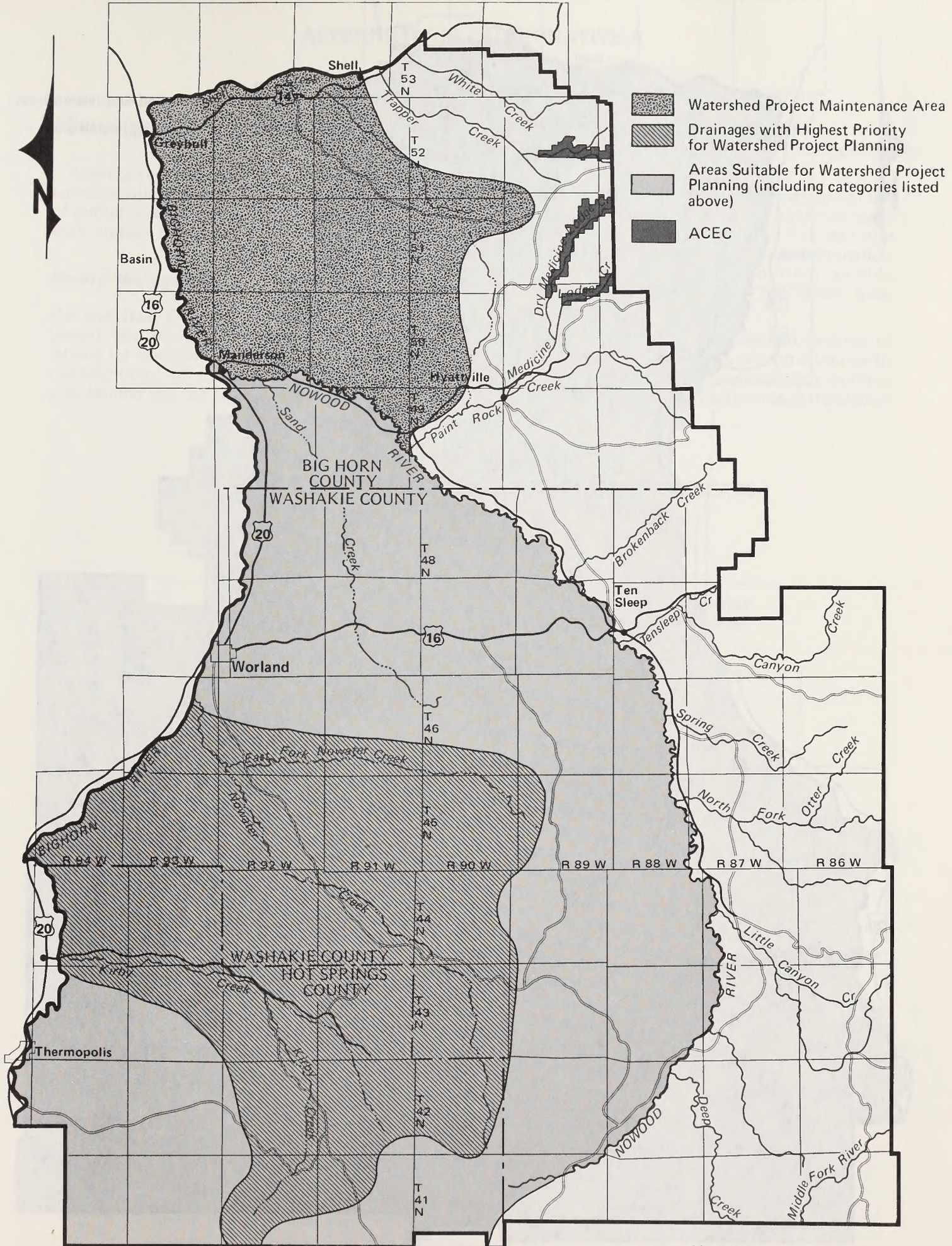
- Contour furrowing would occur on about 15,000 acres of saline upland and saline lowland range sites with slopes of less than 6 percent, particularly near gullies and established drainages.
- Seeding would occur on about 27,000 acres of loamy, shallow loamy, and sandy range sites in poor and fair range condition.

Fire Management

Full suppression of wildfires would occur on about 703,700 acres (Map 13).

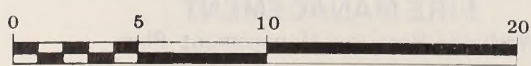
Limited suppression of wildfires would occur on about 530,300 acres.

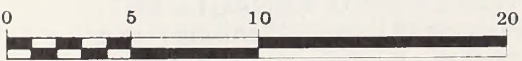
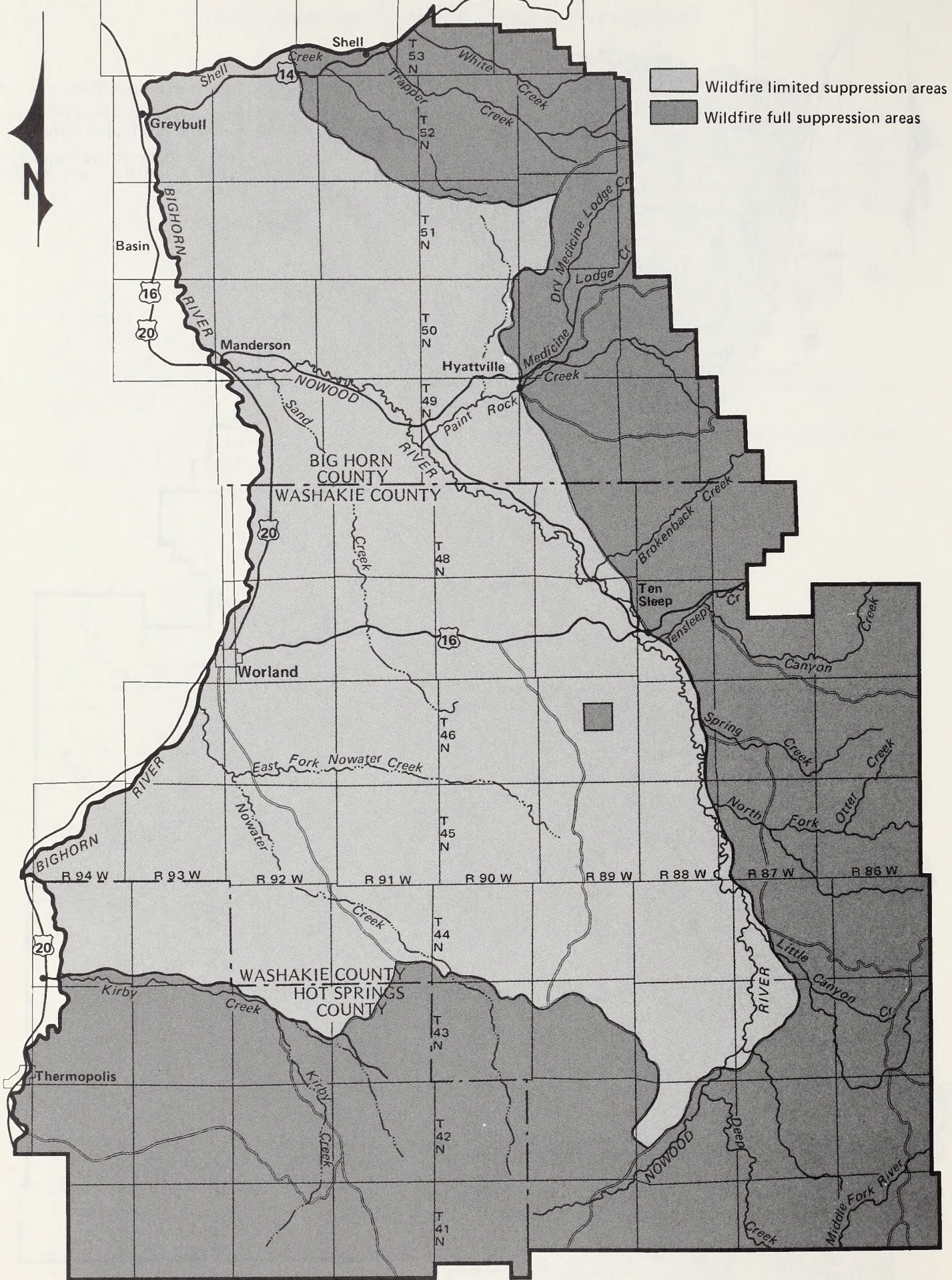




- Watershed Project Maintenance Area
- Drainages with Highest Priority for Watershed Project Planning
- Areas Suitable for Watershed Project Planning (including categories listed above)
- ACEC

Map 12
 Preferred Alternative and Alternatives C & D
WATERSHED MANAGEMENT
Watershed Project Planning Areas
 Washakie Resource Management Plan





Map 13
**Preferred Alternative and Alternatives B, C, D
 FIRE MANAGEMENT**
 Washakie Resource Management Plan

ALTERNATIVES - ALTERNATIVE A

Alternative A

Alternative A is the continuation of current management where the existing management and uses of public lands and resources would continue at their present levels.

Mineral Management

Oil and Gas. Oil, gas, and tar sands would be leased with the Wyoming BLM Standard Stipulations for Surface Disturbing Activities, or future modifications of those stipulations. Additional stipulations may be applied at the time of leasing

to mitigate impacts not covered by the Wyoming BLM standard stipulations (Map 14 and Appendix A).

—Approximately 97,400 acres (6 percent of the federal mineral estate) would continue to be leased but with permanent “no surface occupancy” stipulations (standard stipulation number 4) to protect important wildlife habitat, and cultural and recreation sites (Table 9).

—Approximately 985,600 acres (61 percent of the federal mineral estate) would continue to be leased but with seasonal “no surface occupancy” stipulations (standard stipulation

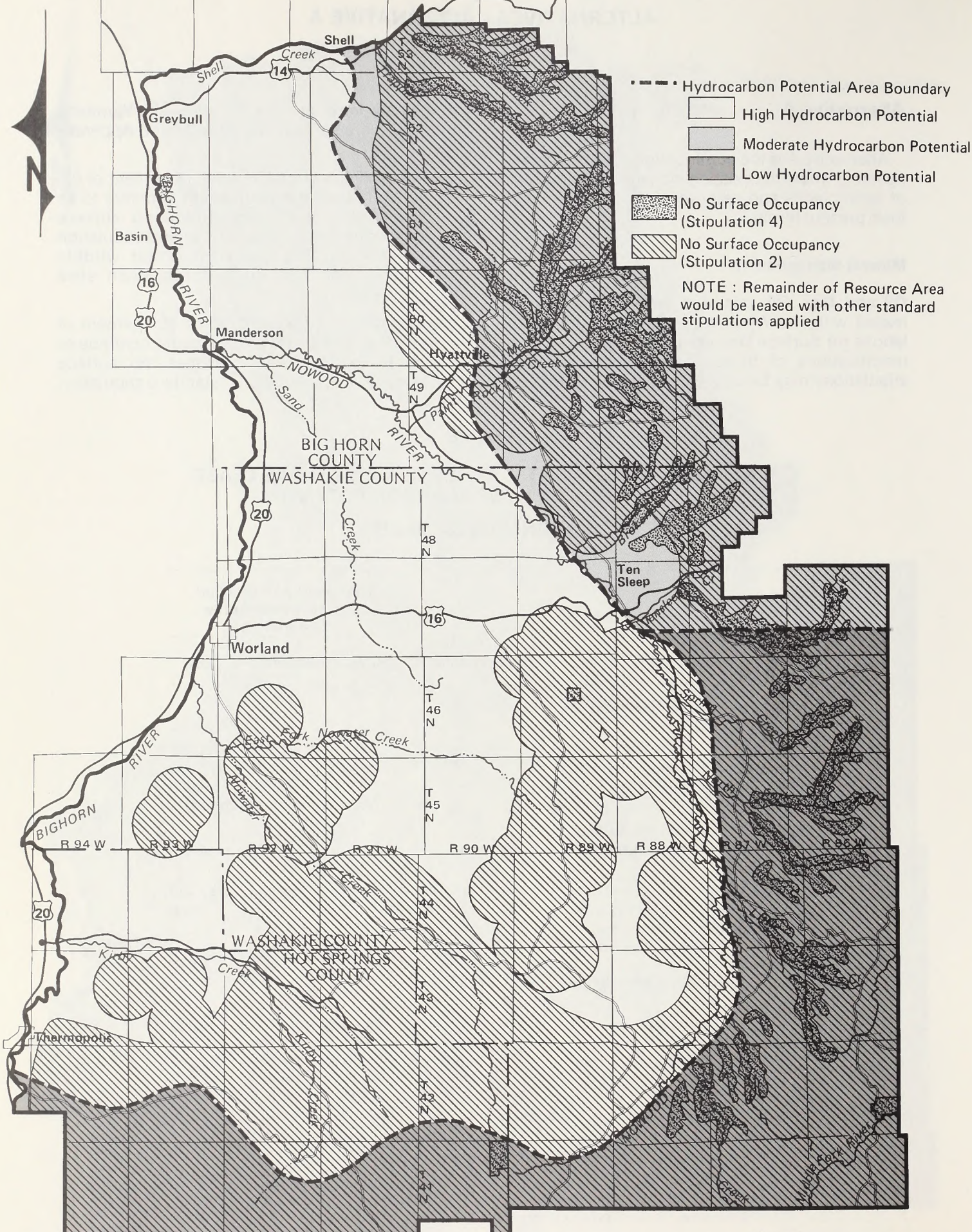
TABLE 9
MINERALS MANAGEMENT - ACRES OF OIL AND GAS LEASE RESTRICTIONS BY HYDROCARBON POTENTIAL
ALTERNATIVES A and B

Category	Lease Stipulation	Hydrocarbon Potential ¹ Mineral Estate Acres (Estimated)		
		High	Moderate	Low
Lease Restrictions (General)				
No Lease ²		0	0	0
Permanent No Surface Occupancy ²		400	47,000	50,000
Seasonal No Surface Occupancy		524,600	184,000	277,000
Lease Under Other Stips		437,000	57,000	26,000
<i>(Note: Numbers Rounded)</i>				
Specific Areas with No Surface Occupancy Lease Restrictions				
Permanent:				
West Slope Canyons	4 ³		46,800	47,900
Middle Fork Powder River	4			900
T&E Species Nesting Area	4	250		
Castle Gardens Campground	4	110		
Bates Battlefield	4			1,040
Medicine Lodge Archeological Site	4		100	
Seasonal:				
Sage Grouse Leks	2c	9,450	2,770	1,890
Elk Calving Areas	2c		5,400	12,200
Sage Grouse Habitat	2b	337,000	92,900	62,100
Crucial Elk Winter Range	2a	4,800	78,800	41,200
Elk Winter Range	2a	173,300	4,000	159,500

¹ Refer to “Evaluation Criteria for Hydrocarbon Potential” in Chapter 1 for a description of the methodology used to determine hydrocarbon potential.

² “No lease” or “no surface occupancy” stipulations would be phased in over the life of the plan by application of those restrictions on leases as they are considered for renewal or first-time issue. These stipulations would not be applied retroactively to existing leases.

³ Refer to Appendix A, “Wyoming BLM Standard Stipulations for Surface Disturbing Activities,” for a description of lease stipulations.



- Hydrocarbon Potential Area Boundary
 - High Hydrocarbon Potential
 - ▒ Moderate Hydrocarbon Potential
 - Low Hydrocarbon Potential
 - ▨ No Surface Occupancy (Stipulation 4)
 - ▧ No Surface Occupancy (Stipulation 2)
- NOTE : Remainder of Resource Area would be leased with other standard stipulations applied

Map 14
 Alternatives A&B
 MINERALS MANAGEMENT
 Oil and Gas Leasing
 Washakie Resource Management Plan

ALTERNATIVES - ALTERNATIVE A

numbers 2a, 2b, or 2c) to protect important wildlife habitat.

- Approximately 520,000 acres (33 percent of the federal mineral estate) would remain open to leasing with other standard surface protection stipulations applied.

Geophysical Exploration. All proposals for geophysical exploration would be evaluated on a case-by-case basis. Suitable surface protection measures as described in the Wyoming BLM Standard Stipulations (or future modifications) and access restrictions (ORV designations) would be applied. About 835,000 acres (68 percent of the federal surface) would continue to be affected by various vehicle use limitations and applicable Wyoming BLM standard stipulations, including "no surface occupancy" (Table 10). Geophysical exploration on the remaining 399,000 acres (32 percent of the federal surface) would continue to be regulated by applicable surface disturbance stipulations, but would not include "no surface occupancy" or vehicle use limitations under ORV designations.

Tar Sand. Included in the above acreage under other surface protection stipulations are about 55,000 acres in the Spanish Point Karst Area which were leased for oil and gas prior to enactment of the Combined Hydrocarbon Leasing Act

(CHLA) of 1981. Deposits of tar sands are projected to exist in those leased areas. Because of constraints associated with those leases, tar sands cannot presently be developed. When those leases expire between now and 1991, and the area is re-leased, tar sands may be developed under the rights granted by new leases.

Land and Realty Management

There currently are no designated right-of-way corridors, which are the preferred locations for existing and future right-of-way grants.

All areas would continue to be open to rights-of-way, although the following areas would be avoided when possible:

- Crucial wildlife habitat,
- Threatened and endangered species habitat,
- Cultural resource sites,
- Sensitive visual areas, and
- Wetland/riparian areas.

Approximately 16,000 acres in Hot Springs County which were classified through the Classification and Multiple Use Act for disposal through public sale, exchange, or State Selection (Notice of Classification W-12616, published in the

TABLE 10
MINERALS MANAGEMENT - ACRES
OPEN TO GEOPHYSICAL EXPLORATION
(Estimated Surface Acres)
ALTERNATIVE A

Category Descriptions	Hydrocarbon Potential		
	High	Moderate	Low
Closed ¹	0	0	0
Limited ²			
Permanent No Surface Occupancy	500	35,500	38,000
Seasonal No Surface Occupancy (See Table 9 for further breakdown)	407,000	142,000	212,000
Total Limited	407,500	177,500	250,000
Total Open	333,000	44,500	20,000

NOTE: All geophysical exploration would be subject to ORV use designations.

¹ "Closed" applies to areas that are not open for leasing of oil and gas.

² "Limited" applies to areas open for leasing of oil and gas but subject to Wyoming BLM Standard Stipulations for Surface Disturbing Activities including permanent or seasonal "no surface occupancy."

ALTERNATIVES - ALTERNATIVE A

Federal Register on August 8, 1968), would continue to be managed pursuant to the terms of the classification as affected by the passage of FLPMA.

A Classification and Multiple Use Act (C&MU) public land classification order (W-12617), published in the *Federal Register* on August 8, 1968, classified approximately 128,500 acres of public land in the Washakie Resource Area for retention in federal ownership, for segregation from sale under section 2455 of the Revised Statutes (43 U.S.C. 1171), and from entry under the agricultural laws. This classification was terminated by the BLM on October 16, 1981. Should the BLM prevail on appeal of Judge Pratt's preliminary injunction, issued in *National Wildlife Federation (NWF) vs. Burford, et.al.* (Civil Action No. 85-2238 D.C.D.C.), this termination will have been effective. The descriptions and analyses for the Preferred Alternative and Alternatives B, C, and D consider the classification on these lands to be terminated.

The administrative site withdrawal associated with Worland's Green Hills Municipal Golf Course would be retained and the City of Worland would continue to lease the land under the R&PP Act.

Forest Management

A maximum of 375 thousand board feet (MBF) of forest products, including about 75 MBF of fuelwood, posts and poles, would be harvested from about 40 acres annually, for about 10 years. After 10 years, a new allowable cut figure would be developed, based on new inventories. Clear-cuts in lodgepole pine would amount to about 15 percent of the total annual acres cut. The remaining 85 percent would be selective or two-stage shelterwood cuts in various coniferous types, aspen and juniper. Factors such as local demand, market conditions and the need for enhancement of other resource values may cause fluctuations in the volume of timber harvested in any one year. Harvest levels would not exceed the long-term sustained yield of the forest base and would maintain existing levels of thermal cover for wildlife.

Wild Horse Management

The wild horse herd in the Zimmerman Springs area (Map 6) would increase from 44 to about 80 animals over a ten year period, and would continue to increase thereafter. Forage would not be allocated to wild horses and livestock grazing capacity would not be adjusted because of the

horses. A wild horse herd management plan would not be written and a wild horse herd management area would not be designated. Thus, there would be no management of the numbers of wild horses.

Range Management

The maximum authorized livestock grazing use within the resource area would be 143,000 AUMs annually. As the "No Action" Alternative, seasons and kind of livestock use would be the same as that currently authorized.

Livestock grazing would continue on all 307 allotments administered by the Washakie Resource Area. Seasons of use in the allotments would occur as follows:

1. No particular season designated, 94 allotments (31 percent),
2. Spring only, 37 allotments (12 percent of the allotments),
3. Combination spring and other, 126 allotments (41 percent of the allotments),
4. Summer, 22 allotments (7 percent of the allotments),
5. Fall and winter, 28 allotments (9 percent of the allotments). (Refer to Appendix D for details on allotments.)

A maximum of 18 existing allotment management plans would be maintained. Monitoring of existing AMPs would continue. Livestock grazing in wetland/riparian areas in those allotments would be managed through implementation of grazing systems, and the use of management practices within the systems (such as fencing, short-term grazing use, or creation of pastures), to restore or maintain habitat condition.

New range projects would not be developed, except on those areas covered by existing management plans.

Off-Road Vehicle Management

Interim limitations on vehicle use would become permanent and would continue to be enforced on Paint Rock Canyon (5,050 acres) to protect the natural resources of the area from overuse or nonconforming uses, and on the Pits Motorcycle Area (125 acres) to manage recreational and competitive uses of the area.

The remainder of the resource area (about 1,228,100 acres) would remain open for ORV use.

ALTERNATIVES - ALTERNATIVE A

Recreation Management

Restrictions on recreational use would be limited to applicable ORV restrictions and the use of caves. Cave use restrictions are designed to enhance the recreation experience by protecting cave resources such as delicate formations; by limiting party size; by alleviating overcrowding; and would provide for user safety.

Special recreation management areas would not be designated, although recreational use of the Bighorn River for fishing, hunting and float boating, and Paint Rock Canyon for hunting, fishing, and camping would be managed under existing activity plans. The objectives of both plans are related primarily to protection of the natural resources of the area from overuse or conflicting uses.

The entire resource area would be designated as an Extensive Recreation Management Area (ERMA), and an activity plan would be prepared to focus management activity on areas of high recreation value, such as west slope canyons or the Bighorn River, or where conflicts with recreation use occur.

Cave use permits would continue to be issued, on application, to qualified users.

New recreational facilities would not be developed.

Fish and Wildlife Habitat Management

Chemical control of pests would be allowed resource area-wide subject to the restrictions identified in Records of Decision on the Northwest Area Noxious Weed Control Program, the Rangeland Grasshopper Cooperative Management Program, findings of the Department of the Interior's Pesticide Program Review, and subsequent programmatic EISs and EAs, to protect food chains, important wildlife habitat and wetlands.

Access would not be controlled in crucial habitats, sensitive species habitats, or wetlands, unless it would affect threatened and endangered species or is provided for in habitat management plans.

Wetland/riparian zones would be protected by fencing. About 185 miles of fencing are needed. Fencing would be built at the rate of about 2 miles annually.

Watershed Management

Future water discharges from mining activities, waste water treatment facilities, etc., into drainages and surface waters would be regulated by the National Pollutant Discharge Elimination System (NPDES) permit process. Existing discharges of produced water from oil and gas operations amounting to an estimated 5.5 million gallons per day and future discharges would be regulated by the Notice to Lessee (NTL) 2B regulations and NPDES permit process.

Chemical control of pests would be allowed resource area-wide subject to the restrictions identified in Records of Decision on the Northwest Area Noxious Weed Control Program, the Rangeland Grasshopper Cooperative Management Program, and subsequent programmatic EISs and EAs, to reduce the possibilities of water pollution.

Projects such as dams or contour furrows would not be developed for the sole purpose of watershed protection because of the attendant increase in surface disturbance resulting from construction and maintenance. Instead, a minimum level of watershed management would consist of relying on standard surface protection stipulations for surface disturbing activities.

Management of the Spanish Point Karst Area of Critical Environmental Concern (ACEC) (Map 7) would continue within the framework of existing management plans and surface protection stipulations, including the Wyoming BLM Standard Stipulations for Surface Disturbing Activities (Appendix A). The following activities and actions would occur under this alternative:

1. Unrestricted ORV use would occur in the area. New roads proposed in the area may be allowed after completion of an environmental analysis.
2. Harvest of forest products and associated actions would be allowed subject to standard and special timber sale contract stipulations.
3. Pesticides would be applied subject to restrictions identified in records of decision for programmatic EISs and EAs, to reduce the possibilities of water pollution.
4. Hydrocarbons would be leased subject to the prescriptions described in this alternative and in the stipulations for surface disturbing activities (Appendix A).

ALTERNATIVES - ALTERNATIVE B



5. Mining claim location would be allowed in areas not already withdrawn from mineral location, but activity on mining claims would be subject to the 43 CFR 3809 regulations.
6. Watershed improvement projects would not be initiated within the Trapper Creek or Medicine Lodge Creek watersheds.

Fire Management

Full suppression of all wildfires would continue resource area-wide (1,234,000 acres). However, some methods of suppression would be restricted within sensitive areas.

Alternative B

Alternative B emphasizes developing and using natural resources. It still provides for environmental protection but the major emphasis is on resource development.

Mineral Management

Oil and Gas. Oil, gas, and tar sands would be leased with the Wyoming BLM Standard Stipulations for Surface Disturbing Activities, or future modifications of those stipulations. Additional stipulations may be applied at the time of leasing to mitigate impacts not covered by the Wyoming BLM standard stipulations (Map 14 and Appendix A).

—Approximately 97,400 acres (6 percent of the federal mineral estate) would continue to be leased but with permanent “no surface occupancy” stipulations (standard stipulation number 4) to protect important wildlife habitat, and cultural and recreation sites (Table 9).

—Approximately 985,600 acres (61 percent of the federal mineral estate) would continue to be leased but with seasonal “no surface occupancy” stipulations (standard stipulation numbers 2a, 2b, or 2c) to protect important wildlife habitat.

—Approximately 520,000 acres (33 percent of the federal mineral estate) would remain open to leasing with other standard surface protection stipulations applied.

Geophysical Exploration. All proposals for geophysical exploration would be evaluated on a case-by-case basis. Suitable surface protection measures as described in the Wyoming BLM Standard Stipulations (or future modifications) and access restrictions (ORV designations) would be applied. About 250 acres of threatened and endangered species habitat would be closed to geophysical exploration. About 837,000 acres (68 percent of the federal surface) would be affected by various vehicle use limitations and applicable Wyoming BLM standard stipulations, including “no surface occupancy” (Table 11). Geophysical exploration on the remaining 397,000 acres (32 percent of the federal surface) would continue to be regulated by applicable standard surface disturbance stipulations, but would not include

ALTERNATIVES - ALTERNATIVE B

TABLE 11
MINERALS MANAGEMENT - ACRES
OPEN TO GEOPHYSICAL EXPLORATION
ALTERNATIVE B

Category Descriptions	Hydrocarbon Potential		
	High	Moderate	Low
Closed ¹			
T&E Species Habitat	250	0	0
Total Closed	250	0	0
Limited ²			
ORV Play Area	130		
Permitted/Licensed Use			
West Slope Canyons		46,800	47,900
Existing Roads & Trails			
Castle Gardens	110		
Wetlands	3,000		
Time or Season of Use			
Medicine Lodge		12,000	
Designated Roads & Trails			
Middle Fork			900
Upper Nowood			32,000
Laddie Creek		4,700	
Designated Roads & Trails			
and/or Season of Use			
Crucial Wildlife Habitat			
or Fragile Soils	404,000	114,000	121,200
Total Limited	407,240	177,500	202,000
Total Open	333,000	44,500	20,000

NOTE: All geophysical exploration would be subject to ORV use designations (see table 12).

¹ "Closed" applies to areas that are not open for leasing of oil and gas.

² "Limited" applies to areas open for leasing of oil and gas but subject to Wyoming BLM Standard Stipulations for Surface Disturbing Activities including permanent or seasonal "no surface occupancy."

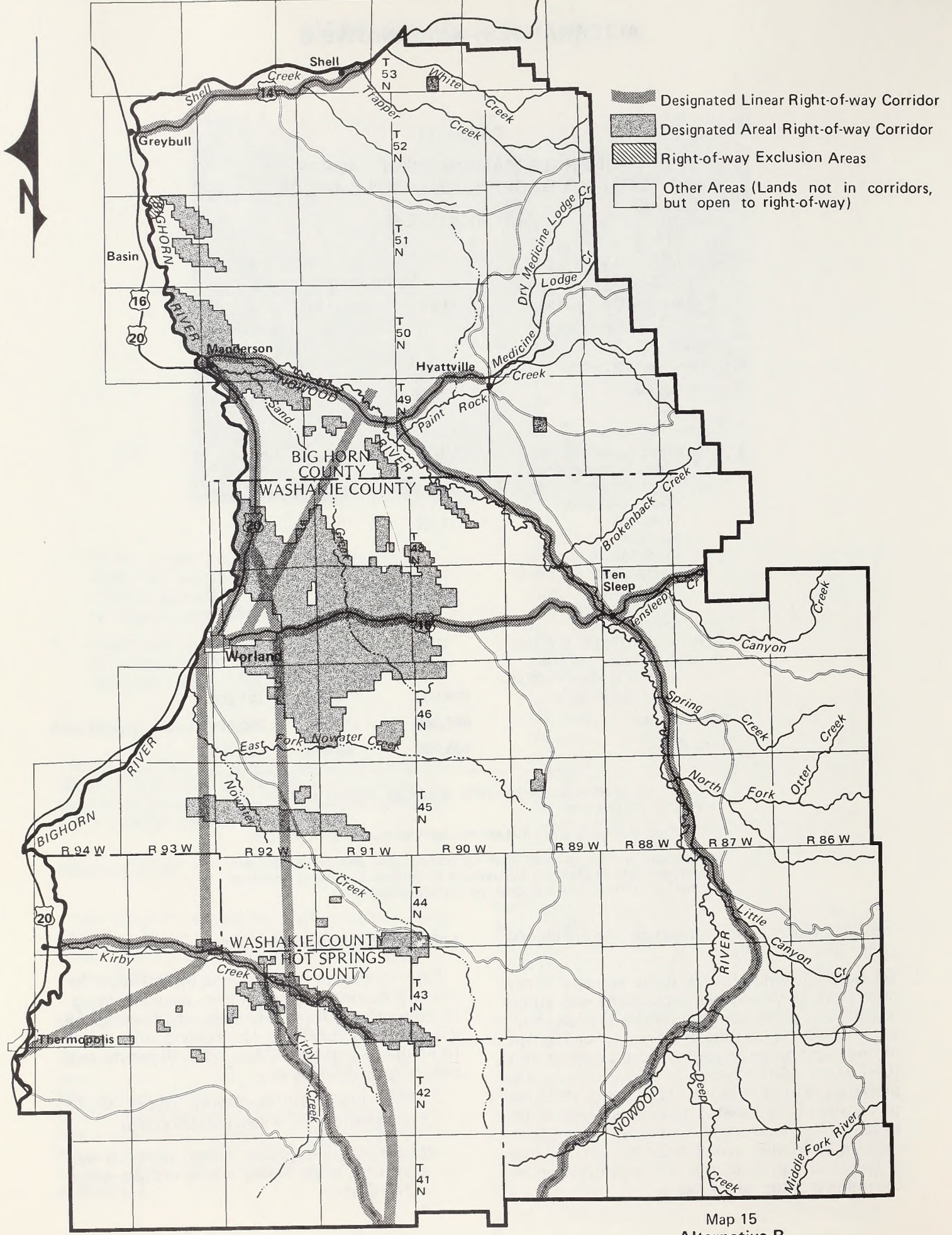
"no surface occupancy" or vehicle use limitations under ORV designations.





Tar Sand. Included in the above acreage under other surface protection stipulations are about 55,000 acres in the Spanish Point Karst Area which were leased for oil and gas prior to enactment of the Combined Hydrocarbon Leasing Act (CHLA) of 1981. Deposits of tar sands are projected to exist in those leased areas. Because of constraints associated with those leases, tar sands cannot presently be developed. When those leases expire between now and 1991, and the area is re-leased, tar sands may be developed under the rights granted by the lease.

Land and Realty Management

Existing transportation and utility corridors for roads, pipelines, and power lines would be designated as right-of-way corridors which would be the preferred locations for existing and future right-of-way grants (Map 15). Right-of-way corridors would include:

- Major linear rights-of-way zones would include about 250 miles (40,000 acres).
- Major short segment linear rights-of-way zones (as in oil fields) would include about 105,000 acres.



-  Designated Linear Right-of-way Corridor
-  Designated Areal Right-of-way Corridor
-  Right-of-way Exclusion Areas
-  Other Areas (Lands not in corridors, but open to right-of-way)

Map 15
 Alternative B
 LANDS AND REALTY MANAGEMENT
 Corridor Designation
 Washakie Resource Management Plan

ALTERNATIVES - ALTERNATIVE B

Approximately 1,089,000 acres would not be included in designated corridors but would be available for rights-of-way under certain circumstances. Of this amount, about 250 acres of threatened and endangered species habitat would be classed as right-of-way exclusion areas. And, about 750 acres of cultural resource sites would be classed as right-of-way avoidance areas.

Classification and Multiple Use Act retention and disposal classifications (orders W-12616 and W-12617) on approximately 144,500 acres in Hot Springs County would be terminated. Discretionary management activity in areas formerly covered by these orders would be dictated by the RMP.

The administrative site withdrawal associated with Worland's Green Hills Municipal Golf Course would be terminated to allow the City to apply for an R&PP patent.

Forest Management

A maximum of 1.2 million board feet (MMBF) of forest products, including about 100 MBF of fuelwood, posts and poles, would be harvested from about 150 acres annually, for about 10 years to meet local demand for timber products and to maintain healthy stands of timber. After 10 years, a new allowable cut figure would be developed, based on new inventories. Clear-cuts in lodgepole pine would amount to about 15 percent of the total annual acreage cut. The remaining 85 percent would be selective or two-stage shelterwood cuts in various coniferous types, aspen and juniper. Factors such as local demand, market conditions and the need for enhancement of other resource values may cause fluctuations in the volume of timber harvested in any one year. Harvest levels would not exceed the long-term sustained yield of the forest base and would maintain existing levels of thermal cover for wildlife.

Wild Horse Management

All the wild horses in the Zimmerman Springs Wild Horse Herd Area (Map 6) would be removed from the area and be made available for adoption through BLM's Adopt-A-Horse Program or be relocated to a designated Wild Horse Herd Management Area in the Worland District. Removal would reduce competition with livestock in the Zimmerman Springs area and would reduce damage to range developments, soil and watershed.

Range Management

The following management actions would be implemented over a fifteen year period to accomplish two goals. First, range site condition would be raised by one class, or maintained in its current condition, meaning all range would eventually be in good or better condition. Secondly, the additional forage produced would be allocated to livestock at an estimated rate of increase in AUMs of 2 percent per year beginning in year four of plan implementation. Increases in forage allocations would correspond to implementation of management actions to improve the range, and the amount of increase would be based on information from monitoring studies. Among the actions that may be used to accomplish these objectives are those listed in Appendix E.

Authorized grazing use levels would increase to an estimated 182,000 AUMs per year at the end of 18 years from plan implementation.

Livestock grazing would occur on all 307 allotments administered by the Washakie Resource Area until adequate data is available to support adjustments. Seasons of use would be established on those allotments that currently have no season of use designated. Projected seasons of use in the allotments would occur as follows:

1. No particular designation, no allotments,
2. Spring only, 8 percent of the allotments,
3. Combination spring and other, 25 percent of the allotments,
4. Summer, 47 percent of the allotments,
5. Fall and winter, 20 percent of the allotments. (Refer to Appendix D for details on allotments.)

All eighteen existing AMPs would be fully implemented and maintained. Twelve new AMPs, grazing systems or development plans, would be developed per year on "I" category allotments. If funding or manpower is reduced, the development of new AMPs would be extended over a longer time period.

The following are the types and estimates of new projects that would be implemented, with funding priority given to "I" category allotments:

- 470 miles of fence,
- 160 spring developments,
- 160 reservoirs,
- 240 miles of pipeline,

ALTERNATIVES - ALTERNATIVE B

- 10 water catchments,
- 20 water wells,
- 23,600 acres of sagebrush spraying, and
- 63,000 acres of prescribed burning.

Livestock grazing would be managed in wetland/riparian areas to allow steady long-term restoration or maintain habitat conditions. About 185 miles of fence are needed to help improve management and to reduce problems on perennial and ephemeral streams, reservoirs, and springs. Fencing would be built around those wetland/riparian areas, at the rate of about 5 miles annually.

In addition to the management practices described in Appendix E, the following general management practices would be applied to improve range condition:

- Livestock grazing use would not be allowed during the following seasons: May 1 to June 15 in the 5 to 9 inch precipitation zone; May 15 to June 25 in the 10 to 14 inch precipitation zone; May 15 to June 30 in the 15 to 19 inch precipitation zone. The use of key forage species would be limited to a level that would allow for maintaining or improving ecological range condition (normally a maximum of about 50 percent utilization annually).

Monitoring studies would be established to determine the adjustments in grazing use. Actual use, utilization and climate studies would be used to determine the level of adjustments in use.

Condition and trend studies would be established to measure long-term changes in range condition.

Subject to prior approval and under the supervision of the BLM, construction of livestock management facilities, implementation of grazing management systems, and the control of sagebrush and juniper stands through chemical or mechanical means or through the use of prescribed fire would be allowed on "M" category allotments, through the use of private funds. Facilities and practices must be consistent with the objectives of maintaining or improving current satisfactory range condition and forage production.

Construction of fences and water developments using private funds, and the development of grazing systems would be allowed on "C" category allotments, subject to prior approval and supervision by BLM.

Off-Road Vehicle Management

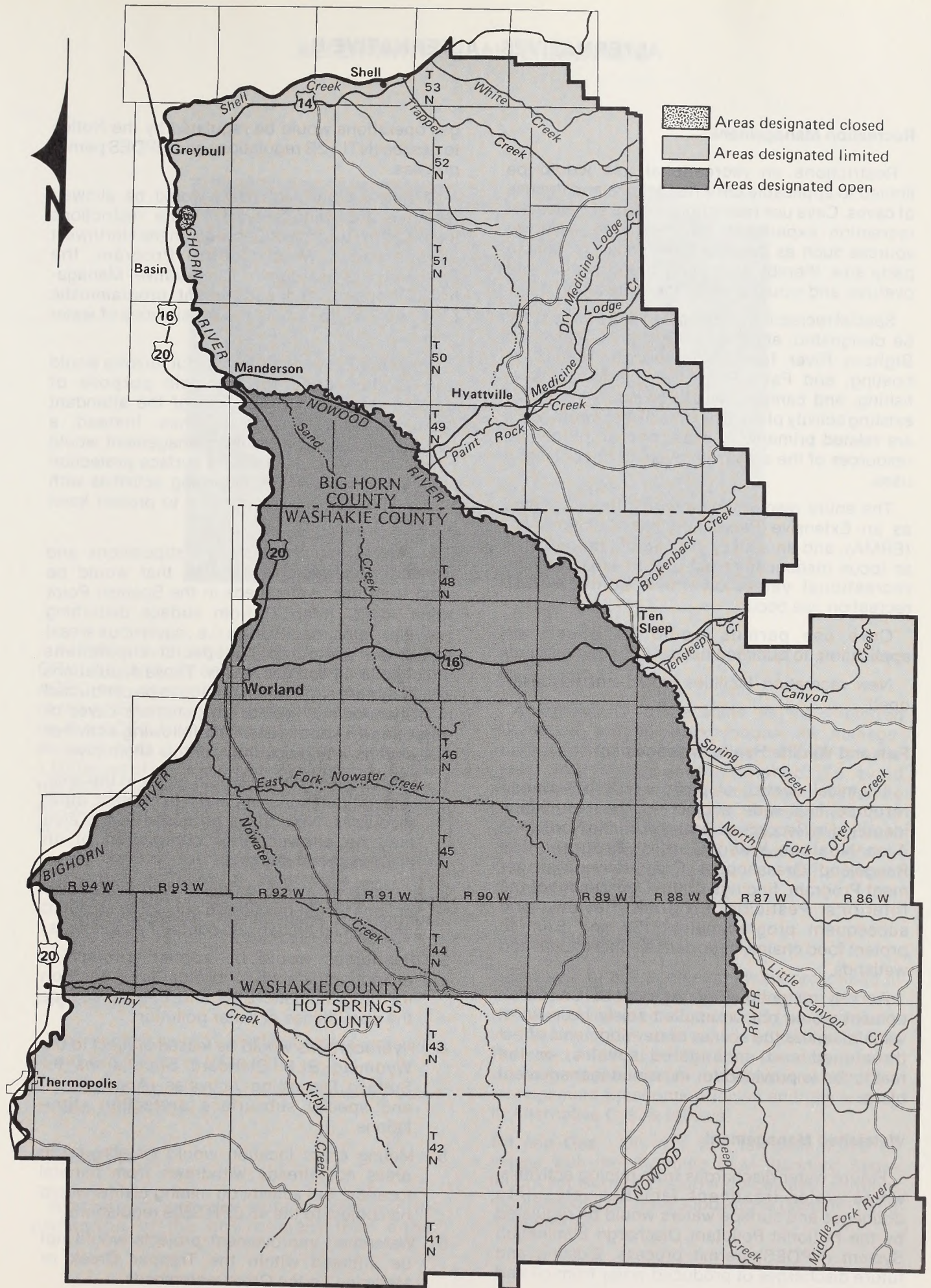
Approximately 250 acres would be closed to vehicle travel to protect threatened and endangered species habitat (Map 16 and Table 12).




Approximately 666,700 acres would have vehicle travel limitations imposed to protect crucial wildlife habitat, fragile soils, wetland/riparian areas, and water quality.

Approximately 567,000 acres would be designated open for ORV use.

TABLE 12
OFF-ROAD VEHICLE MANAGEMENT - ORV DESIGNATIONS
ALTERNATIVE B

Designation	Location	Estimated Acres
Closed	T&E Species Habitat	250
Total Closed		250
Limited		
ORV Play Area	Pits Motorcycle Area	125
Permitted/Licensed Use	Paint Rock Canyon	5,050
Existing Roads & Trails	Castle Gardens	110
	Wetlands	5,000
Time or Season of Use	Medicine Lodge Habitat Unit	12,000
Designated Roads & Trails	Upper Nowood; Laddie Creek; Middle Fork	44,000
Designated Roads & Trails and/or Season of Use	Crucial wildlife habitat; fragile soils	600,395
Total Limited		666,680
Total Open	Area not described above	567,070



-  Areas designated closed
-  Areas designated limited
-  Areas designated open

Map 16
Alternative B
OFF ROAD VEHICLE MANAGEMENT
 Washakie Resource Management Plan

ALTERNATIVES - ALTERNATIVE B

Recreation Management

Restrictions on recreational use would be limited to applicable ORV restrictions and the use of caves. Cave use restrictions would enhance the recreation experience by protecting cave resources such as delicate formations; by limiting party size, thereby alleviating overcrowding and overuse; and would provide for user safety.

Special recreation management areas would not be designated, although recreational use of the Bighorn River for fishing, hunting and float boating, and Paint Rock Canyon for hunting, fishing, and camping would be managed under existing activity plans. The objectives of both plans are related primarily to protection of the natural resources of the area from overuse or conflicting uses.

The entire resource area would be designated as an Extensive Recreation Management Area (ERMA), and an activity plan would be prepared to focus management activity on areas of high recreational value, or where conflicts with recreation use occur.

Cave use permits would be issued, on application, to qualified users.

New recreation facilities would not be developed.

Fish and Wildlife Habitat Management

Chemical control of pests would be allowed resource area-wide subject to the restrictions identified in Records of Decision on the Northwest Area Noxious Weed Control Program, the Rangeland Grasshopper Cooperative Management Program, findings of the Department of the Interior's Pesticide Program Review, and subsequent programmatic EISs and EAs, to protect food chains, important wildlife habitat and wetlands.

Access restrictions or restrictions on development would not be applied solely because of wildlife, unless the access or developments affect threatened and endangered species, or the restriction is provided for in habitat management plans.

Watershed Management

Future water discharges from mining activities, waste water treatment facilities, etc., into drainages and surface waters would be regulated by the National Pollutant Discharge Elimination System (NPDES) permit process. Existing and future discharges of produced water from oil and

gas operations would be regulated by the Notice to Lessee (NTL) 2B regulations and NPDES permit process.

Chemical control of pests would be allowed resource area-wide subject to the restrictions identified in Records of Decision on the Northwest Area Noxious Weed Control Program, the Rangeland Grasshopper Cooperative Management Program, and subsequent programmatic EISs and EAs, to reduce the possibilities of water pollution.

Projects such as dams or contour furrows would not be developed for the sole purpose of watershed protection because of the attendant increase in surface disturbance. Instead, a minimum level of watershed management would consist of relying on standard surface protection stipulations for surface disturbing activities with the addition of ORV restrictions to protect karst areas.

In addition to the standard stipulations and existing management practices that would be used to protect watersheds in the Spanish Point Karst ACEC (Map 7) from surface disturbing activities, subsurface values (i.e., cavernous areas) would be protected by special stipulations attached to oil and gas leases. Those stipulations would require exploration drilling to be conducted in a manner that would not penetrate caves or other known karst areas. The following activities and actions would occur under this alternative:

1. Off-road vehicle use would occur in the area, under limitations imposed to protect other resources. New roads proposed in the area may be allowed after completion of an environmental analysis.
2. Harvest of forest products and associated actions would be allowed subject to standard and special timber sale contract stipulations.
3. Pesticides would be applied subject to restrictions identified in records of decision for programmatic EISs and EAs, to reduce the possibilities of water pollution.
4. Hydrocarbons would be leased subject to the Wyoming BLM Standard Stipulations for Surface Disturbing Activities (Appendix A) and special subsurface protection stipulations.
5. Mining claim location would be allowed in areas not already withdrawn from mineral location, but activity on mining claims would be subject to the 43 CFR 3809 regulations.
6. Watershed improvement projects would not be initiated within the Trapper Creek or Medicine Lodge Creek watersheds.

ALTERNATIVES - ALTERNATIVE C



Activities such as logging, livestock grazing, ORV use, and oil and gas development in the ACEC are especially important to management of the ACEC because of probable adverse affects on the ACEC from those activities. About 3,000 acres of lands in the Bighorn National Forest and 1,800 acres of lands in private ownership are within the ACEC. In order to protect the integrity of the ACEC from outside influences, the following actions would be undertaken:

- Agreements for cooperative management of surface activities in watersheds on Forest Service and private lands would be obtained where possible. Management prescriptions would be compatible with those proposed for public lands.

Fire Management

Full suppression of wildfires would occur on about 703,700 acres (Map 13).

Limited suppression of wildfires would occur on about 530,300 acres.

Alternative C

Alternative C provides more emphasis on the protection of the environment than either

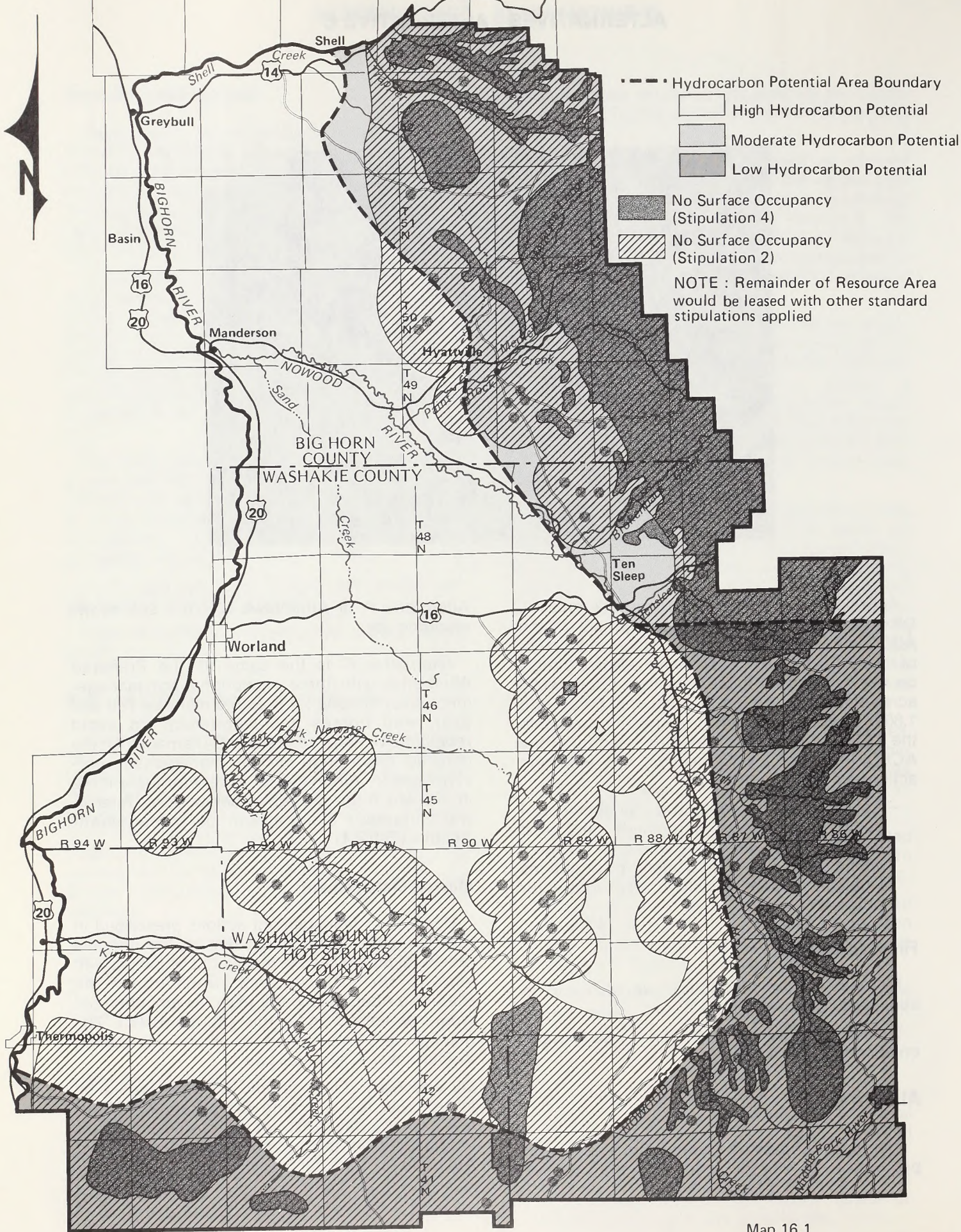
Alternative A or Alternative B, but it still allows resource use.

Alternative C is the same as the Preferred Alternative with three exceptions: the management prescriptions for leasable minerals (oil and gas), wild horses and watershed. To avoid repetition, refer to the Preferred Alternative for the detailed description of the management prescriptions for Alternative C, except for these three items, which are described below. Also, refer to the Summary Comparison of Management Actions (Table 1).

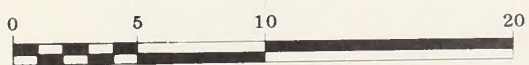
Mineral Management

Because of management actions prescribed in the Watershed Management section, the amounts of federal mineral estate that would be leased with various surface use restrictions under the Preferred Alternative differ from the amounts that would be leased under this alternative (C). The management prescription for oil and gas leasing in Alternative C is as follows:

Oil and Gas. Oil, gas, and tar sand would be leased with the Wyoming BLM Standard Stipulations for Surface Disturbing Activities, or future modifications of those stipulations (Map 16-1 and Appendix A).



- Hydrocarbon Potential Area Boundary
 - High Hydrocarbon Potential
 - Moderate Hydrocarbon Potential
 - Low Hydrocarbon Potential
 - No Surface Occupancy (Stipulation 4)
 - ▨ No Surface Occupancy (Stipulation 2)
- NOTE : Remainder of Resource Area would be leased with other standard stipulations applied



Map 16.1
Alternative C
MINERALS MANAGEMENT
Oil and Gas Leasing
 Washakie Resource Management Plan

ALTERNATIVES - ALTERNATIVE C

- Approximately 253,000 acres (16 percent of the federal mineral estate) would be leased with a permanent “no surface occupancy” stipulation (standard stipulation number 4) to protect important wildlife habitat, the Spanish Point Karst ACEC, and cultural and recreation sites (Table 13).
- Approximately 830,000 acres (52 percent of the federal mineral estate) would be leased with a seasonal “no surface occupancy” stipulation (standard stipulations number 2a or 2b) to protect important wildlife habitat.

- Approximately 520,000 acres (32 percent of the federal mineral estate) would be leased with other standard surface protection stipulations applied.

Geophysical Exploration. All proposals for geophysical exploration would be evaluated on a case-by-case basis. Suitable surface protection measures as described in the Wyoming BLM Standard Stipulations for Surface Disturbing Activities (or future modifications), and access restrictions (ORV designations) would be applied. Generally, geophysical exploration would not be allowed on BLM-administered surface in oil and

TABLE 13
MINERALS MANAGEMENT - ACRES OF OIL AND GAS LEASE
RESTRICTIONS BY HYDROCARBON POTENTIAL
ALTERNATIVE C

Category	Lease Stipulation	Hydrocarbon Potential ¹ Mineral Estate Acres (Estimated)		
		High	Moderate	Low
Lease Restrictions (General)				
No Lease ²		0	0	0
Permanent No Surface Occupancy ²		14,000	134,000	105,000
Seasonal No Surface Occupancy		511,000	97,000	222,000
Lease Under Other Stips		437,000	57,000	26,000
<i>(Note: Numbers Rounded)</i>				
Specific Areas with No Surface Occupancy Lease Restrictions				
Permanent:				
Spanish Point Karst ACEC	4 ³		11,200	
West Slope Canyons	4		35,600	47,900
Middle Fork Powder River	4		900	
T&E Species Nesting Area	4	250		
Castle Gardens Campground	4	110		
Bates Battlefield	4		1,040	
Medicine Lodge Archeological Site	4		100	
Sage Grouse Leks	4	9,200	2,300	1,600
Elk Calving Areas	4		6,400	12,200
Crucial Elk Winter Range	4	4,800	78,800	41,200
Seasonal:				
Sage Grouse Habitat	2b	337,000	92,900	62,100
Elk Winter Range	2a	173,400	4,000	159,500

¹ Refer to “Evaluation Criteria for Hydrocarbon Potential” in Chapter 1 for a description of the methodology used to determine hydrocarbon potential.

² “No lease” or “no surface occupancy” stipulations would be phased in over the life of the plan by application of those restrictions on leases as they are considered for renewal or first-time issue. These stipulations would not be applied retroactively to existing leases.

³ Refer to Appendix A, “Wyoming BLM Standard Stipulations for Surface Disturbing Activities,” for a description of lease stipulations.

ALTERNATIVES - ALTERNATIVE C

gas "no lease" areas. About 6,750 acres (less than 1 percent of the federal surface) would be closed to geophysical exploration, including about 250 acres of threatened and endangered species habitat and about 6,500 acres of BLM-administered surface in the Spanish Point Karst ACEC. Geophysical exploration on the remaining 1,227,400 acres (99 percent of the federal surface) would be affected by vehicle use limitations of various kinds (Table 14).

The management prescriptions for the other leasable minerals in Alternative C are the same as those described in the Preferred Alternative.

Wild Horse Management

About 10,300 acres in the Zimmerman Springs (0591) and Lower Nowood (0015) allotments would be designated and managed as a wild horse herd management Area (Map 6), and a herd management area plan (HMAP) would be written.

About 360 AUMs of forage would be allocated to wild horses, annually. Livestock AUMs in the wild horse herd area would be reduced by the same amount (from about 1,175 to 815) to be compatible with forage production, grazing management programs, and overall forage demand.

TABLE 14
MINERALS MANAGEMENT - ACRES
OPEN TO GEOPHYSICAL EXPLORATION
ALTERNATIVE C

Category Descriptions	Hydrocarbon Potential		
	High	Moderate	Low
Closed¹			
Spanish Point Karst ACEC		6,500	
T&E Species Habitat	250		
Total Closed	250	6,500	0
Limited²			
ORV Play Area	130		
Permitted/Licensed Use			
West Slope Canyons		35,600	47,900
Existing Roads and Trails			
Castle Gardens	110		
Wetlands	3,000		
Crucial Wildlife Habitat;			
Fragile Soils	581,000	52,400	
Designated Roads and Trails			
and/or Time and Season of Use			
Medicine Lodge H. U.		4,300	
Upper Nowood	32,300		
Laddie Creek		4,700	
Middle Fork			900
Crucial Wildlife Habitat;			
Fragile Soils	123,200	117,600	222,100
Wetlands		900	1,100
Total Limited	739,740	215,500	272,000
Total Open	0	0	0

NOTE: All geophysical exploration would be subject to ORV use designations (see table 8).

¹ "Closed" applies to areas that are not open for leasing of oil and gas.

² "Limited" applies to areas open for leasing of oil and gas but subject to Wyoming BLM Standard Stipulations for Surface Disturbing Activities including permanent or seasonal "no surface occupancy."

ALTERNATIVES - ALTERNATIVE C

Wild horse numbers would be limited to 30 animals.

Riparian areas along Nowater Creek would be fenced to exclude wild horses and protect wetland/riparian habitat. About 2 miles of fence would be built along the south side of Nowater Creek to complete the fencing of the Creek in the herd management area.

Watershed Management

Future water discharges from mining activities, waste water treatment facilities, etc., into drainages and surface waters would be regulated by the National Pollutant Discharge elimination System (NPDES) permit process. Existing and future discharges of produced water from oil and gas operations would be regulated by the Notice to Lessee (NTL) 2B regulations and the NPDES permit process. The following constraints would be applied in all situations:

- Discharges would not be allowed in Trapper Creek from the U.S. Forest Service (USFS) boundary downstream to the west line of Section 21, T. 52 N., R. 89 W.
- Discharges would not be allowed in Dry Medicine or Medicine Lodge creeks from the USFS boundary downstream to the confluence of the two creeks.
- Discharges that would degrade water quality in streams and reservoirs having sport fishery potential in the West Slope HMP area would not be allowed.

Special wildfire suppression restrictions would be applied to areas above sinking stream segments and caves. These include:

- Equipment, such as trucks and bulldozers, would not be allowed to operate within 200 yards of Dry Medicine Lodge, Medicine Lodge or Trapper creeks and other tributaries exhibiting karst characteristics.
- Air-dropped fire retardants would not be allowed within 200 yards of Dry Medicine Lodge, Medicine Lodge and Trapper creeks.

Management of the 11,200 acre Spanish Point Karst ACEC (Map 7) would emphasize watershed

protection. Proposed management prescriptions include:

1. All roads and vehicle trails (about 8 miles) in Dry Medicine Lodge Canyon, above the dugway, would be closed and rehabilitated where accelerated erosion is occurring. Additional ORV restrictions would be applied as described in the ORV discussion for this alternative.
2. Logging restrictions on steep slopes, stream buffer zones, and equipment use would be applied.
3. Use of insecticides, herbicides and silvicultural chemicals would be prohibited.
4. Range condition would be brought to good or better condition and maintained at that level by intensive management.
5. Hydrocarbon leasing of the federal mineral estate under private surface and BLM-administered surface would be allowed with "no surface occupancy" stipulations for protection of underground cavernous areas. "No surface occupancy" stipulations would also be applied to the federal mineral estate under national forest system lands.
6. Mining claim location would be allowed in areas not already withdrawn from mineral location, but activity on mining claims would be subject to the 43 CFR 3809 regulations.

Activities such as logging, livestock grazing, ORV use, and oil and gas development in the ACEC are especially important to the management of the ACEC because of probable adverse effects on the ACEC from those activities. About 3,000 acres of surface in the Bighorn National Forest and 1,800 acres of surface in private ownership are within the ACEC. In order to protect the integrity of the ACEC from these influences, the following actions would be undertaken:

- Agreements for cooperative management of surface activities in watersheds on Forest Service and private lands would be obtained where possible. Management prescriptions would be compatible with those proposed for public lands.

ALTERNATIVES - ALTERNATIVE D

With the exception of the Spanish Point Karst ACEC, chemical control of pests would be allowed resource area-wide subject to the restrictions identified in Records of Decision on the Northwest Area Noxious Weed Control Program, the Rangeland Grasshopper Cooperative Management Program, and subsequent programmatic EISs and EAs, to reduce the possibilities of water pollution.

Management actions would emphasize the reduction of soil erosion and sediment yields on approximately 391,000 acres of sensitive watersheds (Map 12). These watersheds are (in descending priority):

- Kirby Creek,
- Nowater Creek, and
- East Fork Nowater Creek.

Management actions would include the use of Best Management Practices (BMPs) (Appendix I) to increase vegetative cover primarily through changes in livestock management, and to stabilize watersheds with water flow and sediment control structures.

Sites that fail to respond to grazing management, including non-use, would have contour furrowing or seeding projects applied to improve vegetation cover and condition.

- Contour furrowing would occur on about 15,000 acres of saline upland and saline lowland range sites with slopes of less than 6 percent, particularly near gullies and established drainages.
- Seeding would occur on about 27,000 acres of loamy, shallow loamy, and sandy range sites in poor and fair range condition.

Alternative D

Alternative D emphasizes the protection and enhancement of environmental quality. It limits uses and development of resources that do not protect or enhance the quality of the natural environment.

Minerals Management

Oil and Gas. Oil, gas, and tar sand would be leased with the Wyoming BLM Standard Stipulations for Surface Disturbing Activities, or future modifications of those stipulations (Map 17 and Appendix A). Additional stipulations may be applied at the time of leasing to mitigate impacts not covered by the Wyoming BLM standard stipulations.

- Approximately 11,200 acres (about 1 percent of the federal subsurface) in the Spanish Point Karst ACEC would not be leased (Table 15).
- Approximately 784,000 acres (49 percent of the federal subsurface) would be leased with permanent “no surface occupancy” stipulations (standard stipulation number 4) to protect important wildlife habitat, and cultural and recreation sites.
- Approximately 808,000 acres (50 percent of the federal subsurface) would be leased with other standard surface protection stipulations applied.

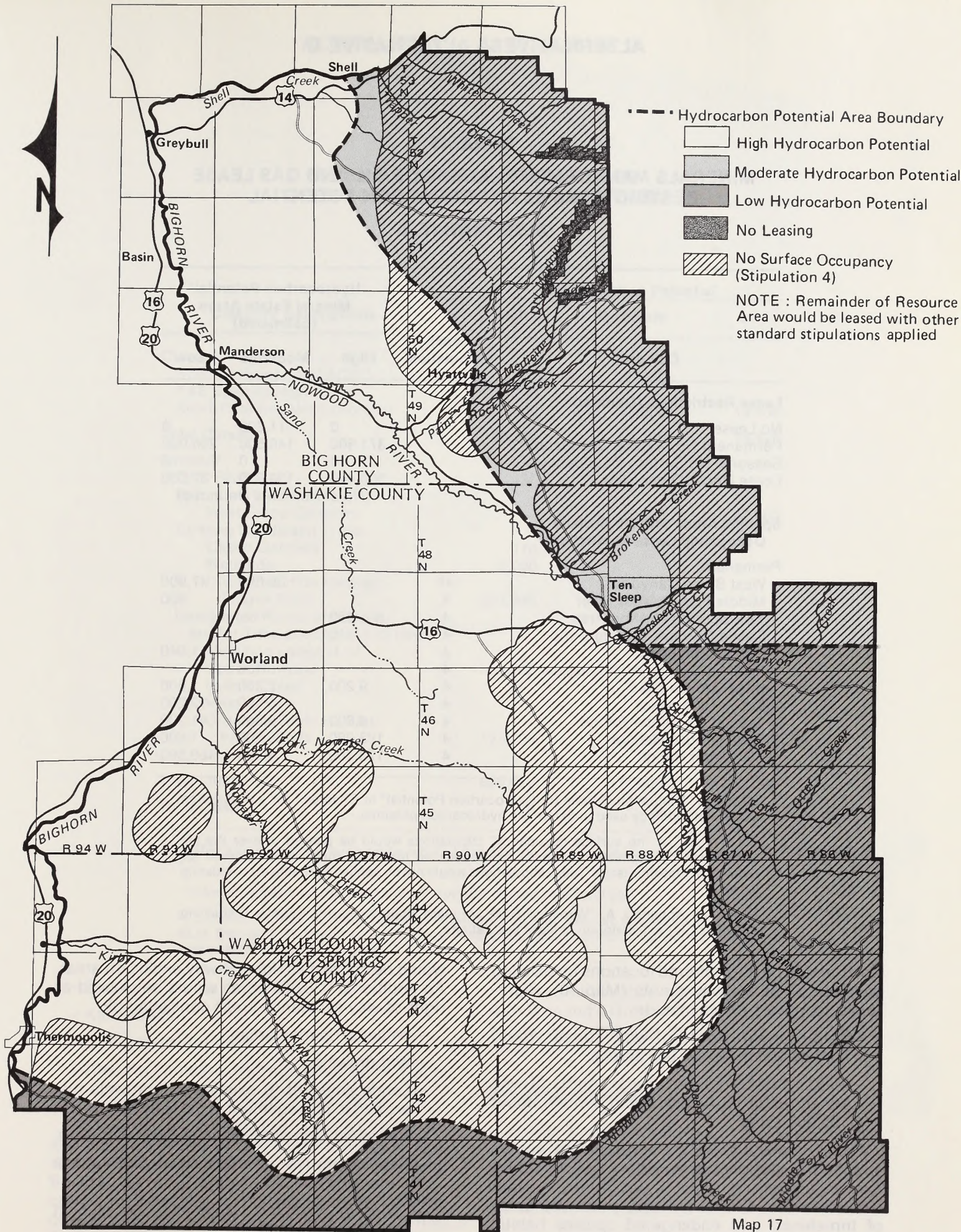
Geophysical Exploration. All proposals for geophysical exploration would be evaluated on a case-by-case basis. Suitable surface protection measures as described in the Wyoming BLM Standard Stipulations for Surface Disturbing Activities (or future modifications), and access restrictions (ORV designations) would be applied. Generally, geophysical exploration would not be allowed on BLM-administered surface in oil and gas “no lease” areas. About 120,000 acres (10 percent of the federal surface) would be closed to geophysical exploration, including about 6,500 acres of BLM-administered surface in the Spanish Point Karst ACEC. Geophysical exploration on the remaining 1,114,000 acres (90 percent of the federal surface) would be regulated by vehicle use limitations of various kinds (Table 16).

Tar Sand. Included in the above acreage under other surface protection stipulations or under “no surface occupancy” stipulations are about 55,000 acres in the Spanish Point Karst area which were leased for oil and gas prior to enactment of the Combined Hydrocarbon Leasing Act (CHLA) of 1981. Deposits of tar sands are projected to exist in those areas. Because of constraints associated with those leases, tar sands cannot presently be developed. When those leases expire between now and 1991, the areas would undergo consideration for re-leasing. There are no pre-CHLA leases that would directly affect the Spanish Point Karst ACEC. Therefore, about 55,000 acres could be re-leased, subject to the management prescriptions contained in this alternative.

Approximately 1,400 acres in post-CHLA leases affecting the ACEC would be leased with a “no surface occupancy” stipulation if, in fact, those leases expired and were considered for re-lease.

Land and Realty Management

Existing transportation and utility corridors for roads, pipelines, and powerlines would be specified as designated right-of-way corridors



- Hydrocarbon Potential Area Boundary
- High Hydrocarbon Potential
- Moderate Hydrocarbon Potential
- Low Hydrocarbon Potential
- No Leasing
- ▨ No Surface Occupancy (Stipulation 4)

NOTE : Remainder of Resource Area would be leased with other standard stipulations applied

Map 17
 Alternative D
 MINERALS MANAGEMENT
 Oil and Gas Leasing
 Washakie Resource Management Plan

ALTERNATIVES - ALTERNATIVE D

TABLE 15
MINERALS MANAGEMENT - ACRES OF OIL AND GAS LEASE
RESTRICTIONS BY HYDROCARBON POTENTIAL
ALTERNATIVE D

Category	Lease Stipulation	Hydrocarbon Potential ¹ Mineral Estate Acres (Estimated)		
		High	Moderate	Low
Lease Restrictions (General)				
No Lease ²		0	11,200	0
Permanent No Surface Occupancy ²		371,600	146,500	266,000
Seasonal No Surface Occupancy		0	0	0
Lease Under Other Stips		590,400	130,300	87,000
<i>(Note: Numbers Rounded)</i>				
Specific Areas with No Surface Occupancy Lease Restrictions				
Permanent:				
West Slope Canyons	4 ³		35,600	47,900
Middle Fork Powder River	4			900
T&E Species Nesting Area	4	250		
Castle Gardens Campground	4	110		
Bates Battlefield	4			1,040
Medicine Lodge Archeological Site	4		100	
Sage Grouse Leaks	4	9,200	2,300	1,600
Elk Calving Areas	4		5,400	12,200
Crucial Elk Winter Range	4	4,800	78,800	41,200
Sage Grouse Habitat	4	183,900	20,300	1,600
Elk Winter Range	4	173,400	4,000	159,500

¹ Refer to "Evaluation Criteria for Hydrocarbon Potential" in Chapter 1 for a description of the methodology used to determine hydrocarbon potential.

² "No lease" or "no surface occupancy" stipulations would be phased in over the life of the plan by application of those restrictions on leases as they are considered for renewal or first-time issue. These stipulations would not be applied retroactively to existing leases.

³ Refer to Appendix A, "Wyoming BLM Standard Stipulations for Surface Disturbing Activities," for a description of lease stipulations.

which would be the preferred locations for existing and future right-of-way grants (Map 18). Right-of-way corridors would include:

- Major linear rights-of-way zones would include 250 miles (40,000 acres).
- Major short segment linear rights-of-way zones (as in oil fields) would include about 105,000 acres.

Approximately 1,089,000 acres would not be included in designated corridors but would be available for rights-of-way under certain circumstances. Of this amount, about 250 acres of threatened and endangered species habitat

would be classed as right-of-way exclusion areas. An additional 938,000 acres would be classed as right-of-way avoidance areas consisting of:

- Wetland/riparian areas,
- Withdrawals,
- Lands adjacent to existing withdrawals that are tied to management of the withdrawn area,
- Approved recreation management plan areas,
- Semi-primitive nonmotorized ROS class areas,
- Lands in Wyoming Game and Fish Habitat Management Units,

ALTERNATIVES - ALTERNATIVE D

TABLE 16
MINERALS MANAGEMENT - ACRES
OPEN TO GEOPHYSICAL EXPLORATION
ALTERNATIVE D

Category Descriptions	Hydrocarbon Potential		
	High	Moderate	Low
Closed¹			
Spanish Point Karst ACEC		6,500	
T&E Species Habitat	250		
Semi-Primitive Nonmotorized	50,000	44,600	18,400
Total Closed	50,250	51,100	18,400
Limited²			
ORV Play Area	130		
Permitted/Licensed Use			
West Slope Canyons		35,600	47,900
Existing Roads and Trails			
Castle Gardens	110		
Wetlands	3,000		
Crucial Wildlife Habitat;			
Fragile Soils	531,330	56,000	
Designated Roads and Trails			
and/or Time and Season of Use			
Medicine Lodge H. U.		4,300	
Upper Nowood	32,300		
Laddie Creek		4,700	
Middle Fork			7,000
Crucial Wildlife Habitat;			
Fragile Soils	123,200	69,500	197,100
Wetlands		900	1,100
Total Limited	690,070	171,000	253,100
Total Open	0	0	0

NOTE: All geophysical exploration would be subject to ORV use designations (see table 17).

¹ "Closed" applies to areas that are not open for leasing of oil and gas.

² "Limited" applies to areas open for leasing of oil and gas but subject to Wyoming BLM Standard Stipulations for Surface Disturbing Activities including permanent or seasonal "no surface occupancy."

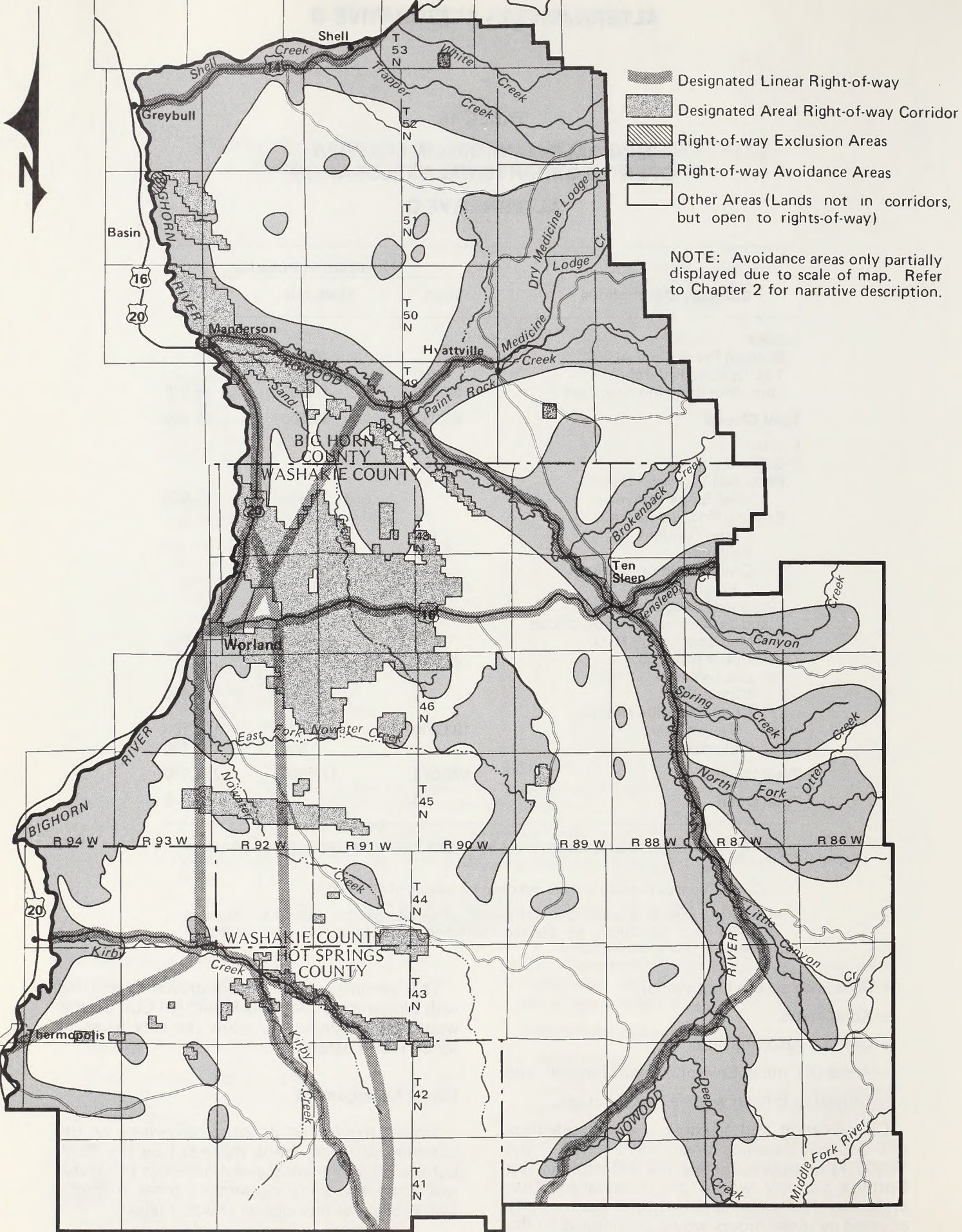
- Soils with severe limitations,
- Karst areas,
- Cultural resource sites,
- Areas of Critical Environmental Concern, and
- Crucial or critical wildlife habitat areas

Classification and Multiple Use Act retention and disposal classifications (orders W-12616 and W-12617) on approximately 144,500 acres in Hot Springs County would be terminated. Discretionary management activity in areas formerly covered by these orders would be dictated by the RMP.

The administrative site withdrawal associated with Worland's Green Hills Municipal Golf Course would be terminated to allow the City to apply for an R&PP patent.

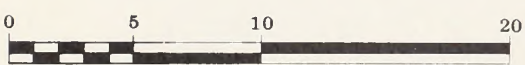
Forest Management

Timber harvest would occur anywhere on the commercial forest lands managed by the BLM, but the primary management objective of harvest would be the enhancement of other resource values over the production of wood fiber.



NOTE: Avoidance areas only partially displayed due to scale of map. Refer to Chapter 2 for narrative description.

Map 18
 Alternative D
 LANDS AND REALTY MANAGEMENT
 Corridor Designation
 Washakie Resource Management Plan



ALTERNATIVES - ALTERNATIVE D

A maximum of 700 thousand board feet (MBF) of forest products including 100 MBF of fuelwood, posts and poles, would be harvested from about 90 acres annually, for about 10 years to meet local demand for timber products and to maintain healthy stands of timber. After 10 years, a new allowable cut figure would be developed, based on new inventories. Clear-cuts in lodgepole pine would amount to about 15 percent of the total annual acreage cut. The remaining 85 percent would be selective or two-stage shelterwood cuts in various coniferous types, aspen and juniper. Factors such as local demand, market conditions and the need for enhancement of other resource values may cause fluctuation in the volume of timber harvested in any one year. Harvest levels would not exceed the long-term sustained yield of the forest base and would maintain existing levels of thermal cover for wildlife.

Operational restrictions and alternative timber stand management techniques would be employed to meet management goals of enhancement of other resource values. Possible actions include:

- The rotation age on mixed conifer forest types, exclusive of lodgepole pine, would be increased from 110-120 years to 150-170 years.
- Burning, disease treatment by spraying, and helicopter logging would be used to meet management goals.

Wild Horse Management

All the wild horses in the Zimmerman Springs Wild Horse Herd Area (Map 6) would be removed from the area and be made available for adoption through BLM's Adopt-A-Horse Program or be relocated to a designated Wild Horse Herd Management Area in the Worland District. Removal would reduce competition with livestock in the Zimmerman Springs area and would reduce damage to range developments, soil, and vegetation.

Range Management

Livestock grazing would be managed to reduce conflicts with other uses. By adjusting season of use and utilization levels, authorized livestock grazing use would be about 114,000 AUMs. These seasons of use and utilization levels are:

- No use April 1 to August 31 in 5- to 9-inch precipitation zones (Cook, 1971).
- No use April 15 to June 25 in 10- to 14-inch precipitation zones.

—No use April 25 to June 30 in 15- to 19-inch precipitation zones.

—Limit livestock use of key forage species on crucial big game winter ranges to 30 percent of the current year's production.

—Limit use of key forage species to 50 percent of the current year's production (Bell, 1973).

Livestock grazing would be eliminated on an undetermined number of allotments administered by the Washakie Resource Area. Grazing would be precluded if unresolvable conflicts exist between grazing use and other uses or values, such as fish and wildlife, wetland/riparian or watershed.

Seasons of use would be established on those allotments that currently have no season of use designated. Projected seasons of use in the allotments would occur as follows:

1. No particular season designated, no allotments,
2. Spring only, no allotments,
3. Combination spring and other, no allotments,
4. Summer (49 percent of the allotments),
5. Fall and winter (51 percent of the allotments).
These figures do not reflect any elimination of grazing resulting from conflict resolution. (Refer to Appendix D for details on allotments.)

The following are the types and estimates of new projects that would be implemented, with funding priority given to "I" category allotments:

- 210 miles of fence,
- 70 spring developments,
- 60 reservoirs,
- 100 miles of water pipeline,
- 20 water catchments,
- 4,300 acres of sagebrush spraying, and
- 12,700 acres of prescribed burning.

A maximum of three AMPs would be written or revised annually, on "I" category allotments.

Monitoring studies would be used to determine the level of adjustment needed in each allotment. Actual use, utilization and climate studies would be used to insure that the use level objectives for the allotments are being met. Condition and trend studies would be used to measure the progress in meeting the long-term objectives of improving range condition.

Range would be managed to attain and maintain good or better condition.

Grazing would be managed in wetland/riparian areas to allow rapid restoration and improvement of degraded habitat conditions. About 185 miles of fence would be built around wetland/riparian areas, at the rate of 15 miles per year, to improve management and to reduce problems on perennial and ephemeral streams, reservoirs, and springs.

Approximately 500 acres of aspen stands throughout the resource area would be protected from livestock grazing, at the rate of 90 acres per year. Priority areas for protection are the Brokenback, Onion Gulch, and Upper Alkali Road areas. Methods of protection include use of rest/rotation grazing systems, establishment of salt stations away from aspen stands, and fencing.

Off-Road Vehicle Management

Approximately 124,000 acres would be closed to vehicular travel to protect karst areas, threatened and endangered species habitat, and roadless areas (Map 19 and Table 17).

Approximately 1,110,000 acres would be designated as limited with regard to vehicle use, to protect crucial habitat, fragile soils, wetlands, etc.

No areas would be designated as open without limitation to vehicular travel (i.e., unrestricted use of vehicles would not be allowed).

Recreation Management

Restrictions on recreational use would be limited to applicable ORV restrictions, the use of the caves, and management prescriptions written for special recreation management areas. Protecting cave resources, such as delicate formations, and providing for user safety would enhance the recreation experience. This would be accomplished with controls such as limiting party size, timing of use to avoid crowding, and closing caves to use during periods of high water runoff. Prescriptions written for special recreation management areas would include directing recreational use, protecting important resources, and reducing conflicts with other uses.

Portions of the west slope of the Bighorn Mountains would be designated as a Special Recreation Management Area (SRMA) (Map 11). About 241,000 acres would be designated, including the following west slope canyons: White, Trapper, Medicine Lodge, Dry Medicine Lodge, Paint Rock, Brokenback, South Brokenback, Otter and Deep creeks. The Bighorn River from the Wedding of the Waters downstream to Shell Creek would also be designated as an SRMA. About 59,000 acres

would be included in this SRMA. The remainder of the resource area (about 934,000 acres) would be designated as an Extensive Recreation Management Area (ERMA). Activity plans would be prepared for both of the SRMAs and the ERMA to focus management activity on areas of high recreational value, or where conflicts with recreation use occur.

Access to caves and west slope canyons would be controlled.

- Vehicular access would be restricted within 1 mile of cave entrances.

- Access agreements would be pursued with private landowners or public land management agencies whose land is associated with caves.

- Road or trail construction would be restricted in or near canyons.

- Access agreements would be pursued with landowners to control access to canyons.

Facilities would be considered for development at the Middle Fork camping area and the Cherry Creek Stock Driveway crossing of Deep Creek for site protection and visitor management. Those facilities may include fire rings, sanitary facilities, and vehicle barriers, depending on the needs of the specific site.

Permits for cave use would be limited to protect cave resources, such as delicate formations, and to provide for user safety. This would be accomplished with controls such as: limiting party size, timing use to avoid crowding, closing caves to use during periods of high water runoff, etc. Permits for other types of use would be reviewed on a case-by-case basis and limitations specific to the activity would be developed.

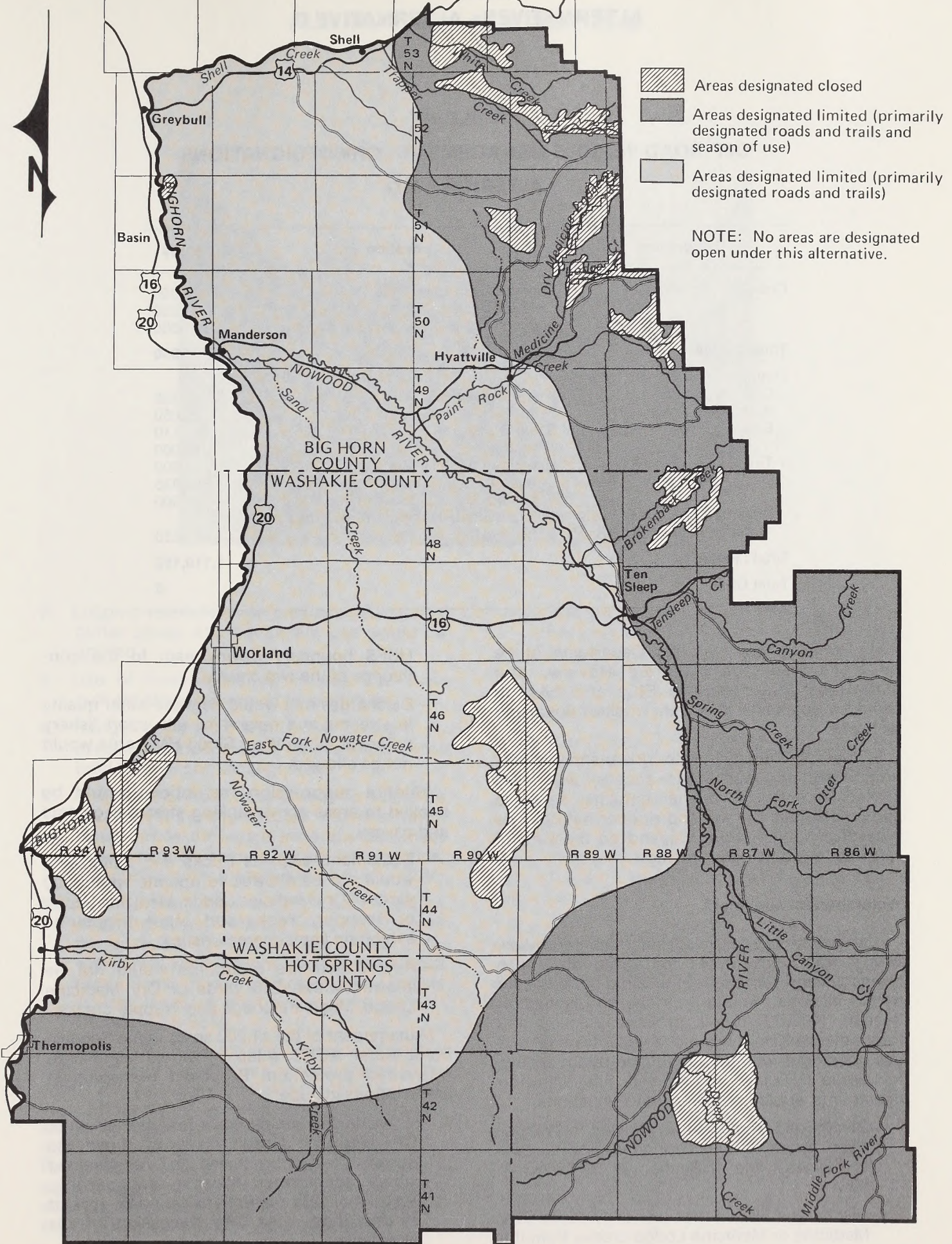
Fish and Wildlife Habitat Management




Certain areas would be managed to allow wildlife species to be reintroduced:

- Approximately 126,700 acres in West Slope Canyons would be managed to facilitate the reintroduction of peregrine falcon.

- Habitat of approximately 190,700 acres north of Ten Sleep and east of the Nowood River would be managed to facilitate the reintroduction of pronghorn antelope.

With the exception of the Spanish Point Karst ACEC, chemical control of pests would be allowed resource area-wide subject to the restrictions identified in Records of Decision on the Northwest Area Noxious Weed Control Program, the Rangeland Grasshopper Cooperative Manage-



-  Areas designated closed
-  Areas designated limited (primarily designated roads and trails and season of use)
-  Areas designated limited (primarily designated roads and trails)

NOTE: No areas are designated open under this alternative.

Map 19
Alternative D
OFF ROAD VEHICLE MANAGEMENT
 Washakie Resource Management Plan

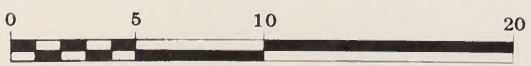


TABLE 17
OFF-ROAD VEHICLE MANAGEMENT - ORV DESIGNATIONS
ALTERNATIVE D

Designation	Location	Acres	
Closed	Spanish Point Karst ACEC	6,500	
	T&E Species Habitat	250	
	Semi-primitive Nonmotorized Areas	117,300	
Total Closed		124,050	
Limited	ORV Play Area	Pits Motorcycle Area	125
	Permitted/Licensed Use	Paint Rock Canyon	5,050
		Castle Gardens	110
	Existing Roads & Trails	Wetlands	5,000
		Medicine Lodge Habitat Unit	4,300
	Time or Season of Use	Crucial Wildlife Habitat; Fragile Soils	589,835
		Upper Nowood; Laddie Creek; Middle Fork	44,000
	Designated Roads & Trails	Crucial Wildlife Habitat; Fragile Soils	461,530
		Designated Roads & Trails and/or Season of Use	
	Total Limited		1,110,150
Total Open		0	

ment Program, findings of the Department of the Interior's Pesticide Program Review, and subsequent programmatic EISs and EAs, to protect food chains, important wildlife habitat and wetlands.

Access (including 4-wheel drive, snowmobile, horseback, and pedestrian access) would be limited in areas of crucial habitats, sensitive species habitats and wetland/riparian habitat. The type of limitation would depend on the kind of resource value being protected.

Watershed Management

Future water discharges from mining activities, waste water treatment facilities, etc., into drainages and surface waters would be regulated by the National Pollutant Discharge Elimination System (NPDES) permit process. Existing and future discharges of produced water from oil and gas operations would be regulated by the Notice to Lessee (NTL) 2B regulations. The following constraints would be applied in all situations:

- Discharges would not be allowed in Trapper Creek from the USFS boundary downstream to the west line of Section 21, T. 52 N., R. 89 W.
- Discharges would not be allowed in Dry Medicine or Medicine Lodge creeks from the

USFS boundary downstream to the confluence of the two creeks.

- Discharges that would degrade water quality in streams and reservoirs with sport fishery potential in the West Slope HMP area would not be allowed.

Wildfire suppression restrictions would be applied to areas above sinking stream segments and caves:

- Equipment, such as trucks and bulldozers, would not be allowed to operate within 200 yards of Dry Medicine Lodge, Medicine Lodge or Trapper creeks and other tributaries exhibiting karst characteristics.
- Air-dropped fire retardants would not be allowed within 200 yards of Dry Medicine Lodge, Medicine Lodge and Trapper creeks.

Management of the 11,200 acres in the Spanish Point Karst ACEC (Map 7) would emphasize watershed protection. Proposed management prescriptions include:

1. All roads and vehicle trails (about 8 miles) in Dry Medicine Lodge Canyon, above the dugway, would be closed and rehabilitated where accelerated erosion is occurring. Additional ORV restrictions would be applied as described in the ORV discussion for this alternative.

ALTERNATIVES - ALTERNATIVE D



2. Logging restrictions on steep slopes, stream buffer zones, and equipment use would be applied.
3. Use of insecticides, herbicides and silvicultural chemicals would be prohibited.
4. Range condition would be brought to excellent condition and maintained at that level by intensive management.
5. A withdrawal from mineral leasing would be pursued for the entire ACEC. The withdrawal would involve the federal mineral estate under private surface, national forest system lands, and public surface administered by the BLM.
6. A withdrawal from mining claim location under the General Mining Law of 1872 would be pursued for the entire ACEC. The withdrawal would involve the federal mineral estate under private surface, national forests system lands, and public surface administered by the BLM.

Activities such as logging, livestock grazing, ORV use, and oil and gas development in the ACEC are especially important to the management of the ACEC because of probable adverse affects on the ACEC from those activities. About 3,000 acres of surface in the Bighorn National Forest and 1,800 acres of surface in private ownership are within the ACEC. In order to protect the integrity of the ACEC from these influences, the following actions would be undertaken:

- Agreements for cooperative management of surface activities in watersheds on Forest Service and private lands would be obtained where possible. Management prescriptions would be compatible with those proposed for public lands.

With the exception of the Spanish Point Karst ACEC, chemical control of pests would be allowed resource area-wide subject to the restrictions identified in Records of Decision on the Northwest Area Noxious Weed Control Program, the Rangeland Grasshopper Cooperative Management Program, and subsequent programmatic EISs and EAs, to reduce the possibilities of water pollution.

Management actions would emphasize the reduction of soil erosion and sediment yields on approximately 391,000 acres of sensitive watersheds (Map 12). These watersheds are (in descending priority):

- Kirby Creek,
- Nowater Creek, and
- East Fork Nowater Creek.

Management actions would include the use of Best Management Practices (BMPs) (Appendix I) to increase vegetative cover primarily through changes in livestock management, and to stabilize watersheds with water flow and sediment control structures.

ALTERNATIVES

Sites that fail to respond to grazing management, including non-use, would have contour furrowing or seeding projects applied to improve vegetative cover and condition:

- Contour furrowing would occur on about 15,000 acres of saline upland and saline lowland range sites with slopes of less than 6 percent, particularly near gullies and established drainages.
- Seeding would occur on about 27,000 acres of loamy, shallow loamy, and sandy range sites in poor and fair range condition.

Fire Management

Full suppression of wildfire would occur on about 703,700 acres (Map 13).

Limited suppression of wildfire would occur on about 530,300 acres.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

The following alternatives were considered as possible methods of resolving planning questions or issues. They were eliminated from detailed

study because they were unreasonable or not viable due to technical, legal, or other constraints.

No Grazing

The elimination of livestock grazing from all public lands in the resource area was considered as a possible method of resolving some of the planning questions related to the vegetative resources issue. Based on work done by the interdisciplinary team and managers, the no grazing alternative was eliminated from detailed study for the following reasons:

1. Resource conditions, including range vegetation, watershed, and wildlife habitat, do not warrant a resource area-wide prohibition of livestock grazing. Reduction or elimination of livestock grazing may, however, be necessary in specific situations on some allotments where livestock grazing would significantly conflict with other management objectives. This would be determined during activity planning based on the results of monitoring and studies, among other factors.
2. Public comments received during preparation of the plan indicated a general acceptance of livestock grazing on public land, provided such grazing is properly managed.
3. The highly fragmented land ownership pattern along the southern and southeastern fringes



ALTERNATIVES

of the resource area would necessitate exchanges of land to block-up public lands or the construction of extensive fencing to exclude livestock from public land. Excessive or extensive fencing would also unnecessarily disrupt wildlife movement and restrict public access.

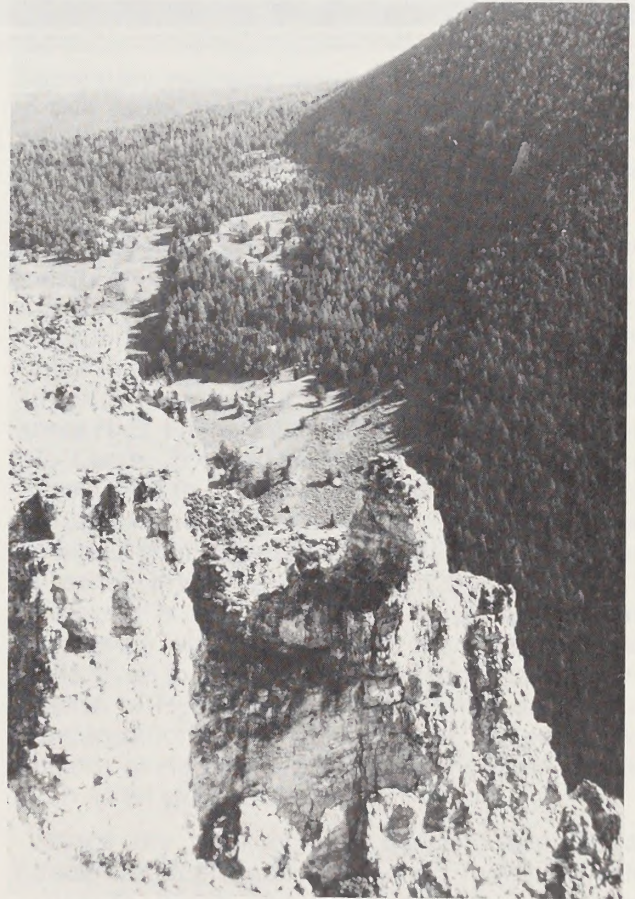
No Harvest of Forest Products

The Washakie Resource Area has 15,000 acres of productive forest lands capable of sustaining forest production which need to be harvested over time to maintain a healthy, vigorous forest. Because fire and, to an extent, disease have been eliminated by man's activities, the harvesting of forest products helps sustain the ecological processes that maintain the healthy condition of the forest. Further, there is sufficient local demand to warrant continued forest harvest. Finally, not harvesting forest products is contrary to the Bureau's forest management policy, as established in the Forest Land Policy Statement, the Public Domain Timber Management Policy, and the Woodlands Management Policy Statement.

Maximum Unconstrained Alternatives

Alternatives that proposed maximum resource area-wide development, production, or protection of one resource at the expense of other resources were not analyzed in detail. The complex ecological relationships that existed before the settling of the region have been altered by human activities. Part of that change comes from the need for the "products" that come from the public lands—timber, minerals, forage, opportunities for recreation, etc. An economic interrelationship also has developed, based on the existing ecological interrelationship. The production of timber and livestock, as examples, are tied to the condition of the ecological relationship. As a result, the

maximum development, production, or protection of one resource at the expense of other resources would alter the existing balance between ecological and economic relationships, and the management of the public lands on a multiple use, sustained yield basis would not be possible. For these reasons, a maximum unconstrained alternative was determined unreasonable and was given no further consideration.





3 Affected Environment

INTRODUCTION

This chapter contains a description of the existing physical, biological, and socioeconomic characteristics of the resource area that would be affected by the alternatives described in Chapter 2. This description of the affected environment serves as a baseline for analyzing and determining the effects on resources from the various alternatives. Much of the information presented in this chapter has been summarized from the Management Situation Analysis, which is available for review in the Worland District Office.

MINERAL RESOURCES

Five rock units produce most of the oil and gas in the Washakie Resource Area: the Cretaceous Frontier Formation, the Cretaceous Muddy sandstone member of the Thermopolis Shale, the lower Cretaceous Greybull sandstone member of the Cloverly Group, the Permian Phosphoria Formation, the Pennsylvanian Tensleep Formation, and the Mississippian Madison Formation (Map 20). Cumulatively, more than 208 million barrels of oil and 136 billion cubic feet of gas have been produced in the resource area. Historically, this is 4 percent of the oil and 1 percent of the gas produced in Wyoming to date.

The Washakie Resource Area has 32 defined and 5 undefined known geologic structures (KGSs) for oil and gas located in the central and western portions of the resource area (Map 20). Of about 1,500 total leases covering about 1.25 million acres, 254 leases on 113,196 acres were producing in February 1986. Production is from 460 oil wells and 23 gas wells. In 1985, an additional 79 oil and 15 gas wells had been shut in. Amounts produced in 1985 were 2.9 million barrels of oil and 4.7 billion cubic feet of gas.

Secondary recovery water injection is underway in five fields, and two other fields are in tertiary recovery. Amounts of liquid removed from gas at two gas plants near Worland totaled 9.2 million gallons in 1984.

Hydrogen Sulfide (H_2S), is a toxic gas dissolved mostly in oil produced from the Phosphoria formation. In the Washakie Resource Area, the Phosphoria Formation is known to contain H_2S . Since this formation is productive in almost every structure in the resource area, most fields produce some H_2S . Fields with significant H_2S production are Lamb, Torchlight, Manderson, Cottonwood Creek, South Frisby, Slick Creek, and Black Mountain. In the Washakie Resource Area, however, this is less of a public health hazard than in other areas of Wyoming; since the H_2S produced is dissolved in crude oil rather than associated with high-volume, high-pressure gas wells. Even though the potential for a catastrophic release of H_2S is therefore far lower, dangerous concentrations (in the hundreds of parts per million) of H_2S can be found in enclosed vessels such as oil storage tanks.

Since the odor of H_2S can be detected at concentrations much lower than minimum safe exposure levels, the characteristic rotten-egg aroma of H_2S is considered a nuisance in communities near oilfields (Worland, Manderson, and Basin). The health effects of chronic exposure are not known.

The total coal resource is about 62 million tons. Movable coal, i.e., coal recoverable by current mining methods, is about 46 million tons under about 50,000 acres. Of this, about 840 acres are privately owned surface and 720 acres are State owned surface. There are currently no existing federal coal leases and only one exploration license in the resource area.

The resource area has approximately 40 potentially minable tar sand deposits, with an estimated 40 million barrels of recoverable petroleum. Leases covering about 55,000 acres

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have been issued prior to November 16, 1981 under oil and gas leases. Only four oil and gas leases (amounting to about 5,100 acres) allow for immediate development of the tar sand resource by methods other than conventional drilling.

Bentonite occurs in a broad band of sedimentary rocks of Cretaceous age 100 miles long and 10 miles wide (Map 21). Some 32 separate bentonite beds extending from the Muddy sandstone member of the Thermopolis Shale to the upper Cody Shale, aggregating about 97 feet (29.5m) in thickness, amount to an overall recoverable resource of 83.2 million tons. The depth of burial and the effect of oxidizing groundwaters probably reduced this resource by some factor as yet unknown.

Gypsum beds crop out in a band 8 miles wide and 64 miles long (Map 21). These beds represent an estimated potential 11,151,000 tons in place and about 5,241,000 tons of recoverable gypsum.

There is no known production of metallic minerals in the study area to date.

Twelve free use permits and 4 material sales contracts are active. About 420,000 cubic yards of sand and gravel and 97,000 tons of limestone, flagstone, and moss rock are under contract or permit; about 13 percent of the sand and gravel and 8 percent of the stone was produced in 1984. Map 21 shows the location of sand and gravel pits in the Washakie Resource Area. In general, BLM permits and contracts are located within these deposits, although there are some minor exceptions near Ten Sleep, and along the Kirby Creek drainage. Total sand and gravel resource is estimated to be more than 1.7 billion cubic yards.

AIR RESOURCES

Air quality within the RMP area can be described as good. The entire airshed is classified as class II, which generally allows for some future deterioration of air quality to accommodate regional economic growth (Wyoming Air Quality Standards and Regulations, 1985). Air contaminants which occur within the area include suspended particulates, hydrogen sulfide (H₂S), oxides of sulfur (SO_x) and nitrogen (NO_x), and vaporous hydrocarbons. Suspended particulates are injected into the surrounding air by surface disturbing activities, wind action, and the combustion of some hydrocarbons. Sulfur dioxide sources within the planning area include flaring of hydrogen sulfide gas and the mineral hot springs at Thermopolis. H₂S, a colorless

extremely toxic gas, is a by-product of liquid and gas hydrocarbon extraction. Therefore its occurrence is primarily restricted to producing oil and gas fields in the area. Vaporous hydrocarbons are released around oil and gas production facilities. While not a problem resource area-wide, significant concentrations may accumulate within oil fields.

A paucity of data exists regarding air contaminants in the area. No data is available on atmospheric concentrations of SO_x or NO_x. However, these gasses are not thought to be produced in sufficient quantities in the area to be environmentally hazardous.

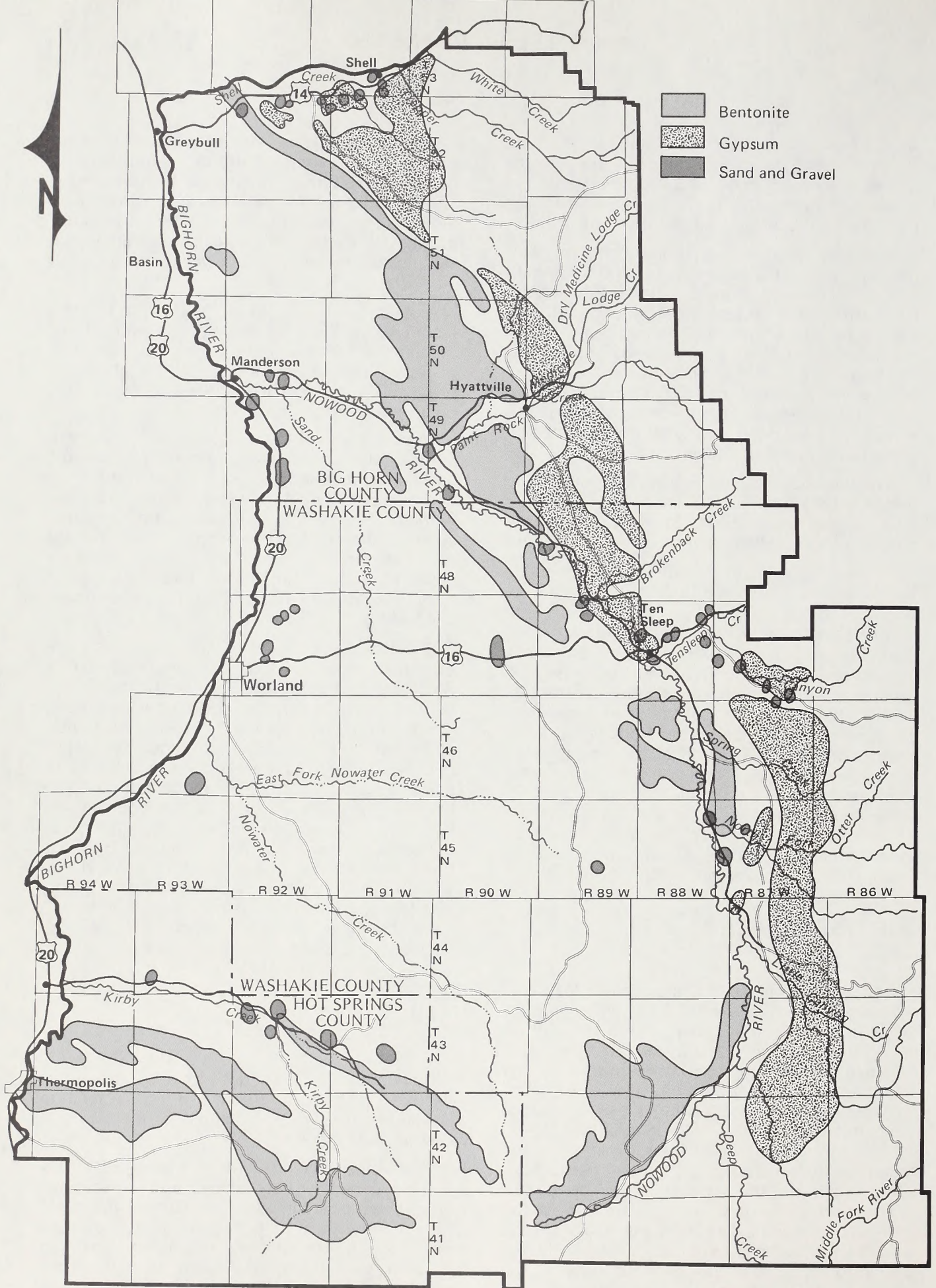
Total suspended particulates (TSP) is the only contaminant for which long-term data is available. Monitoring data indicate TSP values are highest near population centers such as Thermopolis and Worland. Seasonally, TSP values are highest in summer and fall. Marked decreases occur in the winter due to snow cover. Values then rise in the spring after snowmelt. No violations of Wyoming's 24 hour or annual TSP standards have been noted. (SA1 1980).

Significant amounts of H₂S are produced in the Cottonwood, Black Mountain, Worland, Lamb, Slick Creek, Manderson, Ainsworth and Torchlight KGSs. Natural gas produced from these fields ranges from 1 percent to 63 percent H₂S (USDI, 1960). Most of the H₂S produced is rapidly oxidized through combustion to the less toxic gas, sulfur dioxide. Therefore, atmospheric concentrations outside the KGSs boundaries are considered to be below levels which would cause deleterious effects on human beings. H₂S has been blamed for noxious odors around the Worland area, however. Within producing fields, small mammal deaths have been attributed to H₂S poisoning near vent lines, where the gas may accidentally escape to the atmosphere.

SOILS

Soil maps, detailed descriptions, and interpretive information for the entire Washakie Resource Area are maintained at the Worland District BLM office.

The soils have formed in parent materials derived generally from shales and sandstones, limestones, and alluvium. The soils of the basin floor have little profile development; they lack fertile topsoil horizons and retain many features of their parent materials such as salts, lime, alkalinity, and rock contents. Because of abundant



Map 21
**LOCATABLE AND SALABLE
 MINERAL RESOURCES (POTENTIAL)**
 Washakie Resource Management Plan

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soil moisture, soils on the mountain slopes commonly have distinct horizon development, low salt and lime contents, and are not alkaline; abundant rock contents link these soils with their parent material origins.

Survey information, geologic maps and high altitude vegetative imagery have provided a basis for identifying eight broadly defined soil units in the study area. (Map 22, and Table 18). The units differ on the basis of setting (elevation, precipitation, temperature), geology, landscape features, and vegetative types. Areas having fragile soils are depicted on Map 23. These soils are fragile because of shallowness, steep slopes, and highly erodible topsoils.

The mountain soils are in a cool climate where the root zone is moist more than half the time during the frost-free season. Soil leaching and development, along with parent material features, account for a predominance of soils that are

relatively high in organic matter, loamy in texture and low in alkali and salts.

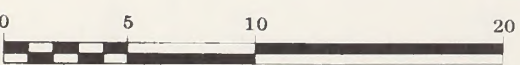
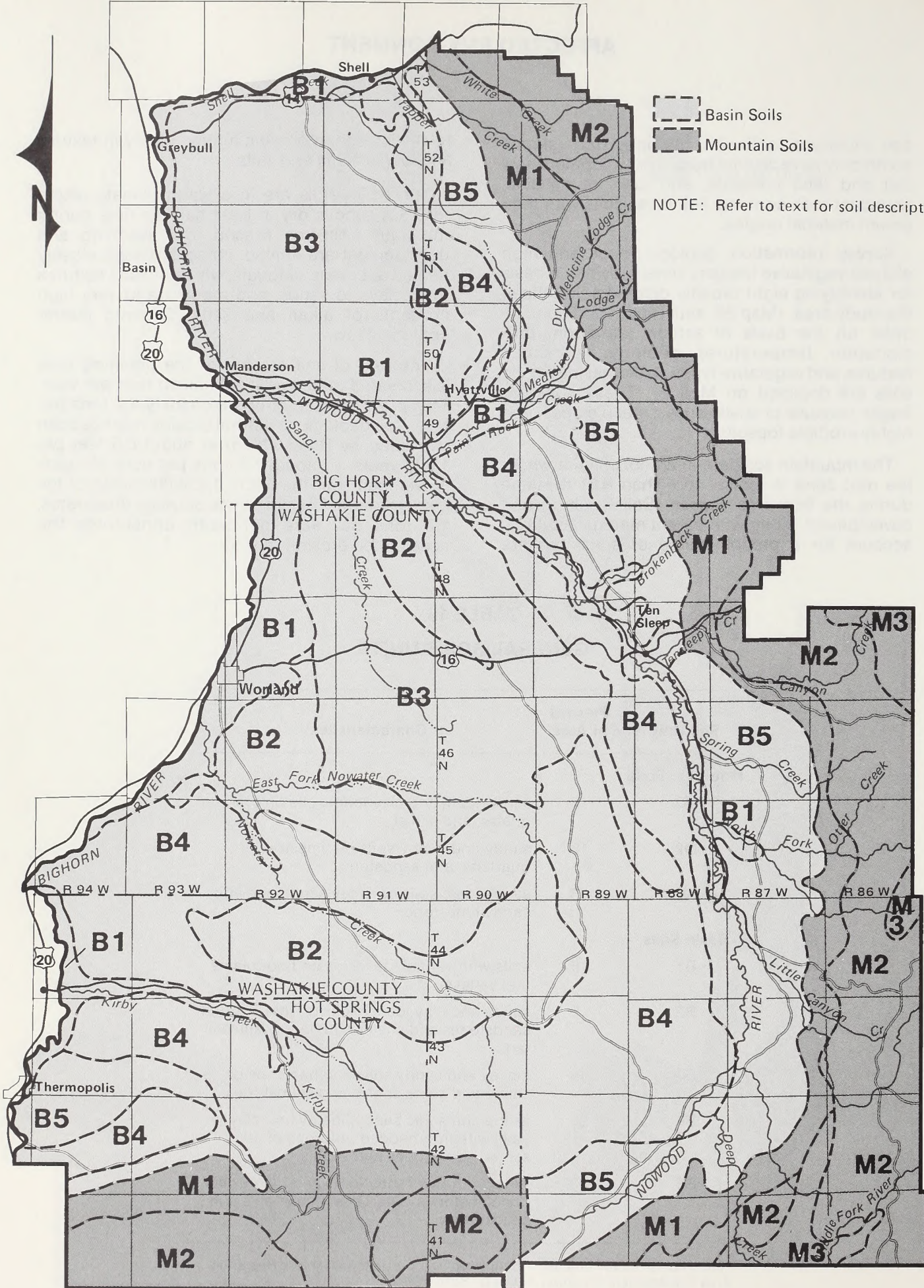
The basin soils are in a warm climate where the root zone is dry at least half the time during the long frost-free season. Soil leaching and development are limited, so soils remain closely related to parent materials, which include textures from clays to sands, and moderate to very high contents of alkali and salts. Organic matter content is low.

The rate of soil erosion in the planning area is estimated to be about 2.7 million tons per year. This is an average of approximately 2.2 tons per acre. The geologic or natural erosion rate has been estimated by Ritter (1975) at about 0.6 feet per 1,000 years, or about 1.2 tons per acre per year if averaged over the entire 1,234,000 acres of the planning area. The difference between these rates, 1.0 tons per acre per year, constitutes the accelerated erosion rate.

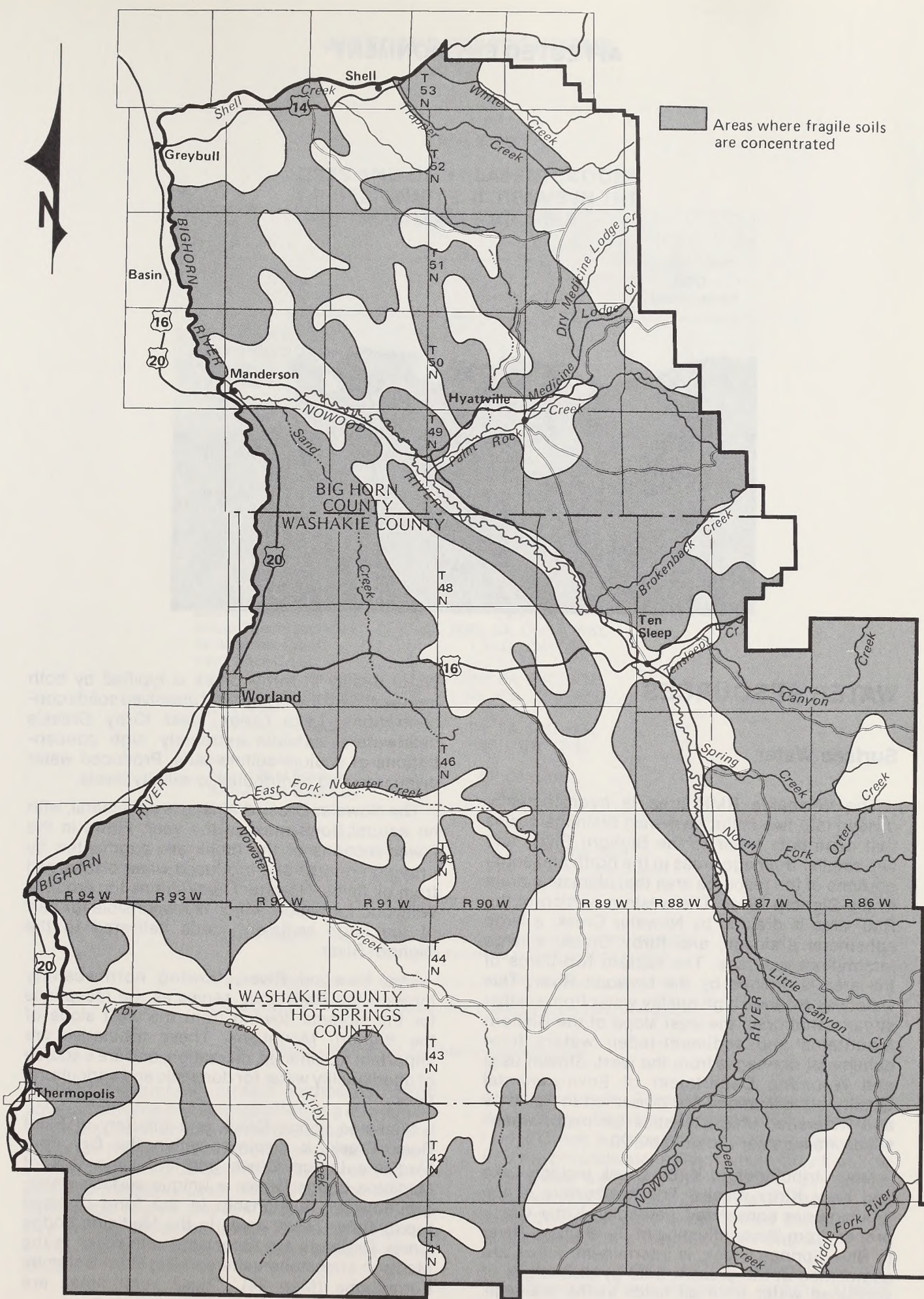
TABLE 18
GENERAL SOILS UNITS

Soil Unit	Percent of Area	Characteristics ¹
Mountain Soils		
M3	2	sandy loam and clay loam soils on granite, gneiss, and schist
M2	16	sandy and loamy soils on limestone, quartzite, and sandstone
M	13	sandy loam soils on limey sandstone and sandy limestone
Basin Soils		
B1	8	soils with variable textures on floodplains and valleys
B2	9	sandy and clay loamy soils on interbedded sandstones and shales with loamy alluvial fans
B3	19	clayey and sandy soils and badlands on saline and sodic shales and sandstones
B4	20	saline and sodic sandy, loamy and clayey soils with interbedded outcrops of dissected sandstones and shales
B5	13	reddish brown sandy loam and loam soils on loamstones, siltstones, thin shales and sandstones

¹ More complete soil unit descriptions can be found in the Washakie Resource Area Management Situation Analysis (BLM, 1984).



Map 22
GENERAL SOILS
 Washakie Resource Management Plan



Areas where fragile soils are concentrated

Map 23
FRAGILE SOILS
 Washakie Resource Management Plan



WATER RESOURCES

Surface Water

The Washakie RMP area is hydrologically divided into two major east-west drainage basins that contribute water to the Bighorn River, and two smaller drainage areas in the north and south portions of the resource area that ultimately drain to the Bighorn River. The western portion of the RMP area is drained by Nowater Creek, a large ephemeral drainage; and Kirby Creek, a large intermittent drainage. The eastern two-thirds of the area is drained by the Nowood River. This waterway receives high quality water from smaller streams that drain the west slope of the Bighorn Mountains and sediment-laden waters from ephemeral drainages from the west. Stream uses and Wyoming Department of Environmental Quality classifications are presented in Table 19 and watershed characteristics for major watersheds are summarized in Table 20.

Major tributaries to Kirby Creek include Lake and West Kirby creeks. The headwaters of the drainage are considered perennial. Kirby Creek proper, from the confluence of the Bighorn River to Blue Springs Creek, is intermittent. Flows are augmented at the present time by discharges of produced water from oil fields in the drainage.

Water quality in Kirby Creek is typified by both high sediment loads and total dissolved solids concentrations. Lake Creek, near Kirby Creek's headwaters, exhibits extremely high concentrations of sodium sulfate salts. Produced water discharge also contributes to salinity levels.

The Nowater Creek drainage is ephemeral, with no natural flows most of the year. Flows in the lower sections of the creek are augmented by irrigation returns and produced water discharged from oil fields. Nowater Creek drains the erodible Willwood formation, which is responsible for part of the large sediment loads delivered to the Bighorn River.

The Nowood River, flowing northwesterly through the RMP area, serves as the receptacle for the streams flowing from the west slope of the Bighorn Mountains. These tributaries are important to fisheries, recreation, and are a source of good quality water for domestic and agricultural uses.

Medicine Lodge Creek is a tributary of Paint Rock Creek. It displays, within the Dry Fork Medicine Lodge Creek and the main fork of Medicine Lodge Creek, a unique surface water-groundwater relationship in the form of karst topography. These areas in the Medicine Lodge Creek Drainage are associated with rocks in the Madison Limestone-Jefferson-Big Horn Dolomite Formations (Map 24). These karst areas are

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**TABLE 19
USES AND DEQ CLASSIFICATIONS
OF DESIGNATED STREAMS IN THE
WASHAKIE RMP AREA**

Name	Uses ¹	DEQ Classification ²
Kirby Creek		
Above Kirby Creek Oil Field	I, W&L, CWF	II
Below Kirby Creek Oil Field	I, W&L	IV
Lake Creek	I, W&L	II
Nowater Creek	W&L	IV
Mud Creek	W&L	IV
Nowood River & Tributaries		
Headwaters to Big Trails	I, W&L, CWF, SA, SBC	II
Big Trails to Ten Sleep	I, W&L, CWF	II
Ten Sleep to Paint Rock Creek	I, W&L, CWF	II
Paint Rock Creek to Mouth	I, W&L, WWF, CWF	II
Deep Creek	I, W&L, CWF, SA	II
Lost Creek	I, W&L, CWF, SA	II
Boxelder Creek	I, W&L, CWF, SA	II
Otter Creek	I, W&L, CWF, SA	II
Spring Creek	I, W&O, CWF, SA	None
Tensleep Creek & Tributaries	II	
Above Forest Boundary	CWF, SBC	
Below Forest Boundary	W&L, SA, CWF, I, W&L	
Brokenback Creek	I, W&L, CWF, SA	II
Paint Rock Creek		
Above Forest Boundary	CWF, SA, SBC, W&L	II
Below Forest Boundary	I, SA, W&L, CWF, SBC	
Shell Creek		
Above Forest Boundary	CWF, SA, SBC, W&L	II
Below Forest Boundary	PWS, I, CWF, W&L	II
Trapper Creek		
Above BLM Boundary	SA, CWF, W&L	II
Below BLM Boundary	I, W&L, CWF	II

¹ PBC - Primary Body Contact	I - Irrigation
SBC - Secondary Body Contact	IWS - Industrial Water
CWF - Cold Water Fishery	PWS - Public Water Supply
WWF - Warm Water Fishery	SA - Stream Aesthetics
W&L - Wildlife & Livestock Watering	

² Class I Waters - Those designated waters which, due to their beneficial values, shall be maintained at their existing quality.

Class II Waters - Waters capable of or presently supporting game fish.

Class III Waters - Waters capable of or presently supporting non-game fish.

Class IV Waters - Waters not capable of supporting fish.

typified by sinking stream segments, large solution caverns and springs emerging into stream channels. Solution has occurred to the extent that caves of regional recreational importance have formed, including La Caverna de Los Tres Charros and Bad Medicine Cave. Maintaining the existing hydrologic regime and the water quality of the Dry Fork of Medicine Lodge Creek is important in the maintenance of the unique features of the caves.

Headwaters for Trapper Creek are on the west flank of the Bighorn Mountains. Like Medicine Lodge Creek, surface streams in this drainage sink into the groundwater system where they first flow into areas underlain by Madison Limestone, Jefferson, and Big Horn Dolomite formations. The second deepest cave in the United States, Great X, is located in the Trapper Creek drainage.

Land uses, primarily grazing, timber sales, and road building have impacted sinking stream

segments and cave entrances. Tremendous amounts of sediment and organic debris are flushed into cave systems through sinking streams.

**TABLE 20
WATERSHED SUMMARY**

Drainage	Area ¹ (Acres)	Mean Discharge ² (CFS)	Estimated Annual Sediment Load (Tons)
Shell Creek	138,000	115	19,000
Nowood River	992,000	550	79,000
Nowater Creek	275,200	DNA	88,000
Kirby Creek	110,000	DNA	40,000
Miscellaneous Tributaries	157,000	DNA	50,000
Bighorn River Total			276,000

Note: DNA means Data Not Available

¹ Acreage represents area inside resource area boundary only.

² Estimates based on USGS instantaneous discharge records.

Groundwater recharge to downslope irrigation and municipal wells may be another important function of the karst areas. An estimated daily average flow of 5 CFS of excellent quality water enters the Madison aquifer through the Trapper and Medicine Lodge Creeks karst areas (Huntoon, 1985).

Groundwater

Groundwater suitable for stock and wildlife use can be developed from almost all geologic units beneath the resource area. Groundwater suitable for municipal and irrigation purposes is restricted primarily to the Madison Limestone-Big Horn Dolomite aquifer.

The Madison aquifer is the source of municipal water for the communities of Worland, Ten Sleep and Hyattville, and provides irrigation water for thousands of acres within the Big Horn Basin. The city of Worland has acquired one flowing artesian well from Husky Oil Company and has drilled and developed another well in the Paint Rock anticline area (T. 49 N., R. 91 W., Sections 1 and 12). Present use from these wells is about 1.6 million gallons/day. The town of Ten Sleep uses Madison water from wells developed just north of that community. The Madison aquifer is stable in pressure and has a potentially large recharge area occurring along the western flanks of the Bighorn Mountains.

VEGETATIVE RESOURCES

Vegetative Communities

Vegetative communities in the Washakie Resource Area include: desert shrub/saltbush (25 percent), sagebrush/grass (70 percent), juniper woodland (3 percent) and greasewood (1 percent). Conifer and wetland/riparian communities also exist (Map 25).

The desert shrub/saltbush plant community forms a semi-arid, native rangeland made up primarily of saline upland and shale range sites in the 5 inch to 9 inch and 10 inch to 14 inch rainfall zones. This plant community is primarily in the northwest portion of the resource area. The Torchlight area and the areas drained by Sand Creek and East Nowater Creek are the largest areas of this type. This plant community annually produces only 200 to 400 pounds of air dried forage/acre under normal conditions.

The sagebrush/grass community is the largest plant community in the resource area. It is scattered throughout the area and is the most important forage producing community. The major range sites in this vegetative community are sandy, shallow sandy, loamy, and shallow loamy in the 5 to 9 inch, 10 to 14 inch, and 15 to 19 inch precipitation zones. The shallow loamy range sites in the 5 to 9 inch and 10 to 14 inch precipitation zones produce 300 to 400 pounds of air dried forage/acre annually, and range sites in the 15 inch to 19 inch precipitation zone produce between 850 and 1,350 pounds of air dried forage/acre annually. There is more species diversity in the higher precipitation zones than in the lower zones, and the species composition varies more between the different range sites.

Much of the sagebrush/grass community is grazed in the spring and is in a declining trend. As a result, big sagebrush makes up more of the total vegetative production than it would in excellent range condition, and some of the more desirable grass species are present in only small amounts.

The sagebrush/grass community is important as cover and for forage production for many wildlife species. Crucial elk and deer winter ranges, sage grouse strutting and nesting areas, some antelope range, and various nongame species habitats are located in this plant community.

The juniper plant community is characterized by open stands of Utah juniper, which usually occur in narrow bands along rimrock areas, ridge

AFFECTED ENVIRONMENT

crests, and on rocky slopes in the 5 to 9 inch and 10 to 14 inch precipitation zones. Although scattered throughout the resource area, major juniper communities are located in the Cedar Mountain area south of Worland, the ridges on both sides of the Nowood River and the lower slopes of the Bighorn Mountains. There are some other juniper areas east of Thermopolis and in the Lightning Ridge area.

The greasewood community is found along the drainages in the 5 inch to 9 inch precipitation zone, primarily in saline lowland range sites in the Kirby Creek and Nowater drainages.

The conifer vegetative type occurs in areas with more than 11 inches of precipitation and is often interspersed with the sagebrush/grass community. This vegetative community is important for logging and as thermal and escape cover for wildlife. Some of the more open stands also provide forage for wildlife and livestock.

The wetland/riparian community is a small but important vegetative community. Major range sites in this plant community are the wetland, subirrigated and lowland sites. These sites are found on level bottomlands, in depressions, and near springs, seeps, reservoirs, and streams. Much of the wetland/riparian community, especially in easily accessible areas, shows signs of continued heavy use by livestock.

Degradation of the wetland communities in the lower precipitation zones has caused streambank erosion along many of the intermittent streams. Rhizomatous wheatgrasses, bluegrasses, and inland saltgrass have replaced much of the more desirable species, and ground cover has been reduced.

In the higher precipitation zones, many riparian areas contain Kentucky bluegrass meadows with a high percentage of forbs. Soil compaction has reduced the water holding capacity of the soil on some areas, causing them to produce well below their potential.

Rangeland Resources

Many operators trail their livestock to pastures on the Bighorn Mountains in the summer, and in mid-October trail them back to lower elevations. As the snow line recedes, livestock move upslope to graze the new vegetation. Allotments that consistently receive yearlong use or spring/summer use are often in poor or fair condition. (Appendix D shows the current range condition of each allotment; Appendix E discusses some

of the grazing management problems, opportunities and objectives for the Washakie Resource Area; and the land use section of this chapter describes ranching and livestock grazing within the resource area.)

Threatened and Endangered Plant Species

There are no known threatened or endangered plant species in the Washakie Resource Area.

Forest Resources

The productive forest lands are composed mainly of Douglas fir, lodgepole pine and ponderosa pine. There are also some areas of Englemann spruce and aspen. An estimated 15,000 acres of productive forest land have been identified. These lands are not only important for the wood fiber they produce, but also for a variety of other resource values: important wildlife habitat, watershed protection and recreational opportunities. Forest characteristics are summarized in Table 21.

**TABLE 21
FOREST CHARACTERISTICS**

Characteristic	Timber Type		
	Lodgepole		
	Douglas Fir	Pine	Ponderosa
Acres	7,000	2,700	5,000
Percent Forest Base	48	18	34
Avg. Age (years)	130	150	110

The resource area also contains approximately 40,000 acres of woodlands (primarily juniper and limber pine). Some minor forest products have been taken from these areas, but historically they have not been a major source of wood fiber. These woodlands are also important for wildlife habitat, watershed protection and recreational opportunities. Map 25 shows the forest and woodland areas.

The distribution of forest types on the west slope of the Bighorns is along an elevational (temperature-moisture) gradient. It ranges from lower timberline, with warm dry sites, to upper timberline, with cold wet sites. The tree types along the lower elevation are ponderosa and

AFFECTED ENVIRONMENT

limber pine. The higher elevations contain Douglas-fir and lodgepole pine, with Englemann spruce and true fir at the highest elevations.

There is an annual loss of approximately 600 thousand board feet (MBF) of timber because of mortality. Approximately 80 percent of the timber base is degenerating because of overmaturity and decadence, stagnation, insect attacks, and diseases (primarily parasitic mistletoe infestations). Most of the sawtimber sized stands are losing volume to mortality, caused by a combination of old age and mistletoe infestation, especially in large-sized stands. In unmanaged stands, old growth timber is dying and timber resource values are being lost. Where understory stands of regeneration are present, they are being infected with mistletoe and other diseases. This results in a loss of most of their growth potential.

Wetland/Riparian Habitat

An estimated 450 miles of intermittent/ephemeral stream zones support riparian habitat on public lands (Map 26). They include such streams as Kirby, Nowater, Cottonwood, Buffalo, and Sand creeks. Additionally, there are 70 miles of sport fisheries streams, 120 miles of perennial streams, 80 springs, and 800 reservoir sites which support riparian habitat such as stands of cottonwoods, willows, bulrushes, and cattails.

Most intermittent/ephemeral streams appear to be in poor to fair condition and deteriorating. Channels are eroding and the riparian zones generally lack a diverse age structure of cottonwood trees, the dominant vegetative form in these desert drainages. Many drainages support only old, decadent cottonwoods.

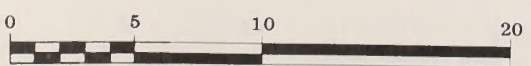
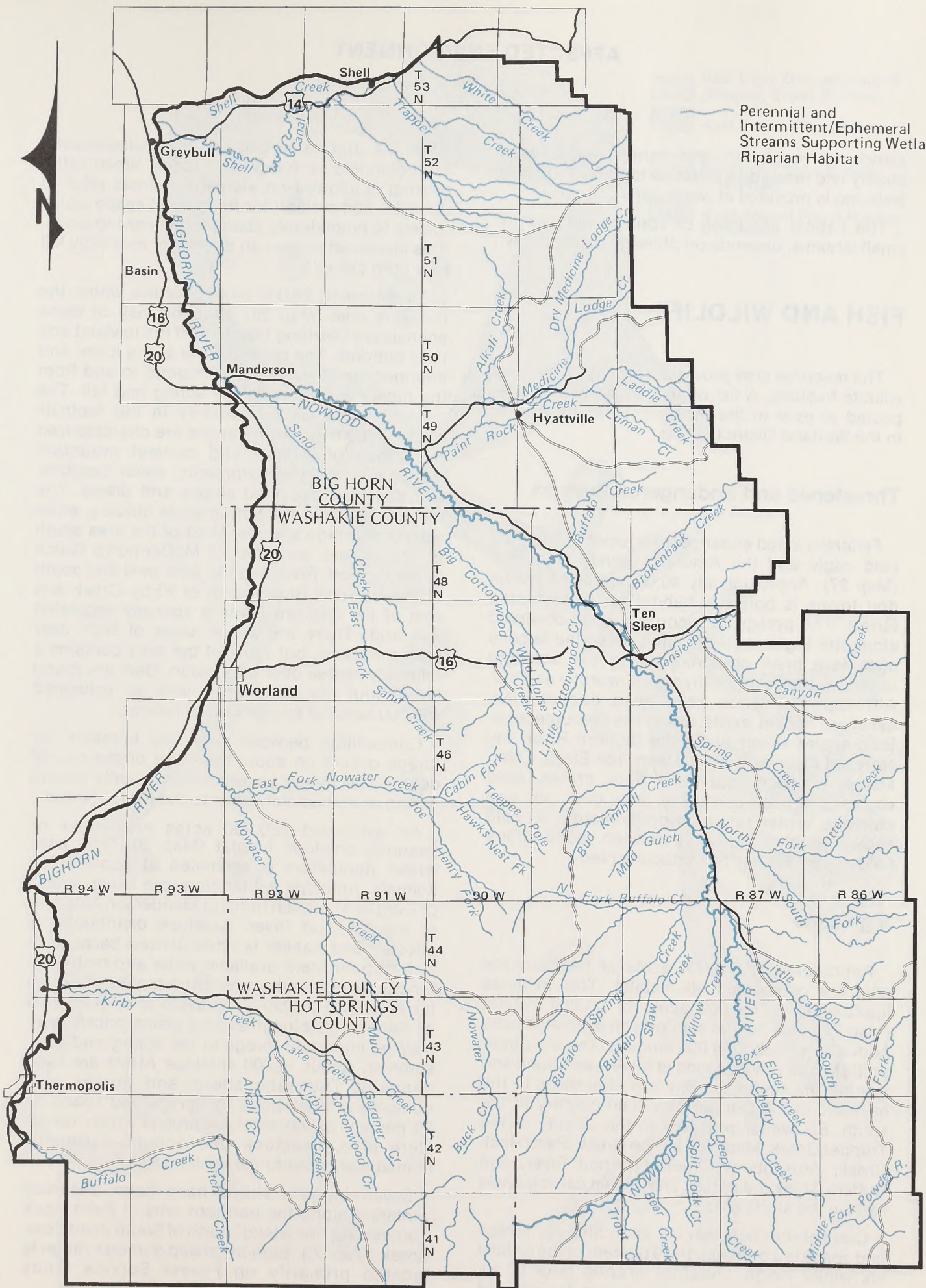
Condition of the 120 miles of perennial streams on public lands ranges from pristine natural to eroded channels with degraded riparian zones. Most of the streams located in canyons on the west slope of the Bighorn Mountains are in good to excellent condition. Channels are stable and the riparian zones exhibit natural diversity and density of vegetation. The perennial stream zones that are easily accessible to livestock have deteriorated. Channels are eroding and riparian zones lack vegetative diversity and density.

Fourteen tracts along the Bighorn River have been fenced to prevent livestock grazing. Habitat on these sites is either in good condition or is improving.

Nearly all of the 800 reservoirs on public land were built as sources for livestock water. As a result, some sites provide good wildlife habitat, and others are barren. Of the 400 that hold water, 60 percent have poor habitat condition, 20 percent fair, and 20 percent good. The trend in reservoir habitat condition is presently static. Five reservoirs have been fenced to exclude livestock grazing. These have developed dense and/or diverse



Perennial and Intermittent/Ephemeral Streams Supporting Wetland Riparian Habitat



Map 26
WETLAND RIPARIAN HABITAT
Washakie Resource Management Plan

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stands of vegetation and exhibit good water quality and reservoir habitat conditions. Livestock watering is provided at water gaps.

The habitat condition of springs, like that of small streams, depends on physical accessibility.

FISH AND WILDLIFE

The resource area provides a variety of fish and wildlife habitats. A list of species known or suspected to exist in the resource area is available in the Worland District Office.

Threatened and Endangered Species

Federally listed endangered species include the bald eagle and the American peregrine falcon (Map 27). Approximately 40,000 acres of prairie dog towns is potential habitat for black-footed ferrets. The peregrine falcon has been observed along the Bighorn River. Adult peregrine falcons also have been observed during the breeding season in west slope canyons as recently as 1982. Although no eyries have been documented, excellent habitat exists within the resource area. Bald eagles winter along the Bighorn River, the Nowood River, and Shell, Deep, Ten Sleep, Otter, Medicine Lodge, and Paint Rock creeks. Bald eagles forage on carrion of mule deer, elk, and antelope winter ranges. Approximately 60 bald eagles winter on public lands each year and one bald eagle nest has been documented.

Big Game

Approximately 714,000 acres of the resource area are considered elk habitat. This includes approximately 218,000 acres of crucial habitat (Map 28). This habitat supports an estimated base population of about 4,000 animals. The elk winter on BLM and private lands at lower elevations and summer mostly in the Bighorn Mountains to the east and in the Copper Mountain country to the south. Elk winter primarily in the vicinity of the Trapper Creek, Medicine Lodge Creek, Paint Rock Creek, Brokenback Creek, Nowood River, and Buffalo Creek drainages. Ten known calving areas exist in the study area.

Competition between elk and cattle for forage and space is a problem on 99 percent of the crucial elk winter range. Livestock grazing prior to elk use often leaves little or no forage for elk and

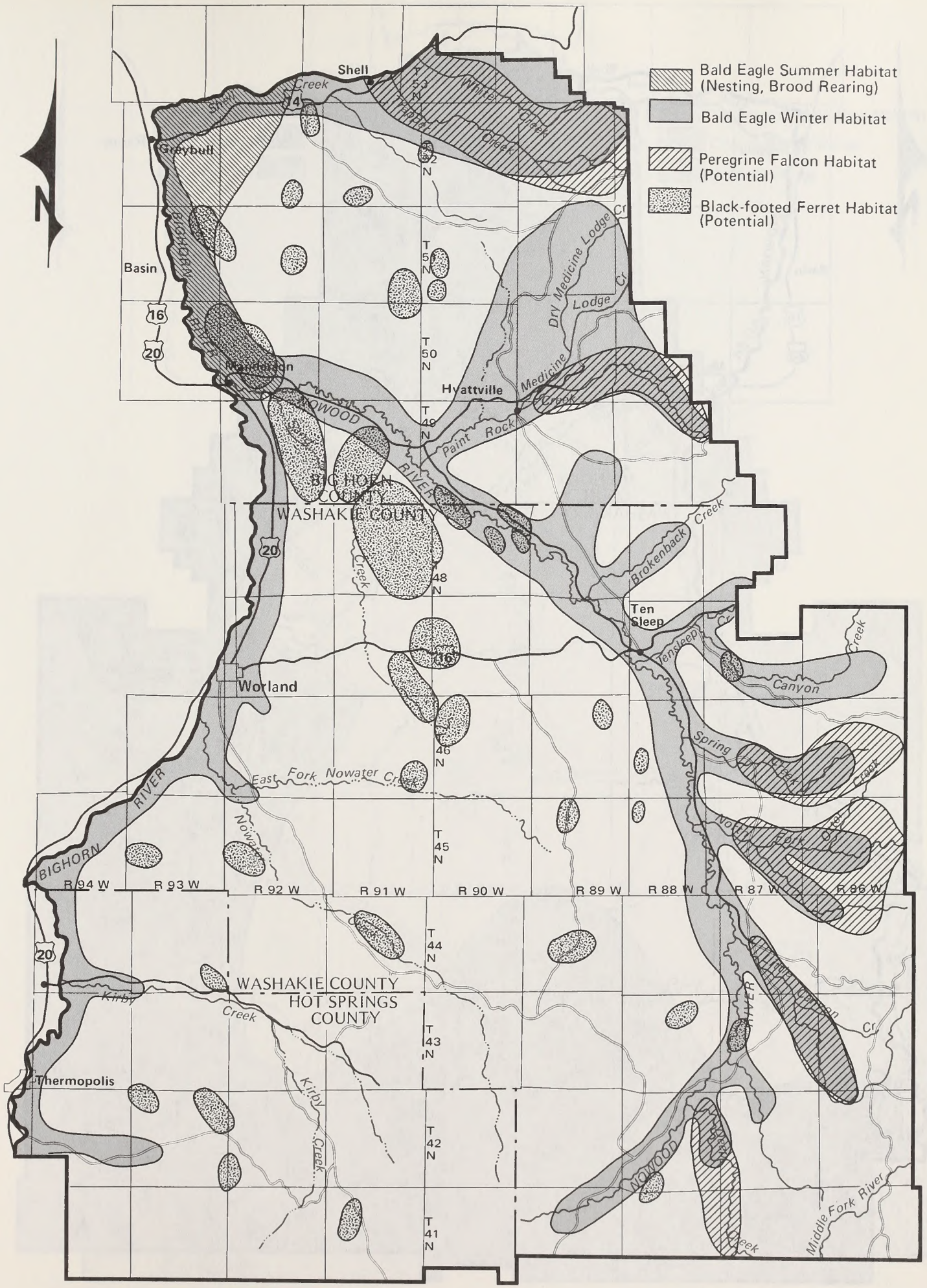
when elk and cattle use occur simultaneously, both compete for forage and space. When cattle grazing is allowed on elk calving areas prior to June 15, competition for forage and space cause the elk to prematurely abandon the calving areas. This increased stress can directly or indirectly kill new born calves.





An estimated 26,000 mule deer live within the resource area (Map 29). Probably half of these animals are yearlong residents of the lowland and river bottoms. The others winter at the lower and intermediate elevations and migrate to and from the higher elevations in the spring and fall. The migrant herds winter primarily in the foothills below 7,500 feet. These ranges are characterized by stands of juniper and curlleaf mountain mahogany, rocky escarpments, steep canyons, and sagebrush covered slopes and draws. The resident herds in the bottomlands utilize a wider variety of forage species. Most of the area south of Shell Creek and west of McDermott's Gulch to the Bighorn River and the area west and south of the Nowood River, north of Kirby Creek and east of the Bighorn River is sparsely vegetated and arid. There are a few areas of high deer concentrations, but most of the area contains a relatively sparse deer population. Deer are found throughout the study area, with an estimated 496,000 acres of known crucial habitat.

Competition between deer and livestock for forage occurs on about one-third of the crucial deer winter range. Livestock use usually occurs during or immediately prior to the winter period.

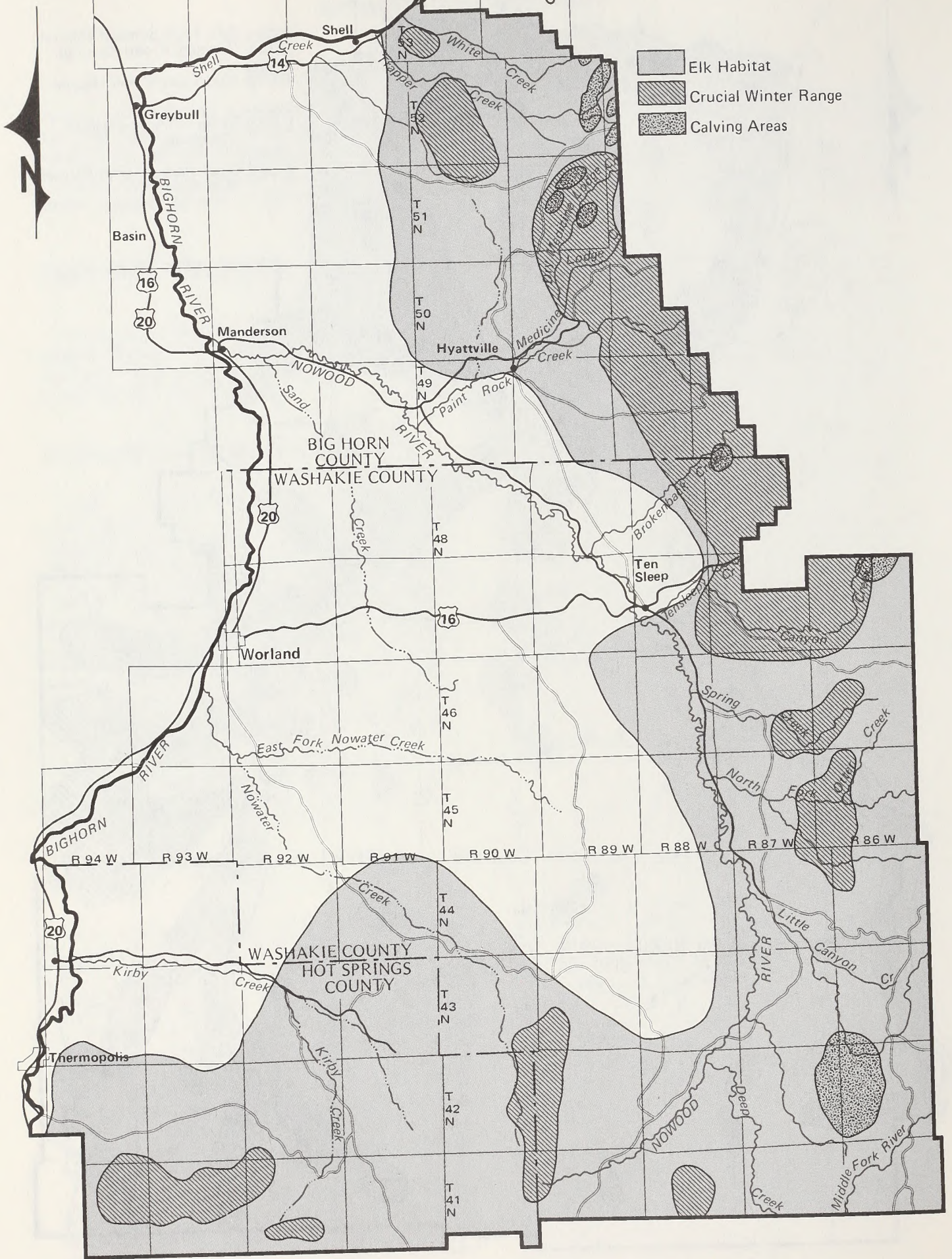
An estimated 800,000 acres are winter or yearlong antelope habitat (Map 30). The base winter population is estimated at about 2,750 animals. Antelope winter from the lower slopes of Copper Mountain north to Manderson and west of the Nowood River. Antelope distribution is affected and habitat is underutilized because of lack of permanent available water and restrictive fences. Browse is the most important forage class for antelope, but certain grasses and forbs such as Sandberg's bluegrass and plains prickly pear may be important forage in the spring and early summer. About 12,000 antelope AUMs are used annually. Domestic sheep and horses also compete with antelope for forage and space on 99 percent of the antelope crucial winter range. Here also, livestock use occurs during or immediately prior to the winter period.

Seven bighorn sheep have been observed wintering along the northern rims of Paint Rock Canyon and "the island" north of South Paint Rock Creek (Map 30). Bighorn sheep summer range is located primarily on Forest Service lands northeast of Paint Rock Canyon.



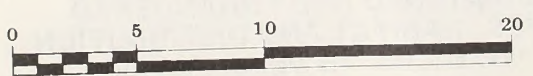
-  Bald Eagle Summer Habitat (Nesting, Brood Rearing)
-  Bald Eagle Winter Habitat
-  Peregrine Falcon Habitat (Potential)
-  Black-footed Ferret Habitat (Potential)

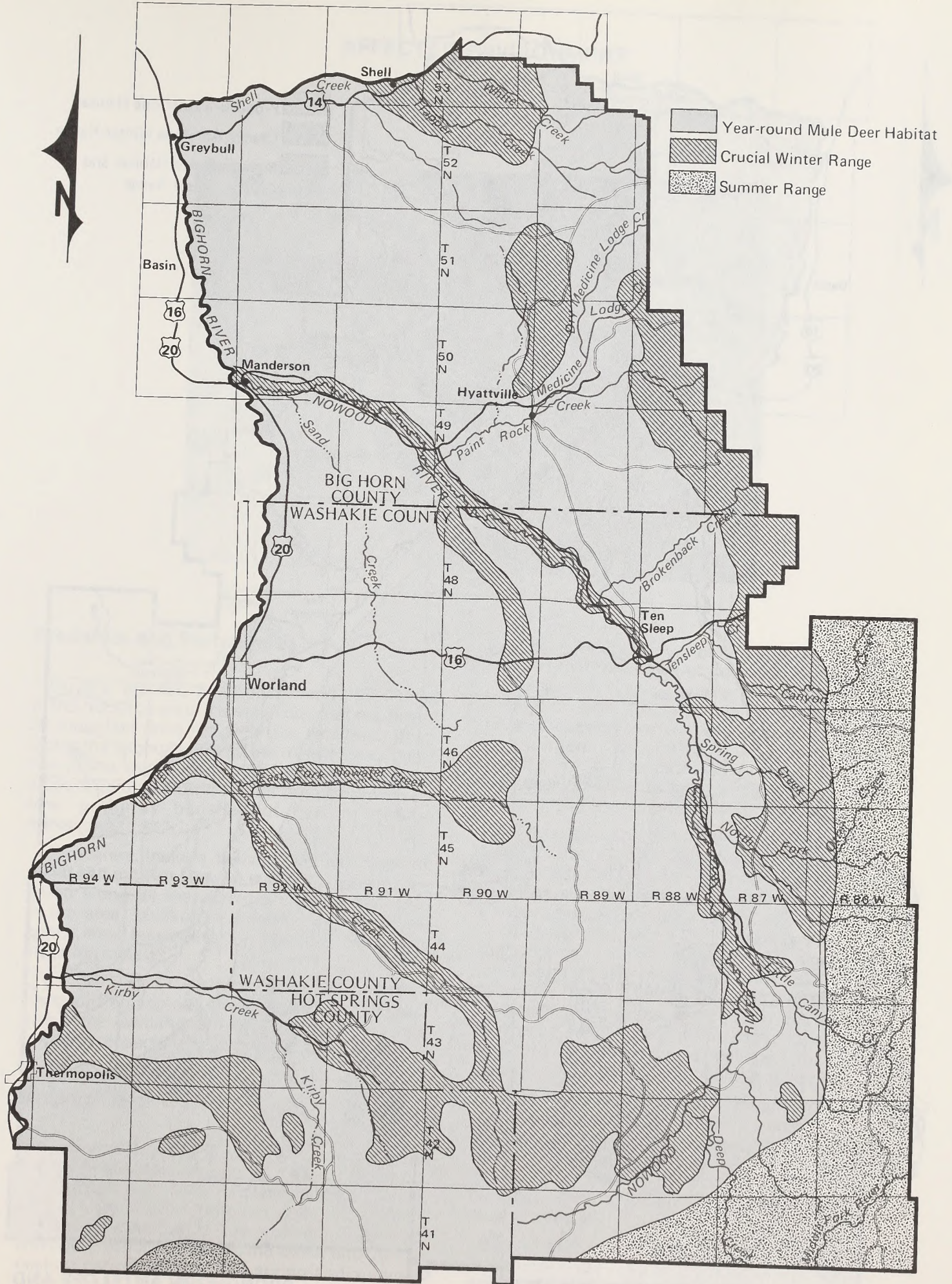
Map 27
THREATENED AND ENDANGERED SPECIES - HABITAT AND DISTRIBUTION
 Washakie Resource Management Plan



- Elk Habitat
- Crucial Winter Range
- Calving Areas

Map 28
ELK HABITAT AND DISTRIBUTION
 Washakie Resource Management Plan





Map 29
MULE DEER HABITAT AND DISTRIBUTION
 Washakie Resource Management Plan

AFFECTED ENVIRONMENT



Predators and Furbearers

Coyote, red fox, and bobcat range over most of the resource area. It is estimated that more than 20 mountain lions reside in the canyon country along the Bighorn Mountains. A few black bears live in the upper portions of many of the west slope canyons. However, the population is very low, primarily because of current habitat limitations.

Furbearers include beaver, badger, muskrat, mink, and marten. Beaver, muskrat, and mink are found along all the perennial stream drainages in the area. Muskrat and mink live around the ponds, small reservoirs, river slough wetlands, and irrigation canals.

Badgers are found throughout the area. Raccoons and striped skunks are fairly abundant along the wetland stream bottom areas and lowlands, especially around agricultural lands.

Upland Game Birds

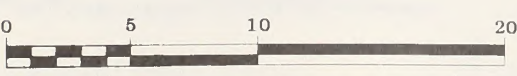
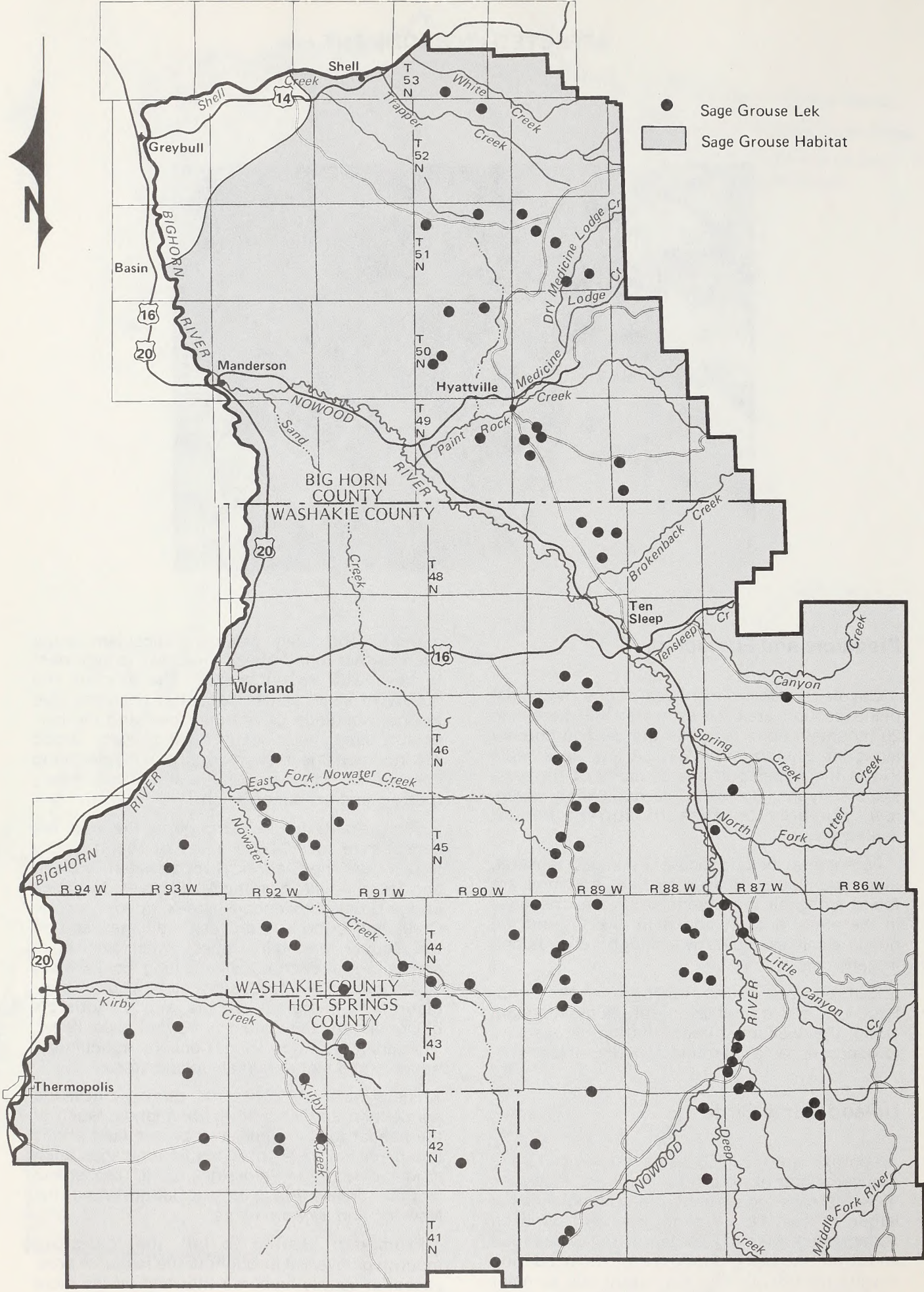
Approximately 85,750 acres are crucial sage grouse habitat or concentration areas; however, the actual sage grouse habitat may be significantly larger. At least 111 strutting grounds have been documented (Map 31). Sagebrush provides food and cover, especially during the winter and during nesting periods. During the spring and summer

months, good quality water and succulent forage such as that found in wet meadows is important to hens with young broods. The amount and quality of sage grouse habitat is declining due to poor condition of wet meadows and the lack of succulent, herbaceous plant growth. Brood rearing habitat is in short supply and is declining because of early season livestock use, heavy grazing, and fire suppression.

Chukar partridge live throughout the area, but concentrate on 164,000 acres of rough, rocky terrain near the Bighorn River between Worland and Thermopolis; near the Alkali Creek, Medicine Lodge Creek, Brokenback Creek, upper Nowater Creek and Cottonwood Creek drainages; and on the Copper Mountain slopes. Water availability affects chukar distribution, and long, cold winters accompanied by deep snow limit chukar populations. Cheatgrass brome and Sandberg's bluegrass are their most important food items. Hungarian partridge (Huns) occupy agricultural, riparian, and higher rainfall upland areas.

There are a few pheasants, primarily near the agricultural and wetland/riparian lands. Much of the habitat for this species is private land and is found on the lower portions of drainages such as Medicine Lodge, Paint Rock, Shell, Trapper and Nowater creeks and along the bottomland of the Nowood and Bighorn rivers.

From early spring to fall, the migratory mourning dove live throughout the resource area, except in heavily timbered sites and on the more



Map 31
SAGE GROUSE HABITAT AND DISTRIBUTION
 Washakie Resource Management Plan

AFFECTED ENVIRONMENT



arid areas. Highest population densities occur in areas with interspersed trees and open land, such as along the wooded stream bottoms and in areas of scattered juniper and mountain mahogany.

Waterfowl and Birds

The rivers, creeks and many small stock ponds and reservoirs provide habitat for ducks and geese. The Bighorn River provides the most important waterfowl habitat, especially nesting habitat for Canada geese and a variety of duck species. Thousands of ducks migrate through the Big Horn Basin, using the Bighorn River and nearby agricultural lands for feeding and resting. Ponds and other stream drainages are also used until freeze-up and during spring migration. Duck production on public land reservoirs is generally low because of lack of quality habitat.

The western three-quarters of the resource area is a winter concentration area for golden eagles and rough legged hawks. Marsh hawks, redbill hawks, American kestrels, western burrowing owls, great horned owls, Swainson's hawks, ferruginous hawks, short-eared owls, prairie falcons, goshawks, Cooper's hawks, and sharp-shinned hawks inhabit the area in the spring and summer. Golden eagles, prairie falcons, goshawks, redbill hawks, kestrels, marsh hawks, Cooper's hawks, sharp-shinned hawks, fer-

ruginous hawks, and great horned owls nest in the area. The turkey vulture is a common summer resident.

Many stock ponds, reservoirs, streams, and rivers provide shoreline and riverbank nesting and feeding habitat necessary for continued existence of shore birds. Great blue herons, gulls, grebes, snipe, lesser yellow-legs, willets, avocets, terns, upland sandpipers, killdeer, and northern long-billed curlews nest in the study area and migrate through the area in the spring and fall.

Fisheries

About 120 miles of perennial streams exist on public lands, most of which are located on the west slope of the Bighorn Mountains. Approximately 70 miles support a sport fisheries for rainbow, brown, brook, and cutthroat trout. Streams also support numerous nongame species.

The quality of the stream fisheries habitat varies from excellent to poor. The best public land trout fisheries exist on the Bighorn River, and Paint Rock, Trapper, Medicine Lodge, Otter, Deep, Canyon, Little Canyon, White, and Brokenback creeks.

Game fish of the study area include rainbow, brown, brook, and cutthroat trout; walleyes;

AFFECTED ENVIRONMENT

sauger; ling; channel catfish; large-mouth bass; and mountain whitefish. Nongame fish include black bullheads, stonecats, white suckers, river carspsuckers, longnose dace, longnose suckers, mountain suckers, flathead chubs, silvery minnow, plains killifish and carp. The Bighorn River supports a trout fishery as well as fisheries for walleye, sauger, ling and channel catfish.

VISUAL RESOURCES

Washakie Resource Area can be divided into three areas of scenic resource: badlands, major rivers (i.e., Bighorn, Nowood) and the west slope of the Bighorn Mountains.

Badlands encompass a majority of the resource area. This area is characterized by an array of contrasting color, erosion, drainages and panoramic views of the Bighorn Mountains. Color dominates the landscape. Some of the wide variety of colors include light brown, gray, purple, tan, white, red, black, salmon and pink. Landforms vary widely from heavily eroded badlands with unique erosional features such as pillars and hoodoos. Erosion has produced Potato Ridge in the northern portion of the resource area; a long anticline characterized by small drainages producing "hog backs." There is very little water in the badlands; most of the water comes in the form of runoff and a few seeps and springs. Vegetation, for the most part, is sparse with sagebrush, grasses, some junipers and mountain mahogany the major species.

The major rivers of the resource area are the Bighorn, Nowood and, to a lesser extent, Shell Creek. These rivers have been extensively modified by farming and small communities, but still have tracts of unmodified woodlands and grasslands. The river bottoms are characterized by irrigated farm lands, low rolling hills, and bluffs, and panoramic views of the Bighorn Mountains and the Absaroka Range. Vegetation makes up the predominant colors with all shades of green, tan, yellows, and browns.

The west slope of the Bighorn Mountains is characterized by deep, entrenched canyons that are heavily carved and eroded. The layering of rock formations produces interesting and unusual patterns in the rock walls. Of the west slope canyons, Trapper Canyon in the most spectacular and is noted for its arches and spires. Above the canyons there are gentle, rolling to steep rolling

slopes. Vegetation is colorful and characterized by coniferous and deciduous trees, sage and mountain mahogany. Rock and soil color varies from gray to tan with shades of red. Creeks along with springs, seeps, and resurgences are unique and beckon exploration.

Excellent vistas of the Big Horn Basin and the Bighorn Mountains are available from the west slope of the Bighorn Mountains.

OUTDOOR RECREATION

All public lands have inherent recreational value and offer some level of opportunities for recreational activity.

Recreation Opportunities

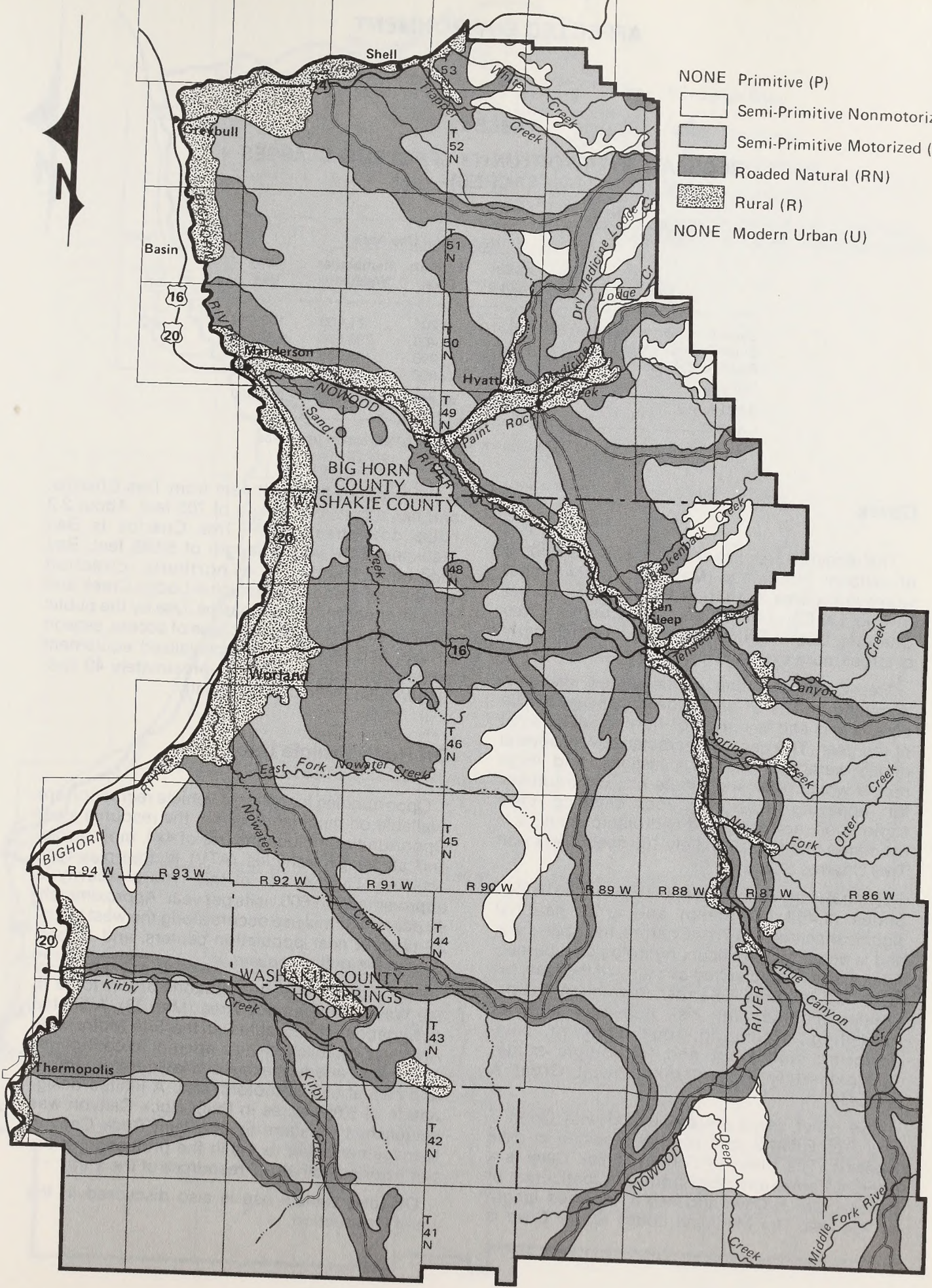
The Recreation Opportunity Spectrum (ROS) process identifies recreation opportunities based on the area's setting and activities. The resource area contains four ROS classes: semi-primitive nonmotorized (SPNM); semi-primitive motorized (SPM); roaded natural (RN); and rural (R) (Map 32).

Semi-primitive nonmotorized opportunities are available on 113,000 acres. These opportunities include solitude in natural environments and activities including camping, hiking, sightseeing, spelunking, nature study, hunting and fishing.

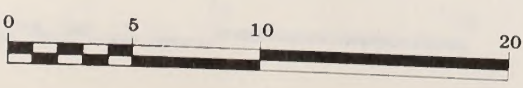
Semi-primitive motorized opportunities are available on 1,214,000 acres. These opportunities include an explicit opportunity to use motorized equipment while in a natural environment and activities which include ORV use (4-WD, dirt bikes and quad runners), sightseeing and nature study.

Roaded natural opportunities are available on 449,000 acres. These opportunities includes an affiliation with others in an isolated environment. Activities include picnicking, rock collecting, wood collecting and driving for pleasure.

Rural opportunities are available on 126,000 acres. These opportunities include affiliation with other recreationists and activities include competitive activities, spectator sports, and bicycling. Table 22 shows the acres of recreation opportunity classes within the West Slope Recreation Use Area, the Bighorn River Recreation Use Area, and the remainder of the resource area.



- NONE Primitive (P)
- Semi-Primitive Nonmotorized (SPN)
- ▒ Semi-Primitive Motorized (SPM)
- Roaded Natural (RN)
- ▤ Rural (R)
- NONE Modern Urban (U)



Map 32
RECREATION OPPORTUNITY SPECTRUM
 Washakie Resource Management Plan

AFFECTED ENVIRONMENT

TABLE 22
RECREATION OPPORTUNITY SPECTRUM CLASSES
(ACRES)

Class	Recreation Use Area			Total Use
	West Slope	Bighorn River	Remainder Washakie	
Semi-Primitive Nonmotorized	25,800	6,200	71,000	103,000
Semi-Primitive Motorized	109,000	5,400	793,500	907,900
Roaded Natural	11,400	2,300	100,800	114,500
Rural	16,300	32,600	59,700	108,600
Total Acres	162,500	46,500	1,025,000	1,234,000

Note: See Map 11 for the West Slope and Bighorn Recreation use areas.

Caves

The resource area has several caves of regional or national importance (Map 33). The two most significant caves are Great Expectations (Great X) and La Caverna de los Tres Charros (Tres Charros). Both have the potential for being parts of larger more extensive cave systems.

Tres Charros is one of the largest caves in Wyoming and is of statewide significance. The cave is wet and is noted for flowing water most of the year. The cave is characterized by several pools, waterfalls, narrow passages, and large rooms which offer spelunkers risk opportunities for rappelling, ascending, rock climbing, cave exploration, and karst and hydrologic study. It is estimated that approximately 100 spelunkers visit Tres Charros annually.

Great X is the second deepest cave in the United States (1,403 feet deep) and is of national significance. As with Tres Charros, the cave is wet and is noted for significant hydrologic resources. The cave is characterized by many of the features identified for Tres Charros. Recreation opportunities include high risk activities such as rappelling, ascending, rock climbing, cave exploring, and karst and hydrologic study. Approximately 60 spelunkers visit Great X annually.

Five other caves are associated with Great X and Tres Charros and may be included in cave systems. The Sinks of Johnny Creek Cave is a short distance upstream from the confluence of Johnny Creek Cave and has a surveyed length of 164 feet. Dry Medicine Lodge Creek Cave is

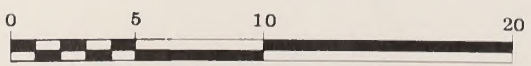
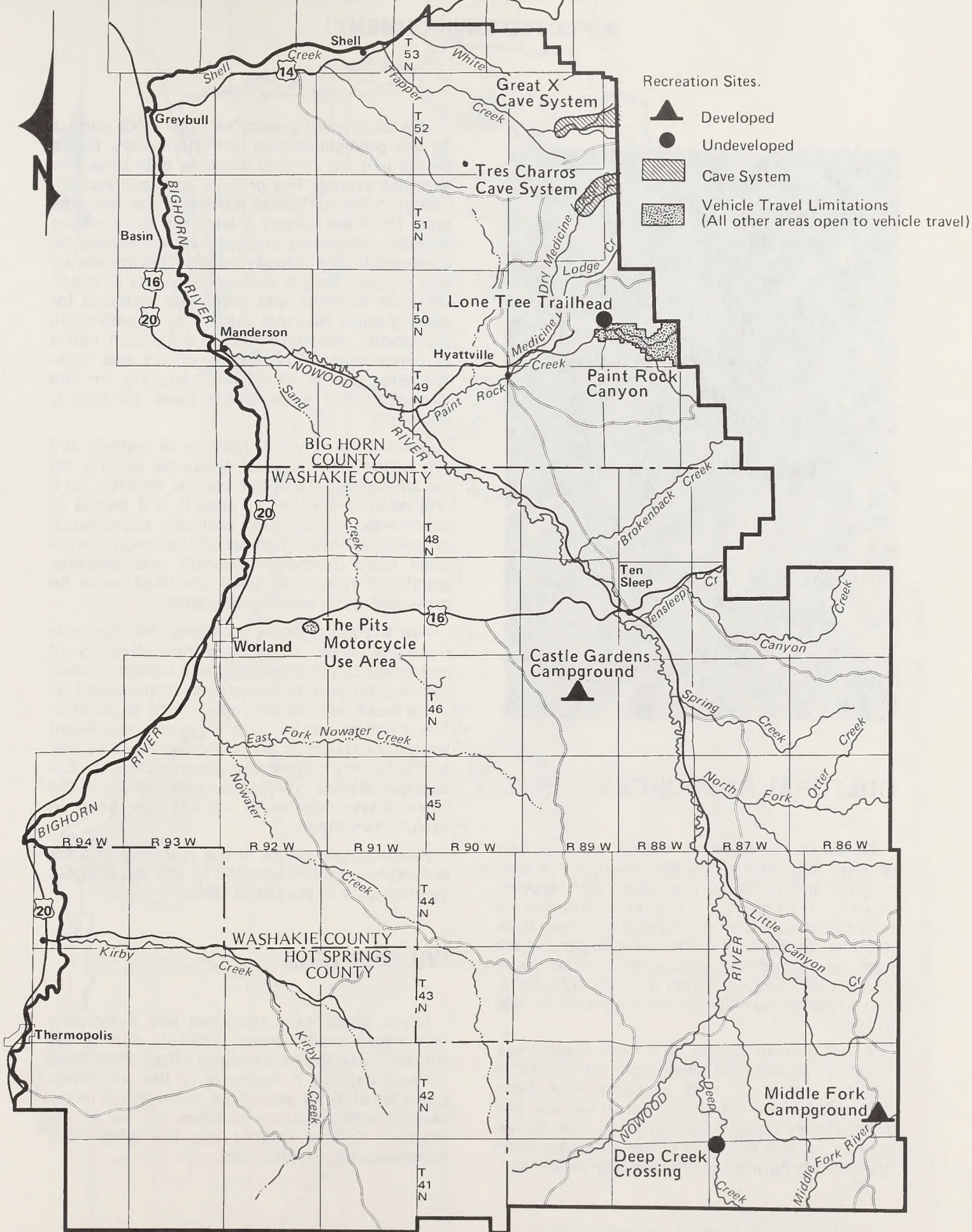
a few hundred feet upstream from Tres Charros, and has a surveyed length of 205 feet. About 2.2 miles downstream from Tres Charros is Bad Medicine Cave with a length of 6,638 feet. Bad Medicine trends in a northerly direction (upstream) along Dry Medicine Lodge Creek and may connect with Tres Charros. Use by the public of these caves is limited because of access, season of use, and the need for specialized equipment and experience; however, approximately 40 spelunkers visit these caves annually.

Off Road Vehicle Use

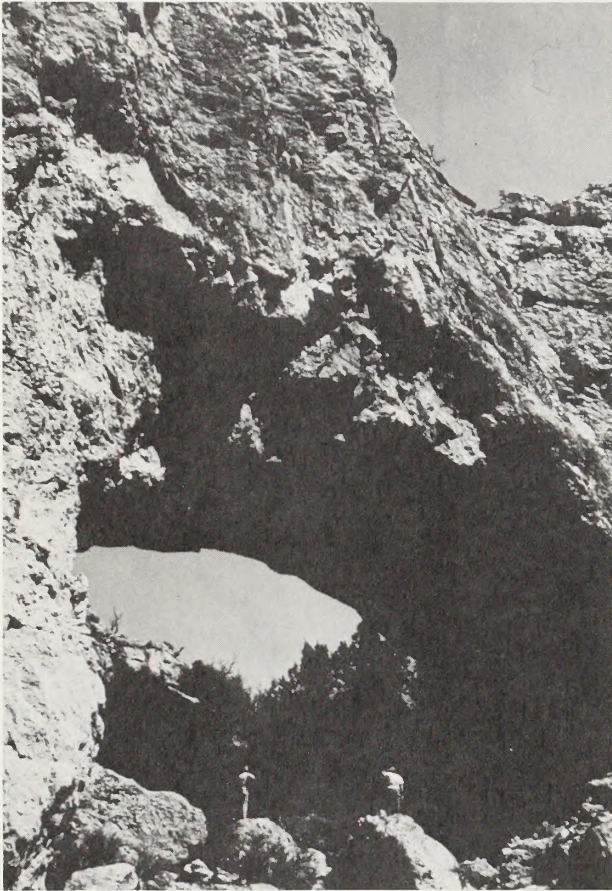
Opportunities for off-road vehicle recreation are available on most lands within the resource area. Opportunities include the use of 4x4, motorcycle, and all terrain vehicles (ATV) in free-play-type activities. Current use of this type of activity is approximately 5,600 visits per year. Approximately 60 percent of this use occurs along the west slope, 30 percent near population centers, and 10 percent in the outlying basin.

Two interim ORV designations are in force in the Washakie Resource Area (Map 33). A limited designation of 125 acres at the Pits Motorcycle Area was established in an attempt to control use of the area and to make it available for organized and casual use of motorcycles. A limited designation of 5,050 acres in Paint Rock Canyon was established pursuant to the Paint Rock Canyon Management plan to aid in the protection of the prehistoric and natural resources of the area.

Off-road vehicle use is also discussed in the Land Use section.



Map 33
**RECREATION OPPORTUNITY
 AND VEHICLE TRAVEL
 LIMITATIONS**
 Washakie Resource Management Plan



CULTURAL RESOURCES

The Washakie Resource Area contains a variety of regionally and nationally significant archeological and historical resources. With approximately 4 percent of the area intensively inventoried to date, about 900 total sites have been formally recorded. Of these, about 90 percent are from prehistoric and protohistoric times (from 12,000 years ago and earlier to about A.D. 1850), and 10 percent are historic (from about A.D. 1850 to 1940).

If 100 percent of the area were inventoried, 10,000 to 20,000 total sites might be located. A similar number of sites probably have been damaged by natural processes such as water and wind erosion. To date, approximately 20 to 30 percent of all sites recorded in the area have been identified as having National Register potential.

The location of prehistoric (pre-1700) sites is far less predictable than for historic sites. Based on the existing cultural resource data base, site densities average five or more sites per section, except in the northwest portion of the resource area. There the density is less than five sites per section, apparently because of environmental constraints. Site density reflects environmental and physical factors such as proximity to water, locations of stone and other raw materials for making tools, seasonal availability of gatherable plant foods, seasonal migration and grazing habits of game animals, protective valleys and rock-shelters, points of higher visibility on the landscape and areas where travel on foot is expedient.

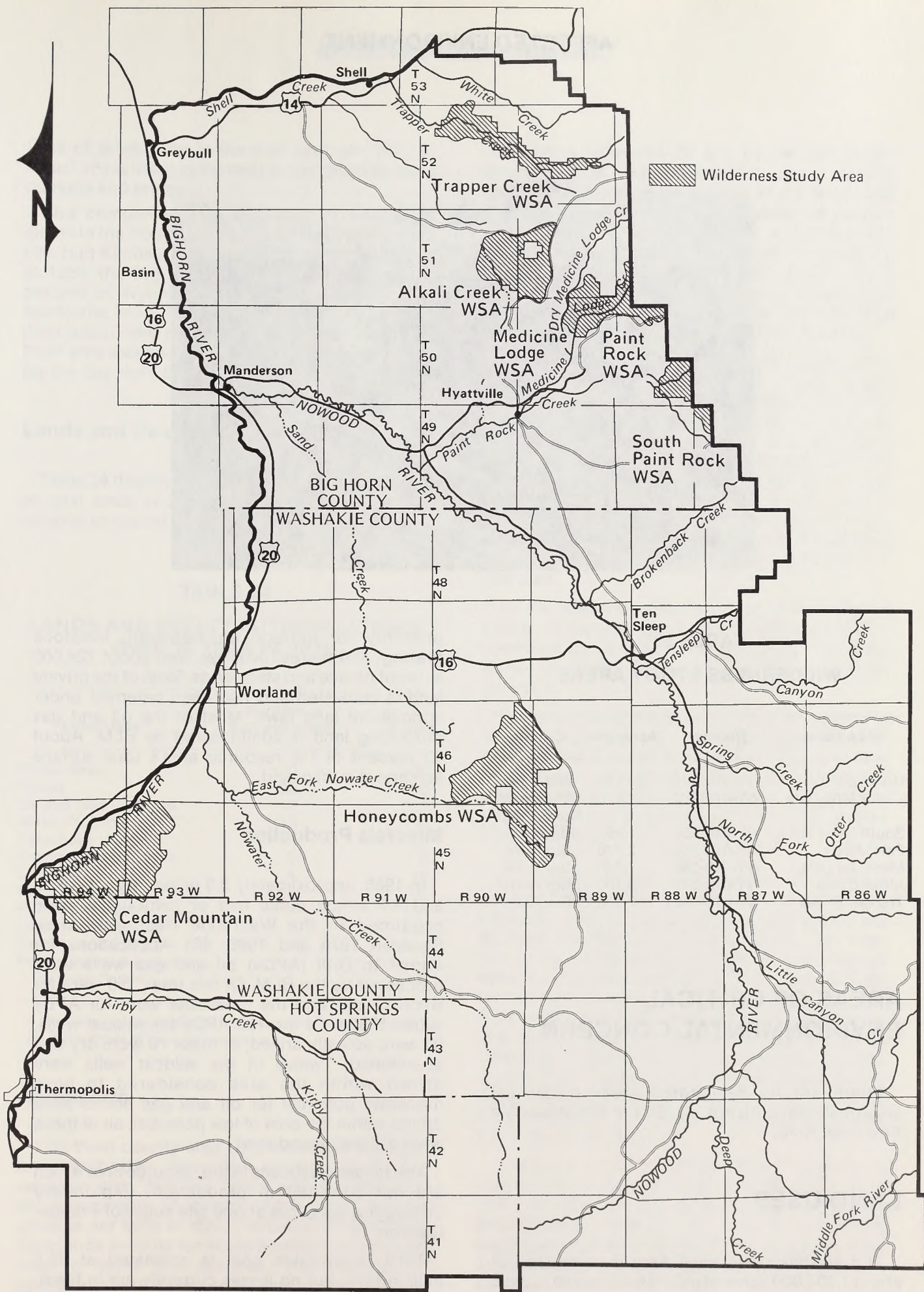
Besides the physical remains of historic and prehistoric sites, cultural resources include the remaining vestiges of our cultural heritage, be it oral history, folklore, or objects and places of modern-day sociocultural, aesthetic, and religious importance. Although these cultural resources are often more difficult to quantify and describe, significant resources, once identified, must be protected under existing mandates.


The Big Horn Basin, including the Washakie Resource Area, supports a rich diversity of vertebrate and invertebrate fossil remains; "type" sections for several formations differentiated by these fossil remains are noted in the study area. The basin is known as a nationally significant source for Mesozoic and Cenozoic fauna as well as regionally significant floral remains. For example, Bakker (1985), discusses the role of Big Horn Basin fossils in recent advances in evolutionary theory.

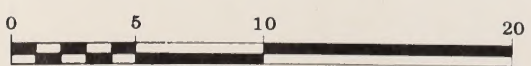
Paleontologic values in the resource area are not expected to be affected to any large extent by other uses of the public lands.

WILDERNESS

Seven areas were identified and designated wilderness study areas (WSAs), during the Bureau's wilderness inventory effort. See Table 23 and Map 34. A summary of the wilderness characteristics for each WSA is contained in the Management Situation Analysis (on file at the Worland District Office) and the Wilderness Supplement to the RMP/EIS.



 Wilderness Study Area



Map 34
WILDERNESS STUDY AREAS
 Washakie Resource Management Plan

AFFECTED ENVIRONMENT



TABLE 23
WILDERNESS STUDY AREAS

WSA Name	Number	Acreage	County
Honeycombs	WY-010-221	20,740	Washakie
Cedar Mountain	WY-010-222	21,570	Washakie/ Hot Springs
South Paint Rock	WY-010-236	660	Big Horn
Paint Rock	WY-010-239	2,770	Big Horn
Medicine Lodge	WY-010-240	7,740	Big Horn
Alkali Creek	WY-010-241	10,100	Big Horn
Trapper Creek	WY-010-242	7,200	Big Horn

AREAS OF CRITICAL ENVIRONMENTAL CONCERN

There are no designated areas of critical environmental concern (ACEC) in the Washakie Resource Area.

LAND USES

The Washakie Resource Area is comprised of about 1,234,000 acres of public land, which is used

primarily for mineral development, livestock grazing, and recreational use, and about 724,000 acres of private and state lands. Most of the private land is cultivated and has been patented under agricultural land laws. Most of the oil and gas producing land is administered by BLM. About 63 percent of the resource area's total surface acreage is public land.

Minerals Production

In 1985, approximately 2.9 million barrels of oil and 4.7 billion cubic feet of natural gas were produced in the Washakie Resource Area. Between 1976 and 1986, 461 Applications for Permit to Drill (APDs) oil and gas wells were processed by the BLM. Of this total, 150 were for wildcat wells and the remainder were for APDs within KGSs. Of the 150 APDs for wildcat wells, 91 were actually drilled; of these 79 were dry and abandoned. Twelve of the wildcat wells were drilled within the area considered to have moderate potential for oil and gas and 3 were drilled within the area of low potential; all of these were dry and abandoned.

The tar sand deposits in the resource area which are not currently in production. Exploratory drilling has occurred at one site south of Trapper Canyon.

Total recoverable coal is estimated at 46.5 million tons, but no leases currently are in force.

AFFECTED ENVIRONMENT

Lack of production in the past suggests little or no activity is likely in the near future given existing markets and prices.

Five companies have bentonite mining operations in the Potato Ridge, Blue Ridge, Wild Horse Hill, Bud Kimball, and Lucerne-Kirby Creek areas. In 1983, the Big Horn Basin produced about 13 percent of Wyoming's total mine production of bentonite and 32 percent of the total mill production. Mill production within the Washakie RMP area was about 20 percent of the production for the Big Horn Basin.

Lands and Realty Management

Table 24 displays levels of land uses that, based on past lands and realty authorizations, are reasonable to expect within the next 10 years.

TABLE 24

LANDS AND REALTY AUTHORIZATIONS OVER 10 YEAR PERIOD

Land Uses	Number of Authorizations ¹	Acres
Power lines	100	800
Roads	80	1,200
Oil and Gas Pipelines	40	600
Water Pipelines	10	100
Telephone lines	10	30
Communication Sites	5	2
Saw Mill	1	10
Rig Stacking Area	20	20
Public Land Sales	1	160
Land Exchanges	1	160
Desert Land Entry	1	300
Recreation and Public Purpose Patent	1	60

¹ Estimated authorizations for a ten year period based on the number of past authorizations.

Agriculture

The three county area (Big Horn, Hot Springs, and Washakie), including lands outside the resource area, has 952 farms and ranches with an average size of roughly 3,264 acres and an average per farm or ranch valuation of \$754,000. Croplands account for about 8 percent of the total land in farms and ranches. The majority of operators live on farms, and farming is their major

occupation. Between 75 and 80 percent of the farms and ranches are individual or family operations. Roughly 68 percent of the farms and ranches include cattle/calf operations, 50 percent also produce horses and ponies, and 28 percent have sheep as a part of their livestock operation. Area farm and ranch sales in 1982 totaled about \$73 million. Livestock sales equaled roughly \$46 million of that total. Cattle/calf transactions accounted for about 2/3 of the livestock sales.

Grazing use is authorized on public lands under both Section 3 and Section 15 of the Taylor Grazing Act. The Washakie Resource Area administers 307 grazing allotments, and an additional 24 allotments along the Washakie/Natrona and Washakie/Johnson county lines are administered by the Casper District for the convenience of allotment holders who live in Buffalo or Casper. The management of these allotments was addressed in the Buffalo and Platte River RMPs so they are not discussed further in this plan.

In the resource area there are 149 cattle, 18 sheep, 21 cattle/sheep, and one horse operation permitted by BLM to use public lands. Domestic horses use public range in conjunction with other livestock.

Roughly 143,000 federal AUMs are available to livestock operators in the Washakie Resource Area, with an average active use of 122,000 AUMs. Authorized non-use is 21,000 AUMs. In the resource area, Section 15 leases account for 11,100 AUMs, and Section 3 permits involve 131,900 AUMs.

In addition to the adjudicated use, approximately 2,000 AUMs of trail use are authorized annually. One of the major trail use areas, the Worland-Ten Sleep (W-T) stock drive, has been fenced and is set aside for trail use only. Several other trailing areas are unfenced or only partially fenced and include the Nowater, Cherry Creek/Split Rock, Rome Hill, Luman Creek, Paint Rock, and Sand Draw stock driveways. Other areas that have also received trail use include Sand Creek Divide, Rattlesnake Ridge, Macaroni Road, Devil's Slide Road, Bluebank Road, Dry Farm Road, Dixon Canyon, Old Maid Gulch Road, and the Black Mountain Road.

There are 28 common allotments (allotments that are used by more than one permittee) and 279 individual allotments (47 Section 15 leases and 232 Section 3 permits). There are 18 allotment management plans (AMPs) in the resource area. Several other allotments have grazing systems in use that are not signed AMPs.

AFFECTED ENVIRONMENT

In 1984, the BLM grazing fee per AUM was \$1.37, yielding \$167,140 in payments on the permitted AUMs. The average duration of federal AUM use by WRA ranchers is 6 to 8 months each year and the major periods of use are April 1 to June 30 and October 1 to November 30.

About 80 percent of BLM permittees rely heavily on public lands for their forage needs and would be affected by changes in BLM grazing policy.

The BLM does not recognize grazing permits as vested property rights; however, effects on private asset valuation do occur. A change in the number of AUMs would cause ranch values to change by an average of \$49 per AUM and earnings to change by an average of \$6.75 per AUM. (Grazing Fee Study)

The total authorized livestock forage from public lands amounts to about 20 percent of the total forage requirements of operators' herds. Roughly \$12 million of livestock sales can be attributed to operators grazing public lands. In addition to contributing to sales, these operators hire an estimated 350 to 360 non-family employees, resulting in a direct and indirect regional employment impact of roughly 730 people. Subsequent livestock operators using public lands add to regional business activity by about \$23 million.

More than 1400 range projects have been constructed in the Washakie Resource Area to enhance the use of public rangelands by livestock. Most projects were authorized under cooperative agreements with grazing permittees or under range improvement permits. Refer to Table 3 for a summary of the range projects.



Timber Production

The productive forest lands in the resource area contain approximately 95 million board feet of timber. On the average, about 300 MBF of sawlogs and 75 MBF of other timber is harvested annually. Estimating stumpage value at \$17 per MBF for sawlogs and \$12 per MBF for other timber results in a total output value of \$6,000 for annual WRA timber harvests. The annual harvest by timber type is: Douglas fir, 90 to 135 MBF; lodgepole pine, 36 to 54 MBF; and ponderosa pine, 66 to 99 MBF.

Annual precommercial thinning of lodgepole pine amounts to about 5 acres.

More than twice the volume presently being harvested in the resource area is being lost annually because of mortality. Production capability figures and site indexes show that most of the forest land could produce more timber than it does today. Stands that now produce 6 to 7 MBF per acre are capable of producing 15 to 20 MBF per acre over the same period of time with proper management.

AFFECTED ENVIRONMENT

Wild Horses

The Zimmerman Springs Wild Horse Area, the north half of T. 44 N., R. 92 W., contains the area's only wild horse herd. The original home range of this herd consisted of about 10,300 acres in the Zimmerman Springs (0591) and Lower Nowater (0015) allotments (Map 6). This area is fenced, but the horses often move up the Nowater drainage in the fall and winter into the Faure Nowater (0112) and Nowater (0105) allotments. The herd has increased steadily over the past 10 years to 44 horses, 37 adults and 7 foals. The herd uses over 400 AUMs of forage annually. Over 50 percent of the current range condition is unsatisfactory (fair or poor) in the original home range of this herd.

Recreation Use

Estimated annual recreation use on public lands is shown in Table 25.

Sightseeing is the most obvious recreational activity relating to the visual resource. An estimated 3,846,000 recreational visitor days of use are associated with sightseeing, most of which are associated with travel on the highways and roads in the resource area.

In general, increases in public land use have been predicted at least through 1990 for such recreational activities as hunting, fishing, picnicking, camping, canoeing/floating, cross-country skiing, and snowmobiling.

Water-based recreation includes fishing, trapping, hunting waterfowl, and float boating. Only the Bighorn River, and to a lesser extent the Nowood River, offer opportunities for swimming, canoeing, row boating, or stream floating. Larger water impoundments, most notably Renner Reservoir, provide limited opportunities for the use of canoes, row boats, small motor boats, or rafts. These activities usually occur in conjunction with hunting or fishing. Use of the Bighorn River occurs nearly year-round, with heaviest use during the hunting seasons (October through January).

Several important fishing streams flow into the resource area from the Bighorn Mountains. Other fishing opportunities are limited to reservoirs, most of which are privately owned, and the Bighorn River.

There are no recommended or designated wild or scenic rivers in the Washakie Resource Area.

Abundant opportunities exist for hunting and trapping. In terms of big game hunting, elk may be found on the west slopes of the Bighorn Mountains and in the Copper Mountain area. Antelope are found in most areas west of the foothills of the Bighorn Mountains. Mule deer are hunted throughout the resource area where suitable habitat exists.

Waterfowl hunting occurs on the Bighorn River, along major water courses and on reservoirs.

Hunting for small game or predators and trapping of fur bearers also occur resource area-wide in areas of suitable habitat.

TABLE 25
ESTIMATED ANNUAL RECREATION USE
(USE DAYS)

Class	Recreation Use Area			Total Use
	West Slope	Bighorn River	Remainder Washakie	
Water Based Use	1,000	1,300	0	2,300
Fishing, Hunting and Trapping	83,800	43,600	13,800	141,200
ORV Use	3,800	500	1,300	5,600
Cave Use	200	0	0	200
Other Recreation Use	58,200	34,400	28,600	121,200
Total Use	147,000	79,800	43,700	270,500

Notes: See Map 11 for the West Slope and Bighorn Recreation use areas. Numbers are rounded.



Off-Road Vehicle Use

Opportunities for off-road vehicle recreation is available on most lands within the resource area. Opportunities include the use of four-wheel drive vehicles, motorcycles, and all terrain cycles in free-play type activities. Current use of this type of activities are approximately 5,600 visits per year. Approximately 60 percent of this use occurs along the West Slope, 30 percent near population centers, and 10 percent in the outlying basin.

Access

Most roads on public lands are open for public access. The majority of roads on public lands are two-track trails or low-standard truck trails. The higher quality roads in the resource area are listed on the Worland District Transportation Plan. They total about 575 miles of road. The majority of those roads are single lane (10 to 14 feet wide), and are unsurfaced. Among the transportation plan roads, the BLM has acquired easements and completed some reconstruction and corrective maintenance on the following mainline roads: Red Gulch, Alkali, Hyattville Logging, Two Mile Hill, Blue Bank, and Nowater.

SOCIOECONOMICS

The largest communities and centers of commercial activities are Greybull, Thermopolis, and Worland. Other communities which service the area include East Thermopolis, Lucerne, Kirby, Big Trails, Ten Sleep, Hyattville, Basin, Manderson, and Shell.

Economics

Mineral exploration and development, farming and ranching, and recreation are the area's major economic activities. Regional sales directly related to these activities in 1980 totaled roughly \$1.2 billion. Between 85 and 90 percent of this total was attributed to mineral activities, about 8 percent to crop and livestock activities, and the rest to recreation.

In 1984, property assessments in the Resource area's three counties totaled about \$88 million (down \$69 million from 1983) with mineral related assessments accounting for roughly three-fourths of the 1984 total. The Washakie Resource Area represents less than 7 percent of the state's 1983 assessed mineral valuation.

AFFECTED ENVIRONMENT

Bonded indebtedness for the WRA of roughly \$10 million in 1984 was about 17 percent above that of 1983. Changes in property valuations and area indebtedness probably reflect the economic impacts of lower employment in the mining and construction sectors for portions of the WRA after 1980.

Total employment for the three counties included in the Washakie Resource Area is estimated at between 13 and 14 thousand, or roughly 5 percent of Wyoming's total employment. Government was the leading employer in 1983 (over 2500) followed by agriculture (roughly 2300), services and retail trade (each over 1400), and mining (roughly 1340). The labor force slightly exceeds the employment level but both declined between October 1983 and October 1984. Historically, both the labor force and employment level have moved generally upward over the past decade.

The annual average unemployment rate of 7.8 percent recorded in 1983 for the resource area counties was the highest in the last 10 to 15 years. This rate declined slightly between October 1983 and October 1984 and fell below the state average in both years.

The average weekly wage in the Resource Area in 1983 was roughly \$300 to \$315. Mining wages were highest, followed by wholesale trade, transportation/utilities, and construction. Weekly wages in other economic sectors averaged under

\$300. Only wages paid by the retail trade sector averaged lower than agricultural wages which were under \$230.

The Washakie RMP area is a sparsely settled region (4.0 people per square mile) which has experienced moderate growth since the mid-1970s due to mineral activities. During the decade 1960 to 1970, sizable levels of out migration from the area occurred due to a loss of businesses in some communities and a resulting loss in employment. Population projections indicate the area will continue to grow but at a slower rate than in the seventies and early eighties due to a slow down in mineral exploration and development.

In Hot Springs and Washakie Counties over 70 percent of the residents live in incorporated communities while in Big Horn County the figure is about 56 percent. Rural farm residents comprise 11 percent of the Big Horn County population, 5 percent of the Washakie County residents and 4 percent of those living in Hot Springs County.

Social Well-Being

Indicators of social well-being for the three counties suggest the area possesses both the positive and negative factors associated with rural areas in general. The counties are lacking some basic services: the number of people per




AFFECTED ENVIRONMENT

physician is much higher than for the state, education levels are lower, and per capita income is lower. There appears to be a loss of population in the working age group (18 to 64 years) which may be due to a lack of employment opportunities.

Although some mineral development has occurred here, the area remains remote and sparsely populated. This results in freedom from

many urban problems such as high crime rates and overcrowding. For example, area crime and divorce rates are lower than the State average. (The influx of mineral workers that occurred in the past 10 years does not appear to have negatively impacted the social structure or infrastructure.) In addition, recreation opportunities are plentiful. Family ranch operations remain predominant.



4 Environmental Consequences

INTRODUCTION

This chapter identifies the total environmental consequences expected from each of the alternatives described in Chapter 2. The environmental consequences on some resources and resource uses were not specifically identified as planning issues. However, impacts to those resources and uses are analyzed and discussed if they would be caused by an alternative.

Table 2 is a summary comparison of the estimated total impacts of each alternative. It is reprinted here to help the reader understand the environmental consequences that are described in this chapter.

Appendix J, Impacts Common to All Alternatives, describes the general causal relationship between management actions and environmental consequences that exist with all of the alternatives.

PREFERRED ALTERNATIVE

This alternative allows resource use with greater emphasis on protecting the natural environment than either Alternative A or B. It does provide for resource development even though the major emphasis is on environmental protection. The assessment of impacts is based on the following actions and assumptions:

- Approximately 99 percent of the federal mineral estate would be available for oil, gas and tar sands leasing. Of this, about 5 percent would be leased with a permanent “no surface occupancy” stipulation and another 61 percent would be leased with a seasonal “no surface occupancy” stipulation.
- Approximately 99 percent of the federal surface would be open to geophysical exploration, but exploration anywhere in the

Resource Area would be subject to vehicle use limitations of various kinds, and would be reviewed on a case-by-case basis.

- The entire Spanish Point Karst ACEC would be closed to mineral leasing and geophysical exploration.
- Existing transportation and utility corridors would be designated as preferred locations for future rights-of-way grants.
- Classification and Multiple Use Act classifications in Hot Springs County would be terminated.
- Approximately 1.0 million board feet of timber would be harvested from about 130 acres, annually.
- All wild horses would be removed from the Zimmerman Springs area.
- The maximum level of livestock grazing would be 143,000 AUMs, annually, on 307 allotments.
- Range projects would be implemented on “I” and “M” category allotments.
- Livestock grazing would be managed in wetland/riparian areas to allow improvement of habitat conditions. About 185 miles of fencing (10 miles/year) would be built to protect wetland/riparian habitat. New grazing systems would be used to restore and maintain wetlands.
- Adjustments in season of use and kind and class of livestock would be made to improve vegetative resources. Emphasis would be placed on adjusting spring grazing and on allotments without designated seasons of use.
- Approximately 500 acres of aspen stands (25 acres/year) would be fenced to reduce livestock damage.
- Restrictions on ORV use would apply throughout the resource area. About 6,600 acres would be closed to vehicle use.

ENVIRONMENTAL CONSEQUENCES

TABLE 2
SUMMARY COMPARISON OF IMPACTS

Causal Relationships and Impacts Common to All Alternatives		Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Air Quality	Air quality would be affected by mineral development, lands and reclamation, timber management practices, grazing management activities, ORV use, wildlife developments, and fire control. Only acceptable reductions in air quality would be anticipated from any of the alternatives.	Smoke and dust would increase from more timber slash burning, and construction of range projects along the west slope of the Bighorn Mountains. Amounts of other air contaminants would be similar to those caused by Alternative A, (Existing Management).	Air contaminants would include suspended particulates, hydrogen sulfide, sulfur dioxide, nitrous oxides, and vaporous hydrocarbons. Suspended particulates would be caused by surface disturbances; sulfur dioxide would be caused by flaring hydrogen sulfide; and vaporous hydrocarbons would be released around oil and gas production facilities.	This alternative would cause the most smoke from burning timber slash and prescribed range sites and the most dust from construction activities and vehicle travel. Here too, however, only acceptable reductions in air quality would be anticipated. Other air contaminants would be similar to those caused by Alternative A.	Impacts would be the same as with the Preferred Alternative.	Management Prescriptions would cause more smoke than Alternative A but less than Alternative C or the Preferred Alternative.
Soil	Surface disturbing activities cause on-site and off-site impacts. Off-site soil impacts include sedimentation in drainages and down-slope soil contamination. On-site impacts include soil compaction and erosion.	Eventually soil loss would be reduced by an estimated 13% compared to levels expected from Alternative A. Changes in livestock grazing would be the primary cause for the reduced soil loss.	Estimated total accelerated soil loss would be about 1.1 million tons per year. The primary soil impact would result from livestock grazing.	Total accelerated soil loss would eventually be about 3% less than with Alternative A.	Impacts would be the same as with the Preferred Alternative.	Total accelerated soil loss would be reduced by an estimated 30% from levels caused by Alternative A. Changes in livestock grazing management would be the primary cause for the reduced soil loss.
Water	Generally, the same activities that affect soils and vegetation also affect surface water.	Surface water quality would improve. Long-term sediment delivery to the Bighorn River would be reduced by an estimated 12% from existing levels. The risk of penetrating caves and karstic waterways by exploratory drilling would be reduced compared to Alternative A, B, or C.	Surface water quality would improve slightly from existing levels as a result of implementing 18 AMPS. Sediment delivery to the Bighorn River would be expected to decline by about 7% from existing levels.	Sediment delivery to the Bighorn River would be reduced by an estimated 8% from existing levels.	Long-term levels of sediment delivery to the Bighorn River would be about the same as with the Preferred Alternative. The risk of penetrating caves and karstic waterways by exploratory drilling would be greater than with the Preferred Alternative.	Sediment delivery to the Bighorn River would decline by an estimated 20% compared to existing levels.

ENVIRONMENTAL CONSEQUENCES

TABLE 2 (Continued)
SUMMARY COMPARISON OF IMPACTS

Causal Relationships and Impacts Common to All Alternatives		Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Vegetation	Vegetation is also affected by surface disturbing activities, e.g., construction of drill pads, roads, pipelines, power lines, as well as forage consumption by livestock and wildlife, and loss of forage by fire or timber harvest. Implementation of grazing systems would result in a long-term improvement in range condition.	The timber harvest level would allow a greater diversity of forest stands than Alternative A. Approximately 15% of the timber base would be maintained for old growth timber. The loss of timber from natural mortality, fire, disease, etc. would be reduced to between 100 and 150 MBF/yr. It is estimated that 20% of the rangeland would be in excellent condition, 40% in good condition, 14% in fair condition, 1% in poor condition, and 25% unclassified. Greater improvement in wetland/riparian areas would occur with this alternative than with either Alternative A or B.	Continuation of current timber management would result in a loss of a large amount of timber on productive forest lands. Old growth and over-mature timber would remain on almost 80% of the timber base. This would perpetuate a loss of timber productivity and a decline in diversity of stand age and size class. Approximately 600 MBF/yr of timber would be lost to decay, disease, insects, etc. An estimated 10% of the rangeland would continue in excellent condition, 40% in good condition, 20% in fair condition, 5% in poor condition, and 25% unclassified. Overall, wetland/riparian habitat condition would stabilize and gradually improve as a result of continued implementation of new grazing practices within revised AMPs, the construction of protective fencing around wetland/riparian zones, and implementation of Habitat Management Plans.	The timber harvest level would result in greater diversity of forest stands. Old growth, over-mature stands would eventually be reduced to approximately 5-10% of the timber base. The loss of timber from natural mortality, fire, etc., would be reduced to approximately 75-100 MBF/yr. An estimated 50% of the rangeland would eventually be in excellent condition, 20% in good condition, 10% in fair condition, and 20% would remain unclassified. Wetland/riparian habitat would be restored and improved faster than with Alternative A.	Overall the impacts would be nearly the same as those described for the Preferred Alternative. Site specific differences would occur within the allotments occupied by wild horses. Here upland vegetative cover would remain at about current levels and wetland/riparian areas would be degraded because there would continue to be trampling of vegetation, soil compaction, and forage use in wetland/riparian areas. Generally, wetland values would be degraded as compaction, sedimentation, peak water flows, and erosion continues, resulting in lower water tables. These impacts would be insignificant compared to the cumulative environmental consequences of the management prescriptions for the entire resource area.	The timber harvest level would result in greater diversity of forest stands less than with the other alternatives. Old growth, over-mature stands would eventually be reduced to approximately 35-40% of the timber base. The loss of timber from natural mortality, fire, insects, etc. would be about 250-300 MBF/yr. An estimated 25% of the rangeland would eventually be classified in excellent condition, 45% in good condition, 7% in fair condition, and 25% unclassified. This alternative would provide the greatest potential for rapid restoration and improvement of all wetland/riparian areas.
Fish and Wildlife	Actions which excavate, bury, overturn, clear, or grade previously undisturbed terrestrial habitat displace animals, increase stress, and cause some mortality to big game, small mammals, reptiles, and birds. The construction of drill pads, roads, pumping stations, pipelines, power lines, reservoirs, fences,	Big game crucial winter range and big game winter range would improve significantly compared to Alternative A, primarily because of the change in season of livestock use and other livestock grazing management. Elk crucial winter range and elk winter range that would be abandoned would be reduced in the long-	Most big game crucial winter and winter range would continue to deteriorate because of competition with livestock. Minerals and forestry actions would cause long-term abandonment of 12,000 acres of elk crucial winter range and 24,000 acres of elk winter range. Big game summer habitat, yearlong	Livestock grazing management would accelerate deterioration of big game habitat and sage grouse habitat. Although the long-term abandonment of elk crucial winter range and elk winter range as Alternative A, temporary abandonment would be greater.	Wildlife impacts would be the same as those described for the Preferred Alternative.	Livestock grazing management would accelerate the improvement of big game habitat and sage grouse habitat. The long-term abandonment of elk habitat would be less than with Alternative A but the amount of temporary abandonment would be slightly more, primarily due to increased timber harvest.

ENVIRONMENTAL CONSEQUENCES

TABLE 2 (Continued)
SUMMARY COMPARISON OF IMPACTS

	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
<p>Causal Relationships and Impacts Common to All Alternatives</p> <p>Fish and Wildlife (Cont.)</p> <p>Spring developments, and communication sites make unusable wildlife habitat until site reclamation is completed. Loss of habitat would be expected to continue primarily in the sagebrush or grass vegetative type due to and gas activity and in timbered areas due to timber harvest. Livestock grazing would affect fish and wildlife habitat throughout the resource area, especially in crucial habitat and wetland/riparian areas.</p> <p>In addition to direct loss of habitat by physical disturbance, some wildlife would abandon habitat temporarily or permanently because of its proximity to human disturbance, noise, noxious odors, soil and water contamination, or use by other animals.</p>	<p>term by 6,000 and 4,000 acres, respectively. Generally, big game summer habitat, yearlong habitat, elk calving habitat, and elk spring, fall, and rutting habitat would all improve compared to Alternative A. Sage grouse habitat would also gradually improve.</p>	<p>habitat, elk calving habitat and elk spring, fall, and rutting habitat would all continue to deteriorate. Sage grouse habitat would also continue to deteriorate slowly.</p>			
<p>Visual</p> <p>Visual character would be affected by mineral exploration and development (especially oil and gas activities) realty actions, timber activities, livestock grazing, ORV use, recreation use, and watershed projects that change the line, texture, form, and color in ways that contrast with the natural surroundings.</p>	<p>Visual impacts associated with utility lines would be concentrated in utility corridors where they would cause less contrast with their natural surroundings than would occur with Alternative A. Visual impacts caused by timber activities on an additional 90 acres/yr would be greater than with Alternative A. Elsewhere, visual quality would be restored as range condition improves and watershed projects are established to stabilize soils.</p>	<p>The area's aesthetics would be affected by activities that change the line, texture, form, and color that contrast with the natural surroundings.</p>	<p>Visual impacts associated with utility lines would be similar to those described for the Preferred Alternative. Timber activities would cause greater visual impacts on the west slope of the Bighorn Mountains than any other alternative. In the long-term visual quality would also be restored on a greater portion of the resource area as more AMPs are implemented and range-land conditions improve.</p>	<p>Visual impacts would be the same as those described for the Preferred Alternative.</p>	<p>Visual impacts associated with mineral activities, rights-of-way, timber activities, and recreation use would generally be concentrated in unrestricted areas where they would cause less visual contrast with their surroundings than would occur with the other alternatives.</p>

ENVIRONMENTAL CONSEQUENCES

TABLE 2 (Continued)
SUMMARY COMPARISON OF IMPACTS

Causal Relationships and Impacts Common to All Alternatives		Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
Outdoor Recreation	<p>Noise, odors, noxious fumes, hazardous chemicals, access restrictions, and surface disturbances would all affect recreation activities because the opportunities for certain types of recreation would be lost or the recreation experience would be degraded.</p>	<p>Recreation use would continue at near 210,000 user days per year. Approximately 6% of the Resource Area would remain in the semi-primitive nonmotorized, 74% in the semi-primitive motorized, 9% in the roaded natural, and 9% in the rural recreation opportunity spectrum classification.</p>	<p>Total recreation use would increase by an estimated 5% primarily as a natural increase in waterbased use. Semi-primitive nonmotorized and semi-primitive motorized recreation opportunities would decline while roaded natural recreation opportunities would increase compared to Alternative A.</p>	<p>Cumulative recreation impacts would be similar to those described for the Preferred Alternative. However, the less stringent minerals management prescription on the ACEC would increase the risk of penetrating caves by directional drilling compared to no leasing with the Preferred Alternative. Drilling could alter the microclimate, introduce pollutants, change the aesthetics, possibly close or flood passageways, and change the recreation experience of regionally or nationally significant caves.</p>	<p>Total recreation use would increase by a negligible amount (about 3%). Semi-primitive nonmotorized and roaded natural recreation opportunities would increase while semi-primitive nonmotorized recreation opportunities would decline slightly.</p>
Cultural Resources	<p>With each alternative most surface disturbing activities would be preceded by a Class III pedestrian inventory to identify cultural resources. Adverse impacts would continue to occur from trespass actions, illegal collecting, vandalism, failure to recognize or report important sites, and natural and accelerated erosion.</p>	<p>Same as impacts common to all alternatives.</p>	<p>Same as impacts common to all alternatives.</p>	<p>Same as impacts common to all alternatives.</p>	<p>Same as impacts common to all alternatives.</p>
Wilderness	<p>See Wilderness Supplement</p>	<p>Same as impacts common to all alternatives.</p>	<p>Same as impacts common to all alternatives.</p>	<p>Same as impacts common to all alternatives.</p>	<p>Same as impacts common to all alternatives.</p>
Wild Horses	<p>Range condition within the wild horse area would improve or remain static; damage to range development would be reduced by an</p>	<p>Wild horses would continue to damage range developments such as fences or water sources. Upland basal vegetative cover would remain at</p>	<p>Impacts would be the same as with the Preferred Alternative.</p>	<p>Impacts would be the same as with Alternative A.</p>	<p>Impacts would be the same as with the Preferred Alternative.</p>

ENVIRONMENTAL CONSEQUENCES

TABLE 2 (Continued)
SUMMARY COMPARISON OF IMPACTS

	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
<p>Causal Relationships and Impacts Common to All Alternatives</p>	<p>estimated 50 percent; and competition for forage would be reduced. Watershed condition would improve and erosion would decline by an estimated 5 tons/acre/year. Erosion due to peak flows would also be reduced. Since the use of wetland areas would be reduced by about 25 percent; less vegetation would be grazed or trampled and less soil would be compacted. Upland and riparian wildlife habitats would improve in the long-term.</p>	<p>about current levels. Wild horses would continue to cause erosion of 3 to 5 tons/acre/year. This would cause soil productivity to decline and peak water flows to increase. Sedimentation of wetlands would also increase. Wetland/riparian areas would be degraded because there would continue to be trampling of vegetation, soil compaction, and forage use in wetland/riparian areas. Generally, wetland values would be degraded as compaction, sedimentation, peak water flows and gullying continues, resulting in lower water tables.</p>	<p>The level of mineral exploration, development, and production activities would be about the same as with Alternative A.</p>	<p>The level of mineral exploration, development, and production activities would be about the same as with Alternative A.</p>	<p>Mineral exploration, development, and production activities would decline by less than 10% compared to Alternative A. About 1/3 of the wildcat wells drilled within the last 10 years would not have been permitted with this alternative.</p>
<p>Wild Horses (Cont.)</p>	<p>The level of mineral exploration, development, and production activities would be about the same as with Alternative A.</p>	<p>Based on the level of activities over the past 10 years, about 90 wildcat wells and 310 wells within KGSs would be drilled within the next 10 years.</p>	<p>The level of mineral exploration, development, and production activities would be about the same as with Alternative A.</p>	<p>The level of mineral exploration, development, and production activities would be about the same as with Alternative A.</p>	<p>Mineral exploration, development, and production activities would decline by less than 10% compared to Alternative A. About 1/3 of the wildcat wells drilled within the last 10 years would not have been permitted with this alternative.</p>
<p>Land Uses</p>	<p>The level of activity associated with coal, bentonite, gypsum, sand, and gravel exploration, development, and production would be similar among the alternatives. The number of lands and really authorizations would be similar for each alternative although the locations could differ among alternatives. Stock trail use would be authorized with all alternatives and existing AMPs would be updated and modified. Timber harvest would be characterized by two-stage shelterwood harvest of mixed conifer and clearcutting of lodgepole pine. Precommercial thinning would occur on</p>	<p>Up to 143,000 AUMs of livestock grazing use would be permitted annually. There would be more summer, fall, and winter grazing use. The reduction of spring livestock use would reduce the supply of spring range. All wild horses would be removed from the Zimmerman Springs area. Approximately 1 million board feet of timber would be harvested from about 130 acres annually. Total recreation use would increase 24%. All categories of recreation use would increase on each special recreation management area. Most</p>	<p>Livestock grazing use could gradually increase from 143,000 AUMs to 182,000 AUMs, depending on implementation of grazing systems, development of range projects, etc. Spring use would occur on about 10% of the allotments, combined spring and other seasons of use on about 20% of the allotments, summer use on about 50% of the allotments, and fall and winter use on 28 allotments. As many as 80 wild horses would remain in the Zimmerman Springs area. An average of 375 MBF of timber would be harvested from about 40 acres annually. Total recreation use would continue at near 270,000 user days/year. Most of this use would continue to occur within the West Slope MBF of timber would be</p>	<p>A maximum of 30 wild horses would continue to use the Zimmerman Springs area. Other land use impacts would be similar to those described for the Preferred Alternative.</p>	<p>Allowed grazing use would be reduced by up to 29,000 AUMs by eliminating all spring use and reducing or eliminating livestock grazing when it conflicts with other uses or values. Maximum authorized livestock use would be 114,000 AUMs. All wild horses would be removed from the Zimmerman Springs area. An average of 700 MBF of timber would be harvested from about 90 acres annually. Total recreation use would increase by about 3% from existing levels although recreation use on the West Slope</p>

ENVIRONMENTAL CONSEQUENCES

TABLE 2 (Continued)
SUMMARY COMPARISON OF IMPACTS

Land Uses (Cont.)	Causal Relationships and Impacts Common to All Alternatives				
	Preferred Alternative	Alternative A (Existing Management)	Alternative B	Alternative C	Alternative D
450 acres of commercial forest land and timber stands in 20-30 year age class.	<p>of this use would occur within the West Slope Recreation Use Area and fishing, hunting, and trapping would be the predominant recreation activities.</p>	<p>Recreation Use area. Fishing, hunting, and trapping, would continue to be the predominant recreation activities.</p>	<p>harvested from about 150 acres. Total recreation use would increase by 5% from existing levels. Most of this use would be hunting, fishing, and trapping.</p>	<p>Special Recreation Management area and fishing, hunting, and trapping would decline slightly because of seasonal access restrictions.</p>	
Socio-economics	<p>The level of livestock sales, resulting operator income, regional business activity, and employment from livestock grazing are expected to remain the same as with Alternative A. Total annual output value from timber harvest would be over \$200,000 higher than with present management. Employment increases would total about 4.5 man years in the timber sector and 6 man years for the total economy. Recreation user expenditures would increase by an estimated 12% and increase annual business activity by about \$1.6 million by the fifth year of implementation.</p> <p>0.1% of total local business activity and related employment. Changes in hunting, fishing, and trapping would result in no more than 0.4% change in regional business activity or employment. None of the alternatives would cause significant economic impacts to the local economy, although some individuals or businesses may experience a noticeable impact from various alternatives.</p>	<p>Since this alternative continues present management, no significant social or economic changes would be expected.</p>	<p>Cumulative net annual change during the 18 year adjustment period would increase at least \$22.6 million, regional business activity by almost \$44.5 million, and labor requirements by roughly 72 workers. Annual post adjustment differences between Alternative A and B includes over \$2 million in additional area sales and almost \$4.4 million in increased regional business activity.</p>	<p>Impacts would be the same as with the Preferred Alternative.</p>	<p>During the first 18 years, net sales related to agriculture and recreation would decline more than \$22 million and net business activity would decline by about \$44 million. Subsequent net area employment would drop by a total of about 40 workers. Following the five year adjustment period for recreation use, annual net differences between Alternative D and A would include over \$1 million in net sales and about \$360,000 more in net business activity. Related employment levels are not expected to change beyond the adjustment period.</p>

- Two Special Recreation Management Areas would be designated; one on the West Slope of the Bighorn Mountains, of 241,000 acres, another on the Bighorn River from Wedding of the Waters to Shell Creek, of about 59,000 acres.
- Two campsites would be developed.
- Public access would be acquired or developed for designated recreation areas.
- Cave use permits would be issued to qualified applicants when the intended use is consistent with cave and other resource management objectives.
- Certain areas would be managed to allow wildlife species to be reintroduced.
- Vehicle and pedestrian access would be limited in certain crucial habitats, sensitive species habitats and wetland/riparian habitats.
- An ACEC (Spanish Point Karst ACEC) would be designated around karst areas, caves, and sinking streams in the Dry Medicine Lodge, Medicine Lodge, and Trapper Creek drainages to protect the watershed by restricting or prohibiting certain activities.
- Erosion control projects would be implemented on about 42,000 acres.
- Full suppression of wildfire would occur on about 703,750 acres, limited suppression on about 530,300 acres.

Generally, the nature of the environmental consequences would be the same as those described for Impacts Common to All Alternatives (Appendix J) unless otherwise stated.

Minerals

New stipulations would not be applied to any existing oil and gas leases. Leases with producing oil and gas wells do not expire and lease terms cannot be modified as long as production continues. As a result, estimated levels of oil and gas production would be approximately the same for all alternatives and the impact on the level of oil and gas production would be insignificant. However, oil and gas exploration and related activities could be affected. Within the last 10 years, 91 wildcat wells and 311 wells within KGSs have been drilled. However, only one of the wildcat wells was drilled in an area that would be restricted by a “no surface occupancy” stipulation.

Tar sand development would also be precluded on new leases by “no surface occupancy” stipulations. This would preclude the development of about 50 percent of the prospective tar sand deposits within the Washakie Resource Area.

Oil and gas leasing and development would be restricted to areas shown on Map 8. However, the number of oil and gas wells drilled would be about the same as with existing management.

Air Quality

Smoke and dust would be expected to increase from more timber slash burning, prescribed burning, and construction of range projects along the west slope of the Bighorn Mountains. Here, too, only acceptable reductions in air quality would be anticipated.

Soils

Compared to the current situation, increased logging, slash burning, range development construction, watershed projects, and prescribed burning would all tend to remove vegetation and increase soil disturbance, soil loss, compaction, and loss of soil productivity at least for short periods. This would be offset by reducing livestock grazing in the spring and increasing vehicle travel limitations and special management of sensitive watersheds. There would also be increases in recreation impacts. The impacts of range developments would be greater than with existing management but nearly 65 percent less overall than with Alternative B. The dramatic reductions in mineral impacts in soil units M1 and M2 are a result of the absence of tar sands development under this alternative.

Table 26 displays estimated soil impacts from various resource management activities on each soil unit. Total long-term soil disturbance and soil loss would be reduced by at least 10 percent over existing levels. Short-term soil loss would increase by about 35 percent. Most of this short-term increase would be caused by construction of range development projects.

In the short-term, soil compaction and soil loss caused by livestock grazing would change slightly as seasons of use change and grazing systems are implemented. However, long-term improvements in upland range condition would eventually be produced at the rate of about 1 percent annually by implementing grazing systems and range devel-

ENVIRONMENTAL CONSEQUENCES — PREFERRED ALTERNATIVE

TABLE 26
ESTIMATED CHANGE IN SOIL LOSS BY GENERAL SOILS UNITS¹
(PERCENT)

PREFERRED ALTERNATIVE

Resource Use Activity	Soil Unit								Total Soil Loss (Tons)
	M3	M2	M1	B1	B2	B3	B4	B5	
Recreation Uses	+10	+15	+10	+5	0	+5	+5	+10	329,400
Range Management									
Range Developments	+30	+35	+30	+35	+40	+35	+40	+40	50,700
Livestock Grazing	0	-40	-40	-40	-40	-0	-30	-35	414,400
Minerals Activities	0	-100	-100	0	0	0	0	0	194,200
Timber Harvest & Forest Management	0	+230	+200	0	0	0	0	0	2,700
Lands	0	0	0	0	0	0	0	0	5000
Wildlife Mgmt. & Habitat Improvements (Short-Term)	0	0	0	0	0	0	0	0	300
Fire Management	0	0	0	0	0	0	0	0	800
Total Accelerated	14,900	165,500	113,100	97,000	85,800	147,000	187,800	186,500	997,700
Estimated Natural	4,000	98,000	100,000	120,000	185,000	280,000	510,000	160,000	1,457,000
Total Erosion	18,900	263,500	213,100	217,000	270,800	427,000	697,800	346,500	2,454,700

NOTE: + indicates an increase in soil loss
 - indicates a decrease in soil loss

¹ Compared to soil loss resulting from existing management.

opment projects. This would increase vegetative ground cover and reduce runoff and peak flows. Soil erosion would eventually decline.

Each reservoir constructed would cause about five acres of short-term on-site soil disturbance. Soil productivity of disturbed areas would decline during construction but would increase over the long-term. Soil disturbance would increase erosion by up to 80 tons per acre. However, total sedimentation would decrease off-site over the long-term by a total of 40,000 tons per reservoir because of silt retention.

Sagebrush control by spraying would increase basal vegetation cover. Erosion would increase in the short-term by 2 to 5 tons/acre/year, but would be reduced in the long-term by up to 5 tons/acre/year where dense sagebrush is converted to grass and proper grazing management is implemented.

Prescribed burning could increase annual soil loss by up to 5 tons/acre immediately following the burn. Within two years, however, this could be reversed and the original soil erosion rate could be reduced.

Off-road vehicle use restrictions could reduce soil compaction on about one acre/mile of trail. This would also eventually increase productivity and reduce runoff and sedimentation.

The management prescribed for the proposed ACEC would close about eight miles of roads and trails in Dry Medicine Lodge Canyon and eliminate the use of motor vehicles in the ACEC. Closing roads and trails would reduce soil erosion by 5 to 10 tons/acre/year of road or trail closure. Restrictions on mining would prevent soil loss of up to 50 tons/acre/year from accelerated erosion. Restriction on timber harvest would eliminate the potential soil loss of an additional 20 tons/acre/year.

Soil disturbance caused by ripping and seeding would cause a short-term (about two years) increase in soil loss of up to two tons per acre, depending on the site. However, the increase in cover after the establishment of vegetation would result in a long-term reduction in soil erosion of up to 5 tons/acre/year. Soil productivity could increase by 50 to 100 percent depending on the initial conditions and results of the seeding.

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Construction of contour furrows would cause a short-term increase in soil loss of up to 10 tons/acre/year. Like seeding, the increase in cover from seeding and additional water infiltration would result in long-term reduction in soil erosion. Soil productivity would improve up to 100 percent on treated areas.

Finally, limited suppression of wildfire could increase annual soil loss caused by fires by 2 to 5 tons per acre of burned area. However, the surface disturbance associated with fire line construction, resulting from the use of heavy equipment and other fire suppression activities, would be avoided. This would eliminate annual soil erosion of up to 20 tons per acre of disturbance that could have long-term erosion results if not reclaimed.

Water

Long-term sediment delivery to the Bighorn River would be reduced by about 12 percent or 33,000 tons/year with this alternative. Sediment reduction associated with grazing management and tar sands production mitigation measures would be 41,000 tons/year. Sediment increases due to timber harvesting and increased recreation use would be about 8,000 tons/year. Table 27 displays expected sediment deliveries to the Bighorn River due to actions in this alternative.

TABLE 27
ESTIMATED ANNUAL SEDIMENT DELIVERED TO THE BIGHORN RIVER FROM RMP AREA
PREFERRED ALTERNATIVE

Drainage	Preferred Alternative	Existing Sediment Delivery (Tons)	Percent Reduction
Shell Creek	15,000	19,000	21
Nowood River	70,000	79,000	11
Nowater Creek	80,000	88,000	9
Kirby Creek	34,000	40,000	15
Miscellaneous Tributaries	44,000	50,000	12
Bighorn River Total	243,000	276,000	12

The use of herbicides for range improvement projects may degrade water quality in the short-term. Concentrations in water may reach 1 to 2 micrograms/liter.

The “no lease” prescription for minerals management would reduce the risk of penetrating caves and karstic waterways by exploratory drilling when compared to Alternatives A, B, and C. In addition, timber harvest restrictions, closure





and reclamation of roads, and maintaining good or better range condition, would have a net effect of reducing sediment loads delivered to karst areas. Annual sediment delivery would decline by about 15 percent with these prescriptions.

The risk of liquid hydrocarbon spills reaching karst areas would be less with this alternative than with Alternative A, B, or C.

Seeding and construction of contour furrows could reduce runoff by as much as 90 percent which, in turn, would reduce erosion, sedimentation, and peak flows. Water quality would improve, channel filling would be reduced, and wetland quality would improve. In some cases, however, reduced runoff could reduce the amount of water reaching reservoirs or other wetlands.

Immediately following burning there may be as much as 100 times more sediment than occurred with pre-burn conditions. However, long-term rates would normally decrease to below pre-burn levels.

Management prescribed for the ACEC would preclude activities which would cause soil erosion and sedimentation. Surface and groundwater quality would be maintained at existing levels or improved through restrictions on activities such as the use of pesticides, motor vehicle use, and surface disturbance.

Vegetation

The increased timber harvest would double or triple the amount of wood being produced and vegetative diversity would increase.

The short-term increase in human activities and equipment use and the production of slash would increase the risk of fire. However, over the long-term, fire risk would be reduced because of lower rates of fuel loading and spreading.

Fencing would increase aspen growth by 30 percent and increase the amount of aspen available for fuelwood by 150 MBF (300 cords) per year.

Management prescribed for the ACEC would affect about 1,200 acres (8 percent) of the commercial forest lands in the resource area and reduce salable timber by 50 to 100 MBF per year.

Implementation of grazing systems would cause long-term improvements in range condition and it is estimated that 960,000 acres would be in good or better condition. It is estimated that 20 percent of the rangeland would be in excellent condition, 40 percent in good condition, 14 percent in fair condition, 1 percent in poor condition, and 25 percent would remain unclassified. Fencing for range development would improve forage and habitat condition on upland and wetland sites and

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would contribute to more varied vegetation. Impacts to livestock operations and grazing use are discussed in the land use section.

Water developments, including year-round water sources and reservoirs, would improve livestock distribution and encourage more even utilization of forage. While utilization of forage and distribution would improve, heavy concentrations of livestock around reservoirs would still damage vegetation nearby. Sagebrush control by spraying or prescribed burning would increase basal vegetation cover and cause a long-term decrease in shrubs by 70 to 95 percent, short-term increase in annual weeds, and a 20 to 50 percent long-term increase in grass production. Total forage production would decline for about two growing seasons prior to increasing.

Seeding projects would increase forage production by 500 to 800 pounds per acre, with 50 percent of the increased production available for livestock use, providing an additional 0.2 to 0.5 AUMs of forage/acre/year. Contour furrowing would cause a loss of approximately 1 AUM/year/acre of treated land during the first three years of a project. After vegetation is established, the amount of forage would double initial levels before gradually declining. Available forage would increase by about 0.1 AUM/year for each acre treated.

Limited suppression of wildfire would allow a short-term loss of vegetation; however, within

three years livestock forage would generally exceed original levels as grasses replace shrubs.

Greater improvements in wetland/riparian areas would occur in this alternative than Alternative A or B due to the increased considerations given to habitat restoration and improvement. The annual construction of 10 miles of protective fence around degraded wetland/riparian areas would allow restoration and improvement of hundreds of streams, springs, and reservoirs. Changes in seasons of grazing use from spring and summer to winter would reduce impacts to wetland/riparian areas. Spring development and reservoir construction, although less than with Alternative B, would improve and/or create several hundred acres of habitat. Sedimentation would be further reduced and water quality improved through greater restriction of ORV use, mineral development, timber cutting, and implementation of specific watershed restoration and improvement practices. Appendix K compares the estimated impacts that this alternative would have on wetland and riparian areas to the impacts of each of the other alternatives.

Wetland/riparian restoration and improvement projects would be implemented within the HMPs at the same rate as under Alternative A, but at 12 times the rate of Alternative B. In general, this alternative would allow steady, long-term restoration and improvement of the designated wetland/riparian zones in the resource area.



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Fish and Wildlife

Table 28 displays estimated impacts on big game habitat and Table 29 indicates the amount of sage grouse habitat that would be affected by the livestock grazing management prescription.

Livestock grazing prescriptions would generally improve the condition of much of the big game and sage grouse habitat. As early spring livestock grazing is reduced, less shrub growth would also be promoted. This would increase forage and plant diversity for all animals including big game and livestock. Range condition would tend to improve and more forbs would be available for

sage grouse, deer, antelope, and elk. The condition of wet meadows would improve and heterogeneous plant communities would increase. The competition between livestock and big game, especially elk, for space and forage would be reduced.

Livestock grazing management and range development prescriptions would improve wildlife habitat. Fencing would impede big game movement and increase mortality especially in crucial big game winter ranges, migration routes, and parturition areas; and spraying sagebrush would reduce local wildlife populations that depend on sagebrush for food or cover. Reservoir construction would, however, improve wildlife

TABLE 28
IMPACTS ON BIG GAME HABITAT
PREFERRED ALTERNATIVE

Habitat Description and Anticipated Impacts	Cause of Impact	Acres (Thousands)			
		Antelope	Deer	Elk	Bighorn Sheep
Crucial Winter Range					
Accelerated Improvement	Livestock	14			2
Slow Improvement	Livestock	47	62	71	2
Slow Deterioration	Livestock		221	34	
Long-Term Abandonment ¹	Minerals/Forestry			6	
Temporary Abandonment ²	Minerals/Forestry			25	
Winter Range					
Accelerated Improvement	Livestock	17			
Slow Improvement	Livestock	97	118	152	
Slow Deterioration	Livestock	113	412	123	
Long-Term Abandonment ¹	Minerals/Forestry			20	
Temporary Abandonment ²	Minerals/Forestry			26	
Summer Habitat					
Accelerated Improvement	Livestock	15			
Slow Improvement	Livestock	6	7		
Slow Deterioration	Livestock		26	9	
Yearlong Habitat					
Accelerated Improvement	Livestock	102			
Slow Improvement	Livestock	573	101		
Slow Deterioration	Livestock		543	8	
Elk Calving Habitat					
Slow Improvement	Livestock			1	
Slow Deterioration	Livestock			1	
Long-Term Abandonment ¹	Minerals			2	
Elk Spring, Fall, Rutting Habitat					
Slow Improvement	Livestock			3	
Slow Deterioration	Livestock			6	

¹ Habitat that is unusable or abandoned for more than 10 years.

² Habitat that is abandoned for less than one year.

TABLE 29
**SAGE GROUSE HABITAT AFFECTED
 BY LIVESTOCK GRAZING MANAGEMENT**
PREFERRED ALTERNATIVE

Habitat Description	Existing		Short-Term	
	Trend	Acres ¹ (Thousands)	Change in Trend	Acres ¹ (Thousands)
Strutting grounds (leks)	Slow Deterioration	14	Gradual Improvement	2
Spring Habitat	Slow Deterioration	388	Gradual Improvement	133
Summer Habitat	Slow Deterioration	211	Gradual Improvement	83
Fall Habitat	Slow Deterioration	197	Gradual Improvement	76
Winter Habitat	Slow Deterioration	353	Gradual Improvement	138
Brood Rearing Habitat	Slow Deterioration	455	Gradual Improvement	55

¹ Some of these acres overlap and therefore are not additive.

distribution while plantings or seedings would improve habitat condition, forage, and cover. Although additional habitat may be produced by seeding for watershed stabilization, the diversity of the forage would decline. Habitat diversity would increase only if seedings provide a variety of plant species and forage types.

Logging an additional 90 acres annually would initially remove hiding cover for several wildlife species including elk and mule deer. The cover would be reestablished over the long-term. The human activity associated with logging would cause temporary displacement of various species. Eventually (after up to 50 years) gains in timber productivity would replace the habitat loss and provide additional habitat for elk and deer. Approximately five acres of timber base would be removed annually to construct roads associated with timber management. Construction and use of the road would also displace big game, especially elk. Displacement would increase stress and mortality rates while lowering the level of reproduction. These impacts would continue to some extent until the surface disturbing activities end, reclamation is complete, and habitat is reestablished.

Vehicle travel restrictions would significantly reduce the potential stress on wildlife caused by ORV use.

The designation and use of corridors for lands and realty related activities such as roads, pipelines, and powerlines would reduce the amount of wildlife habitat that would be abandoned compared to existing management.

Fishery habitat would be improved as new AMPs are implemented and streams are fenced to

exclude livestock use. Construction of additional reservoirs and implementation of watershed and wetland projects would also improve fish habitat by reducing erosion and sedimentation.

Visual Resources

Visual impact associated with utility lines would generally be concentrated in the utility corridor where they would cause less visual contrast with their surroundings than could occur with Alternative A (existing management).

Mineral activities, lands and realty actions, timber management practices, and range development projects that cause surface disturbances would also cause visual impacts such as changes in line, texture, form, and color that would contrast with natural surroundings. These impacts could occur on an additional 90 acres of timber that would be logged each year.

Outdoor Recreation

Recreation use (Table 30) would increase due to a greater Bureau presence and promotion of recreation opportunities; designation of special recreation management areas; increased access for hunting, fishing, boating, and camping; better wildlife habitat which would increase hunting opportunities; and development of recreation facilities at various sites.

ENVIRONMENTAL CONSEQUENCES — PREFERRED ALTERNATIVE

TABLE 30
ANNUAL RECREATION USE
PREFERRED ALTERNATIVE

Categories of Use	West Slope SRMA	Bighorn River SRMA	Remainder Washakie Recreation Use Area	Total Use
Water Based				
User Days	1,400	2,300	1	3,701
% Change	+40	+85	0	+60
Fishing, Hunting & Trapping				
User Days	96,400	47,900	14,200	158,500
% Change	+15	+10	+3	+12
ORV Use				
User Days	4,700	1,000	1,300	7,000
% Change	+25	+50	0	+26
Cave Use				
User Days	300	0	0	300
% Change	+50	0	0	+50
Other Recreation Use				
User Days	66,900	36,800	32,900	136,600
% Change	+15	+7	+15	+12
Total Recreation Use				
User Days	169,700	88,000	48,401	306,101
% Change	+14	+10	+10	+24
ROS Classes				
Semi-primitive Nonmotorized ROS Class				
User Days	27,500	0	42,600	112,000
% Change	+7	0	-40	-32
Semi-primitive Motorized ROS Class				
User Days	106,800	11,000	817,300	935,100
% Change	-2	0	+3	+3
Roaded Natural ROS Class				
User Days	12,100	2,300	105,800	120,200
% Change	+5	0	+5	+5
Rural ROS Class				
User Days	16,300	32,600	59,700	108,600
% Change	0	0	0	0

Cultural Resources and Wilderness

See the description of environmental consequences for Impacts Common to All Alternatives (Appendix J).

Wild Horses

The removal of wild horses would directly affect range condition, range developments, upland veg-

etation, soil compaction, riparian vegetation, livestock use, and forage utilization within the Zimmerman Springs area. Indirectly, income, soil erosion and productivity, sedimentation, peak flows, wildlife forage and habitat, and wetland values would also be affected. Range condition in the Zimmerman Springs Area would improve or remain static; damage to range developments would be reduced by an estimated 50 percent; and competition for forage would be reduced. Watershed condition would improve and erosion would decline by an estimated 5 tons/acre/year.

Erosion due to peak flows would also be reduced. Since the use of wetland areas would be reduced by about 25 percent; less vegetation would be grazed or trampled and less soil would be compacted. Upland and riparian wildlife habitats would improve in the long-term.

Land Uses

The level of oil and gas activities, e.g., exploratory wells drilled, would be about the same as with Alternative A (existing management).

Livestock grazing use would continue at current levels while monitoring studies are established and grazing systems are implemented or revised on three allotments per year. Monitoring on these allotments might indicate that season of use or levels of use need to be adjusted either through changes in the grazing system or changing the AUMs used on the allotment. Exclusion of livestock from using some areas, at least on a temporary basis, may be necessary to improve range condition. If exclusions or reductions in livestock use were required, some operators would be forced to reduce their herd size or purchase additional forage.

In the long-term, an estimated 143,000 AUMs would be available for livestock use. As grazing systems and range development are implemented and livestock seasons of use are modified, range condition should improve. Although less livestock grazing would be allowed on some allotments, forage yield would increase area wide. Weaning weights, calf crops and cow weights should increase while death losses decrease for some ranch operations.

The elimination or reduction of spring grazing use on public lands would reduce the supply of available spring range for livestock in the Big Horn Basin. Unless livestock numbers decline proportionally, the price of spring forage would also increase. More intensive grazing management implies more work would be required to move stock and maintain facilities.

All wild horses would be removed from the Zimmerman Springs area.

Recreation use would increase by an estimated 20 to 30 percent.

Approximately one million board feet of timber would be harvested from about 130 acres annually. Mixed conifers would be harvested using two-stage shelterwood harvest on three year sale units of up to 150 acres in size. Clear-cutting would also occur on up to 20 acres of lodgepole pine

annually from sale units of 10 acres in size. Here, too, less than two miles of road construction or upgrading would occur annually on non-permanent roads.

Socioeconomics

Mineral activities, e.g., wells drilled, are expected to be about the same with all alternatives; therefore, no measurable differences in socioeconomic impacts are projected between this Alternative and Alternative A (existing management) as a result of mineral activity.

The level of livestock sales, resulting operator income, regional business activity, and employment from livestock grazing are expected to remain the same under this alternative as under present management.

Annual timber output would total 1,000 MBF, up 625 MBF from present levels. Corresponding total annual output value would be over \$200,000 higher than under present management. Annual regional business activity would be over \$422,000 higher. Employment increases would total about 4.5 man years in the timber sector and 6 man years for the total regional economy.

Visitor use for hunting, fishing, and trapping would increase by an estimated 12 percent by the fifth year of plan implementation. This would result in an equal increase in user expenditures (\$743,000) and a rise of about \$1.6 million in annual business activity. Related regional employment could increase by a total of about 50 workers in the first five years.

Cumulatively over the first 18 years of the plan, the Preferred Alternative would result in \$11.9 million more in expenditures for hunting, fishing, and trapping than under present management and over \$24.8 million more in regional business activity.

No specific information on attitudes toward this alternative has been collected. However, based on attitudes toward specific issues (see the discussion of Public Participation in Chapter 5) people who are concerned with increased soil and watershed protection, wildlife habitat enhancement, increased recreation access and development, and control over ORV use may feel their concerns are partially addressed by this alternative. Those concerned with maximizing opportunities for mineral and energy exploration and development may feel their issues are not adequately addressed by this alternative. Those interested in enhancing livestock grazing may be



concerned by the possible decrease in AUMs and new restrictions on grazing; these concerns may be offset by the development of new range projects.

Increases in employment would be insignificant regionally but would have a positive impact on social well-being in individual cases.

Unavoidable Adverse Impacts

Approximately 2.46 million tons of natural and accelerated soil loss would occur annually.

Short-term sediment delivery to surface water would increase by about 5 percent.

Livestock operators may be forced to reduce their herd size or purchase additional forage.

Short-Term Uses Versus Long-Term Productivity

Short-term uses would likely cause the following effects on long-term productivity.

Although soil loss would increase in the short-term, long-term levels of soil loss would be similar to existing levels. Short-term increases in sediment caused by surface disturbance during construction and implementation would eventually be offset by expected improvements in range condition and vehicle restrictions in areas of fragile soils and sensitive watersheds which would reduce runoff.

Irreversible and Irretrievable Commitment of Resources

Accelerated soil loss would be about 1.0 million tons per year in addition to the 1.46 million tons of natural soil loss.

Approximately 1.0 million board feet of timber would be harvested from about 130 acres annually and 143,000 AUMs of forage would be consumed by livestock.

Summary

Air Quality

Smoke and dust would increase from more timber slash burning, and construction of range projects along the west slope of the Bighorn Mountains. Amounts of other air contaminants would be similar to those caused by Alternative A (Existing Management).

Soils

Eventually soil loss would be reduced by an estimated 13 percent compared to levels expected from Alternative A. Changes in livestock grazing would be the primary cause for the reduced soil loss.

Water

Surface water quality would improve. Long-term sediment delivery to the Bighorn River would be reduced by an estimated 12 percent from existing levels. The risk of penetrating caves and karstic water-ways by exploratory drilling would be reduced compared to Alternative A, B, or C.

Vegetation

The timber harvest level would create a greater diversity of forest stands than Alternative A.

ENVIRONMENTAL CONSEQUENCES - PREFERRED ALTERNATIVE

Approximately 15 percent of the timber base would be retained as old growth timber for wildlife habitat. The loss of timber from natural mortality, fire, and disease would be reduced to between 100 and 150 MBF/yr. It is estimated that 20 percent of the rangeland would be in excellent condition, 40 percent in good condition, 14 percent in fair condition, 1 percent in poor condition, and 25 percent unclassified. Greater improvement in wetland/riparian areas would occur with this alternative than with either Alternative A or B.

Fish and Wildlife

Big game crucial winter and big game winter range would improve significantly compared to Alternative A, primarily because of the change in season of use and other livestock grazing management. The number of acres of elk crucial winter range and elk winter range that would be abandoned would be reduced in the long-term by 6,000 and 4,000 acres, respectively. Generally, big game summer habitat, year long habitat, elk calving habitat, and elk spring, fall, and rutting habitat would all improve compared to Alternative A. Sage grouse habitat would also gradually improve.

Visual

Visual impacts associated with utility lines would generally be concentrated in utility corridors where they would cause less contrast with their natural surroundings than would occur with Alternative A. However, visual impacts caused

by timber activities on an additional 90 acres/year would be greater than with Alternative A. Elsewhere, visual quality would also improve as range condition improves and watershed projects are established to stabilize soils.

Outdoor Recreation

Total recreation use would increase by an estimated 24 percent because of a greater Bureau presence and promotion of opportunities and activities. Semi-primitive nonmotorized recreation would decline while semi-primitive motorized and roaded natural recreation opportunities would increase.

Cultural Resources

Same as impacts common to all alternatives.

Wilderness

See Wilderness Supplement.

Land Uses

The level of mineral exploration, development, and production activities would be about the same as with Alternative A. Up to 143,000 AUMs of livestock grazing use would be permitted annually. There would be more summer, fall, and winter grazing use. The reduction of spring livestock use would reduce the supply of spring range. All wild horses would be removed from the Zimmerman



ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE A

Springs area. Approximately 1 million board feet of timber would be harvested from about 130 acres annually. Total recreation use would increase by an estimated 24 percent. All categories of recreation use would increase on each special recreation management area. Most of this use would occur within the West Slope Recreation Use Area and fishing, hunting, and trapping would be the predominant recreation activities.

Socioeconomics

The level of livestock sales, resulting operator income, regional business activity, and employment from livestock grazing would be expected to remain the same as with Alternative A. Total annual output value from timber harvest would be over \$200,000 higher than with present management. Employment increases would total about 4.5 man years in the timber sector and 6 man years for the total economy. Recreation user expenditures would increase by an estimated 12 percent and increase annual business activity by about \$1.6 million by the fifth year of implementation.

ALTERNATIVE A

Alternative A is the continuation of current management except for the range management program where Alternative A reflects both the “no action” and the proposed action. The assessment of impacts is based on the following actions and assumptions:

- All legally available acreage, approximately 99 percent of the federal mineral estate, would be open to oil, gas, and tar sands leasing. Of this, 6 percent would be leased with a permanent “no surface occupancy” stipulation and another 61 percent would continue to be leased with a seasonal “no surface occupancy” stipulation.
- All areas would continue to be open to rights-of-way, although sensitive areas would be avoided when possible.
- Approximately 375 thousand board feet of timber would be harvested from about 40 acres, annually.
- No wild horse herd management plan would be adopted for the Zimmerman Springs wild horse herd. The herd size would increase to about 80 animals within ten years.
- The maximum level of livestock grazing would be 143,000 AUMs annually, on 307 allotments.
- No new range projects would be developed except in allotments with existing management plans.
- Off-road vehicle use limitations would be enforced on about 5,175 acres within Paint Rock Canyon and the Pits Motorcycle Area. ORV use would be unrestricted in the remainder of the resource area.
- The entire resource area would be designated as an extensive recreation management area.
- Cave use permits would continue to be issued to qualified users.
- No special recreation management areas would be designated.
- Access controls to protect wildlife habitat would be imposed only in specific situations and in specific habitats.
- Two miles of fence would be constructed annually to protect wetland riparian zones.
- An ACEC would be designated on karst areas in Trapper and Medicine Lodge Creeks subject to existing management practices and surface protection stipulations.
- Full suppression of wildfire would be practiced throughout the resource area.

Minerals and Air Quality

The environmental consequences would be the same as those described for Impacts Common to All Alternatives for minerals and air quality (Appendix J).

Soils

Table 31 displays the estimated soil loss that would be caused by various activities in each general soil unit. The amounts of sedimentation, soil contamination, and soil compaction would be proportional to the soil loss estimates.

TABLE 31
ESTIMATED SOIL LOSS BY GENERAL SOILS UNITS¹
(TONS PER YEAR)
ALTERNATIVE A

Resource Use Activity	Soil Unit								Total Soil Loss (Tons)
	M3	M2	M1	B1	B2	B3	B4	B5	
Recreation Uses	8,400	88,200	49,000	50,000	5,700	11,300	12,100	74,600	299,300
Range Management									
Range Development	0	0	0	0	0	0	0	0	0
Livestock Grazing	5,000	90,300	85,300	40,100	71,900	76,000	161,200	91,000	620,800
Minerals Activities	0	400	400	17,000	29,000	49,000	61,300	37,900	195,000
Timber Harvest & Forest Management	0	800	900	0	0	0	0	0	1,700
Lands	0	0	0	500	700	1,300	1,600	900	5,000
Wildlife Mgmt. & Habitat Improvements (Short-Term)	0	0	50	70	50	40	60	60	300
Fire Management	20	180	160	0	0	0	310	180	850
Total Accelerated	13,400	179,900	135,800	107,700	107,400	137,600	236,700	204,600	1,123,100
Estimated Natural	4,000	98,000	100,000	120,000	185,000	280,000	510,000	160,000	1,457,000
Total Erosion	17,400	277,900	235,800	227,700	292,400	417,600	746,700	364,600	2,580,100

The largest soil impact would result from livestock grazing because this activity occurs on over 80 percent of the resource area. Grazing impacts would average about 0.6 tons per acre per year. Most minerals impacts, except those caused by seismic activities, are site-specific and therefore more intensive at a given site. The majority of oil and gas impacts take place on the B soil units; however small impacts in units M1 and M2 are expected from tar sands development. Timber harvest impacts, while insignificant in the totals, are also site intensive because these activities normally are concentrated in small forested areas of 50 acres, or less.

Water

Overall, watershed conditions would improve slightly in the long term resulting in less sediment production and ultimately less sediment delivery to the Bighorn River. This would occur as a result of continued implementation of the 18 AMPs and construction of protective wetland fences. Surface disturbing activities such as timber harvesting, oil and gas exploration, and ORV use would create upland erosion. The net affect on sediment production in relation to long-term improvement in range condition would be minor on an area-

wide basis. Significant local impacts to water quality may occur if major new developments are initiated, such as strip mining of 70 acres of tar sands in the Trapper-Medicine Lodge drainages. Table 32 displays estimated sediment loadings within major drainages. Sediment delivery to the Bighorn River would be expected to decline by about 7 percent from existing levels.

TABLE 32
ESTIMATED ANNUAL SEDIMENT DELIVERED TO THE BIGHORN RIVER FROM RMP AREA
ALTERNATIVE A

Drainage	Preferred Alternative	Existing Sediment Delivery (Tons)	Percent Reduction
Shell Creek	16,000	19,000	16
Nowood River	73,000	79,000	8
Nowater Creek	86,000	88,000	2
Kirby Creek	37,000	40,000	7
Miscellaneous Tributaries	46,000	50,000	8
Bighorn River Total	258,000	276,000	7



Management of the proposed Spanish Point Karst ACEC would allow most actions to occur after preparation of an environmental analysis. With this alternative, activities such as oil and gas exploration, tar sand mining, hydrocarbon extraction, timber harvesting, road construction and ORV use could be initiated or allowed to continue within the ACEC boundaries. These surface disturbing activities would result in increased sediment loading to the karst areas located in Trapper and Medicine Lodge Creeks. A total increase of 400 tons of sediment per year, or a 25 percent increase from existing levels, is expected from these activities under Alternative A.

Tar sand mining and hydrocarbon extraction require water and light hydrocarbon solvents. Water requirements would be about 22,000 gallons per day, which may be obtained from surface drainages via diversion, or from groundwater by use of wells. Solvents, and extracted tar sand hydrocarbons could enter the karst areas if they were accidentally spilled.

Oil and gas drilling within the boundaries of the Spanish Point Karst ACEC could penetrate caves and subkarstic waterways and cause physical damage by injecting drilling fluids into karstic waterways.

Vegetation

A continuation of current timber management would cause a loss of a large amount of timber

from productive forest lands. This would have far reaching and long-term impacts on other resources such as wildlife habitat, watershed, and recreation. At management levels of the last ten years, only about 0.5 percent of the forest land base is harvested every 10 years. This would continue to perpetuate old growth and overmature timber on almost 80 percent of the timber base. These stands are prime candidates for insect and disease infestations and wildfires, which could leave many acres of once good commercial forest land in a non-forest condition.

Overall there would continue to be a loss of productivity on about 80 percent of the commercial forest lands and a decline in the diversity in stand age and size class and in the species composition. There would continue to be a loss of approximately 600 MBF of timber products annually because of decay, disease, and insects.

Approximately 10 percent of the range would continue in excellent condition, 40 percent in good condition, 20 percent in fair condition, and less than 5 percent in poor condition. About 25 percent would remain unclassified.

Range condition in "M" category allotments would continue in an upward trend. These allotments would continue to produce at or near their potential. There would also continue to be no conflicts or only minor conflicts with other uses. The distribution of livestock grazing would continue to be satisfactory.

One or more of the following situations would continue on "I" category allotments. Range

condition would continue to be either unsatisfactory or to show a downward trend. Although these allotments have moderate to high potential, they would continue to produce well below that potential. Major conflicts with other uses would continue. Livestock use would continue to be poorly distributed within allotments and pastures, resulting in heavy utilization of some sites while others would receive little or no grazing use. Current levels of livestock use also would continue to exceed carrying capacity on some allotments. Impacts of current management on livestock grazing use and operations are also discussed in the land use section of Chapter 3.

The range condition on those allotments with existing AMPs should improve or at least remain unchanged as these AMPs are updated and revised.

Unfenced wetland/riparian habitat would continue to deteriorate as a result of livestock grazing at current levels. Impacts would include soil compaction, bank sloughing, streamside vegetation loss, channel widening, increased channel erosion, increased water temperature, increased sediments, reduced stream depth, and lowered water table.

Overall, however, wetland/riparian habitat condition would stabilize and eventually improve. This would occur as a result of continued implementation of new grazing practices within revised AMPs and the construction of protective fencing (about 2 miles per year) around wetland/riparian zones. Improvement of range conditions on uplands would also help improve wetland/riparian areas as erosion and runoff peaks are reduced.

Wild horses would continue to impact riparian zones and increase sedimentation in streams and reservoirs within the Zimmerman Springs area.

Other impacts to wetland/riparian zones are usually associated with erosion of uplands. Large scale surface disturbances such as timber cutting, oil and gas development, ORV use, fire suppression and rights-of-way construction increase sedimentation of wetlands and degrade water quality. Most of these activities are now conducted in a manner to minimize soil loss from disturbed sites.

Implementation of the Bighorn River and West Slope HMPs and extension of the West Slope HMP to the area south and west of Nowood River would ensure wetland/riparian habitat improvement. Constructing protective fences, digging potholes, installing nesting structures, planting desirable vegetation, placing stream habitat improvement

structures, and building islands would all help to improve habitat conditions. Appendix K compares impacts on wetland/riparian areas from each of the alternatives.

Fish and Wildlife

As plant communities change, the wildlife using them would also change. Some wildlife would be displaced from specific pastures and allotments as the ecological condition changes in response to vegetation manipulation and behavioral intolerances between livestock and wildlife occur.

Livestock grazing on wildlife habitat from April through June would create wildlife/livestock interactions during parturition, one of the most crucial times for wildlife species. Some wildlife would die from the additional stress caused by interactions with livestock during this period.

When winter elk ranges are heavily grazed by livestock prior to winter, there is less forage for the elk. Intensive livestock grazing on some "I" category allotments would continue to displace antelope and reduce nutrient intake per animal. For example, short-term winter and spring domestic sheep use on crucial antelope winter ranges deplete forage needed to support antelope. These impacts would continue in the long-term where antelope and sheep compete for shrubby winter forage and spring forbs.

Since deer rely on shrub and forb species for much of their diet, the estimated dietary overlap between deer and sheep is 53 percent, and 15 percent between deer and cattle. Sheep use is particularly detrimental to the carrying capacity of many "desert" drainages for deer. For example, if no significant change in livestock use of wetland/riparian areas and drainages occurs, the cottonwood/big sagebrush community would continue to deteriorate.

Table 33 indicates the impacts on big game habitat from current management and Table 34 describes the impacts of livestock grazing management on sage grouse habitat. Generally, both big game habitat and sage grouse habitat would continue to slowly deteriorate with continuation of current management. As a result, in the long-term, Wyoming Game and Fish Department Strategic Plan population goals for game species would not be met. Nor, would the planning criteria concerning wildlife populations be met.

TABLE 33
 IMPACTS ON BIG GAME HABITAT
 ALTERNATIVE A

Habitat Description and Anticipated Impacts	Cause of Impact	Acres (Thousands)			
		Antelope	Deer	Elk	Bighorn Sheep
Crucial Winter Range					
Slow Improvement	Livestock			35	
Slow Deterioration	Livestock	61	283	70	4
Long-Term Abandonment ¹	Minerals/Forestry			12	
Temporary Abandonment ²	Minerals/Forestry			14	
Winter Range					
Slow Improvement	Livestock			46	
Slow Deterioration	Livestock	113	412	229	
Long-Term Abandonment ¹	Minerals/Forestry			24	
Temporary Abandonment ²	Minerals/Forestry			9	
Summer Habitat					
Slow Deterioration	Livestock	21	32	9	
Yearlong Habitat					
Slow Deterioration	Livestock	675	644	8	
Elk Calving Habitat					
Slow Deterioration	Livestock			2	
Long-Term Abandonment ¹	Minerals			4	
Elk Spring, Fall, Rutting Habitat					
Slow Deterioration				41	

¹ Habitat that is unusable or abandoned for more than 10 years.

² Habitat that is abandoned for less than one year.

TABLE 34
 SAGE GROUSE HABITAT AFFECTED
 BY LIVESTOCK GRAZING MANAGEMENT
 ALTERNATIVE A

Habitat Description	Existing Trend	Acres ¹ (Thousands)
Strutting grounds (leks)	Slow Deterioration	14
Spring Habitat	Slow Deterioration	388
Summer Habitat	Slow Deterioration	211
Fall Habitat	Slow Deterioration	197
Winter Habitat	Slow Deterioration	353
Brood Rearing Habitat	Slow Deterioration	455

¹ Some of these acres overlap and therefore are not additive.

Stream habitat for fish would stabilize or slowly improve as projects and additional management practices are implemented to eliminate wetland/riparian degradation caused by livestock grazing and other activities.

**Visual Resources, Outdoor Recreation,
 Cultural Resources, and Wilderness**

The nature of environmental impacts would be similar to those described for impacts common to all alternatives (Appendix J). Recreation use levels and recreational opportunities available with Alternative A are presented in Chapter 3. Overall, total annual recreation use on public lands would continue at around 270,000 user days.

Wild Horses

Wild horses would affect range condition, range developments, upland vegetation, soil compaction, riparian vegetation, livestock use, and forage utilization within the wild horse area. They would indirectly affect soil erosion, vegetative productivity sedimentation, peak flows, wildlife forage and habitat, and wetland/riparian values within the same area.

Wild horses would continue to damage range developments such as fences or water sources. Upland basal vegetative cover would remain at about current levels. Wild horses would continue to cause soil erosion of 3 to 5 tons/acre/year. This would cause soil productivity to decline and peak water flows to increase. Sedimentation of wetlands would also increase. Wetland/riparian areas would be degraded because trampling of vegetation, soil compaction, and forage use in wetland/riparian areas would continue. Generally, wetland values would be degraded as compaction, sedimentation, peak water flows and gulying continue, resulting in lower water tables.

Land Uses

Land uses would continue present trends. For example, land and realty authorizations would affect about 300 acres annually; authorized grazing use would be about 143,000 AUMs; the number of wild horses would increase within the Zimmerman Springs Wild Horse Area; and

recreation use on public lands would continue at about 270,000 user days per year.

With continuation of current management, 200-300 MBF of timber would be harvested from approximately 40 acres per year in units of about 10 acres in size. An estimated annual average of 10 acres of lodgepole pine would be clearcut in those units. Mixed conifer sale units would be harvested over a number of years using two-stage shelterwood harvest on units up to 150 acres in size. Approximately two miles of roads would be constructed or upgraded over a 10 year period.

Socioeconomics

Since this alternative continues present management, no significant social or economic changes would be expected. No specific information on attitudes toward this alternative has been collected. Individuals who feel the BLM should maintain existing management levels would probably approve of the alternative. People who perceived problems with existing management (see the discussion of Public Participation in Chapter 5) might not feel their concerns were being addressed by this alternative. Problems perceived but not addressed to the degree some people may wish, include: increased soil and watershed protection, ORV use control, wildlife habitat enhancement, increased recreation access and development, livestock forage enhancement and increased control of mineral and energy exploration and development.





Unavoidable Adverse Impacts

The unavoidable adverse impacts would be the same as those described for impacts common to all alternatives (Appendix J). The significance or magnitude of these impacts would probably be similar to what has occurred in the past.

Short-Term Uses Versus Long-Term Productivity

In addition to the impacts described for management common to all alternatives, short-term uses are likely to cause the following effects on long-term productivity.

Current timber harvest levels would continue to perpetuate old growth, overmature timber on about 80 percent of the timber base and cause timber productivity to decline.

The condition and productivity of range sites preferred by livestock would remain the same or decline over the long-term unless they are part of an existing AMP that would improve livestock distribution. Range condition and productivity in "M" category allotments would continue to increase while productivity in "I" category allotments would either remain unsatisfactory or decline.

Most surface disturbing activities, except for mineral related activities, would not have a

significant impact on the long-term productivity of wildlife habitat. However, this would not be the case when the disturbances occur in big game winter or other important habitats such as elk calving areas.

Irreversible and Irretrievable Commitment of Resources

Levels of production would continue past trends described in Chapter 3.

Accelerated (man-caused) soil loss would be an estimated 1.1 million tons annually.

Other irreversible and irretrievable commitments of resources would be the same as those described for impacts common to all alternatives (Appendix J).

Summary

Air Quality

Air contaminants would include suspended particulates, hydrogen sulfide, sulfur dioxide, nitrous oxides, and vaporous hydrocarbons. Suspended particulates would be caused by surface disturbances; sulfur dioxide would be caused by flaring hydrogen sulfide; and vaporous hydrocarbons would be released around oil and gas production facilities.

ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE A

Soils

Estimated total accelerated soil loss would be about 1.1 million tons per year. The largest soil impact would result from livestock grazing.

Water

Surface water quality would improve slightly from existing levels as a result of implementing or updating 18 AMPs. Sediment delivery to the Bighorn River would be expected to decline by about 7 percent from existing levels.

Vegetation

Continuation of current timber management would result in a loss of a large amount of timber on productive forest lands. Old growth and overmature timber would remain on almost 80 percent of the timber base. This would perpetuate a loss of timber productivity and a decline in diversity of stand age and size class. Approximately 600 MBF of timber would be lost to decay, disease, and insects. An estimated 10 percent of the rangeland would continue in excellent condition, 40 percent in good condition, 20 percent in fair condition, 5 percent in poor condition, and 25 percent unclassified. Overall, wetland/riparian habitat condition would stabilize and gradually improve as a result of continued implementation of new grazing practices within revised AMPs, the construction of protective fencing around wetland/riparian zones, and implementation of habitat management plans.

Fish and Wildlife

Most big game crucial winter and winter range would continue to deteriorate because of competition with livestock. Minerals and forestry actions would cause long-term abandonment of 12,000 acres of elk crucial winter range and 24,000 acres of elk winter range. Big game summer habitat, year long habitat, elk calving habitat and elk spring, fall, and rutting habitat would all continue to deteriorate. Sage grouse habitat would also continue to deteriorate slowly.

Visual

The area's visual character would be affected by activities that change the line, texture, form,

and color, producing contrasts with the natural surroundings.

Outdoor Recreation

Recreation use would continue at near 270,000 user days per year. Approximately 8 percent of the resource area would remain in the semi-primitive nonmotorized, 74 percent in the semi-primitive motorized, 9 percent in the roaded natural, and 9 percent in the rural recreation opportunity spectrum classifications.

Cultural Resources

Impacts would be the same as impacts common to all alternatives.

Wilderness

See Wilderness Supplement.

Land Uses

Based on the level of activities over the past 10 years, about 90 wildcat wells and 310 wells within KGSs would be drilled within the next 10 years.

Up to 143,000 AUMs of livestock grazing use would be permitted annually. All spring use would occur on 37 allotments, combined spring and other use on 126 allotments, summer use on 22 allotments, and fall and winter use on 28 allotments.

As many as 80 wild horses would remain in the Zimmerman Springs area.

An annual average of 375 MBF of timber would be harvested from about 40 acres.

Total recreation use would continue at near 270,000 user days/year. Most of this use would continue to occur within the West Slope Recreation Use Area. Fishing, hunting, and trapping would continue to be the predominant recreation activities.

Socioeconomics

Since this alternative continues present management, no significant social or economic changes would be expected.

ALTERNATIVE B

Alternative B emphasizes developing and using natural resources. It does provide for environmental protection even though the major emphasis is on resource development. The assessment of impacts is based on the following actions and assumptions:

- Approximately 99 percent of the federal mineral estate would be open to oil, gas and tar sands leasing. Of this, 6 percent of the federal mineral estate would be leased with a permanent “no surface occupancy” stipulation and another 61 percent would be leased with a seasonal “no surface occupancy” stipulation.
- Existing transportation and utility corridors would be preferred locations for future rights-of-way grants.
- Approximately 1.2 million board feet of timber would be harvested from about 150 acres, annually.
- The entire Zimmerman Springs wild horse herd would be removed from the resource area.
- Livestock grazing would be allowed to increase to an estimated 182,000 AUMs per year on 307 allotments. This would be accomplished by implementing range projects and management practices on “I” and “M” category allotments.
- Livestock grazing would be managed in wetland/riparian areas to allow improvement of habitat conditions. About 185 miles of fence would be built at a rate of about 5 miles per year.
- Management practices such as changes in season of use and limited use of key forage species would be implemented to improve range condition.
- “I” category allotments would receive priority for the funding of range projects and development of grazing management systems.
- Approximately 250 acres would be closed to ORV use. Restrictions would be applied on an additional 666,700 acres.
- No special recreation areas would be designated.
- Access controls would occur only in specific situations and in specific wildlife habitats.

—An ACEC would be designated to protect karst areas, caves and sinking streams in the Dry Medicine Lodge, Medicine Lodge and Trapper Creek drainages using standard stipulations and existing management practices for surface protection as well as special stipulations for protection of sub-surface values.

—Full suppression of wildfire would occur on about 703,750 acres; limited suppression would occur on about 530,300 acres.

Minerals

The environmental consequences would be the same as those described for impacts common to all alternatives (Appendix J).

Air Quality

More timber slash burning and prescribed range burning along the west slope of the Bighorn Mountains would increase smoke and dust in the air. However, only acceptable reductions in air quality would be anticipated.

Soils

More logging, slash burning, recreation use, and new range developments would remove vegetation and increase soil disturbance, erosion, compaction, and loss of productivity for short periods. Table 35 displays the estimated change in soil loss that could be caused by various activities in each soil unit. Eventually, total estimated accelerated soil loss would decrease by almost 3 percent to about 1,092,000 tons of soil loss/year. Most of this decrease would result from the eventual improvement in range condition. On a per acre basis, grazing would cause approximately 0.4 tons/acre/year of soil loss.

In the short-term, soil compaction and soil loss caused by gradual increases in livestock grazing would increase slightly as seasons of use change and grazing systems are implemented. However, long-term improvements in upland range condition would eventually be produced by changing seasons of use and implementing grazing systems and range development projects. This would increase basal vegetation cover and reduce runoff and peak flows. Soil erosion would eventually decline.

ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE B

TABLE 35
ESTIMATED CHANGE IN SOIL LOSS BY GENERAL SOILS UNITS¹
(PERCENT)
ALTERNATIVE B

Resource Use Activity	Soil Unit								Total Soil Loss (Tons)
	M3	M2	M1	B1	B2	B3	B4	B5	
Recreation Uses	+5	+5	+5	+5	0	0	0	0	309,000
Range Management									
Range Developments	+100	+100	+100	+100	+100	+100	+100	+100	138,600
Livestock Grazing	-5	-25	-30	-30	-30	-10	-40	-25	439,400
Minerals Activities	0	0	0	0	0	0	0	0	194,700
Timber Harvest & Forest Management	0	+280	+190	0	0	0	0	0	3,900
Lands	0	0	0	0	0	0	0	0	5,000
Wildlife Mgmt. & Habitat Improvements (Short-Term)	0	0	-45	-30	-45	-40	-55	-50	200
Fire Management	0	0	0	0	0	0	0	0	900
Total Accelerated	16,300	183,000	132,200	107,000	98,000	155,700	201,800	198,000	1,092,000
Estimated Natural	4,000	98,000	100,000	120,000	185,000	280,000	510,000	160,000	1,457,000
Total Erosion	20,300	281,000	232,200	227,000	283,000	435,700	711,800	358,000	2,549,000

NOTE: + indicates an increase in soil loss
 -indicates a decrease in soil loss

¹ Compared to soil loss resulting from existing management.

Each reservoir constructed would cause about 5 acres of long-term on-site soil disturbance. Soil disturbance would increase erosion by up to 80 tons/acre/year until vegetation is reestablished. However, sedimentation would decrease off-site over the long-term by a total of 40,000 tons/reservoir because of silt retention.

Spraying sagebrush would increase erosion by 2 to 5 tons/acre/year until basal vegetation is reestablished. Once sagebrush is replaced by grass, erosion would be reduced by up to 5 tons/acre/year.

Prescribed burning would also increase soil loss by up to 5 tons/acre/year. However, within 2 years this too could be reduced from present levels by up to 2 tons/acre/year for the next 5 to 10 years.

Water

Sediment delivery to the Bighorn River would be reduced by about 21,000 tons per year from existing levels with this alternative. Improvement

in range condition by one condition class would result in about a 43,000 ton/year reduction in sediment delivery. Sediment production from recreation and forest management would increase, however, by about 22,000 tons/year. Table 36 displays net sediment delivery by major drainage for this alternative.

Range improvement projects which use herbicides for brush control would degrade water quality in the short-term. Pesticide concentrations would increase in the short-term by 1 to 2 micrograms/liter.

Environmental impacts due to surface activities within the Spanish Point Karst ACEC would be the same as Alternative A (existing management). Subsurface disturbance by exploratory drilling would be mitigated by lease stipulations requiring that operations be conducted in a manner that would not penetrate caves, passageways, and sub-karstic waterways. Mitigation of this type may not be entirely successful because the exact location and extent of caves that underlie Trapper and Medicine Lodge Creek drainages are unknown.

ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE B

TABLE 36
ESTIMATED ANNUAL SEDIMENT
DELIVERED TO THE BIGHORN
RIVER FROM RMP AREA
ALTERNATIVE B

Drainage	Preferred Alternative	Existing Sediment Delivery (Tons)	Percent Reduction
Shell Creek	15,500	19,000	18
Nowood River	72,000	79,000	9
Nowater Creek	86,000	88,000	2
Kirby Creek	36,500	40,000	9
Miscellaneous Tributaries	45,000	50,000	10
Bighorn River Total	255,000	276,000	8

Vegetation

The increased timber harvest would increase productivity by 200-300 percent and increase or improve vegetative diversity on logged areas. The short-term increase in human activities, equipment use, and slash would increase the risk of fire. Over the long-term, however, the fire risk would be reduced because there would be less dead wood for fuel.

Implementing grazing systems that allow for periodic rest or spring deferment would improve vegetation composition and diversity, increase forage production, and improve the ecological range condition. An estimated 50 percent of the rangeland would eventually be in excellent condition, 20 percent in good condition, 10 percent in fair condition, and 20 percent would remain unclassified.

Adjusting the seasons of grazing use would allow key forage plants to store more carbohydrate reserves and gain plant vigor (Stoddard, Smith, and Box, 1975). This adjustment, along with the prescribed utilization levels, would improve overall vegetative condition.

Brush control, through chemical applications or prescribed fire, would enhance productivity of herbaceous vegetation in the sagebrush-grass and juniper-woodland vegetation types. It would also cause a long-term decrease in shrub species production by 70 to 95 percent, a short-term increase in annual forbs, and a long-term increase in grass species production and basal vegetation cover. In some cases, forage production has more

than doubled after prescribed burning or spraying of sagebrush ranges (Pechanec, Steward and Blaisdell, 1954; Hyder and Sneva, 1956). Since treated areas would be rested for two growing seasons following treatment, total available livestock forage on these areas would decline for 2 years before increasing.

Removing wild horses and managing livestock would improve range condition within the allotments now being used by the horses.

Water developments, including year-round water sources, reservoirs, and fencing to implement grazing systems, would improve livestock distribution and encourage more even utilization of forage. While utilization of forage and distribution would improve, heavy concentrations of livestock around reservoirs could still damage vegetation nearby. Seeding projects would increase forage production by 500 to 800 pounds/acre. About 50 percent of the increased production would be available for livestock use, and would provide an additional 0.2 to 0.5 AUMs of forage/acre/year. Impacts to livestock operations and livestock grazing use are discussed in the land use section.



ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE B

Limited wildfire suppression would cause a short-term loss of vegetation; however, within 3 years livestock forage would generally exceed original levels as grasses replace shrubs.

Implementation of improved grazing practices throughout the resource area would restore and improve wetland/riparian habitat faster than with existing management. To meet the increased allocation of AUMs, wetland/riparian areas would have to be managed as healthy ecosystems in order to produce maximum amounts of forage. Also, overall improvement of range condition by one condition class would reduce the rate of sedimentation and degradation of water quality in streams and reservoirs. Water flow into reservoirs could be reduced sufficiently by increased vegetation. This could cause some reservoirs to dry up more often. Appendix K compares the estimated impacts on wetland/riparian zones resulting from implementing Alternative B with the expected impacts from the other alternatives.

Constructing 160 new reservoirs would create about 400 acres of new wetland/riparian habitat. Fencing more wetland/riparian areas would restore and improve habitat conditions of more streams, reservoirs, and springs. The condition of stream and reservoir zones would also improve in the Zimmerman Springs area when the wild horses are removed.

The Bighorn River and West Slope HMPs would be implemented but the number of projects would be severely reduced. As a result, the amount of riparian habitat improved by wildlife management

prescriptions would be about 80 percent less than with Alternative A.

Establishing an ACEC would also improve watershed condition in a small portion of the resource area and thus reduce sedimentation in wetland/riparian areas.

Fish and Wildlife

Table 37 shows the estimated impacts on big game habitat and Table 38 displays the amount of sage grouse habitat that would be affected by the livestock grazing management prescription. The increased competition between livestock and wildlife would tend to accelerate the deterioration of both big game and sage grouse habitat. As a result, in both the short- and long-term, Wyoming Game and Fish Department Strategic Plan population goals for game species would not be met. Nor, would the planning criteria concerning wildlife populations be met.

Although the long-term abandonment of elk crucial winter habitat and elk winter habitat would be about the same as with Alternative A, temporary abandonment would be greater because of the increased timber harvest and related activities. For example, construction and use of about 2 miles of roads per year for timber management would displace elk and some deer from 200 to 400 acres per year. This habitat would be abandoned until the roads are closed. In the long-term, impacts of building and using these roads would reduce elk populations.



ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE B

**TABLE 37
IMPACTS ON BIG GAME HABITAT
ALTERNATIVE B**

Habitat Description and Anticipated Impacts	Cause of Impact	Acres (Thousands)			
		Antelope	Deer	Elk	Bighorn Sheep
Crucial Winter Range					
Slow Deterioration	Livestock	3	68	23	
Accelerated Deterioration	Livestock	58	216	83	4
Long-Term Abandonment ¹	Minerals/Forestry			13	
Temporary Abandonment ²	Minerals/Forestry			29	
Winter Range					
Slow Deterioration	Livestock	28	101	88	
Accelerated Deterioration	Livestock	86	311	187	
Long-Term Abandonment ¹	Minerals/Forestry			25	
Temporary Abandonment ²	Minerals/Forestry			30	
Summer Habitat					
Slow Deterioration	Livestock	6	16	4	
Accelerated Deterioration	Livestock	14	17	4	
Yearlong Habitat					
Slow Deterioration	Livestock	383	396	4	
Accelerated Deterioration	Livestock	292	248	4	
Long-Term Abandonment ¹	Minerals/Forestry	2		4	
Elk Calving Habitat					
Slow Deterioration	Livestock			1	
Accelerated Deterioration	Livestock			1	
Long-Term Abandonment ¹	Minerals/Forestry			4	
Elk Spring, Fall, Rutting Habitat					
Slow Deterioration				33	
Accelerated Deterioration				8	

¹ Habitat that is unusable or abandoned for more than 10 years.

² Habitat that is abandoned for less than one year.

**TABLE 38
SAGE GROUSE HABITAT AFFECTED
BY LIVESTOCK GRAZING MANAGEMENT
ALTERNATIVE B**

Habitat Description	Existing		Short-Term	
	Trend	Acres ¹ (Thousands)	Change in Trend	Acres ¹ (Thousands)
Strutting grounds (leks)	Slow Deterioration	14	Accelerated Deterioration	7
Spring Habitat	Slow Deterioration	388	Accelerated Deterioration	274
Summer Habitat	Slow Deterioration	211	Accelerated Deterioration	41
Fall Habitat	Slow Deterioration	197	Accelerated Deterioration	111
Winter Habitat	Slow Deterioration	353	Accelerated Deterioration	233
Brood Rearing Habitat	Slow Deterioration	455	Accelerated Deterioration	199

¹ Some of these acres overlap and therefore are not additive.

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Planting trees could eventually improve wildlife habitat diversity by 10 percent and fencing aspen stands would improve big game habitat for elk and deer. However, timber harvest levels would cause deer and especially elk to abandon more habitat during logging periods and would significantly degrade wildlife habitat by removing old growth timber.

Reservoir construction would improve wildlife distribution while plantings or seedings would improve habitat condition, forage, and cover. Although additional forage may be produced by seeding for range improvement or watershed stabilization, the diversity of the forage would decline. Habitat diversity would increase only if seedings provide a variety of plant species and forage types.

Spraying and burning sagebrush could reduce local wildlife populations that depend on sagebrush for food or cover. However, sagebrush control within elk range may improve their habitat where forage is a limiting factor.

Vehicle travel restrictions would lessen the displacement of less big game and reduce stress, especially during the winter and spring.

Potential conflicts between wildlife habitat and leasable mineral activities or developed recreation use would change very little from existing management levels. However, the potential conflicts between wildlife habitat and lands and realty related actions and ORV use would decrease compared to Alternative A. This would be more than offset by increases in potential conflicts with timber harvesting and livestock grazing prescriptions.

Fishery habitat would improve faster with Alternative B than with existing management due to restoration of wetland/riparian habitat and reduced sedimentation. Habitat availability would increase as new large stockwater reservoirs are built.

Visual Resources

Visual impacts caused by the construction of utility lines would be concentrated in the utility corridors where they would generally cause less visual contrast than if they were constructed outside the corridors. Changes in line, texture, form, and color would contrast with the natural landscape on an additional 110 acres that would be logged each year.

Outdoor Recreation

Table 39 displays estimated annual recreation use. An overall increase in recreation use of 5 percent would occur as a natural increase in water based use. Increases would not be dramatic because the Bureau would not advertise or promote the opportunities. Water based recreation would increase primarily because of the completion of the Bighorn River HMP while cave use would increase naturally.

TABLE 39
ANNUAL RECREATION USE
ALTERNATIVE B

Categories of Use	Washakie Extensive	Total Use
Water Based		
User Days	3,500	3,500
% Change	+56	+56
Fishing, Hunting & Trapping		
User Days	148,200	148,200
% Change	+5	+5
ORV Use		
User Days	5,600	5,600
% Change	0	0
Cave Use		
User Days	400	400
% Change	+100	+100
Other Recreation Use		
User Days	125,400	125,400
% Change	+5	+5
Total Recreation Use		
User Days	283,100	283,100
% Change	+5	+5
ROS Classes		
Semi-primitive Nonmotorized ROS Class		
User Days	72,100	72,100
% Change	-30	-30
Semi-primitive Motorized ROS Class		
User Days	880,700	880,700
% Change	-3	-3
Roaded Natural ROS Class		
User Days	172,600	172,600
% Change	+54	+54
Rural ROS Class		
User Days	108,600	108,600
% Change	0	0

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Cultural Resources and Wilderness

The environmental consequences would be the same as those described for impacts common to all alternatives.

Wild Horses

The removal of wild horses would directly affect range condition, range developments, upland vegetation, soil compaction, riparian vegetation, livestock use, and forage utilization within a limited area. Indirectly, income, soil erosion and productivity, sedimentation, peak flows, wildlife forage and habitat, and wetland values would also be affected. Range condition would improve or remain static; damage to range developments would be reduced by an estimated 50 percent; and competition for forage would be reduced. Watershed condition would improve and erosion would decline by an estimated 5 tons/acre/year. Erosion due to peak flows would also be reduced. Since the use of wetland areas would be reduced by about 25 percent, less vegetation would be grazed or trampled and less soil would be compacted. Upland and riparian wildlife habitats would improve in the long-term.

Land Uses

Grazing use would continue at current levels (143,000 AUMs) except for temporary reductions in allotments that had vegetative manipulations taking place. After 3 years, an annual increase of 2 percent of the base 143,000 AUMs/year would take place as grazing systems, development plans, and range projects are implemented. An output level of 182,000 AUMs for livestock use could be achieved after 18 years. This expected increase in forage production and availability would depend on the implementation of grazing systems, installation of range projects and implementation of brush control projects. Implementation of allotment management plans would have to be extended over a longer time period if funding is inadequate.

As grazing systems and range development are implemented and livestock seasons of use are modified, range condition should improve. This would increase forage yield and improve livestock conditions. Weaning weights, calf crops and cow weights should increase and death losses should decrease.

The impact of implementing grazing systems or adjusting season of use would vary from allotment to allotment depending on how the grazing use in the allotment fits into the operator's yearlong operation. Additional summer, fall, or winter pasture may be of little importance if spring forage limits the herd size of an operator. Brush control projects and grazing systems that reduce or defer livestock grazing would cause operators to reduce their herd size or find some other feed source. More intensive management also implies more work moving livestock and maintaining facilities.

Timber would be harvested from approximately 130 acres/year using two-stage shelterwood harvest of mixed conifers on three-year sale units of up to 150 acres in size. Clear-cutting would also occur on about 20 acres of lodgepole pine annually from units of up to 10 acres in size. Less than 2 miles of road construction or upgrading would occur annually on non-permanent roads.

Although vehicle closures or limitations would be imposed on about 667,000 acres, ORV and other recreation use would probably shift from one location to another.

Socioeconomics

No measurable changes in socioeconomic impacts are projected as the result of mineral activities.

Alternative B proposes a management program which in the first 3 years of the plan continues allocating present AUM levels. During the following 15 years, annual available forage levels would increase by 2 percent of the present 143,000 AUM base. At the end of the 18th year of the plan, available AUMs would total a maximum of 182,000. This is 39,000 AUMs higher than is presently available.

Under this alternative, additional forage would provide the potential for operators using public land to increase animal units by slightly under 1 percent per year during the 15 year adjustment period. This would result in a total potential annual animal unit (AU) increase of 13.7 percent by the end of the first 18 years of the plan. Corresponding total local livestock sales would have the potential (using 1982 as a base for sales value) to be roughly \$105,000 higher for each 0.9 percent increase in total animal units utilizing the additional leased forage. By the end of the 18 years, this could result in annual livestock sales being roughly \$1.6 million higher (between 3 and 4 percent) than present

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levels. This increase translates into \$3.2 million (less than 1 percent) more in total annual area business activity. It would also raise direct employment in the livestock sector by about 21 workers (5 to 6 percent) and total regional employment by between 43 and 44 persons.

Depending on the size and flexibility of the given livestock operation, Alternative B could raise individual operator post adjustment gross income by an average of between \$2,700 and \$106,000 per year.

Cumulatively, over the first 18 years of the plan, Alternative B could produce between \$12 and 13 million more in total local livestock sales than present management. Subsequently, regional business activity would realize a cumulative increase of \$25.3 million.

Timber's contribution to the total area's economy is very small, and regardless of the alternative selected, BLM timber sales would account for less than 0.1 percent of total area's business activity and related employment.

The corresponding increase in revenues (output value) associated with timber harvest would be about \$282,000 and related direct employment would increase by about six workers above present levels. Stumpage revenue would approach \$20,000. Subsequent direct milling revenues are estimated at over \$368,000 with total regional revenues over \$775,000. Regional employment would increase by about eight workers, because of increased timber activities.

Cumulatively, over the first 18 years of the plan, timber sales would increase by \$3.8 million and regional business activity by \$7.6 million.

Quantifiable hunter day expenditures were the only recreation output included in the economic analysis. Under Alternative B these expenditures are expected to increase by roughly \$60,000/year during an adjustment period which extends over the first 5 years of the plan. The total annual differences in the post adjustment period between this alternative and present direct expenditures would be \$300,000. This translates into about \$627,000 more in yearly regional business activity. These increases result from the projected 5 percent higher user days/year during the post adjustment period and would be expected to continue for as long as the plan remains in affect. User day changes are assumed to translate into proportional changes in user expenditures. Regional employment during the 5 year adjustment period would rise a total of about 20 workers.

The cumulative difference between Alternative B and recreation expenditures under present management over the first 18 years of the plan is \$4.8 million. Resulting differences in related regional business activity would be slightly over \$10 million.

No specific information on attitudes toward this alternative has been collected. However, based on attitudes toward specific issues, people who are concerned with enhancing livestock grazing and allowing maximum opportunities for mineral and

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energy exploration and development may feel their concerns are addressed by this alternative. Those who are concerned with the increased soil and watershed protection, wildlife habitat enhancement, increased recreation access and development, and increased control of mineral and energy exploration and development may not feel their concerns are met by this alternative.

Increases in ranch income would have a positive effect on the social well-being of families who depend on the ranches. The social well-being of small livestock operators has the greatest potential for being impacted since some of these people are currently earning a minimum income. Increases in employment would be insignificant regionally but would have a positive impact on social well-being in individual cases.

Unavoidable Adverse Impacts

Short-term accelerated soil loss would be about 1.01 million tons/year.

Visual impacts would occur on an additional 110 acres/year because of increased timber harvest.

Individuals who are concerned with increased soil and watershed protection, wildlife habitat enhancement, increased recreation access and development, and increased control of mineral and energy exploration and development may not feel their concerns are met by this alternative.

Short-term Uses Versus Long-Term Productivity

In addition to the impacts described as common to all alternative, short-term uses would likely cause the following effects on long-term productivity.

Range condition eventually would improve and cause an estimated 10 percent decline in soil loss and sedimentation. Protecting aspen regeneration would increase aspen growth by an estimated 30 percent. Increased timber harvest would increase productivity by 200 to 300 percent and increase vegetative diversity on logged areas. Implementing grazing systems that allow periodic rest or spring deferment would improve vegetative composition and diversity, increase forage production and improve ecological range condition. Brush control would cause a long-term decrease in shrub species production by 70 to 95 percent, a short-term increase in annual forbs and a long-term increase in grass species production and vegetation cover.

Wetland/riparian habitat would be restored and improved faster with Alternative B than with existing management because it would implement more grazing systems.

Cumulative net annual changes during the 18 year adjustment period show total area sales up by at least \$22.6 million, regional business activity by almost \$45.5 million, and local labor requirements by roughly 72 workers.

In addition to these cumulative changes, there would be annual post adjustment differences in economic impacts between Alternative B and existing management that would be expected to continue for as long as the plan is in effect. These annual differences include over \$2 million in additional areas sales and almost \$4.4 million in increased regional business activity. Employment levels would not be expected to change beyond levels obtained during the adjustment period. Those annual post adjustment period difference would be less than 1 percent of present employment levels or 1980 business activity levels.

Irreversible and Irrecoverable Commitment of Resources

Accelerated soil loss would be about 1.1 million tons/year.

Limited wildfire suppression would allow a short-term irretrievable loss of some forage; however, within 3 years forage would generally exceed original levels as grasses replace shrubs.

Increased land disturbing activities such as brush control projects and other range projects would increase the number of Class III cultural resource inventories. More cultural resources would be located, but more would also be disturbed or destroyed.

Summary

Alternative B emphasizes developing and using natural resources. It does provide for environmental protection even though the major emphasis is on resource development.

Air Quality

This alternative would cause the most smoke from burning timber slash and prescribed range sites and the most dust from construction activities and vehicle travel. However, only acceptable

ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE B

reductions in air quality would be anticipated. Other air contaminants would be similar to those caused by Alternative A.

Soils

After 15 or 20 years, annual total accelerated erosion would be about 3 percent less than with Alternative A.

Water

Sediment delivery to the Bighorn River would be reduced by an estimated 8 percent from existing levels.

Vegetation

The timber harvest level would result in greater diversity of the forest stands. Old growth, overmature stands would eventually be reduced to approximately 5 to 10 percent of the timber base. The loss of timber from natural mortality, fire, etc., would be reduced to approximately 75 to 100 MBF/year.

Implementing grazing systems and range development projects would improve vegetation composition and diversity, increase forage production, and improve the ecological range condition. An estimated 50 percent of the rangeland would eventually be in excellent condition, 20 percent in good condition, 10 percent in fair condition, and 20 percent would remain unclassified.

Wetland/riparian habitat would be restored and improved faster with Alternative B than with existing management.

Fish and Wildlife

Alternative B would increase potential conflicts between wildlife and timber management activities and livestock grazing. These conflicts would accelerate the deterioration of big game habitat and sage grouse habitat and cause more temporary abandonment of elk habitat.

Visual

Visual impacts associated with rights-of-way would be similar to those described for the Preferred Alternative. Timber harvest and related activities would cause greater visual impacts on the west slope of the Bighorn Mountains than any other alternative. However, in the long-term, visual

quality would also be restored on a greater portion of the resource area as more AMPs are implemented and rangeland conditions improve.

Outdoor Recreation

Total recreation use would increase by an estimated 5 percent as a natural increase in water-based use. Semi-primitive nonmotorized and semi-primitive motorized recreation opportunities would decline while roaded natural recreation opportunities would increase, compared to Alternative A.

Cultural Resources

The impacts to cultural resources would be essentially the same as those described for impacts common to all alternatives (Appendix J).

Land Uses

The level of mineral exploration, development, and production activities would be about the same as with Alternative A.

Livestock grazing use could gradually increase from 143,000 AUMs to 182,000 AUMs, depending on implementation of grazing systems, development of range projects, etc. All spring use would occur on about 10 percent of the allotments, combined spring and other use on about 20 percent of the allotments, summer use on about 50 percent of the allotments, and fall and winter use on about 20 percent of the allotments. Existing AMPs would be maintained or upgraded and AMPs, grazing systems, or development plans would be implemented on 12 additional allotments each year.

An annual average of 1,200 MBF of timber would be harvested from about 150 acres.

All wild horses would be removed from the Zimmerman Springs Wild Horse Area.

Total recreation use on public lands would increase by about 5 percent from existing levels. Most of this use would be hunting, fishing, and trapping.

Socioeconomics

Cumulative net annual changes during the 18 year adjustment period would cause total area sales to increase by at least \$22.6 million, regional business activity by almost \$44.5 million, and labor requirements by roughly 72 workers. In addition to the cumulative changes, there would be annual

ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE C

post adjustment difference in economic impacts between Alternatives A and B that would be expected to continue for as long as the plan would be in effect. These annual differences include over \$2 million in additional area sales and almost \$4.4 million in increased regional business activity. Employment levels would not be expected to change beyond levels obtained during the adjustment period. The cumulative difference in recreation expenditures over the first 18 years between Alternative B and Alternative A (present management) would be \$4.8 million. The resulting difference in related regional business activity would be slightly over \$10 million.

ALTERNATIVE C

Alternative C allows resource use with more emphasis on resource protection than Alternative A or B. The assessment of impacts is based on the same actions as described for the Preferred Alternative except:

- Approximately 16 percent of the federal mineral estate would be leased with a permanent “no surface occupancy” stipulation. About 52 percent would be leased with a seasonal “no surface occupancy” stipulation, and 32 percent would be leased with other standard surface protection stipulations.
- A Wild Horse Herd Management Area of about 10,300 acres would be designated in the Zimmerman Springs area. About 360

AUMs of forage would be allocated for wild horses. Livestock grazing within two allotments would be reduced accordingly. Wild horse herd size would be limited to no more than 30 animals. Riparian areas along Nowater Creek would be fenced to exclude wild horses and protect wetland/riparian habitat.

- The Spanish Point ACEC would be leased with “no surface occupancy” stipulations.

The environmental consequences of Alternative C would be the same as those described for the Preferred Alternative except for the following site specific impacts.

Based on past drilling activity, it is expected that the permanent “no surface occupancy” stipulation could cause a wildcat well to be drilled in a different location than would occur with a seasonal “no surface occupancy” as in the Preferred Alternative.

The wild horses would affect range condition, range development, upland vegetation, soil compacts, riparian vegetation, livestock use, and forage utilization within the management area and would indirectly affect soil erosion, vegetative productivity sedimentation, peak flows, wildlife forage and habitat, and wetland/riparian values within the same area.

Wild horses would continue to damage range developments such as fences or water sources. Upland basal vegetative cover in the horse management area would remain at about current levels. Wild horses would continue to cause erosion of 3 to 5 tons/acre/year. This would cause



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soil productivity to decline and peak water flows to increase. Sedimentation of wetlands would also increase. Wetland/riparian areas would be degraded because there would continue to be trampling of vegetation, soil compaction, and forage use in wetland/riparian areas. Generally, wetland values would be degraded as compaction, sedimentation, peak water flows and gullying continues, resulting in lower water tables.

Overall, these impacts would be insignificant compared to the cumulative environmental consequences of the management prescriptions for the entire resource area.

The less stringent minerals management prescription of “no surface occupancy” on the ACEC area would increase the risk of penetrating caves and karstic waterways by directional drilling compared to “no leasing” in the Preferred Alternative. While interest in drilling in the area of the ACEC has been, and may continue to be, relatively small, the likelihood of penetrating caves and karstic waterways would be great if drilling were to occur, and the potential consequences to the cave and groundwater resources could be serious. For example, drilling could alter the microclimate, introduce pollutants, change the aesthetics, possibly close or flood passages, and change the recreation experience of regionally and nationally significant caves. Drilling within this area could also degrade the groundwater quality and reduce the artesian pressures of the Madison Aquifer. The Madison Aquifer is the source of municipal water for the communities of Worland, Ten Sleep, and Hyattville, and provides irrigation water for thousands of acres within the Big Horn Basin.

ALTERNATIVE D

Alternative D emphasizes the protection and enhancement of environmental quality. It limits the uses and development of resources that do not protect or enhance the quality of the natural environment. The assessment of impacts is based on the following actions and assumptions:

- Approximately 99 percent of the federal mineral estate would be open to oil, gas and tar sands leasing. Of this, 49 percent would be leased with a permanent “no surface occupancy” stipulation. The Spanish Point Karst ACEC would not be leased.
- Designated transportation and utility corridors would be preferred locations for future rights-of-way grants.

- Approximately 0.7 million board feet of timber would be harvested from about 90 acres, annually.
- The entire Zimmerman Springs wild horse herd would be removed from the resource area.
- Livestock grazing would be limited to 114,000 AUMs annually to reduce conflicts with other uses. This would be accomplished through season-of-use and forage utilization restrictions.
- Range projects would be implemented on “I” and “M” category allotments.
- Livestock grazing would be managed in wetland/riparian areas to improve habitat condition. About 185 miles of fencing needed to protect wetland/riparian habitat would be built at the rate of 15 miles annually.
- Restrictions on ORV use would apply throughout the resource area. About 124,000 acres would be closed to vehicle use.
- Two areas would be managed as Special Recreation Management Areas. These include 241,000 acres on the west slope of the Bighorn Mountains and 59,000 acres along the Bighorn River from Wedding of the Waters to Shell Creek.
- Wildlife habitat would be managed to permit an increase in habitat quality and quantity. About 357,400 acres would be managed to facilitate the reintroduction of various wildlife species.
- An ACEC would be designated for karst areas, caves, and sinking streams in the Dry Medicine Lodge, Medicine Lodge, and Trapper Creek drainages.
- The reduction of soil erosion and sediment yields would be emphasized on about 391,000 acres of sensitive watershed in the Kirby, Nowater, and East Fork Nowater Creek drainages.
- Full suppression of wildfire would occur on about 703,700 acres, and limited suppression would occur on about 530,300 acres.

Minerals

Levels of oil and gas production would be approximately the same for all alternatives. “No surface occupancy” would not be applied to any leases with producing wells. However, newly issued or reissued leases would be subject to “no

ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE D

surface occupancy." Exploration, development, and production activities would decline by less than 10 percent compared to Alternative A. About one-third (29) of the wildcat wells drilled within the last 10 years would not have been permitted where they were if this alternative had been in effect.

Air Quality

More timber slash burning and prescribed range burning along the west slope of the Bighorn Mountains would cause more smoke than occurs with existing management. Only acceptable deterioration in air quality would be anticipated.

Soils

The nature of soil impacts caused by this alternative would be the same as those described for impacts common to all alternatives. Table 40 displays estimated accelerated soil loss from various resource management activities. Total

accelerated erosion would be reduced by more than 30 percent from levels occurring with existing management.

Logging, slash burning, range development construction, watershed projects, prescribed burning would all tend to remove more vegetation, and increase soil disturbance, erosion, compaction and loss of soil productivity, at least for short periods. This would be offset by reducing livestock grazing, changing seasons of livestock use, and limiting surface occupancy for mineral activities.

Recreation impacts on soils would be slightly less than occur with existing management. As with the Preferred Alternative, range improvements would cause more impacts than existing management, but about 80 percent less than in Alternative B. The total decrease in minerals impacts in soil units M1 and M2 is a result of the expected absence of tar sands developments in this alternative. The decreases in minerals impacts in the B soil units would be a result of decreases in expected activity.

Surface disturbance caused by logging would increase erosion of logged areas by up to 20 tons/

TABLE 40
ESTIMATED CHANGE IN SOIL LOSS BY GENERAL SOILS UNITS¹
(TONS PER YEAR)
ALTERNATIVE D

Resource Use Activity	Soil Unit								Total Soil Loss (Tons)
	M3	M2	M1	B1	B2	B3	B4	B5	
Recreation Uses	-5	-5	-5	+5	+5	+5	+5	-5	292,200
Range Management									
Range Developments	+15	+15	+15	+15	+20	+20	+20	+20	25,200
Livestock Grazing	-40	-70	-60	-70	-65	-30	-60	-60	249,600
Minerals Activities	0	-100	-100	+10	+10	+10	+10	+10	174,800
Timber Harvest & Forest Management	0	+230	+200	0	0	0	0	0	3,600
Lands	0	0	0	0	-10	-10	-10	-10	4,500
Wildlife Mgmt. & Habitat Improvements (Short-Term)	0	0	0	0	0	0	0	0	300
Fire Management	0	0	0	0	0	0	0	0	900
Total Accelerated	11,200	115,100	79,000	81,400	61,100	115,900	142,200	145,100	751,100
Estimated Natural	4,000	98,000	100,000	120,000	185,000	280,000	510,000	160,000	1,457,000
Total Erosion	15,200	213,100	179,000	201,400	246,100	395,900	652,200	305,100	2,208,000

NOTE: + indicates an increase in soil loss
- indicates a decrease in soil loss

¹ Compared to soil loss resulting from existing management.

acre and sediment delivery would exceed one ton/acre/year until vegetation is reestablished.

Prescribed burning would increase soil loss by up to 5 tons/acre/year immediately following the burn. However, within two years this would be reversed and the original soil erosion rate could be reduced in the long-term.

ORV use restrictions would reduce soil compaction on about 2 acres/mile of trail with use restrictions. This would also eventually increase productivity and reduce run-off and sedimentation.

The ACEC designation and management would close about eight miles of roads and trails in Dry Medicine Lodge Canyon and eliminate the use of motor vehicles in the ACEC. Road and trail closures would reduce soil erosion by 5 to 10 tons/acre/year of road or trail closure. Restrictions on mining could prevent the loss of up to 50 tons/acre/year from accelerated erosion. Timber harvest restrictions would eliminate the potential loss of an additional 20 tons/acre/year.

Soil disturbance during seed bed preparation for reseeding would cause a short-term (about two years) increase in soil loss of up to 2 tons/acre/year, depending on the site. However, the increase in cover after the establishment of vegetation would result in a long-term reduction in soil erosion of up to 5 tons/acre/year. Soil productivity could increase by 50 to 100 percent depending on the initial conditions and results of seeding.

Construction of contour furrows would cause short-term increases in soil loss of up to 10 tons/acre/year. As with seedings, the increase in cover from seeding and additional water infiltration would result in a long-term reduction of soil erosion. Soil productivity would improve up to 100 percent on treated areas.

Finally, limited suppression of wildfire could increase soil loss by 2 to 5 tons/acre/year of burned area. However, the surface disturbance associated with fire line construction because of the use of heavy equipment and other fire suppression activities, would be avoided.

Water

Sediment delivery to the Bighorn River would decline by 20 percent or 55,000 tons/year in the long term under this alternative. Improved range conditions and improved watershed cover represents the majority of the sediment reduction. Table 41 displays sediment delivery by drainage within the resource area.

TABLE 41
ESTIMATED ANNUAL SEDIMENT DELIVERED TO THE BIGHORN RIVER FROM RMP AREA
ALTERNATIVE D

Drainage	Preferred Alternative	Existing Sediment Delivery (Tons)	Percent Reduction
Shell Creek	14,000	19,000	26
Nowood River	69,000	79,000	13
Nowater Creek	70,000	88,000	20
Kirby Creek	28,000	40,000	30
Miscellaneous Tributaries	40,000	50,000	20
Bighorn River Total	221,000	276,000	20

Range improvements involving herbicides for brush control would degrade water quality in the short term. Herbicide concentrations in surface water would be about 1 to 2 micrograms/liter.

Management of range resources for excellent condition, and no leasing of mineral resources are the primary changes in management prescription for Alternative D within the proposed Spanish Point Karst ACEC. Management for excellent range condition would reduce sediment to the karst areas by 50 tons/year compared to Alternative C. The more stringent minerals management prescription of "no lease" would reduce the risk of penetrating caves and karstic waterways by directional drilling compared to Alternatives A, B and C.

Vegetation

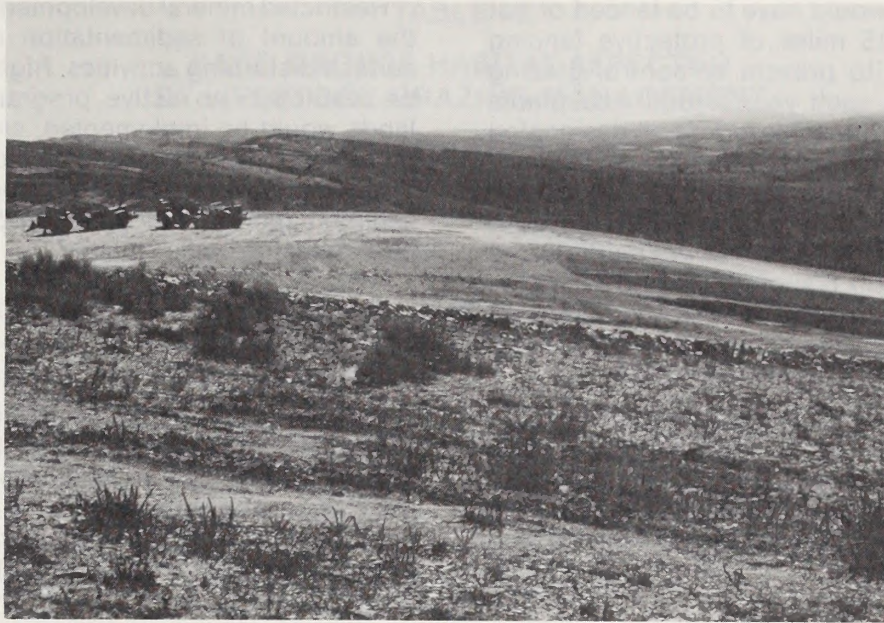
The increased timber harvest would double or triple the amount of timber being produced. Vegetative diversity would increase compared to Alternative A (existing management).

The short-term increase in human activities and equipment use and the production of slash would increase the risk of fire. However, over the long-term, fire risk would be reduced because less dead wood would be on the ground to fuel a fire.

Removing all wild horses would gradually improve range condition within the allotments now being used by the horses.

Implementation of grazing systems would improve range condition. It is estimated that at least 960,000 acres would eventually achieve good

ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE D



or excellent condition. An estimated 25 percent of the rangeland would eventually be classified in excellent condition, 43 percent in good condition, 7 percent in fair condition, and 25 percent would remain unclassified. Fencing range developments would improve forage and habitat condition on upland and wetland sites and would contribute to more varied vegetation.

Water developments, including year-round water sources and reservoirs, would improve livestock distribution and encourage more even utilization of forage. Despite improved distribution, heavy concentrations of livestock around reservoirs could still damage vegetation nearby. Seeding projects would increase forage production by 500 to 800 pounds/acre. If 50 percent of the increased production is available for livestock use, it would provide an additional 0.2 to 0.5 AUMs of forage/acre/year. Impacts on livestock operations and livestock grazing use are discussed in the land use section.

Reducing livestock grazing use by 29,000 AUMs, eliminating all spring grazing use, limiting utilization levels to no more than 50 percent of the current year's production, and implementing watershed projects would all improve range condition. The adjustments in season of use would allow key forage plants to begin to store carbohydrate reserves which would improve plant vigor beyond existing levels.

Contour furrowing would cause a loss of approximately 0.1 AUM/year/acre treated during the first three years of a project. However, after vegetation is established, the amount of forage

would double initial levels before gradually declining. Available forage would increase by about 0.1 AUM/year for each acre treated.

Sagebrush control by spraying or prescribed burning would increase basal vegetation cover and prescribed burning would cause a long-term decrease in shrub species by 70 to 95 percent, a short-term increase in annual weeds, and a 20 to 50 percent long-term increase in grass species. Total available forage production would decline for about two growing seasons prior to increasing.

ACEC designation and management would affect about 1,200 acres (8 percent of the forest land in the resource area) and reduce salable timber by 50 to 100 MBF/year.

Seeding projects would increase forage production by 500 to 800 pounds/acre, with 50 percent of the increased production available for livestock use, providing an additional 0.2 to 0.5 AUMs of forage/acre/year.

Limited wildfire suppression would cause a short-term loss of vegetation. However, within three years livestock forage would generally exceed original levels as grasses replace shrubs.

Alternative D would provide the greatest potential for rapid restoration and improvement of wetland/riparian areas. Livestock grazing would be managed to allow restoration and improvement of all wetlands. This would be accomplished mostly by increasing winter use in areas that had been grazed during other seasons. If newly implemented grazing treatments fail to allow restoration and improvement of habitat con-

ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE D

ditions, the areas would have to be fenced or not grazed. At least 15 miles of protective fencing would be needed to prevent or control grazing on degraded sites each year or until acceptable habitat conditions are achieved on all designated wetland/riparian areas. The amount of wetland/riparian habitat improved or created in association with spring development and reservoir construction would be the same as with the Preferred Alternative. Appendix K summarizes the estimated impacts on wetland/riparian zones and compares these impacts with those of each of the other alternatives.

The implementation of the Bighorn River and West Slope HMPs would restore and improve wetland/riparian conditions. Improvement of wetland/riparian habitat would also occur as a result of specific watershed restoration and development projects.

Restricted mineral development would decrease the amount of sedimentation originating from surface disturbing activities. Rights-of-way would be restricted, no active program to dispose of lands would be implemented, and large portions of the resource area would be closed to ORV use. These management practices would all reduce the sedimentation rate in wetland/riparian zones and help to restore water quality.

Fish and Wildlife

Potential conflicts between wildlife habitat and other resource uses would be reduced on significant portions of wildlife habitat. Livestock grazing management would accelerate the improvement of big game habitat and sage grouse habitat (Table 42 and Table 43). The long-term

TABLE 42
IMPACTS ON BIG GAME HABITAT
ALTERNATIVE D

Habitat Description and Anticipated Impacts	Cause of Impact	Acres (Thousands)			
		Antelope	Deer	Elk	Bighorn Sheep
Crucial Winter Range					
Accelerated Improvement	Livestock	12	91	45	4
Slow Improvement	Livestock	49	192	62	
Long-Term Abandonment ¹	Minerals/Forestry			6	
Temporary Abandonment ²	Minerals/Forestry			17	
Winter Range					
Accelerated Improvement	Livestock			153	
Slow Improvement	Livestock	28	147	122	
Slow Deterioration	Livestock	85	264		
Long-Term Abandonment ¹	Minerals/Forestry			10	
Temporary Abandonment ²	Minerals/Forestry			17	
Summer Habitat					
Accelerated Improvement	Livestock	8	4	2	
Slow Improvement	Livestock	13	28	6	
Yearlong Habitat					
Accelerated Improvement	Livestock	176	154	1	
Slow Improvement	Livestock	499	491	7	
Elk Calving Habitat					
Accelerated Improvement	Livestock			1	
Slow Improvement	Livestock			1	
Long-Term Abandonment ¹	Minerals			2	
Elk Springs, Fall, Rutting Habitat					
Accelerated Improvement	Livestock			4	
Slow Improvement	Livestock			37	

¹ Habitat that is unusable or abandoned for more than 10 years.

² Habitat that is abandoned for less than one year.

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TABLE 43
SAGE GROUSE HABITAT AFFECTED
BY LIVESTOCK GRAZING MANAGEMENT
ALTERNATIVE D

Habitat Description	Existing		Short-Term	
	Trend	Acres ¹ (Thousands)	Change in Trend	Acres ¹ (Thousands)
Strutting grounds (leks)	Slow Deterioration	14	Rapid Improvement	6
Spring Habitat	Slow Deterioration	388	Rapid Improvement	228
Summer Habitat	Slow Deterioration	211	Rapid Improvement	98
Fall Habitat	Slow Deterioration	197	Rapid Improvement	100
Winter Habitat	Slow Deterioration	353	Rapid Improvement	228
Brood Rearing Habitat	Slow Deterioration	455	Rapid Improvement	128

¹ Some of these acres overlap and therefore are not additive.

abandonment of elk habitat would be less than with the other alternatives, but the amount of temporary abandonment would be slightly more, primarily because of increased timber harvesting.

This alternative would provide the greatest degree of protection to wildlife habitat from leasable mineral development. It protects more wildlife habitat by protecting all seasonal ranges of some species. Potential conflicts between wildlife habitat and land and realty related actions such as powerline, pipeline, or communication site construction would also be reduced compared to existing management.

Logging an additional 50 acres annually would initially remove thermal and hiding cover for several wildlife species including elk and mule deer. The cover would be reestablished over the long-term and would increase over pre-logged amounts. The human activity would cause temporary abandonment of various species. Habitat loss would affect elk and deer. Very long-term gains in timber productivity would replace the habitat loss and provide additional habitat for elk and deer.

The construction of about two miles of road per year associated with timber management would remove timber and disturb the surface of approximately five acres per year. Road construction and use could displace big game, especially elk, from up to 400 acres of habitat. This displacement would continue as long as people continue to use the roads.

Planting trees on logged or nonstocked sites would improve wildlife habitat diversity by 10 percent in forested areas over the long-term.

Fencing livestock out of 50 acres of aspen stands would improve big game habitat.

Overall, potential conflicts between wildlife habitat (especially elk habitat) and timber harvest, associated road building, and other timber related activities would increase.

Livestock grazing management would generally reduce competition between livestock and wildlife for forage and space, and would cause big game habitat and sage grouse habitat to improve. In many areas, the existing trend would shift from slow deterioration to slow improvement or even accelerated improvement.

Removing wild horses would improve habitat by improving watershed and range condition for deer and antelope on the existing wild horse range.

Fencing range developments may impede some big game movement and increase mortality. This would be especially evident in crucial big game winter range, migration routes, and parturition areas. Reservoir construction would improve wildlife distribution while plantings or seedings would improve habitat condition, forage, and cover. Spraying sagebrush would temporarily reduce local wildlife populations that depend on it for food or cover. However, spraying within elk range would improve habitat if forage is limiting.

Although additional habitat may be produced by seeding for range improvement or watershed stabilization, the diversity of the forage would decline. Habitat diversity would increase only if seedings provide a variety of plant species and forage types.

Vehicle travel restrictions would reduce the displacement of big game species and reduce stress, especially during the winter and spring. Potential conflicts between wildlife habitat and ORV use would be reduced on 75 percent of the wildlife habitat compared to existing management.

Fishery habitat would steadily improve under this alternative as wetland/riparian habitat is restored and improved due to changes in grazing practices and installation of protective fences.

Visual Resources

Visual impacts associated with mineral activities, rights-of-way, timber activity, and recreation use would generally be concentrated in unrestricted areas where they would cause less visual contrast with their surroundings than could occur with existing management. Changes in line, texture, form, and color would cause contrasts with natural surroundings, but the significance would be less than with any of the other alternatives.

Outdoor Recreation

Table 44 displays estimated annual recreation use and expected changes in the recreation opportunity spectrum classification. The semi-primitive nonmotorized class would increase in acreage due to more ORV closures. This acreage would come from the semi-primitive motorized

class. Recreation use would increase only slightly because greater controls, such as area closures, limitations, and access agreements with private landowners, would be placed on vehicle use.

Cultural Resources and Wilderness

The environmental consequences would be the same as those described for impacts common to all alternatives.

Wild Horses

The removal of wild horses would directly affect range condition, range developments, upland vegetation, soil compaction, riparian vegetation, livestock use, and forage utilization within a limited area. Indirectly, income, soil erosion and productivity, sedimentation, peak flows, wildlife forage and habitat, and wetland values would also be affected. Range condition would improve or remain static; damage to range developments would be reduced by an estimated 50 percent; and competition for forage would be reduced. Watershed condition would improve and erosion would decline by an estimated 5 tons/acre/year. Erosion due to peak flows would also be reduced. Since the use of wetland areas would be reduced by about 25 percent; less vegetation would be grazed or trampled and less soil would be compacted. Upland and riparian wildlife habitats would improve in the long-term.

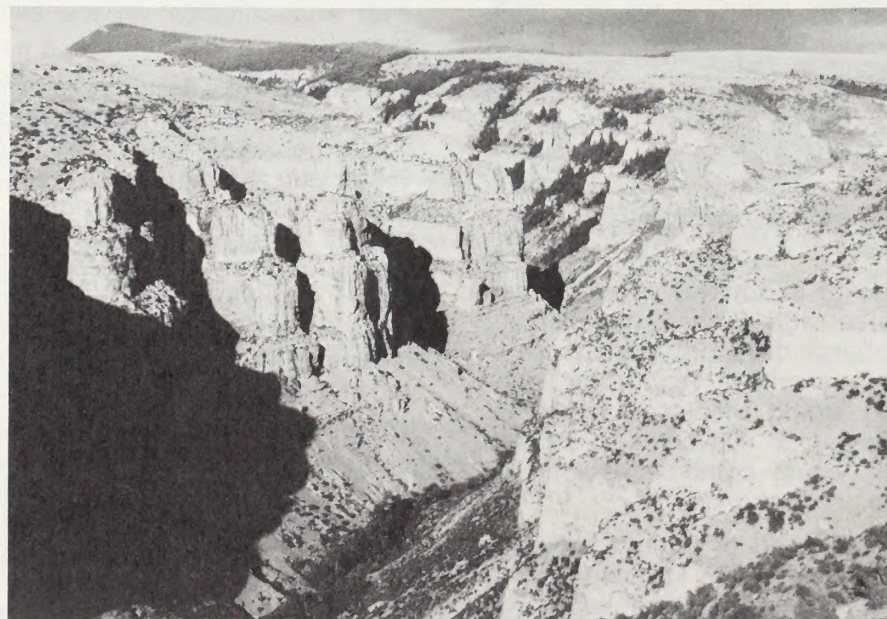


TABLE 44
ANNUAL RECREATION USE
ALTERNATIVE D

Categories of Use	West Slope SRMA	Bighorn River SRMA	Remainder Washakie Recreation Use Area	Total Use
Water Based				
User Days	1,400	2,300	1	3,701
% Change	+40	+85	0	+60
Fishing, Hunting & Trapping				
User Days	75,400	47,900	14,200	137,500
% Change	-10	+10	+3	-3
ORV Use				
User Days	3,300	1,000	1,700	6,000
% Change	-10	+50	+28	+7
Cave Use				
User Days	300	0	0	300
% Change	+50	0	0	+50
Other Recreation Use				
User Days	62,300	36,800	30,000	129,100
% Change	+7	+7	+5	+7
Total Recreation Use				
User Days	142,700	88,100	45,800	276,600
% Change	-3	+10	+5	+3
ROS Classes				
Semi-primitive Nonmotorized ROS Class				
User Days	34,800	6,200	71,000	112,000
% Change	+35	0	0	+9
Semi-primitive Motorized ROS Class				
User Days	106,700	5,400	777,600	889,700
% Change	-2	0	-2	-2
Roaded Natural ROS Class				
User Days	10,800	2,300	110,600	123,700
% Change	-6	0	+9	+8
Rural ROS Class				
User Days	16,300	32,600	59,700	108,600
% Change	0	0	0	0

Land Uses

Oil and gas exploration, development, and production activities would decline by less than 10 percent compared to Alternative A. About one-third of the wildcat wells drilled within the last 10 years would not have been permitted in the same location with this alternative.

Under this alternative allowed grazing use would be reduced 29,000 AUMs by eliminating all spring use and reducing or eliminating livestock

grazing when it conflicts with other uses or values. Those operators whose grazing privileges would be changed or reduced would have to significantly modify their livestock operations. Other operators who use their grazing privileges during the fall and winter and have little or no conflicts with other uses or values may not be significantly impacted.

This alternative prescribes maintaining or revising the 18 existing AMPs and implementing new AMPs to resolve conflicts with other resources or values. Some grazing treatment might exclude areas from livestock grazing. These



intensive grazing management systems would require more labor to move stock and maintain facilities.

Frequently, the value of a ranching operation is related to the number of AUMs licensed to graze on public land. The reduction of AUMs authorized to be grazed on public land would affect the ranch owner's ability to borrow funds. As a result, some operators could suffer severe financial impacts.

The elimination of spring grazing use would aggravate the shortage of spring range availability in the Big Horn Basin. The operators would have to leave their livestock on private lands, lease additional pasture, or feed more hay.

An estimated 700 MBF of timber would be harvested from about 90 acres annually. Mixed conifers would be harvested using two-stage shelterwood harvest on three-year sale units of up to 150 acres in size. Clear-cutting would also occur on between 10 and 20 acres of lodgepole pine annually from sale units of up to 10 acres in size. Here, too, less than two miles of road construction or upgrading would occur annually on temporary roads.

All wild horses would be removed from the Zimmerman Springs Wild Horse Area.

Total recreation use on public lands would remain relatively stable, and restrictions on ORV use would apply throughout the resource area.

Socioeconomics

Licensed livestock use is projected to decline by a total of 29,000 AUMs to 114,000 annually. This decrease would be related to changes in season of use and other policy directives which are assumed for this analysis to be enforced within the first year of the plan. Such a decline in licensed grazing use would translate into a 10 percent reduction in annual animal units consuming BLM forage. Depending on the size of the individual livestock operation, an operator's income could decline by as much as \$79,000 per year. Corresponding regional livestock sales value could drop by almost \$1.2 million and regional business activity by roughly \$2.4 million per year. Subsequent employment would decline by approximately 16 workers in the livestock sector and over 32 workers region wide.

It is estimated that the cumulative decline in livestock sales over the first 18 years of the plan would total about \$21.5 million, which translates into over \$44 million less regional business activity than is associated with present management.

Annual timber output would total 700 MBF, almost double the present levels. Corresponding total annual output value would be about \$106,000 higher than under present management. Annual regional business activity would be over \$200,000 higher. Employment increases would total roughly three workers region wide, of which two are accounted for by the timber sector.

ENVIRONMENTAL CONSEQUENCES - ALTERNATIVE D

Over the first 18 years of the plan, there would be a cumulative increase of almost \$2 million in timber sales and a corresponding \$3.8 million increase in regional business activity over comparable levels under present management.

During the first five years of implementation, there would be an average annual decline of about \$31,800 in recreation user expenditures. By the end of this five year adjustment period, both user days and expenditures would have declined a total of 2.6 percent below present levels.

In the post adjustment period for as long as the plan would remain in effect, the annual reduction in user expenditures would total about \$159,000. This translates into a \$332,000 drop in annual local business activity and about 10 or 11 fewer workers for the total region. The recreation sector would experience about 80 to 85 percent of the total employment decline.

A cumulative decline of over \$2.5 million in local recreation expenditures would occur during the first 18 years of the plan. This would result in a subsequent decline of roughly \$5.3 million in regional business activity from levels associated with present management.

No specific information on attitudes toward this alternative has been collected. Based on attitudes toward specific issues, people who are concerned with protection of caves and west slope canyons, soil and watershed protection, wildlife habitat enhancement, increased control of mineral and

energy exploration and development, and control over ORV use may feel their concerns are addressed by this alternative. Those concerned with enhancement of grazing for livestock and opportunities for oil and gas development would probably react negatively toward this alternative because it decreases AUMs, restricts spring grazing, and restricts surface occupancy on oil and gas leases on about 60 percent of the resource area.

Changes in grazing management would have the greatest effect on the social well-being of those families whose ranch operation does not have the ability to assume additional debt and higher fixed costs. Generally, the ability of a ranch enterprise to adjust to a loss of grazing privileges is related to its ability to reduce its herd size. Reducing herd size may reduce some variable costs but not fixed costs. As the proportion of fixed costs increase, the operation becomes less flexible and may become less profitable. A change in a base property's public grazing privileges would also change its total appraised value. Changes in appraised value are related to the ranch operation's dependence on public lands for livestock forage. This would average about \$49 per AUM. Generally, the greater the effect on debt service capacity and ranch valuation, the greater the effect on the social well-being of the ranch family. Decreases in employment would be insignificant regionally, but could also have a negative impact on social well-being in individual cases.



ENVIRONMENTAL CONSEQUENCES - ALTERNATIVE D

Unavoidable Adverse Impacts

The level of exploratory oil and gas drilling would be about 10 percent less than current levels. Employment and income in the mining sector might also be expected to decline proportionately.

Annual accelerated soil loss would be about 732,000 tons/year.

Recreation use, hunting, fishing, trapping and ORV use, would decline on the West Slope Special Recreation Management Area by at least 10 percent because of greater controls placed on vehicle use, such as area closures and vehicle use limitations.

Those livestock operators whose authorized grazing use would be reduced could suffer financially. In addition, ranch values could decline and affect the owner's ability to borrow operating funds.

In the first year the decline in AUMs would reduce livestock sales by over \$1 million for the life of the plan and recreation would decline by about \$159,000/year by year five of the plan. Net business activity related to agriculture and recreation would decline by an estimated \$2.5 million.

Short-Term Uses Versus Long-Term Productivity

Precluding oil and gas activities by "no surface occupancy" stipulations on 58 percent of the area would reduce the potential for discovering and developing new oil and gas reserves. Thus, oil and gas production would continue to decline perhaps at a somewhat faster rate than with other alternatives.

As accelerated erosion is reduced, soil productivity would be maintained and, in some cases, soils would be built up faster than they are depleted. Timber harvesting would increase the amount of timber produced on logged areas. Reducing livestock grazing, eliminating spring use, and limiting utilization levels would improve range and watershed conditions.

Contour furrows, sagebrush control, limited suppression of wildfire and more seeding projects would all increase forage production.

Alternative D would provide the greatest potential for rapid restoration and improvement of wetland/riparian areas.

Wildlife habitat is expected to increase. Fishery habitat would steadily improve as wetland/riparian habitat is restored and improved.

Irreversible and Irrecoverable Commitment of Resources

Soil loss would be accelerated by about 732,000 tons/year. Limited wildfire suppression would cause a short-term irretrievable loss of vegetation. Effects on cultural resources because of increased contour furrowing and reseeding would be similar to those described for the Preferred Alternative.

Over the first 18 years of the plan, the estimated cumulative irretrievable loss in net agricultural and recreation sales would be over \$22 million with a corresponding \$44 million loss in regional business activity. Regional employment would also decline by nearly 40 workers.

Summary

Alternative D emphasizes the protection and enhancement of environmental quality. It limits the uses and development of resources that do not protect or enhance the quality of the natural environment.

Air Quality

Management prescriptions would cause more smoke than Alternative A but less than Alternative C or the Preferred Alternative.

Soils

Total accelerated soil loss would be reduced by an estimated 30 percent annually and soil productivity would be maintained or improved more with this alternative than with the others. Changes in livestock grazing management would be the primary cause for the reduced soil loss.

Water

Sediment delivery to surface water would also be reduced significantly, especially to the Bighorn River where it would decline by an estimated 20 percent compared to existing levels.

ENVIRONMENTAL CONSEQUENCES - ALTERNATIVE D



Vegetation

Increased timber harvest would increase timber production and vegetative diversity on an additional 50 acres/year. Old growth, overmature stands would eventually be reduced to approximately 35 to 40 percent of the timber base. The loss of timber from natural mortality, fire, insects, etc. would be about 200 to 300 MBF/year. An estimated 25 percent of the rangeland would eventually be classified in excellent condition, 43 percent in good condition, 7 percent in fair condition, and 25 percent unclassified. This alternative would provide the greatest potential for rapid restoration and improvement of wetland/riparian areas. Range and watershed condition would be improved most by range developments and livestock grazing prescriptions.

Fish and Wildlife

Wildlife habitat quality and quantity would be improved, potential conflicts with other uses would be reduced on significant portions of wildlife habitat, and fishery habitat would steadily improve. Livestock grazing management would accelerate the improvement of big game habitat and sage grouse habitat. The long-term abandonment of elk habitat would be less than with Alternative A, but the amount of temporary abandonment would be slightly more, primarily due to increased timber harvesting.

Visual

Visual impacts associated with mineral activities, rights-of-way, timber activities, and recreation use would generally be concentrated in unrestricted areas where they would cause less visual contrast with their surroundings than would occur with the other alternatives.

Outdoor Recreation

Total recreation use would increase by a negligible amount (about 3 percent). Semi-primitive nonmotorized and roaded natural recreation opportunities would increase while semi-primitive motorized recreation opportunities would decline slightly.

Cultural Resources

The impacts on cultural resources would be the same as with the other alternatives.

Land Uses

Mineral exploration, development, and production activities would decline by less than 10 percent, compared to Alternative A. About one-third of the wildcat wells drilled within the last 10 years would not have been permitted with this alternative.

ENVIRONMENTAL CONSEQUENCES - ALTERNATIVE D

Authorized livestock grazing use would decline by 29,000 AUMs, spring use would be eliminated, and livestock grazing would be reduced or eliminated when it conflicts with other uses or values. Maximum authorized livestock use would be 114,000 AUMs. Ranch values would decline and grazing management would become more intensive.

All wild horses would be removed from the Zimmerman Springs area.

An average of 700 MBF of timber would be harvested from about 90 acres annually.

Total recreation use would increase by about 3 percent compared to existing levels, although recreation use on the West Slope Special Recreation Management Area and fishing, hunting, and trapping would decline slightly.

Socioeconomics

During the first 18 years of the plan, net sales related to agriculture and recreation would have a cumulative decline of over \$22 million and net business activity would drop by roughly \$44

million. Subsequently, net area employment would drop by a total of about 40 workers.

Following the adjustment period, combined net sales for livestock, timber, and recreation activities, i.e., hunting, fishing, and trapping, would be about \$1.2 million below the present annual levels. This would result in roughly \$2.5 million less in annual net regional business activity. This equals about 0.2 percent of the area's business activity in 1980.

No specific information on attitudes toward this alternative has been collected. Based on attitudes toward specific issues people who are concerned with protection of caves and west slope canyons, soil and watershed protection, wildlife habitat enhancement, increased control of mineral and energy exploration and development and control over ORV use may feel their concerns are addressed by this alternative. Those concerned with enhancement of grazing for livestock and oil and gas development opportunities would probably react negatively toward this alternative because it decreases AUMs, restricts spring grazing, and restricts surface occupancy on oil and gas leases on 58 percent of the area.





5 Consultation and Coordination

INTRODUCTION

The Washakie RMP/EIS was prepared by an interdisciplinary team of specialists from the Washakie Resource Area and the Worland District Office. Reviews for accuracy and consistency were provided by both the district office and state office staffs.

Consultation, coordination, and public involvement have occurred throughout the process through public meetings, informal meetings, individual contacts, news releases, and Federal Register notices.

Initial steps in the process began in 1982 with the development of a preparation plan. Other early efforts included research, inventory, analysis, and interagency coordination.

PREPARERS

Management Overview

Chester E. Conard, Worland District Manager

Edward L. Fisk, Associate District Manager

Roger D. Inman, Washakie Resource Area Manager

RMP/EIS Core Team

David L. Stout, Planning Coordinator/RMP Team Leader, Plan Management, Outdoor Recreation, Wilderness. Ten years, BLM; two years, Industry; M.S. Park Administration, Texas Tech. University; B.S. Outdoor Recreation, Colorado State University.

John H. Thompson, Environmental Coordinator/Technical Coordinator, Document Preparation.

Nine years, BLM; M.S. Agricultural Economics, Purdue University; B.S. Economics/Political Science, South Dakota State University.

Interdisciplinary Team

David Baker, Recreation Technician/Outdoor Recreation. Two years BLM; two years USFS; B.S. Recreation Management, University of Montana.

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Gary A. Bingham, ATROW Specialist/Access. Twenty-two years, BLM; B.S. Forest Management, University of Montana.

Allan D. Carriere, Fire Management Specialist/Fire Control. Twelve years, BLM; one year, USFS; B.S. Forestry, University of Montana.

Stephen J. Christy, Forester/Forest Resources. Eleven years, BLM; one year, Agricultural Research Service (USDA); two years, Colorado Dept. of Natural Resources, Division of Parks and Outdoor Recreation; M.A. Botany, University of Northern Colorado; B.S. Botany, Colorado State University; A.S. Mesa College, Grand Junction, Colorado.

Arnold E. Dougan, Chief, Branch of Planning and Environmental Assistance/Coordination and Consultation. Four years BLM; one year MMS; one year USGS; eighteen years private industry; B.S. Environmental Science, Grand Valley State College; Graduate Study, Natural Resource Management, University of Michigan.

M. Lee Douthit, Archeologist/Cultural Resources. Six years BLM; five years various universities; Ph. D. Anthropology, University of Texas at Austin; M.A. Anthropology, University of Texas at Austin; B.A. History, Texas Woman's University.

CONSULTATION AND COORDINATION

Renee L. Duval, Wildlife Biologist/Range Inventory, Geographic Information System. Five years, BLM; five years, U.S. Fish & Wildlife Service; B.S. Wildlife Biology, University of Maine; Certified Wildlife Biologist by The Wildlife Society.

Mark J. Goeden, Range Conservationist/Range Management, Wild Horses. Nine years, BLM; ½ year, USFS; B.S. Biology, North Dakota State University; Graduate Study, Range Ecology, North Dakota State University.

Mark E. Goldbach, Outdoor Recreation Planner/Wilderness Team Leader, Wilderness Document Preparation, Outdoor Recreation and Wilderness. Five years, BLM; two years, USFS; B.S. Recreation Resources Management, Slippery Rock State University.

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Richard L. Kroger, Fisheries Biologist/Aquatic/Wetland Habitat. Eight years, BLM; five years, U.S. Fish and Wildlife Service; seven years, National Marine Fisheries Service; M.S. Zoology (Fisheries), University of Wyoming; B.S. Wildlife Techniques and Conservation, South Dakota State University

Paul J. Meyer, Soil Scientist/Soils and Hazardous Materials. Eight years, BLM; one year, USFS; M.S. Botany/Ecology, University of Minnesota; B.S. Biology/Chemistry, University of Minnesota.

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Gary W. Rosenlieb, Hydrologist/Water and Air Resources. Eight years, BLM; M.S. Water Resources Management, University of Wyoming; B.S. Microbiology, University of Wyoming.

Carl L. Santmyer, Economist/Economic Analysis. Five years, BLM; five years, USFS; ten years Economic Research Service (USDA); Ph.D., Washington State University; M.A. University of Pittsburgh; B.S. Carnegie-Mellon University.

Marty K. Sharp, Outdoor Recreation Planner/Outdoor Recreation. Two years, BLM; M.S. Wildland Recreation Management, University of Idaho; B.S. Outdoor Recreation, California State Polytechnic University, Pomona.

Tim Smith, Outdoor Recreation Planner/Outdoor Recreation. Eight years BLM; B.S. Outdoor Recreation Management and Administration, Utah State University.

Joan Trent, Sociologist/Social Analysis. Seven years, BLM; M.S. Environmental Science, Miami University; B.A. Psychology, Miami University.

Victor L. Trickey, Realty Specialist/Lands and Realty Management. Fifteen years, BLM; B.S. General Agriculture; Tarleton State College.

Bernard M. Weynand, Wildlife Biologist/Wildlife. Nine years, BLM; two years, Texas A&M University; one year, Arizona Game and Fish Dept.; B.S. Wildlife Science, Texas A&M University; Certified Wildlife Biologist by The Wildlife Society.

Support Services (Worland District)

Cynthia Schelin, Supervisor, Office Services
Becky A. Brown, Word Processing
Lorri Denton, Word Processing
Diane Losey, Word Processing
Grace Tanaka, Word Processing
Margaret Tidemann, Word Processing

PUBLIC PARTICIPATION

A public participation plan was prepared to ensure that the public would have numerous opportunities to be actively involved in the planning and environmental process. Both formal and informal input have been encouraged and used.

Questionnaires were sent to approximately 650 persons in January 1983. The purpose of the mailing was to identify the issues in the resource area. Ninety-two responses were received. The following discussion on issues-related attitudes is based on information received from those who took the initiative to make their views known via the issue questionnaire. The majority of the responses (other than those from mineral companies) were received from area residents. It

CONSULTATION AND COORDINATION

should be noted that the majority of the respondents expressed views on more than one issue. On most issues a wide variety of opinions was expressed. Many respondents indicated they favored multiple use but interpretation of what that meant differed.

Half of the responses contained comments regarding energy/mineral exploration and/or development. The comments covered a wide range of attitudes from "exploration and development is the high priority and all lands should be open;" to "resources need to be developed slowly and carefully in accordance with environmental regulation and sound reclamation practices;" to "energy and mineral exploration and/or development is the lowest priority and should be minimized." Most of the responses fell into the middle ranges - the resources are needed and must be developed, but in a careful, prudent manner. Concerns included conflicts with wildlife, proper reclamation, conflicts with ranching, and not precluding development with unnecessary restrictions.

Over 40 percent of the people who responded to the issues brochure mentioned livestock concerns. Of these, half indicated livestock grazing on federal land was a main priority. Associated comments included: lessees are good land stewards; range improvements are needed for livestock; soil and water conservation needs improvement; livestock grazing is part of multiple use; wildlife numbers should be controlled; and the rancher should not be the only user who pays to use the range. The other half of the respondents who mentioned livestock concerns indicated overgrazing and/or conflicts between wildlife and livestock to be problems. (See following paragraph.) A few respondents indicated that in their opinion, the range is presently managed solely for livestock.

Approximately 40 percent of the people who responded to the issues questionnaire mentioned concerns regarding wildlife and/or wildlife habitat. These concerns centered around big game winter range, wildlife conflicts with livestock and wildlife conflicts with mineral exploration and development. Specific conflicts with livestock grazing included excessive or poorly timed livestock use, degradation of riparian areas and poorly planned range improvements. Other less frequently mentioned wildlife concerns included threatened and endangered (T&E) species, critical game bird habitat and fisheries. Two respondents indicated wildlife numbers need to be controlled because they conflict with livestock.

About one-third of the respondents made comments regarding recreation. These comments frequently dealt with recreation access and ORV use, and were some of the most varied of all the responses. The access comments ranged from "more access is needed" to "access needs to be limited from what is available now" with most respondents falling at the "need more access" end of the continuum.

Specific comments included "federal lands need to be signed so their location is obvious" and "private landowners will not let recreationists/humans cross their land to get to public lands." A few respondents felt off-road vehicle (ORV) use was very important while others felt ORV use should be limited or was a low priority. Quite a few respondents indicated recreation was a high priority use of the public lands and quality recreation areas should be maintained.

Approximately one-fourth of the respondents indicated a concern for soil and water conservation with several saying it should have the highest priority. Specific concerns included riparian habitat, water recharge, instream flows for fisheries and erosion. The following were seen as contributors to problems: overgrazing, ORV use and poor reclamation of disturbed lands.

About 10 percent of the respondents commented on the trading or selling of public lands. A few indicated that small isolated tracts should be sold to adjacent landowners because they are difficult to administer economically and encourage hunters to trespass. Others feel that lands should not be sold but traded for consolidation purposes. Still others feel these small isolated tracts should not be sold or traded because they may contain riparian areas of value to wildlife, or may contain valuable cultural resources. Several individuals felt land should be made available for community expansion.

About 10 percent of the respondents commented generally or specifically about wilderness designations with comments being nearly evenly divided for and against. Specific comments included "overgrazing is destroying some WSAs" and "Trapper Canyon should be designated a Resource Natural Area."

In February 1983, a notice of intent to prepare a plan was published in the *Federal Register*.

In June of 1984, a news release was issued and a notice mailed to 813 individuals, companies, groups, and governmental agencies to solicit views and comments on a set of proposed planning criteria.

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In November 1984, a letter requesting comment was mailed to 134 entities considered to have interests in mineral resources. A *Federal Register* notice and news release followed in February 1985 requesting comments specifically from anyone who may have interests in the coal resources of the Washakie Resource Area.

The Worland District Advisory Council has been kept apprised of the RMP progress and their comments and recommendations have been solicited.

Each operator of a grazing allotment has been contacted either in person or in writing to discuss the categorization of his allotment.

Formal and informal meetings have been held with many members of the ranching and minerals industries and with other interest groups and agencies. A summary of comments generated from these meetings is on file in the Washakie Resource Area Office.

As part of the ongoing activity in consultation and coordination, the BLM is preparing a biological assessment for threatened and endangered species. The BLM will share the results of the assessment with the U.S. Fish and

Wildlife Service, as required by Section 7 of the Endangered Species Act of 1973, as amended.

CONSISTENCY

Coordination with other agencies and consistency with other plans were accomplished through frequent communications and cooperative efforts between the BLM and involved federal, state, and local agencies and organizations.

The Wyoming Governor's Clearing House was supplied with numerous copies of this draft document for review to ensure consistency with the state's ongoing plans. County land-use plans for Big Horn, Washakie and Hot Springs counties have been reviewed by the RMP team to ensure consistency. Meetings have been held with the respective county planners and commissioners to promote greater understanding of goals, objectives, and resources of both the counties and the BLM. The Forest Service draft plan for the Bighorn National Forest has been reviewed and comments provided to the Forest Supervisor.



CONSULTATION AND COORDINATION

CONSULTATION/ COORDINATION

Members of the RMP team have consulted formally or informally with numerous agencies, groups, and individuals in the RMP development process. The following list is representative of the businesses, agencies, organizations, and individuals who have indicated an interest in the Washakie RMP and who have been contacted during the planning process. This list is not inclusive. A complete list is on file at the office of the Washakie Resource Area.

Required Reviewers

U.S. Department of the Interior
Bureau of Land Management (340), Washington, D.C.
Bureau of Land Management (931), Cheyenne, WY.
Office of Environmental Project Review, Denver, CO.
National Park Service, Div. of Env. Compliance (WASO 762), Washington, D.C.
U.S. Fish and Wildlife Service, Chief, Div. Env. Coord., Washington, D.C.
Minerals Management Service, Offshore Env. Assessment Div., Washington, D.C.
Bureau of Reclamation, Div. of Env. Affairs, Washington, D.C.
Bureau of Mines, Mineral Data Anal. (MS-5000), Washington, D.C.
U.S. Geological Survey, National Center (423), Reston, VA.

U.S. Air Force
HQ USAF/LEER, Washington, D.C.
HQ SAC/DEPU, Offut AFB, NE.
HQ-US LEVX, Office of Env. Planning, Bolling AFB, Washington, D.C.
Asst. Secy. of the Air Force, Install. Env. and Safety, Pentagon, Admiralty, VA.

U.S. Army Corps of Engineers
Chief, Planning Division, Omaha, NE.
Chief, Planning Division, Portland, OR.

Department of Energy (EP-36), Washington, D.C.
Nuclear Regulatory Commission, Bethesda, MD.
Environmental Protection Agency, Denver, CO.
State of Wyoming, Wyoming State Clearing House, Cheyenne, WY.

Other Contacts

Federal Government

Department of Agriculture
Soil Conservation Service
U. S. Forest Service
Farmers Home Administration

Department of the Interior
Bureau of Indian Affairs
Bureau of Reclamation
National Park Service
U. S. Fish & Wildlife Service

Environmental Protection Agency
Federal Highway Administration
USDE-Western Area Power Administration

State of Wyoming

Office of the Governor
State Board of Land Commissioners
University of Wyoming
Wyoming Conservation Commission
Wyoming Department of Environmental Quality
Wyoming Department of Agriculture
Wyoming Game & Fish Department
Wyoming Geological Survey
Wyoming Highway Department
Wyoming Recreation Commission
Wyoming State Clearing House
Wyoming State Engineer
Wyoming Water Development Commission

County Government

Big Horn County Commissioners
Hot Springs County Commissioners
Washakie County Commissioners

Federal Legislators

The Honorable Richard Cheney
The Honorable Alan K. Simpson
The Honorable Malcolm Wallop

State Legislators

Office of Representatives (2), Big Horn County
Office of Representative, Hot Springs County
Office of Representative, Washakie County
Office of Senator, Big Horn County
Office of Senator, Hot Springs & Washakie Counties

Organizations

American Wilderness Alliance
Basin Sportsmens' Club
Earth First!
Foundation for North American Wild Sheep
Girl Scout National Center West
Hot Springs County Sportsmens' Club
Isaac Walton League of America
National Audubon Society
National Outdoor Leadership School
National Wetlands Technical Council
National Wildlife Federation
Natural Resource Defense Council
Nature Conservancy
Park County Resource Council
Petroleum Association of Wyoming
Professional Outfitters & Guides of Wyoming
Public Lands Council
Rocky Mountain Oil & Gas Association
Sierra Club
Thermopolis Pick & Trowel Club
Wilderness Society
Willwood Irrigation District
Wyoming Heritage Society
Wyoming Outdoor Council
Wyoming Outfitters Association
Wyoming Mining Association
Wyoming State Mineral & Gem Society
Wyoming Wildlife Federation
Wyoming Wool Growers Association

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Businesses

Amerada-Hess
American Natural Gas Production Company
Aminoil USA, Incorporated
Amoco Production Company
Anderson Oil Company
Anschutz Corporation
Apache Corporation
Archeological Consultants, Incorporated
Arkla Exploration
Atlantic Richfield Company
Beard Oil Company
Benton Clay Company
Beta Exploration
Big Horn Land Title Company
Big Horn Lumber Company, Incorporated
Big Horn REA
Bishop Geological Services
Blackburn Drilling
Boydston & Franzen Well Service
Bronco Oil & Gas Company
Buckhorn Petroleum Company
Canyon Concrete & Excavating, Incorporated
Carneal Construction
Carver Excavation
Carter Oil Company
Champlin Petroleum Company
Cherokee Exploration
Chevron USA, Incorporated
Coastal Oil & Gas Corporation
Cody Lumber Company
Conoco, Incorporated
Cork Petroleum Company
Coronado Oil Company
Coseka Resources Ltd.
Cowboy Timber Treating, Incorporated
Dale Weaver, Incorporated
Dan Brown Trucking
Dave Mattis Masonry
Dresser Industries-Minerals Division
Environmental Mgmt. Services Company
Exxon Company USA
Freeport Exploration Company
Frontier Petroleum Services
Getty Oil Company
Goton Outfitters
Grace Petroleum Company
Grass Creek Lumber Company
Grosch Construction Company
Gulf Oil Corporation
H & R Exploration
Hot Springs County REA
Hot Springs Title Company
Hrubetz Oil Company
HSB, Incorporated
Hughes Oil, Incorporated
Husky Oil Company
Intermountain Motor Sports
John W. Donnell Assoc., Incorporated
Kaycee Bentonite Corporation
Koch Production Company
Marathon Oil Company
Marathon Pipeline Company

McCormac Redi-Mix
McGarvin-Moberly Construction Company
Meridian Land & Mineral Company
Milestone Petroleum
Minerals Exploration Coalition
Mobil Oil Corporation
Montana-Dakota Utilities Company
Mountain Geophysical
Natural Gas Processing Company
Norpac Exploration Services, Incorporated
Northwestern Resources Company
Nupec Resources, Incorporated
Occidental Exploration & Production
Ozark Underground Laboratory
Pacific Power & Light Company
Peter Kiewit & Sons Mining
Petro-Lewis Corporation
Phillips Oil Company
Placid Oil
Prairie Winds Consulting Service
Ralph Wortham Construction
Santa Fe Energy Company
Shell Oil Company
Shellco Mines, Incorporated
Snyder Oil Company
Superior Oil Company
Tenneco
Texaco, Incorporated
Texas Gas Exploration Corporation
The Outdoorsman
Tri-County Telephone Assoc., Incorporated
Tri-State Generation & Transmission Assoc., Incorporated
True Oil Company
Union Carbide Corporation
Union Oil Company of California
Union Texas Petroleum
United Minerals Ltd.
Valley Construction Company
Washakie Abstract Company
Washakie Oil Company
Wyo-Ben, Incorporated
Wyoming Production Credit Assoc.
Wyoming Sawmills, Incorporated

Ranching/Grazing Interests

Arapahoe Padlock Ranch
Ewen Ranch, Incorporated
Flitner Land Company
Greer Brothers
Hamilton Ranch, Incorporated
Herbst Ranch
John Mercer, Incorporated
Mayland Brothers
Orchard Ranch Ltd.
Otter Creek Grazing Assoc.
Paintrock Angus Ranch
Paintrock Hereford Ranch
Shell Valley Ranch
Southfork Ranch, Incorporated
Tensleep Cattle Company
Valley Ranch
VE Bar Livestock Company



Appendices

APPENDIX A

WYOMING BLM STANDARD STIPULATIONS FOR SURFACE DISTURBING ACTIVITIES (ALSO STANDARD OIL AND GAS LEASE STIPULATIONS)

The following stipulations would be attached to oil and gas leases to provide surface protection. However, the use of these stipulations transcends just oil and gas. They are surface disturbance stipulations for all activities, and will be used to mitigate all types of surface disturbing activities.

1. SURFACE DISTURBANCE STIPULATION

Surface disturbance will be prohibited in any of the following areas or conditions. Modifications to this limitation may be approved in writing by the Authorized Officer.

- a. Slopes in excess of 25 percent.
- b. Within important scenic areas (Class I and II Visual Resource Management areas).
- c. Within 500 feet of surface water and/or riparian areas.
- d. Within a quarter mile or visual horizon (whichever is closer) from a historic trail.
- e. Construction during periods when the soil material is saturated, frozen, or when watershed damage is likely to occur.

Guidance

The SURFACE DISTURBANCE STIPULATION will be included on all lease parcels. The intent of this stipulation is to inform interested parties (potential lessees) that, when one or more of the five (a through e) environmental conditions exist, surface disturbing activities will be prohibited unless or until the lessee or his designated operator and the surface management agency (SMA) arrive at an acceptable plan for mitigation of anticipated impacts. This negotiation will occur prior to development of the lease and become a condition for approval in the Application for Permit to Drill (APD).

Specific threshold criteria (e.g., 500 feet from water) have been established based upon the best information available. However, geographical areas and time periods of concern must be delineated at the field level (i.e., "surface water and/or riparian areas" may include both intermittent and ephemeral water sources or may be limited to perennial surface water). These decisions, where possible, should be documented in the land use planning documents.

APPENDIX A

2. WILDLIFE STIPULATION

a. To protect important big game ungulate winter habitat, drilling and other surface disturbing activity will not be allowed during the period from November 15 to April 30 within certain areas encompassed by this lease. The same criteria applies to elk calving areas from the period of May 1 to June 30. This limitation does not apply to maintenance and operation of producing wells. Modifications to this limitation in any year may be approved in writing by the Authorized Officer.

b. To protect important raptor and/or sage and sharp-tailed grouse nesting habitat, drilling and other surface disturbing activity will not be allowed during the period from February 1 to July 31 within certain areas encompassed by this lease. This limitation does not apply to maintenance and operation of producing wells. Modifications to this limitation in any year may be approved in writing by the Authorized Officer.

c. No surface occupancy will be allowed on that portion of the lease within the area (*legal description*) for the purpose of protecting (*e.g., sage/sharp-tailed grouse strutting, and/or other species activity*) habitat. Modifications to this limitation in any year may be approved in writing by the Authorized Officer.

Guidance

The WILDLIFE STIPULATION is intended to provide two basic types of protection: seasonal restrictions (a. and b.) and no surface occupancy (c.). Legal descriptions will ultimately be required and should be measurable and legally definable. There are no minimum subdivision requirements at this time. The area delineated can and should be refined as necessary based upon current biological data at the time the APD is processed. It should eventually become a condition for approval in the Application for Permit to Drill.

The seasonal restriction section of the stipulation identifies three groups of species and delineates two similar timeframe restrictions. These two restrictions are big game ungulate and raptors/grouse. The big game ungulates including elk, moose, deer, antelope, and bighorn sheep all require protection of crucial winter range between November 15 and April 30. Raptors including eagles, accipiters, falcons, buteos, osprey,

ferruginous hawks, burrowing owls, and sage and sharp-tailed grouse all require nesting protection during periods between February 1 and July 31.

The “no surface occupancy” section of the stipulation is intended for protection of unique wildlife and wildlife habitat values (*e.g., sage grouse strutting grounds, known threatened and endangered species habitat, etc.*) which cannot be protected using seasonal restrictions.

3. SPECIAL RESOURCE PROTECTION STIPULATION

In order to protect (*resource value*), the District Manager reserves the right to prohibit surface disturbance (*i.e., within a specific distance of the resource value or between date-to-date*) in (*legal subdivision*). This limitation does not apply to operation and maintenance of producing wells. Modifications to this limitation may be approved in writing by the Authorized Officer.

Resource Category (*select category and identify specific resource value*):

- a. Recreation areas
- b. Special historic features
- c. Special management areas
- d. Sections of major rivers
- e. Prior existing rights-of-way, and
- f. Occupied dwellings.

Guidance

The SPECIAL RESOURCE PROTECTION STIPULATION is intended for use only in the few very specialized, site-specific situations where one of the other three general stipulations will not adequately address the concern. The resource value, location, and specific restriction must be clearly identified. A detailed plan addressing mitigation and special restrictions on development will be required prior to development of a lease and become a condition for approval in the Application for Permit to Drill.

4. NO SURFACE OCCUPANCY STIPULATION

No surface occupancy will be allowed on the following described lands (*legal subdivision/area*) because of resource values. See examples.

APPENDIX A

Resource Category (select category and identify specific resource value):

- a. Recreation areas (campgrounds, historic trails, national monuments, etc.).
- b. Major reservoirs/dams, etc.
- c. Special management areas (ACEC, wild and scenic rivers, etc.).

Guidance

The "NO SURFACE OCCUPANCY" STIPULATION (NSO) is intended for use only when other stipulations are determined insufficient to adequately protect the public interest and/or as an alternative to "no leasing." The legal subdivision and resource value of concern must be identified in the stipulation and be tied to a land use planning document.) There will be no exceptions to this stipulation granted without modification of the appropriate land use plan or unless an exception is approved by the State Director.

Washington Office guidance advises that when considering the "no lease" option, a rigorous test

must be met and fully documented in the record. This test must be based on the stringent standards of the Interior Board of Land Appeals. Since rejection of a lease offer is more severe than the most restrictive stipulation, the record must show that consideration was given to leasing subject to reasonable stipulations, including a NSO stipulation. The record must also show that stipulations were determined to be insufficient to adequately protect the public interest. A "no lease" decisions should not be made solely because it appears that directional drilling would be unfeasible, especially where a NSO lease may be acceptable to a potential lessee. In such cases the opportunity to accept or refuse a NSO lease should be left to the potential lessee. Exception(s) by the District Manager to the NSO stipulation will be subject to the same test used to initially justify the imposition of this stipulation. If the NSO stipulation is justified but upon development less restrictive stipulations would adequately protect the public interest, then an exception to the NSO stipulation could be granted. The record must show that because conditions and uses have changed, less restrictive stipulations will protect the public interest.

APPENDIX B

LAND DISPOSAL CRITERIA AND TRACTS THAT MAY BE SUITABLE FOR CONSIDERATION FOR DISPOSAL, EXCHANGE OR ACQUISITION

LAND DISPOSAL CRITERIA

Listed below are the criteria that will be applied on a case-by-case basis to tracts of land that may have future potential for transfer. Tables B-1 and B-2 describe tracts that may be suitable for consideration for disposal. Tables B-3 and B-4 describe tracts that may be suitable for consideration for acquisition.

**TABLE B-1
SUMMARY OF TRACTS THAT
MAY BE SUITABLE FOR
CONSIDERATION FOR DISPOSAL**

Land Description		
Township (North)	Range (West)	Acres
41	87	820.44
41	88	334.40
41	89	317.86
41	90	520.00
41	91	560.00
41	92	720.00
41	93	881.24
42	86	554.31
42	87	840.00
42	90	80.00
42	91	40.00
42	93	1,160.00
43	86	1,159.71
43	87	2,200.74
43	90	23.91
44	86	1,440.00
44	87	1,165.46
44	94	44.70
45	86	479.53
45	87	441.77
45	88	40.38
46	86	531.75
46	87	660.00

TABLE B-1 (Continued)

Land Description		
Township (North)	Range (West)	Acres
46	88	315.19
47	89	94.15
47	86	1,399.88
47	87	380.00
47	88	197.37
48	88	20.68
48	89	480.00
48	90	637.32
49	90	532.33
52	88	40.00
52	92	411.50
53	91	160.00
Total		19,684.62

Criteria established by policy, law, or regulation, which make lands unsuitable for sale or exchange:

- Lands with mining claims of record under Section 314 of FLPMA
- Lands withdrawn or segregated pending withdrawal, depending on the order
- Wetlands requirements (parcels containing wetlands can be disposed, if:)
 1. The tract is so small or remote that it is uneconomical to manage, and
 2. The tract is not suitable for management by another federal agency, and
 3. The patent contains restriction of uses prohibited by wetland regulations, and
 4. The patent contains restrictions and conditions that ensure protection of wetlands on a continuous basis.

APPENDIX B

TABLE B-2
DESCRIPTION OF TRACTS THAT MAY BE SUITABLE FOR CONSIDERATION FOR DISPOSAL

Land Description Township Range	Land Description Township Range	Land Description Township Range	Land Description Township Range	Land Description Township Range
T. 41 N., R. 87 W. Sec. 1: Lot 11 Sec. 7: E1/2SE1/4 Sec. 10: Lot 4 Sec. 11: Lot 5 Sec. 11: Lot 6 Lot 9 NE1/4NW1/4 Sec. 14: Lot 5 Lot 6 Lot 7 N1/2SE1/4 NE1/4SW1/4 Sec. 16: Lot 3 Lot 4 Sec. 17: Lot 1 Lot 2 Lot 3 NE1/4NE1/4 N1/2SW1/4 N1/2SE1/4 Sec. 19: SE1/4NE1/4 Sec. 20: SW1/4NW1/4 N1/2SW1/4 NW1/4SE1/4 Sec. 22: Lot 4 Sec. 23: SE1/4NE1/4 Sec. 24: W1/2NW1/4 SE1/4NW1/4 N1/2SW1/4	T. 41 N., R. 90 W. (Cont.) Sec. 21: NW1/4NW1/4 Sec. 23: E1/2N1/2 Sec. 34: SE1/4SE1/4 Sec. 35: S1/2SW1/4 SE1/4NE1/4 SE1/4NW1/4 NE1/4SW1/4 NE1/4NE1/4 Sec. 26: NE1/4NW1/4 Sec. 27: NW1/4NE1/4 NE1/4NE1/4 T. 41 N., R. 91 W. Sec. 9: E1/2SW1/4 Lot 4 SE1/4 Sec. 11: SE1/4SW1/4 Sec. 17: E1/2NE1/4 NE1/4SE1/4 Sec. 18: NE1/4SE1/4 Sec. 24: SW1/4NW1/4 Sec. 29: NE1/4SW1/4 Sec. 35: SW1/4NW1/4 T. 41 N., R. 92 W. Sec. 9: NE1/4NW1/4 Sec. 11: SE1/4NW1/4 Sec. 15: SE1/4SW1/4 Sec. 21: SW1/4NE1/4 NW1/4SE1/4 Sec. 22: W1/2NE1/4 E1/2NW1/4 SE1/4NW1/4 Sec. 27: NE1/4NE1/4 SW1/4NE1/4 S1/2NW1/4 SE1/4NW1/4 N1/2SW1/4	T. 41 N., R. 93 W. (Cont.) Sec. 23: E1/2N1/2 Sec. 34: SE1/4SE1/4 Sec. 35: S1/2SW1/4 SE1/4NE1/4 SE1/4NW1/4 NE1/4SW1/4 NE1/4NE1/4 Sec. 30: Lot 1 Lot 2 Lot 3 Lot 4 N1/2NE1/4 SE1/4NW1/4 Sec. 31: Lot 1 NE1/4NE1/4 NE1/4NW1/4 32: S1/2SW1/4 T. 42 N., R. 87 W. Sec. 10: SW1/4NE1/4 W1/2SE1/4 Sec. 15: NW1/4NE1/4 Sec. 25: E1/2SE1/4 Sec. 34: NW1/4NE1/4 SW1/4NW1/4 N1/2S1/2 T. 42 N., R. 90 W. Sec. 27: NE1/4NE1/4 S1/2NW1/4 SE1/4NW1/4 T. 42 N., R. 91 W. Sec. 1: NW1/4SE1/4 Sec. 15: NW1/4SW1/4 Sec. 20: SW1/4SE1/4 Sec. 21: NE1/4NW1/4 Sec. 22: SE1/4SE1/4 Sec. 27: W1/2SE1/4 Sec. 28: S1/2NE1/4 E1/2SE1/4 Sec. 29: SW1/4NE1/4 NE1/4SW1/4 22: S1/2NW1/4 NE1/4SW1/4 W1/2SE1/4 Sec. 32: W1/2NW1/4	T. 42 N., R. 93 W. (Cont.) Sec. 32: NW1/4SW1/4 SE1/4 Sec. 33: NW1/4NW1/4 S1/2NW1/4 SW1/4 NE1/4SE1/4 Sec. 34: NE1/4NW1/4 NE1/4NE1/4 T. 43 N., R. 86 W. Sec. 2: Lot 4 S1/2NW1/4 SW1/4 Sec. 3: Lot 1 SE1/4NE1/4 E1/2SE1/4 Sec. 9: SW1/4SW1/4 10: NE1/4NE1/4 11: NW1/4NE1/4 N1/2NW1/4 Sec. 12: E1/2SE1/4 E1/2SE1/4 Sec. 20: SE1/4NE1/4 Sec. 21: N1/2NE1/4 Lot 6 W1/2SE1/4 SE1/4SE1/4 Sec. 24: SE1/4SE1/4 Sec. 28: W1/2NE1/4 SE1/4NE1/4 T. 43 N., R. 87 W. Sec. 3: S1/2SW1/4 Sec. 4: Lot 2 SW1/4NE1/4 E1/2SE1/4 Sec. 5: E1/2SW1/4 W1/2SE1/4 Sec. 7: E1/2NE1/4 Sec. 8: NE1/4NW1/4 Sec. 21: NE1/4NW1/4 Sec. 27: W1/2SE1/4 Sec. 28: S1/2NE1/4 E1/2SE1/4 Sec. 29: SW1/4NE1/4 NE1/4SW1/4 NW1/4SE1/4 Sec. 32: W1/2NW1/4	T. 42 N., R. 87 W. (Cont.) Sec. 6: Lot 4 Sec. 8: SW1/4NW1/4 W1/2SW1/4 SE1/4SW1/4 Sec. 17: N1/2NW1/4 NW1/4SW1/4 SE1/4SW1/4 Sec. 29: S1/2NE1/4 SE1/4NW1/4 NE1/4SW1/4 SE1/4 Sec. 32: NE1/4 SE1/4NW1/4 Sec. 33: SE1/4NE1/4 S1/2NW1/4 W1/2SE1/4 T. 43 N., R. 86 W. Sec. 1: S1/2SW1/4 Sec. 2: SE1/4SW1/4 Sec. 11: N1/2NE1/4 S1/2SW1/4 NE1/4SE1/4 Sec. 12: NW1/4 N1/2SW1/4 SE1/4SW1/4 Sec. 14: SW1/4NE1/4 SE1/4NW1/4 NE1/4SW1/4 NW1/4SE1/4 Sec. 15: SE1/4SW1/4 W1/2SE1/4 Sec. 22: NE1/4NW1/4 Sec. 24: E1/2NE1/4 SE1/4NW1/4 Sec. 25: S1/2SW1/4 Sec. 33: SE1/4SE1/4 Sec. 34: NW1/4SW1/4 Sec. 35: E1/2NE1/4 NE1/4SE1/4 T. 43 N., R. 87 W. Sec. 20: E1/2SW1/4 NW1/4SW1/4 Sec. 21: N1/2NE1/4 Sec. 22: SW1/4NW1/4 Sec. 31: NE1/4NE1/4 Sec. 34: S1/2NE1/4 NE1/4NW1/4 Sec. 35: NW1/4NE1/4 E1/2NW1/4 T. 43 N., R. 90 W. Sec. 30: Lot 5 SW1/4NE1/4 T. 44 N., R. 86 W. Sec. 1: S1/2SW1/4 Sec. 2: SE1/4SW1/4 Sec. 11: N1/2NE1/4 S1/2SW1/4 NE1/4SE1/4 Sec. 12: NW1/4 N1/2SW1/4 SE1/4SW1/4 Sec. 24: SE1/4SE1/4 Sec. 28: W1/2NE1/4 SE1/4NE1/4 T. 44 N., R. 87 W. Sec. 31: Lot 3 Sec. 32: S1/2NE1/4 Sec. 35: NW1/4NW1/4 T. 45 N., R. 86 W. Sec. 1: S1/2NE1/4 NE1/4SE1/4 Sec. 4: Lot 3 SE1/4NW1/4 Sec. 31: Lot 3 E1/2SW1/4 Lot 4 E1/2SW1/4 Sec. 32: S1/2NE1/4 Sec. 35: NW1/4NW1/4 T. 45 N., R. 87 W. Sec. 7: Lot 4 Sec. 18: Lot 1 Lot 2 SE1/4NW1/4 NE1/4SW1/4 Sec. 19: W1/2SE1/4 Sec. 30: NW1/4NE1/4 E1/2SW1/4 NW1/4SE1/4 T. 45 N., R. 88 W. Sec. 12: Lot 1 6: Lot 3 SE1/4NW1/4

APPENDIX B

TABLE B-3 (Continued)

- Lands in WSAs
 - Lands in crucial and critical habitat including T&E habitat, and
 - Lands closed by Secretarial Order.
- Criteria established by policy, law, or regulation which make lands unsuitable for desert land entry.
- Lands mineral in character under 30 U.S.C. 21
 - Wetlands (see A, above)
 - WSAs
 - Lands in crucial and critical habitat including T&E habitat
 - Lands closed by Secretarial Order
 - Lands where the water source has been fully appropriated
 - Lands where less than one-eighth of any particular parcel can be irrigated
 - Timbered lands, and
 - Lands that have been effectually reclaimed.

TABLE B-3

**SUMMARY OF TRACTS THAT
MAY BE SUITABLE FOR
CONSIDERATION FOR ACQUISITION**

Land Description		
Township (North)	Range (West)	Acres
41N	86W	1,300.36
41N	88W	947.87
41N	89W	158.95
42N	86W	1,000.00
42N	87W	1,120.00
42N	88W	160.63
42N	89W	3,640.00
42N	90W	640.00
42N	92W	4,078.16
42N	93W	720.00
43N	86W	80.00
43N	87W	1,640.00
43N	92W	960.00
43N	94W	638.83
44N	86W	1,441.53
44N	87W	1,880.00
44N	94W	582.21
45N	86W	640.00
45N	87W	3,280.00
45N	88W	800.00

Land Description		
Township (North)	Range (West)	Acres
45N	89W	640.00
45N	93W	640.00
45N	95W	640.00
46N	86W	1,200.00
46N	87W	720.00
46N	88W	680.00
46N	90W	1,600.00
47N	87W	640.00
48N	87W	680.00
48N	88W	1,240.00
48N	89W	1,640.00
49N	87W	160.00
49N	88W	2,675.82
49N	89W	2,054.53
50N	88W	1,480.00
50N	89W	1,801.06
50N	90W	640.00
50N	92W	640.00
50N	93W	480.00
51N	89W	1,760.00
51N	90W	1,405.02
51N	91W	751.43
51N	93W	500.00
52N	89W	640.00
52N	90W	4,467.31
52N	91W	1,564.88
53N	89W	240.00
53N	90W	400.00
Total		57,697.59

Listed below are additional items which are to be considered during the process of review or evaluation of proposals for land disposal. These items may be applied to further the management objectives of various programs and may make lands undesirable for sale, exchange or entry.

- Lands adjacent to existing withdrawals which should be withdrawn to complete management goals
- Lands in semi-primitive nonmotorized ROS classes
- Lands in VRM classes I and II
- Lands in approved management plans (HMPs, SRMAs, RAMPs, caves, etc.), unless disposal would enhance management

APPENDIX B

TABLE B.4 (Continued)
DESCRIPTION OF TRACTS THAT MAY BE SUITABLE FOR CONSIDERATION FOR ACQUISITION (CONTINUED)

Land Description Township Range	Land Description Township Range	Land Description Township Range	Land Description Township Range	Land Description Township Range
T. 49 N., R. 89 W. Sec. 1: Lot 8 Sec. 2: Lot 9	T. 50 N., R. 90 W. (Cont.) Sec. 2: Lot 15 Lot 19	T. 50 N., R. 89 W. Sec. 36: Lot 16 Sec. 24:	T. 52 N., R. 90 W. (Cont.) Sec. 2: Lot 15 Lot 19	
SW1/4NE1/4 S1/2NW1/4	Sec. 25: Tract 51 (portion) Tract 53 (portion) Tract 40A Tract 40B Tract 40C Tract 400	Sec. 25: Tract 51 (portion) Tract 53 (portion) Tract 54 (portion)	Sec. 25: Tract 51 (portion) Tract 53 (portion) Tract 54 (portion)	
Sec. 3: Lot 5 Sec. 11: Tract 66 Tract 65 Tract 64	T. 51 N., R. 89 W. Sec. 11: SW1/4NE1/4 Sec. 13: Tract 38 Tract 39	T. 51 N., R. 89 W. Sec. 11: SW1/4NE1/4 Sec. 13: Tract 38 Tract 39	Sec. 3: Lot 12 Lot 14	
Sec. 13: Tract 63 Sec. 14: Tract 62 Sec. 16: A11 Sec. 17: SW1/4SE1/4 Sec. 36: Tract 52	Sec. 14: NE1/4NW1/4 NW1/4SW1/4 Tract 40 Sec. 16: A11 Sec. 22: SW1/4NE1/4 Sec. 24: Tract 41 Sec. 36: Tract 44	Sec. 14: NE1/4NW1/4 NW1/4SW1/4 Tract 40 Sec. 16: A11 Sec. 22: SW1/4NE1/4 Sec. 24: Tract 41 Sec. 36: Tract 44	Sec. 10: NW1/4SE1/4 Sec. 15: Lot 1 Sec. 16: A11 Sec. 36: A11 Lot 13 S1/2SE1/4	
T. 50 N., R. 88 W. Sec. 15: Tract 38 Sec. 33: SE1/4SE1/4 Sec. 34: S1/2SW1/4 SE1/4 Sec. 35: S1/2 Sec. 36: SW1/4 S1/2SW1/4	T. 51 N., R. 90 W. Sec. 16: A11 Sec. 18: Lot 7 Lot 8 EI1/2SW1/4 Sec. 36: Tract 53	T. 51 N., R. 90 W. Sec. 16: A11 Sec. 18: Lot 7 Lot 8 EI1/2SW1/4 Sec. 36: Tract 53	Sec. 16: A11 Sec. 23: Sec. 24: Sec. 36: Tract 46	
T. 50 N., R. 89 W. Sec. 16: Tract 63 Sec. 25: Lot 6 Lot 7 Lot 8 Lot 9 S1/2SW1/4 NW1/2SE1/4 Sec. 34: Lot 2 Sec. 35: Lot 2 Lot 7 Lot 8 Lot 10 Sec. 36: Lot 1 Lot 2 Lot 3 Lot 4 Tract 16	T. 51 N., R. 91 W. Sec. 13: Lot 1 Lot 2 Lot 3 Lot 4 M1/2 NW1/2SW1/4 Sec. 24: NE1/4 Lot 15	T. 51 N., R. 91 W. Sec. 13: Lot 1 Lot 2 Lot 3 Lot 4 M1/2 NW1/2SW1/4 Sec. 24: NE1/4 Lot 15	T. 52 N., R. 91 W. Sec. 10: Lot 1 Lot 2 Lot 3 SW1/4SW1/4 T. 53 N., R. 89 W. Sec. 30:	
Sec. 36: Lot 1 Lot 2 Lot 3 Lot 4 Tract 16	T. 51 N., R. 93 W. Sec. 27:	T. 51 N., R. 93 W. Sec. 27:		
T. 50 N., R. 90 W. Sec. 36: A11	T. 52 N., R. 90 W. Sec. 1: Sec. 2: Lot 9 Lot 10 Lot 11 Lot 12 Lot 13 Lot 14	T. 52 N., R. 90 W. Sec. 1: Sec. 2: Lot 9 Lot 10 Lot 11 Lot 12 Lot 13 Lot 14		
T. 50 N., R. 92 W. Sec. 36: A11				

APPENDIX B

- Lands included in Wyoming Game and Fish Habitat Management Units
- Lands with cultural resource sites suitable for national register designation
- Lands with severe soil use limitations
- Karst areas, and
- Land without legal access.

NOTE: Disposal by exchange may cause the criteria in A and the items in C, above, to be modified if the unique qualities of the lands acquired offset the qualities of the lands transferred.

APPENDIX C

ALLOTMENT CATEGORIZATION CRITERIA

Specific criteria were developed to evaluate the management situation for each allotment and single out those allotments that will require a change in present grazing management in order to resolve conflicts in the use of resources. The present condition of the resource, its potential to respond to management changes, conflicts with other uses, the current management situation, the economic feasibility of implementing changes in grazing management, and allotment size and land pattern were all used as criteria. These are based on current BLM policy, which can be found in W.O. IM 82-292. Each criterion was rated independently by a cross section of resource specialists familiar with the allotment. Each specialist recommended placement of each allotment into one of three management categories. Finally, the ratings and recommendations of the interdisciplinary team were reviewed by the Area Manager, who made a tentative determination on how the allotment would be categorized. Appendix D places each allotment into one of the three management categories and describes livestock use in each allotment. The management category for an allotment may be changed after the RMP/EIS is completed, or may be changed when resource conditions change or new data becomes available.

CATEGORY M - MAINTAIN EXISTING RESOURCE CONDITIONS

Factors

1. Range condition is satisfactory or recent studies show an upward trend in range condition.
2. These allotments have a moderate to high potential and are producing at or near their potential.
3. There are no conflicts or only minor conflicts with other uses.
4. Opportunities may exist for positive economic return on public investments.

5. Present management appears to be satisfactory to maintain or improve current range condition.
 - The distribution of grazing animals is satisfactory.
 - turnout dates and season of use are consistent with sound range management principles.

Management Actions

1. The BLM's objectives will be to take actions that will maintain current use and resource conditions.
2. Livestock use will be permitted under a ten year permit/lease. Changes in use may be allowed when consistent with multiple-use objectives.
3. Range improvement projects on federal lands can be authorized, however, allotments in the Category "I" (Improve) will have first priority for public lands.
4. The BLM will conduct low to high intensity monitoring depending upon the value of resources in the allotment.

CATEGORY I - IMPROVE EXISTING RESOURCE CONDITIONS

Factors

1. Range condition is unsatisfactory or existing studies show a downward trend in range condition.
2. These allotments have a moderate to high potential but are producing well below their potential.
3. There are major conflicts with other uses or high public controversy.
4. Opportunities exist for positive economic return on public investments.

APPENDIX C

5. Present management appears to be inadequate to maintain or improve current range condition.
 - The distribution of grazing animals is not satisfactory.
 - Turnout dates and season of use are not consistent with sound range management principles.
 6. The allotment contains more than 640 acres of public lands and/or is a “well blocked” parcel of public land with the public lands making up more than 20 percent of the total allotment.
4. Present management appears to be satisfactory, is the only logical practice under existing resource conditions, or the costs of changing management practices exceed the benefits expected.
 5. Opportunities for positive economic return on public investment do not exist or are not economic under current technology.
 6. The allotment contains only a small acreage of public land or is made up of isolated, noncontiguous tracts that make up less than 20 percent of the total allotment.

Management Actions

1. Implement actions that will improve resource conditions.
2. Increase or decrease livestock use to meet management objectives. Permit/lease terms will be one to ten years.
3. These allotments will be considered first for investment of public funds.
4. BLM use supervision and monitoring will normally be done on these allotments first.

CATEGORY C - CUSTODIAL MANAGEMENT

Factors

1. Range condition is probably not a factor.
2. These allotments have a low potential due to low annual precipitation and/or soils with low production capabilities and are producing near their potential.
3. There are only limited conflicts, if any, with other resource uses.

Management Actions

1. Authorize grazing use at a level needed to prevent deterioration of existing conditions.
2. The permit/lease will be issued for terms of ten years.
3. Range improvements on public lands can be authorized, but the chances for the use of public funds are limited because Category “M” and “I” allotments will probably be financed first.
4. The BLM will conduct low intensity use supervision and monitoring.

The allotment category will be based on all of the criteria items. No single item will establish the allotment category. All items will be considered together, with current range condition, conflicts with other uses, current management, and resource potential being the most important items. The remaining criteria will be used to establish the allotment category for allotments that are “on the line” between two categories and to help determine the priority listing of the “I” category allotments.

APPENDIX D

SUMMARY OF ALLOTMENT CONDITION AND AUTHORIZED USE

This appendix consists of a table that summarizes the allotment condition and authorized livestock grazing use for each allotment in the Washakie Resource Area. The table begins on the next page.

APPENDIX D

TABLE D-1
SUMMARY OF ALLOTMENT CONDITION AND AUTHORIZED USE

Mgmt Status M, I, C	Rank/No.	Total Acres	Ecological Range			Class Poor	Unclassified or Unmapped	Public Land Acres	Other Acres	Kind of Livestock	Season of Use	Public Land AUMs
			Excel.	Good	Fair							
I	3	6,531	648	3,490	1,225	837	331	6,531	0	C	04/16 to 08/30	779
I	1	35,390	2,930	17,463	10,903	448	3,122	32,156	3,234	S	02/01 to 02/28 05/06 to 06/20 09/16 to 02/13	2,410
I	1	4,510	745	2,077	1,139	-	549	4,510	0	C	05/09 to 07/30 09/01 to 10/31 04/16 to 12/15 05/10 to 07/10	1,096
I	1	12,943	158	4,131	4,762	2,721	1,171	10,139	2,804	C	10/16 to 11/15 05/15 to 07/14 11/01 to 11/30	870
I	1	35,585	5,557	19,755	5,242	988	4,043	27,798	7,787	H	03/01 to 02/28 05/01 to 06/30 10/26 to 11/21	3,563
I	3	9,374	113	3,471	4,267	375	1,148	8,511	863	C	04/16 to 06/15 11/01 to 12/31	729
I	2	14,870	2,008	608	2,084	1,741	8,429	13,270	1,600	C	05/01 to 02/05 04/15 to 06/25 10/22 to 02/8	1,110 3,053
I	2	20,926	3,255	13,158	2,588	538	1,387	18,359	2,567	C	05/01 to 06/25 05/01 to 06/25	865
I	2	9,695	528	8,304	487	102	273	6,352	3,343	S	05/01 to 05/31 10/21 to 1/20	863
M		3,300	2,550	367	355	0	28	2,714	586	C	04/26 to 06/10 04/26 to 06/10	1,301
I	2	7,083	854	4,406	1,682	0	141	6,522	561	C	04/26 to 06/10 12/01 to 03/31	5,489
I	1	23,443	5,323	9,431	7,788	116	784	22,021	1,422	H	04/21 to 06/20 11/01 to 1/15	10
C		655	0	237	132	0	286	100	555	C	None Designated	825
I	2	9,637	289	4,385	4,735	53	175	9,229	408	C	05/15 to 06/14 10/01 to 10/30	699
I	2	4,927	2	1,725	2,382	215	603	4,918	9	S	03/16 to 04/25 12/16 to 01/15	663
I	3	9,416	3,678	4,583	193	0	962	8,462	954	S	04/23 to 05/31 12/01 to 01/16	240
M		1,567					1,567	1,327	240	S	06/01 to 10/31	743
I	3	6,032	1,010	3,283	966	56	717	6,030	2	S	03/16 to 04/16 12/16 to 01/31	612
I	3	7,699	893	3,104	2,203	0	1,499	2,629	5,070	C	04/10 to 06/30 09/10 to 11/25	202
I	3	2,323	0	1,430	584	0	309	1,682	641	C	09/15 to 12/15 05/01 to 05/23	283
I	3	2,732	14	1,455	627	211	425	2,731	1	C	11/26 to 12/15 05/01 to 06/15	48
I	3	1,197	315	367	17	0	499	672	525	C	10/01 to 12/23 06/18 to 08/31	

APPENDIX D

SUMMARY OF ALLOTMENT CONDITION AND AUTHORIZED USE (Continued)

Mgmt Status M, I, C	Rank/ No.	Total Acres	Ecological Range Cond.			Class Poor	Unclassified or Unmapped	Public Land Acres	Other Acres	Kind of/ Livestock	Season of Use	Public Land AUMs
			Excel.	Good	Fair							
I	2	1,879	0	0	1,822	0	57	1,788	91	C	05/01 to 06/15	175
I	3	1,745	367	676	264	103	335	1,745	0	C	11/01 to 11/30	485
I	3	1,446	23	406	672	50	295	1,097	349	C	04/26 to 06/10	72
I	3	2,715	0	1,462	168	246	829	1,790	925	C	10/10 to 12/31	139
I	2	1,000	0	395	333	0	272	671	321	C	04/24 to 06/30	302
C		673	0	278	340	0	55	69	604	C	07/01 to 09/30	15
M		1,443	816	430	21	0	176	110	1,333	C	None Designated	20
I	3	5,752	10	1,544	1,820	712	1,666	4,655	988	C	None Designated	405
I	1	16,956	4,497	6,438	2,355	68	3,598	12,921	4,035	H	04/20 to 06/20	1,466
I	2	9,165	200	5,243	3,144	192	386	8,521	644	C	03/01 to 02/28	728
I	2	2,736	0	494	1,586	281	375	1,969	767	C	06/16 to 01/31	287
I	3	12,162	310	7,210	2,715	78	1,849	12,158	4	H	04/01 to 06/15	1,243
I	3	5,526	1,632	2,315	1,043	22	514	3,979	1,547	S	12/01 to 01/27	719
C		9,643	1,177	3,581	3,743	301	841	9,328	315	S	05/01 to 06/05	814
I	2	2,592	0	1,819	466	0	307	1,443	1,149	S	12/01 to 02/20	139
I	3	5,696	1,894	2,170	469	0	1,163	800	4,896	C	01/12 to 04/01	240
C		702	18	205	439	22	18	701	1	S	04/26 to 06/25	58
I	3	1,362	82	1,060	43	0	177	1,315	47	C	None Designated	166
I	2	9,028	878	378	399	0	7,373	8,193	835	C	05/15 to 08/11	900
M		2,307	975	869	232	137	94	1,737	570	C	04/20 to 06/19	100
M		980	0	539	99	329	13	602	378	H	11/01 to 01/15	49
I	3	1,140	63	126	839	6	106	328	812	C	05/01 to 06/15	67
I	3	1,586	0	401	663	0	522	1,447	139	C	11/10 to 12/31	160
I	2	2,924	188	1,666	597	288	185	2,884	40	C	02/01 to 06/30	210
I	1	25,310	35	11,793	7,368	143	5,971	24,460	850	C	07/01 to 01/31	2,075
I	3	2,842	828	945	557	0	512	1,891	993	S	09/16 to 10/25	423
I	1	2,301	682	267	603	271	478	662	1,639	C	04/20 to 06/19	170
I	3	2,315	0	1,422	666	0	227	706	1,609	C	11/22 to 04/15	80

APPENDIX D

SUMMARY OF ALLOTMENT CONDITION AND AUTHORIZED USE (Continued)

Mgmt Status	Rank/No.	Total Acres	Ecological Range			Class Poor	Unclassified or Unmapped	Public Land Acres	Other Acres	Kind of Livestock	Season of Use	Public Land AUMs
			Excel.	Good	Fair							
C	0052	291	5	203	49	11	23	291		C	04/16 to 06/05	25
C	0053	938	51	240	128	0	519	280	658	C	06/01 to 06/30	54
I	0054	1,333	218	467	595	21	32	1,333		C	04/22 to 05/16	101
C	0055	247	0	174	69	0	4	201	46	H	05/01 to 09/30	25
I	0056	1,583	856	358	61	15	293	921	662	S&C	06/10 to 10/15	177
I	0057	2,963	22	139	1,485	839	478	2,821	142	C	05/01 to 08/31	155
I	0058	2,319	201	1,374	83	12	649	2,319		C	07/01 to 10/31	416
C	0059	455	91	226	131	0	7	455		H	12/16 to 03/31	26
M	0060	1,034	80	710	0	0	244	845	189	C	06/01 to 06/30	22
M	0061	1,263	266	244	59	0	694	496	767	C	06/01 to 06/30	10
I	0062	1,988	310	871	543	0	264	1,272	716	C&H	05/01 to 06/25	130
I	0064	3,310	407	2,015	25	0	863	1,215	2,095	C&S	None Designated	185
M	0065	2,036	29	1,729	0	0	278	1,263	773	S	06/01 to 06/30	501
										C	07/01 to 07/31	
										C	09/01 to 11/15	
										S	09/20 to 11/20	
I	0066	1,807	124	596	817	39	231	1,763	44	S	06/01 to 09/30	416
M	0067	5,345	919	1,222	1,028	15	2,161	565	4,780	C&S	None Designated	119
I	0068	2,742	283	1,273	732	57	397	1,355	1,387	C	None Designated	423
I	0069	3,435	735	1,418	766	0	516	2,680	755	C	05/01 to 06/15	433
I	0070	3,260	286	2,215	34	77	648	3,016	244	C	04/15 to 08/31	330
M	0071	4,737	551	3,604	312	0	270	4,724	13	C	04/11 to 06/10	330
M	0072	1,044	97	716	55	0	176	660	384	C	11/01 to 11/30	644
I	0073	12,179	43	7,329	2,089	304	2,434	12,138	661	S&C	None Designated	45
I	0074	15,648	442	7,768	5,178	236	2,024	13,923	1,725	S	12/06 to 03/15	1,462
										C	11/27 to 06/05	1,776
M	0075	2,997	515	1,890	122	0	470	1,101	1,896	S	04/01 to 05/31	
I	0076	7,564	922	2,660	2,230	324	1,428	6,091	1,473	C	11/01 to 12/05	19
I	0077	3,889	512	1,491	1,406	0	480	2,554	1,335	C	07/20 None Designated	555
I	0078	2,634	644	370	804	0	816	1,219	1,415	H	11/01 to 02/28	310
I	0079	3,015	13	2,166	612	0	224	1,066	1,949	C	12/01 to 05/15	173
										H	11/01 to 04/15	244
										C	12/01 to 05/15	
I	0080	11,250	3,430	4,878	1,449	98	1,395	6,644	3,731	C	04/16 to 05/31	888
I	0081	1,590	0	943	167	291	189	1,568	22	C	10/10 to 11/15	200
I	0082	1,156	0	545	434	35	142	981	165	C	11/19 to 04/30	276
										C	04/01 to 04/30	
										C	05/01 to 05/15	
										C	11/14 to 11/18	
										C	05/16 to 06/04	
										C	11/04 to 11/13	

APPENDIX D

SUMMARY OF ALLOTMENT CONDITION AND AUTHORIZED USE (Continued)

Mgmt Status M, I, C	Rank/ No.	Total Acres	Ecological Range Cond.			Class Poor	Unclassified or Unmapped	Public Land Acres	Other Acres	Kind of ^{2/} Livestock	Season of Use	Public Land AUMs
			Excel.	Good	Fair							
I	2	2,545	212	1,477	575	0	281	1,607	938	C	06/05 to 06/20 08/20 to 11/03	325
I	1	3,094	15	2,550	152	0	377	1,846	1,248	H	08/20 to 10/31	188
C		200	0	0	0	0	200	200	None Designated	C	None Designated	2
M		2,470	134	1,186	182	0	968	1,781	689	C	05/16 to 06/15	148
M		371	0	119	4	0	188	371	0	C	06/16 to 07/15	75
I	2	2,513	60	2,067	176	0	210	1,275	1,238	C	05/01 to 12/31	416
I	2	8,472	1,773	4,086	1,859	153	601	7,205	1,267	C	12/15 to 05/15	1,429
I	2	6,941	612	3,182	1,636	4	1,507	4,767	2,174	C	05/16 to 06/30 09/16 to 12/15	811
I	2	26,606	2,506	15,920	4,330	554	3,296	25,189	1,416	H	11/01 to 02/28 04/01 to 06/10	2,181
I	1	12,852	937	7,054	1,298	17	3,546	7,637	5,215	C	10/17 to 12/20	1,260
I	2	1,452	397	409	181	0	465	1,361	91	H	04/16 to 12/31	136
I	1	7,500	1,087	4,330	734	644	705	7,387	113	C	None Designated 04/27 to 07/31	89
I	1	4,143	395	3,363	128	0	257	4,115	28	H	04/16 to 12/31	1,004
I	3	1,396	0	227	267	634	268	1,395	1	C	05/01 to 07/31	2
M		2,962	1,305	868	391	309	89	2,956	6	S	05/01 to 06/15	11
M		4,538	0	1,016	284	0	3,238	726	3,812	C	09/10 to 02/28	0
C		3,230	1,368	1,251	292	32	287	3,229	1	C	None Designated	0
C		2,035	0	586	1,206	132	111	1,852	183	C	04/16 to 06/05	170
M		2,793	80	1,017	646	31	1,019	1,040	1,753	C	12/01 to 01/07 05/01 to /10	163
M		876	12	101	0	0	763	248	628	C	10/16 to 10/30	153
M		1,096	489	340	0	0	268	433	663	C	None Designated	43
I	3	2,690	0	1,164	782	228	516	2,229	461	S	None Designated	12
I	2	9,733	245	4,292	2,073	85	3,038	9,691	42	S	04/10 to 06/05	243
M		2,559	1,152	776	68	0	563	337	2,222	C	02/01 to 05/31	732
I	2	31,588	810	13,481	9,342	94	7,861	29,158	2,430	C	None Designated 04/01 to 06/30	14
I	3	953	0	0	600	225	128	327	1,958	C	12/01 to 02/15 07/01 to 07/31	2,320
C		2,285	0	446	1,802	15	22	420	1,865	C	07/01 to 07/31	0
I	2	8,967	1,425	4,420	2,230	462	430	7,746	1,221	C	None Designated	75
I	2	633	0	270	269	0	94	633	0	C	11/24 to 02/02	900
I	2	3,619	0	1,160	1,256	851	352	2,958	661	S	04/21 to 06/20 06/15 to 10/16	134
I	3	1,395	0	350	952	69	23	1,395	0	S	04/16 to 06/15 02/05 to 02/15 04/01 to 04/22 02/01 to 02/13	471

APPENDIX D

SUMMARY OF ALLOTMENT CONDITION AND AUTHORIZED USE (Continued)

Mgmt Status	Rank/No.	Total Acres	Ecological Range			Class Poor	Unclassified or Unmapped	Public Land Acres	Other Acres	Kind of Livestock	Season of Use	Public Land ADMs
			Excl.	Good	Fair							
I	3	3,534	0	208	2,542	0	784	2,823	511	S	12/01 to 01/08	259
M		1,568	0	0	0	0	1,568	484	1,084	C	None Designated	44
M		2,096	0	0	0	0	2,096	240	1,856	C	None Designated	39
I	1	14,501	379	6,730	4,607	1,595	1,190	14,238	263	C	12/16 to 04/30	1,663
M		8,927	4,797	3,685	405	0	40	7,023	1,904	S	04/16 to 06/23	
I	2	5,061	1,657	2,158	846	126	274	3,860	1,201	C	12/01 to 02/04	1,267
M		2,884	0	0	0	0	2,884	238	2,646	C	04/20 to 06/25	
I	1	40,225	5,860	23,233	8,818	34	2,280	20,021	20,209	C	11/01 to 02/28	924
I	1	26,851	2,460	10,125	4,085	501	9,680	9,337	17,514	C	04/16 to 06/20	
I	1	5,568	264	3,230	1,086	0	988	2,114	3,454	C	11/01 to 06/15	37
I	1	6,681	0	523	3,652	1,710	786	4,031	2,650	H	03/01 to 02/28	6,814
M		2,048	0	1,029	696	0	323	334	1,714	C	04/16 to 10/31	710
I	1	3,400	0	1,817	1,249	0	334	3,400	0	C	None Designated	460
I	1	1,683	0	416	699	0	568	1,683	0	C	06/10 to 07/09	26
I	2	16,083	544	6,937	6,313	723	1,566	14,000	2,083	C	10/01 to 11/15	429
I	2	5,304	0	2,607	1,727	132	838	4,834	470	C	07/15 to 09/14	216
C		1,707	114	877	337	196	183	1,606	101	C	05/01 to 06/09	1,270
C		805	0	0	0	0	805	805	0	C	05/05 to 06/10	
C		612	0	394	41	103	74	612	0	S	11/16 to 12/31	678
I		990	0	577	138	85	190	650	340	C	05/01 to 06/06	
I	3	1,674	129	744	544	141	116	1,674	0	C	08/15 to 10/14	141
C		407	0	42	22	0	343	40	367	C	02/01 to 02/17	115
M		949	290	391	97	149	22	272	677	C	None Designated	32
I	1	2,459	405	1,310	86	0	658	1,700	759	C	None Designated	58
I	1	12,634	1,683	6,886	1,388	158	2,519	9,300	3,334	C	None Designated	258
C		14,476	80	10,125	1,610	805	1,856	13,076	1,400	C	None Designated	7
M		8,799	6,158	1,415	853	129	243	8,482	317	C	None Designated	52
I	3	4,233	100	1,968	1,920	18	227	3,076	1,157	H	05/20 to 07/10	788
I	2	3,333	286	1,265	929	0	852	703	2,630	C	09/16 to 11/15	
										S&C	05/20 to 07/10	1,200
										S&C	06/01 to 10/10	1,200
										C	01/11 to 05/31	960
										C	11/01 to 06/06	
										H	10/30 to 05/15	1,321
										S&C	04/21 to 06/15	
										S&C	10/11 to 01/10	
										C	None Designated	130
										C	05/10 to 07/09	515
										C	11/01 to 12/30	

APPENDIX D

SUMMARY OF ALLOTMENT CONDITION AND AUTHORIZED USE (Continued)

Mgmt Status	Rank/ No.	Total Acres	Ecological Range Cond.			Class Poor	Unclassified or Unmapped	Public Land Acres	Other Acres	Kind of Livestock	Season of Use	Public Land AUMs
			Excel.	Good	Fair							
I	1	16,299	4,279	6,517	1,592	275	3,637	8,137	8,162	C	05/15 to 10/31	1,186
M		1,242	45	591	0	0	606	19	1,223	H	None Designated	10
M		655	0	603	0	52	0	655	0	C	05/16 to 12/31	56
C		913	314	324	28	181	66	192	721	H	None Designated	20
I	2	1,723	12	703	710	0	298	1,722	0	H	05/01 to 05/31	60
C		10,977	1,231	5,100	3,341	0	1,304	9,482	1,495	S	11/16 to 05/18	1,358
I	3	1,667	0	458	572	0	637	612	1,055	S	None Designated	111
I	2	4,335	0	1,038	29	0	3,247	975	2,272	C&S	None Designated	190
I	2	6,409	0	260	4,380	1,169	600	4,727	1,682	C&S	04/21 to 05/31	558
M		2,732	330	2,079	220	497	1,731	2,180	552	C	09/16 to 12/15	502
I	1	14,676	1,199	8,067	3,182	794	750	8,900	5,776	C	04/23 to 06/18	1,995
C		4,685	0	2,119	1,024	0	0	3,244	1,441	C	11/08 to 12/30	93
I	2	3,302	150	1,301	1,019	0	832	1,557	1,745	C	03/01 to 06/20	152
C		2,582	0	678	510	0	1,394	2,434	148	C&S	05/01 to 09/15	219
I	2	11,347	0	4,161	2,897	652	3,637	9,964	1,383	S	None Designated	1,388
I	3	6,483	128	2,322	1,807	138	2,068	6,237	246	S	04/17 to 05/16	803
I	2	10,490	560	4,764	605	2,994	1,567	10,299	191	S	11/16 to 02/28	425
I	3	1,765	0	146	1,377	96	146	622	1,143	S	09/15 to 12/17	103
I	3	3,251	0	497	1,957	103	694	1,405	1,846	C&S	05/26 to 06/10	239
I	3	2,243	0	79	1,702	128	334	1,336	907	C	08/01 to 10/15	34
M		1,778	0	0	0	0	1,778	200	1,578	C	11/17 to 12/01	40
C		6,149	599	3,615	2,231	0	154	6,071	78	C	None Designated	680
C		1,191	151	759	9	153	119	1,059	132	C	04/15 to 06/22	179
I	3	1,064	0	452	406	0	206	906	158	C	12/01 to 01/15	39
I	2	2,173	296	1570	141	64	102	2,033	140	C	04/10 to 06/24	365
I	2	1,679	0	1669	0	0	10	1,595	84	C	05/01 to 05/14	107
I	1	6,659	1,084	3,302	1,954	0	319	5,429	1,230	C	12/10 to 01/09	606
I	1	1,646	727	807	0	0	112	1,198	448	C	10/19 to 10/31	207
I	1	2,583	664	1,543	62	0	314	1,196	1,387	C	05/15 to 06/14	407

APPENDIX D

SUMMARY OF ALLOTMENT CONDITION AND AUTHORIZED USE (Continued)

Mgmt Status	Rank/No.	Total Acres	Ecological Range Cond.			Class Poor	Unclassified or Unmapped	Public Land Acres	Other Acres	Kind of Livestock	Season of Use	Public Land AUMs
			Excell.	Good	Fair							
C	1	571	0	181	90	46	254	367	204	S	05/01 to 05/31 None Designated	12
M	2	3,265	259	1,063	75	0	1,868	200	3,065	S	01/16 to 04/09	21
C	1	20,749	1,096	4,897	12,488	104	2,164	18,340	2,409	S		1,571
I	1	8,621	1,422	3,415	2,331	0	1,453	3,546	5,075	C	05/01 to 06/15 09/26 to 11/13	864
I	2	3,304	0	0	0	0	3,304	1,160	2,144	S	06/16 to 09/25	209
C	1	13,936	536	8,102	1,834	700	2,764	11,901	2,035	S	03/01 to 04/25 12/24 to 01/15	1,567
C	1	10,763	192	3,444	4,446	0	2,681	10,093	670	S	11/04 to 12/23	651
I	2	2,692	0	48	300	921	1,423	2,625	67	C	05/01 to 06/30	342
I	1	1,695	57	1,309	73	0	236	1,075	620	H	05/10 to 07/11 10/25 to 11/14	114
I	1	1,427	40	649	565	0	173	844	583	C&H	05/15 to 07/11	210
I	1	2,016	472	794	0	0	750	761	1,255	C&H	07/12 to 10/24	67
I	2	2,510	27	1,911	529	0	43	2,510	0	C	05/10 to 08/05	407
I	3	2,272	176	1,379	560	17	140	421	1,851	C	08/06 to 11/05	80
I	3	630	0	454	132	0	44	202	428	C	None Designated	33
I	2	1,395	0	428	10	0	183	621	0	C	06/01 to 09/30	136
I	1	780	0	164	457	0	159	346	434	C	06/01 to 08/15	64
I	2	1,395	0	459	442	25	469	472	923	C	11/16 to 02/28	58
M	1	454	122	270	49	0	13	375	79	C	None Designated	37
M	1	324	25	54	46	4	195	167	157	H	None Designated	32
I	2	4,559	59	2,514	1,822	0	164	3,586	870	C	03/01 to 05/31 04/16 to 06/20	923
M	1	3,315	0	2,241	695	199	180	1,613	1,702	C&H	11/01 to 02/06 10/01 to 04/30	184
C	3	474	0	94	334	0	46	124	350	C	04/01 to 06/30 11/01 to 12/31	15
I	1	8,782	394	4,961	2,891	160	376	7,393	1,389	S	05/01 to 07/31 02/14 to 03/24 04/25 to 05/05	638
I	1	1,326	494	317	36	0	479	1,020	306	C	04/25 to 07/15 07/08 to 09/25	231
I	2	2,901	81	1,858	503	432	27	758	2,143	C	None Designated	61
I	2	1,211	69	937	73	0	132	878	333	C	05/11 to 10/10	141
I	1	2,204	0	1,143	423	0	638	1,330	874	C	06/15 to 09/14 06/15 to 10/15	263
M	1	2,697	54	1,434	717	0	492	250	2,447	H	None Designated	65
M	1	718	0	417	183	0	118	718	0	C	07/16 to 10/15	172
I	2	1,822	0	941	86	0	795	980	842	C	07/01 to 09/30	212
I	2	9,638	1,199	3,063	4,868	0	508	5,461	4,177	C	04/10 to 06/30 11/16 to 02/28	931

APPENDIX D

SUMMARY OF ALLOTMENT CONDITION AND AUTHORIZED USE (Continued)

Mgmt Status	M, I, C	Rank/No.	Total Acres	Ecological Range Cond.			Class Poor	Unclassified or Unmapped	Public Land Acres	Other Acres	Kind of Livestock	Season of Use	Public Land ADUs
				Excel.	Good	Fair							
I	I	3	251	0	156	27	4	64	251	0	C	05/01 to 05/31	18
I	I	3	237	17	36	94	20	70	111	126	C	None Designated	12
C	C	136	136	49	65	10	10	2	101	35	C	Exchange of Use Only	12
C	C	386	386	0	0	0	0	386	87	299	C	05/01 to 05/30	5
I	I	3	4,959	607	3,535	195	378	244	2,334	2,625	C	04/12 to 06/30	408
M	M	1,818	1,818	0	1,047	615	37	119	1,743	75	S	12/01 to 01/11	192
I	I	1	5,788	1,213	2,039	1,576	582	378	4,175	1,613	S	05/01 to 05/31	314
I	I	1	14,109	1,177	9,650	1,684	936	662	12,111	1,998	H	04/20 to 11/30	832
M	M	904	904	391	210	210	0	93	196	708	S	05/14 to 05/24	50
C	C	4,619	4,619	0	2,564	1,791	0	264	4,089	530	C	11/21 to 01/11	331
I	I	2	2,476	130	952	1,179	144	71	1,846	600	S	None Designated	136
I	I	2	1,717	478	909	122	0	208	1,682	35	C	05/18 to 06/13	108
I	I	3	2,331	0	1,618	482	0	231	1,682	35	C	10/16 to 10/30	75
I	I	1	16,153	107	3,822	3,327	0	8,897	15,084	1,069	S	06/16 to 07/15	2,957
I	I	3	4,808	57	2,877	177	235	1,462	3,797	1,011	C	01/01 to 06/10	584
M	M	737	737	0	0	0	0	737	224	513	H	03/01 to 10/15	64
C	C	9,012	9,012	0	5,969	521	565	1,957	8,320	692	S	10/15 to 02/28	690
M	M	1,734	1,734	25	1,207	153	65	284	1,085	649	C	05/11 to 06/10	175
M	M	1,524	1,524	387	648	170	82	237	1,122	402	C	04/15 to 06/20	172
I	I	11,958	11,958	5,837	3,966	1,217	441	497	11,641	317	C	08/29 to 11/14	1,934
I	I	2	5,422	0	2,638	2,240	0	544	2,305	3,117	C	04/01 to 05/31	341
I	I	2	1,307	24	249	87	0	942	1,307	0	C	11/05 to 12/13	200
I	I	3	6,428	1,522	902	2,135	239	1,630	6,428	0	S	06/01 to 06/30	900
I	I	2	4,071	0	625	654	30	2,762	4,071	0	C	10/16 to 11/01	503
I	I	1	14,583	953	791	1,405	0	11,433	10,146	4,437	S	01/20 to 12/31	1,044
I	I	2	5,728	5	2,408	2,727	134	454	5,027	701	H	01/23 to 05/31	476
I	I	2	1,670	0	0	0	0	1,670	1,286	384	S	10/21 to 01/22	203
I	I	2	6,451	93	1,690	567	26	4,075	5,155	1,296	S	05/01 to 09/28	869
C	C	2,719	2,719	79	546	660	0	1,434	2,280	439	H&C	10/01 to 04/30	431

APPENDIX D

SUMMARY OF ALLOTMENT CONDITION AND AUTHORIZED USE (Continued)

Mgmt Status	Rank ^{1/} No.	Total Acres	Ecological Range Cond.			Class Poor	Unclassified or Unmapped	Public Land Acres	Other Acres	Kind of ^{2/} Livestock	Season of Use	Public Land ADMs
			Excell.	Good	Fair							
I	2	7,117	873	4,282	827	197	938	4,595	2,522	S	06/16 to 12/31	595
C		1,595	57	840	414	33	251	1,073	522	C	05/20 to 06/17	134
M		646	32	397	136	0	81	548	98	C	05/01 to 05/31	100
I	2	8,031	386	1,534	1,110	261	4,740	5,953	2,078	S	11/01 to 12/09	1,021
										C	12/14 to 03/14	
										C	04/16 to 05/30	
I	2	2,286	229	704	411	70	872	2,031	255	C	10/01 to 11/21	385
I	2	1,958	18	864	755	0	321	1,958	0	C	12/01 to 12/15	444
C		906	0	755	69	0	82	792	114	C	05/15 to 06/06	444
M		3,006	0	0	0	0	1,006	300	2,706	C	10/01 to 12/07	106
I	2	2,518	0	1,598	337	0	583	384	2,134	C	07/01 to 08/30	36
I	2	3,884	1,017	1,563	0	0	1,304	1,012	2,872	C	None Designated	39
C		8,816	416	7,453	365	26	511	8,032	784	S	None Designated	137
I	1	6,789	1,253	3,538	1,419	0	579	4,165	2,624	C	None Designated	508
M		781	0	547	167	0	67	700	81	C	12/01 to 02/10	412
I	2	12,645	1,149	7,386	1,768	1,287	1,056	12,531	114	C	04/22 to 07/07	36
I	1	2,021	24	1,316	62	0	619	643	1,378	C	09/01 to 09/30	36
I	1	6,188	2,060	3,054	397	131	546	5,450	738	C	05/01 to 05/31	265
I	2	1,751	215	1,277	13	0	246	153	1,598	C	None Designated	157
C		4,463	45	149	3,082	105	1,082	4,409	54	S	None Designated	295
C		119	74	31	0	0	14	119	0	C	01/01 to 01/26	99
I	2	3,716	1,358	2,280	2	7	69	2,935	781	C	05/01 to 05/09	124
C		2,594	475	1,352	223	0	544	1,057	1,537	C	05/01 to 07/01	380
M		651	0	463	68	0	120	590	61	C	None Designated	54
C		611	0	541	0	0	70	480	131	C	05/01 to 06/30	41
C		306	0	275	31	0	0	306	0	C	05/15 to 06/14	20
I	2	30,874	5,662	16,837	5,064	1,781	1,530	27,940	2,934	C	06/15 to 07/14	26
										H	04/27 to 06/06	2,543
											05/02 to 05/18	
I	1	1,052	146	657	142	32	75	1,052	0	C	11/01 to 01/20	187
C		2,197	0	353	1,629	73	142	620	1,577	C	06/07 to 06/30	187
I	1	13,359	3,348	6,938	1,759	470	844	12,534	825	S	10/01 to 10/30	25
I	1	8,363	742	4,376	1,703	31	1,511	5,868	2,477	C	05/01 to 05/30	1,160
C		9,147	0	4,010	3,133	0	2,004	8,800	347	C	04/26 to 07/10	634
M		1,116	23	833	260	0	0	842	274	C	04/28 to 07/30	539
M		375	0	194	125	0	56	375	0	C	09/11 to 10/30	77
M		152	0	58	36	0	58	152	0	C	11/01 to 01/31	80
X										C	None Designated	38
											None Designated	

APPENDIX D

SUMMARY OF ALLOTMENT CONDITION AND AUTHORIZED USE (Continued)

Mgmt Status M,I,C	Rank/ No.	Total Acres	Ecological Range Cond.			Class Poor	Unclassified or Unmapped	Public Land Acres	Other Acres	Kind of Livestock	Season of Use	Public Land AUMs
			Excel.	Good	Fair							
2003		2,234	0	0	0	0	2,234	80	2,154		None Designated	20
2004		478	0	224	41	0	212	478	0		None Designated	66
2005	I	1,036	0	594	161	0	281	1,036	0		None Designated	260
2006	M	34	0	26	0	0	8	34	0		None Designated	10
2007	I	1,367	0	553	306	0	508	1,301	66		None Designated	318
2008	I	238	0	36	8	0	194	75	163		None Designated	72
2009	M	1,075	0	0	0	0	1,075	80	995		None Designated	10
2010	M	536	0	249	91	0	197	536	0		None Designated	124
2012	M	428	--	--	--	0	4,028	4,028	--		None Designated	841
2013	M	748	20	515	5	0	208	748	0		None Designated	163
2014	M	479	0	155	0	0	324	158	321		None Designated	26
2015	I	163	45	0	110	0	8	163	0		None Designated	44
2016	M	146	0	140	0	0	6	146	0		None Designated	70
2017	M	293	40	195	30	0	28	293	0		None Designated	78
2018	I	3,320	0	0	0	0	3,320	1,952	1,368	S	08/01 to 11/30	109
2019	I	3,760	0	0	0	0	3,760	400	3,360	S	None Designated	80
2503	I	16,352	0	0	0	0	16,352	4,570	11,782		None Designated	828
2506	I	6,386	0	0	0	0	6,386	2,868	3,518	S&C	None Designated	460
2507	I	3,202	0	1,253	312	2	1,635	1,342	1,860		None Designated	300
2509	I	9,809	0	1,560	0	0	8,249	3,162	6,647		None Designated	861
2512	I	6,424	0	126	432	0	846	520	5,904		None Designated	122
2513	I	486	0	0	0	0	486	242	244		None Designated	30
2514	I	11,741	0	0	0	0	11,741	2,985	8,756		None Designated	473
2515	I	1,970	0	0	0	0	1,970	233	1,732		None Designated	48
2516	M	1,789	0	0	0	0	1,789	414	1,375		None Designated	67
2521	I	2,649	0	0	0	0	2,649	1,549	1,100		None Designated	240
2525	I	5,316	0	0	0	0	5,316	440	4,876		None Designated	75
2529	I	1,993	0	0	0	0	1,993	241	1,752		None Designated	51
2530	I	2,333	0	0	0	0	2,333	540	1,793		None Designated	95
2531	I	2,943	0	0	0	0	2,943	120	2,823		None Designated	24
2536	I	2,086	0	0	0	0	2,086	2,086	0		None Designated	404
2538	I	11,418	0	0	0	0	11,418	2,340	9,078		None Designated	910
2541	I	1,051	0	0	0	0	1,051	839	212		None Designated	58
2542	I	1,074	0	0	0	0	1,074	440	634		None Designated	96
2543	I	4,413	0	0	0	0	4,413	698	3,715		None Designated	156
2546	I	5,613	0	0	0	0	5,613	3,749	1,864		None Designated	811
										S	04/20 to 06/09	
										C	05/01 to 06/19	
2547	I	4,321	421	2,368	494	398	640	2,213	2,108	S	11/10 to 12/31	396
										C	11/20 to 01/09	
										H	03/01 to 10/31	
										S	06/01 to 11/30	
										C	08/01 to 02/28	

APPENDIX D

SUMMARY OF ALLOTMENT CONDITION AND AUTHORIZED USE (Continued)

Mgmt Status M, I, C	Rank/ No.	Total Acres	Ecological Range Cond.			Class Poor	Unclassified or Unmapped	Public Land Acres	Other Acres	Kind of ^{2/} Livestock	Season of Use	Public Land AUMs
			Excel.	Good	Fair							
I	3	77	0	35	37	0	5	40	37		None Designated	8
I	2	2,034	16	1,627	113	7	271	774	1,260		None Designated	95
I	2	3,931	0	0	0	0	3,931	632	3,299		None Designated	104
I	1	10,197	0	0	0	0	10,197	2,424	7,773		None Designated	454
I	1	8,726	0	0	0	0	8,726	1,046	7,680		None Designated	373
I	1	4,585	0	0	0	0	4,585	755	3,830		None Designated	215
I	1	639	0	0	0	0	639	76	563		None Designated	71
I	1	4,695	0	3,758	514	0	422	2,601	2,094		None Designated	646
I	2	0	0	143	0	7	150	160	0		None Designated	32
TOTALS											1,095,467	142,494

^{1/} Priority for action within "I" Category allotments

^{2/} C = Cattle S = Sheep H = Horses

APPENDIX E

PROBLEMS, OPPORTUNITIES AND OBJECTIVES FOR GRAZING MANAGEMENT

Table E-1 describes the most common problems encountered in the administration and management of livestock grazing on public lands in the Washakie Resource Area. It also describes in general terms what management actions can be used to correct the problems. The table is intended

to provide an overview of how grazing management of administration could be used to improve the situations listed. The situations described do not apply to all allotments, nor do the management actions take into account all multiple-use management considerations.

TABLE E-1
PROBLEMS, OPPORTUNITIES AND OBJECTIVES FOR GRAZING MANAGEMENT

Situation	Management Action
Grazing season and grazing habits of different kinds and classes of livestock can reduce the quality and quantity of vegetation produced by a plant community.	Change the season and/or the class or kind of livestock. Designate the season and kind of livestock for the allotments that currently have no designation. Implement grazing systems that will provide for plant maintenance requirements. As a general rule, on all allotment categories, adjustments would limit use prior to seed ripe on key forage species to 1 year out of 2 or 3 in areas with less than 10 inches of annual precipitation and 1 year out of 2 in areas with 10 or more inches of precipitation. A rest cycle would be considered any time use occurs prior to seed ripe. As a goal, use of key species on selected key areas would be limited to a level that would meet the objectives of allotment management, normally a maximum of 50 percent utilization of the current year's production (Bell, 1973).

APPENDIX E

TABLE E-1 (Continued)
PROBLEMS, OPPORTUNITIES AND OBJECTIVES FOR GRAZING
MANAGEMENT

Situation	Management Action
<p>Livestock use can be poorly distributed within an allotment or pasture. This can result in heavy utilization of some sites while others may receive little or no grazing use.</p>	<p>Develop new water sources to distribute livestock use more evenly.</p> <p>Construct drift fences to alter traditional grazing patterns.</p> <p>Specify locations for placement of salt or mineral supplements.</p> <p>Require herding of livestock.</p> <p>Authorize the class or kind of livestock that will best utilize the allotment.</p>
<p>Current levels of livestock use may exceed the carrying capacity of an allotment.</p>	<p>Monitor actual livestock use and resulting levels of utilization to determine the proper carrying capacity.</p>
<p>Some sites that are now producing a quality and quantity of forage well below their potential have a poor potential to respond to changes in grazing management alone.</p>	<p>Restore productivity of these sites through mechanical treatment, prescribed fire and/or seeding with native species or well-adapted introduced species.</p>
<p>Investments in range improvements needed to implement changes in grazing management often do not have favorable benefit/cost ratios for the U.S. Government.</p>	<p>Solicit contributions from range users and other parties benefiting from changed grazing management.</p> <p>Design grazing management systems that require a minimum investment in range improvements but will meet the stated objectives.</p>
<p>Plant and animal pests can adversely affect livestock and vegetative productivity.</p>	<p>In cooperation with other affected land owners and agencies, take actions to control concentrations of pests.</p>

APPENDIX F

VEGETATION MANIPULATION PRACTICES

All vegetation manipulation proposals should have multiple resource review, including scoping, planning and design, implementation, and management. Sagebrush and juniper areas treated with chemicals or by mechanical means, including prescribed burning, should follow the guidelines listed below.

VEGETATION MANIPULATION GUIDELINES FOR SAGEBRUSH IN MULE DEER AND ELK HABITAT

Treatments of sagebrush in mule deer and elk habitat should meet the following guidelines:

- Sagebrush treatment areas should be homogeneous blocks wider than 1,250 feet and be lacking a diverse grass/forb layer.
- Sagebrush treatment areas should have an excess of cover and insufficient green forage.
- Sagebrush in treatment areas is less desirable than meadow plant communities.

Treatments in sagebrush areas should be based on 5,000 acre (or less) management units and meet the following objectives:

- Treatments should not occur within 330 feet of trees in deer fawning areas.
- Treatments should produce a good, evenly dispersed mosaic.
- Treatments should not remove more than 50 percent of the available cover of homogeneous sagebrush stands within the habitat management units.
- Treatment areas should be: (1) irregular; (2) long and perpendicular to prevailing winds on winter ranges; (3) no wider than 800 feet; (4) remaining areas of cover should be at least 600 feet wide to 1,200 feet wide, irregular, and continuous, interconnected and scattered.

Treatments in juniper areas on mule deer and elk range should meet the following objectives:

- A canopy closure of 60 percent should be the minimum provided for thermal cover.
- Openings in juniper stands should be no wider than 200 feet and should be perpendicular to prevailing winds.
- Remaining cover areas should be 600 to 1,200 feet wide.

VEGETATION MANIPULATION GUIDELINES FOR SAGE GROUSE HABITAT

Treatments of sagebrush in sage grouse habitat should meet the following guidelines:

- Winter habitat should not be treated.
- Spring or summer habitat should be treated in the late summer or fall.
- Treatments within 2 miles of leks generally are not recommended.
- In spring or summer habitat, treatments should not occur when sagebrush canopy density is less than 20 percent. A minimum of 20 percent sagebrush should remain after treatment.
- Living strips of sagebrush in irregular patterns should be maintained in 300 foot strips on each side of streams.
- Treated areas should be no wider than 100 feet.
- Untreated areas should be at least 200 feet wide.
- Herbicides should be applied with helicopters or ground equipment for best control of the spray.
- Sagebrush kills on treated areas should not exceed 90 percent.

APPENDIX G

PROPOSED SPANISH POINT KARST AREA OF CRITICAL ENVIRONMENTAL CONCERN

INTRODUCTION

The Washakie Resource Management Plan proposes to designate about 11,200 acres of BLM-administered public surface or mineral estate within the Trapper and Medicine Lodge Creek watersheds as the Spanish Point Karst Area of Critical Environmental Concern. The plan provides management prescriptions to guide surface and subsurface activities in the area.

Before designation, a potential ACEC must meet both relevance and importance criteria (43 CFR 1610.7-4) to become eligible for further consideration. Definitions of these criteria are:

Relevance. An environmental resource or natural hazard may be found “relevant” where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards.

Importance. A resource is important if it has qualities that give it special worth, meaning, distinctiveness, or cause for concern, especially when compared to any like or similar resources. It also must be more than locally significant. Qualities or circumstances that make such a resource fragile, sensitive, rare, irreplaceable, endangered, threatened, or vulnerable to adverse change may be among the reasons management action is appropriate. A natural hazard may be found important if it is a significant threat, either existing or potential, to human life or property.

The relevant resource, within the proposed Spanish Point Karst ACEC is karst topography. These karst formations are a manifestation of natural hydrogeologic processes and consist of areas of limestone and/or dolomite which are typified by sinking stream segments, cave and cavern formation, and rapid subterranean movement of water.

The karst formations are important because they contain caves of national and statewide importance and also provide an important recharge area for the Madison aquifer. Caves within the ACEC boundaries that offer recreational and scientific opportunities include Great Expectations (Great X), La Caverna de los Tres Charros (Tres Charros), Bad Medicine, Dry Medicine Lodge and P Bar. Associated with the caves, within the ACEC boundaries, are 45,000 feet of explored cave passages and 100,000 feet of subkarstic waterways. The cave entrances, passages and waterways serve as a receptacle and circulation system for very fresh (TDS < 75 mg/1) water originating in the Precambrian highlands to the east on Forest Service lands. A portion of the water that circulates through the karstic system is entrapped in the carbonate rocks and recharges the widely used and economically important Madison aquifer of the interior Big Horn Basin.

The Madison aquifer is the source of municipal water for the communities of Worland, Ten Sleep, and Hyattville, and provides irrigation water for thousands of acres within the Big Horn Basin.

It is recommended, upon designation of the Spanish Point Karst ACEC, that management prescriptions for the area pursue a course of optimizing watershed opportunities over other resource concerns in the area. The existence of regional and nationally important caves, and recharge areas for the Madison aquifer are features of historic and ongoing hydrogeologic processes. Any actions within these vital watersheds which would alter existing hydrogeologic regimes through the addition of sediment, debris, water pollutants or toxic substances, or divert water above major sinking points, could detract significantly from the recreational and scientific values of caves as well as contaminate the Madison aquifer.

A detailed map (Map 7) of the Spanish Point ACEC can be found in Chapter 2. A complete legal description of the ACEC is presented in Table G-1.

DESCRIPTION OF THE SPANISH POINT KARST AREA

The Spanish Point Karst ACEC includes public land stream channels and canyon rims of Trapper, Dry Medicine Lodge and Medicine Lodge Creeks. Geographically the area is located along the eastern border of the Washakie Area on the west slope of the Bighorn Mountains (Map 24). Huntoon (1985a) has described the regional hydrogeology in the following way:

“The Trapper-Medicine Lodge area serves as a recharge area for aquifers interbedded within the Paleozoic and Mesozoic section. The sediments dip gently westward at about six degrees in a homocline that is being stripped of its younger sediment by erosion. The resulting configuration is one of broad dipslopes composed of successively older units as one proceeds upstream in various drainages in the area.

The 1,150 ft. section of carbonate rocks comprising the Madison aquifer crops out between younger rocks to the west Cambrian and Precambrian rocks to the east. Units within the carbonate sequence include from bottom to top: Ordovician Bighorn Dolomite, Devonian Jefferson Limestone and Mississippian Madison Limestone. Overlying and underlying shales in the section serve as regional confining layers both westward in the basin and within the Trapper-Medicine Lodge area in locations where they are preserved.

All surface streams which originate on the precambrian highlands (on Forest Service lands) to the east sink into the first downstream carbonate outcrops they encounter. In most cases, sinkholes are developed in the basal Bighorn Dolomite, where extensive caves dissolved from the carbonate sequence conduct water downgradient but up section to resurgences in the floors near the western most exposures of the Madison Limestone.” (Map G-1)

Both Aley (1983) and Huntoon (1985b) have investigated the fate of water initially entering the karst system. Caves within the Trapper-Medicine Lodge area have the capacity to initially swallow large quantities of flowing water. For example, BLM personnel have measured flows of 50 CFS entering the entrance of Dry Medicine Lodge and Tres Charros Caves. However, not all of this water is lost to the interior basin as groundwater. Dye tracings conducted by Aley in Dry Medicine Lodge Creek confirm that significant quantities of water exit the system as surface waters via resurgences

at the toe of the Bighorn Mountains. Quantities of water “lost” as recharge will be discussed in a later section of this appendix.

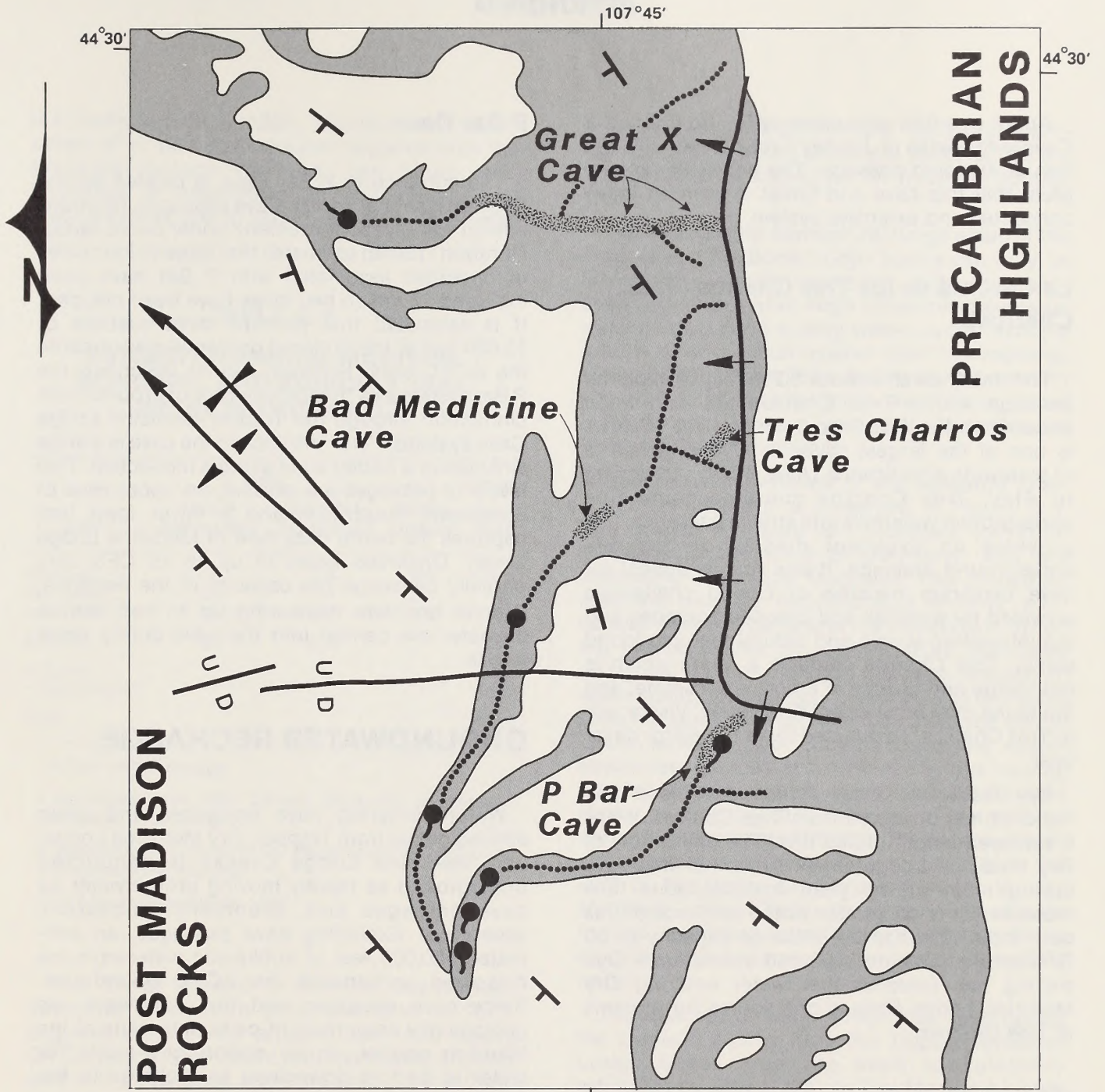
CAVES OF THE SPANISH POINT KARST ACEC










The ACEC proposal includes within its boundaries entrances, passageways and sub-karstic waterways associated with four major caves, and includes Great Expectations in Trapper Creek, and three caves in Medicine Lodge Creek: La Caverna de los Tres Charros, Bad Medicine, and P Bar. Two lesser caves, Dry Medicine Lodge Cave and the Sinks of Johnny Creek Cave, are also included. The complete cave system, including entrances and known passageways, of Tres Charros, Bad Medicine, and Dry Medicine Lodge Cave, are within, or lie underneath the ACEC boundaries. The complete systems associated with Great X, P Bar and Johnny Creek caves are not contained wholly within or underneath the proposed ACEC boundaries. Only partial passages and or entrances to these caves are included. Individual descriptions of caves are presented below.

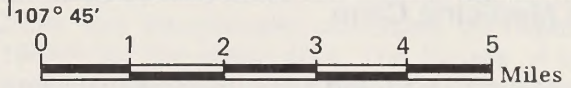
Great Expectations (Great X)

About 21,000 feet of explored Great X Cave passages lie underneath the proposed ACEC. Great X is a major cave discovery on Trapper Creek. Known previously as the Sinks of Trapper Creek Cave (Caves of Wyoming, 1976) the cave was originally thought to be 140 feet in length. In 1977 spelunkers were able to expand the length of known passage by enlarging a crack in the back of the entrance room. Between 1977 and 1980, numerous spelunkers working in teams were able to discover thousands of feet of passageway, locate a second entrance (called Great Exit) some seven miles downstream from the upper entrance, and make a through cave connection between the two entrances. The upper entrance to Great X is on private lands, while Great Exit is on public lands and is included within the Spanish Point Karst ACEC.

After a survey, completed in October 5, 1980, Great X was determined to be the deepest cave in the United States, with a depth of 1,403 feet. That record was subsequently eclipsed by a cave in the Teton mountains; Great X is now the second deepest cave in the U. S. Visitor use to Great X is estimated to be 50 visits/year.



-  Madison Limestone, Jefferson Limestone, Bighorn Dolomite
-  Explored Cave
-  Subsurface Karstic Waterway
-  Fault
-  Anticline
-  Syncline
-  Monocline
-  Strike and Dip of Rocks
-  Resurgence



Modified from Huntoon: Gradient Controlled Caves, Trapper-Medicine Lodge Area, Bighorn Basin, Wyoming, 1985.

Map G-1
CAVES, SINKING STREAM SEGMENTS
and SUB-KARSTIC WATERWAYS

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About one-fifth mile down valley from Great X Cave is the sinks of Johnny Creek Cave, with 164 feet of explored passage. The possibility is very great that this cave and Great X form an interconnected and extensive system.

La Caverna de los Tres Charros (Tres Charros)

The entrance and about 5,200 feet of explored passage within Tres Charros are contained underneath the ACEC boundaries. Tres Charros is one of the largest caves in Wyoming and is of statewide significance (Aley, 1979). According to Aley, Tres Charros contains some fine underground waterfalls and stream passages, and provides an excellent display of complex underground drainage. It has special appeal for cave explorers because of caving challenges provided by waterfall and cascade passages and the interesting scenic and natural features found within. Tres Charros contains a fauna which is both large and diverse in a northern climate, and the fauna may be of scientific interest. Visitor use to Tres Charros is estimated to be 100 visitor days/year.

Dry Medicine Lodge Creek cave is a few hundred feet upstream from Tres Charros. It has a surveyed length of 205 feet. The entire flow of Dry Medicine Lodge Creek sinks into this cave during most of the year. Instantaneous flow measurements conducted at the entrance of this cave indicate it has an entrance capacity of 50 CFS before flows are bypassed downstream. Dye tracing has revealed that water entering Dry Medicine Lodge Cave is one source for streams in Tres Charros.

Bad Medicine Cave

The entrance to Bad Medicine Cave is about 2.2 miles downstream from Tres Charros Cave. The entrance and about 6,600 feet of passage associated with the cave are contained within the ACEC. Bad Medicine Cave trends in a northerly direction (upstream) along Dry Medicine Lodge Creek. Tres Charros trends downstream along the same creek, thus indicating a potential for linkage of the two caves by a passage. Dry tracing by Aley (1983) has shown that waters flowing through Bad Medicine also flow through Tres Charros.

P Bar Cave

The entrance to P Bar Cave is located on the Bighorn National Forest. Cave passages, however, appear to trend southwesterly under public lands. Huntoon (1985b) estimates that three to four miles of passages associated with P Bar have been explored, of which two miles have been mapped. It is estimated that perhaps three-quarters or 15,000 feet of the explored passages may underlie the ACEC area. Huntoon further described the P Bar system as a "typical example of groundwater circulation through the Trapper-Medicine Lodge Cave systems." The entrance to the cave is a large sinkhole in a folded zone along a monocline. Two levels of passages are present, an upper level of ephemeral floodways, and a lower level that captures the entire base flow of Medicine Lodge Creek. Observed flows of up to 15 CFS only partially challenge the capacity of the entrance. Granite boulders measuring up to two feet in diameter are carried into the cave during large floods.

GROUNDWATER RECHARGE

Waters entering cave entrances and other sinking points from Trapper, Dry Medicine Lodge, and Medicine Lodge Creeks is conducted underground as rapidly moving groundwater by cave passages and, eventually, subkarstic waterways. Excluding cave passages, an estimated 100,000 feet of subkarstic waterways are dissolved underneath the ACEC boundaries. Since cave passages and the waterways are geologically comprised of carbonate units of the Madison aquifer, ample opportunity exists for water to be lost downslope as recharge to the interior Madison artesian basin.

Groundwater flow in the Madison/Big Horn aquifer is strongly influenced by secondary features of the rocks, primarily fracturing and subsequent solution. These features, when occurring on a large scale, make the Madison aquifer ideal for development of large quantities of fresh, surface flowing artesian water.

The ability of the Madison to produce copious quantities of fresh water has made it a favorable target for municipal and irrigation water developers. About 25 wells currently withdraw an estimated 8,900 acre feet of water per year from

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the Madison (USGS, 1985). Municipalities which obtain all or part of their water supplies from the Madison include Worland, Ten Sleep, and Hyattville. A breakdown of estimated annual Madison water use, by sector, is displayed in Table G-2.

TABLE G-2
ESTIMATED ANNUAL MADISON
MUNICIPAL AND AGRICULTURAL
WATER WITHDRAWALS

Use	Daily		Annual	
	Million Gallons/Day	Cubic Feet Per Second	Million Gallons	Acre-Feet
Worland ¹	1.6	2.5	590	1,810
Ten Sleep ²	.07	.11	30	92
Hyattville ³	.01	.02	3.6	11
Subtotal	1.68	2.63		1,913
Irrigated Agriculture ⁴				7,000
Total				8,913

¹ Actual 1984 Pumpage

² Estimated with 1980 Census Data and Assuming Consumption of 200 gpcd

³ Estimated by Assuming Population of 50 and Consumption of 200 gpcd

⁴ 1976 Estimate by USGS, 1985

The City of Worland is the most recent major developer of Madison water. Worland, in 1979, acquired one flowing artesian well from Husky Oil Company, and drilled and developed another well in the Paintrock Anticline area. The citizens of Worland, in 1980, voted to spend nine million dollars to develop the Madison well field and an ancillary 18 mile pipeline delivery system. Worland previously obtained its municipal supplies from the Bighorn River. Citizen complaints about water quality were numerous when the river water was utilized.

The well field developed by Worland dramatically demonstrated the capacity of the Madison. Tests of Worland Husky No. 1 in 1979 resulted in an average flow rate of 5,180 gallons per minute for a 24 hour period and a total flow of 7,459,494 gallons. Initial shut in pressure was 193 psi, with a pressure drawdown of 11 pounds during the test. Recovery was instantaneous after the well

was shut in (Verne Nelson, personal communication). Worland Municipal Well No. 3 is the largest reported flowing well in Wyoming (USGS, 1985).

The relationship between recharge areas in the Trapper and Medicine Lodge basins can only be inferred by similar geologic units and geochemistry at this time. High volume and pressure wells flowing good quality water usually indicate a fairly open conduit system from the recharge areas. Driller logs indicate that caverns extending some 10 to 15 feet in depth were encountered in the donated Worland-Husky well. (Verne Nelson Personal Communication)

Geochemical evidence of the recharge area-aquifer relationship is presented in Figure G-1. The graphs in Figure G-1 represent ion comparisons in the form of polygons, and are commonly called Stiff Diagrams. This procedure involves plotting cationic and anionic concentrations on either side of the vertical axis. When the plotted points are connected, a distinctive polygonal pattern emerges that is a function of water quality for a particular source. The first three plots in Figure G-1 represent Dry Medicine Lodge Creek water at Tres Charros Cave and downstream resurgences as determined by dye tracing. The final plot represents waters from the Worland Husky municipal well. Similarities in the patterns are readily apparent. Although the graphs should not be interpreted that water withdrawn from the well is the same subterranean water in Dry Medicine Lodge Creek, the graphs do present logical expected relationships of the same dominate ions and increasing mineralization of the water.

The quantity of water which may be entering the Madison aquifer from the Trapper Medicine Lodge Creek area has been speculatively estimated by Aley (1983) on Dry Medicine Lodge Creek and theoretically calculated by Huntoon (1985b) for the entire area. The figures of both investigators are based on one-time observations, but they do provide a range from which to work.

While conducting dye tracing in 1983 on Dry Medicine Lodge Creek, Aley discovered that an appreciable amount of water could not be accounted for at resurgences when compared to water entering the system through Dry Medicine Lodge Cave, Tres Charros, and other appurtenant sinking points. Water entering the groundwater system was estimated to be 10 CFS, while water leaving through resurgences lower in the drainage was estimated at 4.5 CFS, leaving 5.5 CFS unaccounted for.

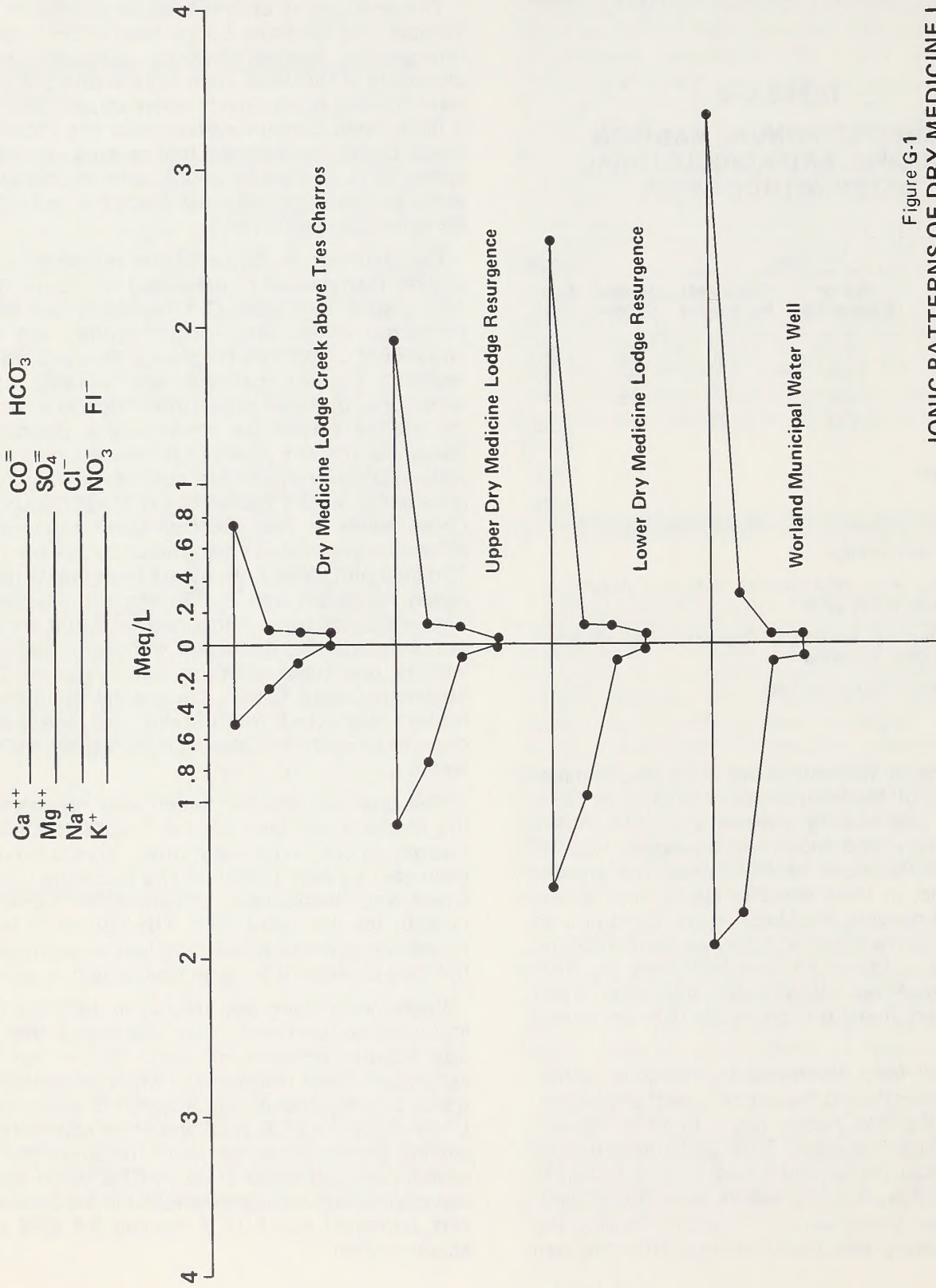


Figure G-1
**IONIC PATTERNS OF DRY MEDICINE LODGE CREEK
AND WORLAND MUNICIPAL WELL WATERS**

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Huntoon calculated a theoretical maximum recharge by applying Darcy's equation to a cross section through the Madison aquifer which extends through the mouths of Trapper and Medicine Lodge canyons. Using a length of the aquifer of 89,760 feet, a calculated transmissivity of 4.4×10^3 gallons per day per foot, and a mean basinward gradient of .0076 ft/ft., a maximum recharge value of 5 CFS is calculated. Assuming 5 CFS is an annual daily average, a total of 3,650 acre feet of water per year would recharge the Madison aquifer through the karst areas. This would amount to about 40 percent of the estimated average annual withdrawals of water from the Madison.

WATER QUALITY

Water quality sampling has been conducted by BLM and Forest Service personnel of Trapper and Dry Medicine Lodge Creek above the two major sinking points of these streams. Sample results are presented in Table G-3. As expected, the water quality of these streams can be described as excellent, with low dissolved mineral content and virtually no trace metals. As a comparison, water within both streams would meet or exceed all drinking water standards with the possible exception of bacteriological parameters.

PAST IMPACTS AND FUTURE POTENTIAL CONFLICTS

Because of the direct connections between caves of the Trapper and Medicine Lodge drainage basins and sinking stream segments, and the relationship of cave passages and subkarstic waterways to recharge of the Madison aquifer, the most significant impacts on the karst areas from land management activities will be water related. Specifically, the most significant impacts will be associated with water quality of the streams, including sediment, debris and toxic substances, and water quantity or diversion of water away from streams above major sinking points. Specific concerns with these watershed processes are described below.

TABLE G-3
REPRESENTATIVE WATER QUALITY
DATA TRAPPER AND DRY
MEDICINE LODGE CREEKS, WYOMING

Water Quality Parameter	Units (Mg/l)	
	Dry Medicine Lodge Creek Above Tres Charros ¹	Trapper Creek Above Great X ²
TDS	47	
Calcium	18	
Magnesium	3	
Sodium	4	
Potassium	0	
Carbonate	0	
Bicarbonate	39	
Sulfate	7	
Chloride	5	
Nitrate	.13	.1
Fluoride	.06	
Conductance	59 ³	48 ³
pH	7.25 ⁴	6.6 ⁴
Hardness	32	30
Alkalinity	32	56
Phosphate	.03	1.0
Suspended Sed.	4	3.4
Arsenic	ND	
Barium	ND	
Boron	.03	
Cadmium	ND	
Copper	ND	
Chromium	ND	
Dissolved Iron	ND	
Mercury	ND	
Selenium	ND	
Silver	ND	
Zinc	.008	

Note: ND means Not Detected.

¹ T51N, R88W, NENW, Sec. 4, data collected by BLM, September 13, 1984

² T52N, R88W, SENW Sec. 2, data collected by Forest Service, September 13, 1980

³ Units in (uMhos).

⁴ Units in (Units).

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Sediment

Sediment transported by water is of concern because of its propensity for plugging solutionally enlarged conduits. Natural erosional processes contribute vast amounts of sediment and debris to the cave systems. Of primary concern is sediment contributed to the streams by accelerated erosion. Accelerated erosion is caused by surface disturbing activities which remove vegetation and expose bare soils to erosion initiating elements such as precipitation and surface runoff. Land uses within the Trapper and Medicine Lodge drainages which have caused accelerated erosion include timber harvesting, grazing and off-road vehicle use. Aley has made the following observations regarding land use and sedimentation in the Dry Medicine Lodge drainage.

“Under natural conditions the streams of the area transport substantial quantities of sediment and organic material. These materials in turn enter the cave systems. Without doubt, grazing, road building and logging have all tended to accelerate the transport of these materials into the streams and ultimately the caves of the area. The question of concern is, has this change been detrimental to cave or water resources? Based upon our examination of the area and underlying cave systems, our understanding of groundwater transport in karst systems and (interpretation of data collected from dye studies) it is our conclusion that the increased contributions of sediment and organic material into groundwater systems of the area has been harmful to both water and cave resources. Damage has occurred to groundwater systems through the plugging or partial plugging of solutionally enlarged conduits through which water naturally travels through the groundwater system. Cave resources have been damaged by deposition of sediment and debris in cave passages, and particularly in some of the lower gradient passages such as ponds and lakes in Tres Charros.”

A potential new land use, extraction of tar sands, may occur in the future in the Trapper-Medicine Lodge Creek area. Although the exact technology for extracting petroleum from the tar sand deposits is not known, strip mining appears to be the most reasonable development scheme. Such mining could disturb several tens or hundreds of acres over time, thus leading to significant sediment loads to the sinking points of Trapper and Dry Medicine Lodge Creek.

Toxic Substances and Other Pollutants

The use of water from the Madison aquifer for municipal and agricultural purposes makes the accidental introduction of toxic substances, oil and grease, salts and other contaminants a primary concern. The rapid diversion of surface water to groundwater conduits in the karst areas would most certainly ensure that introduction of water pollutants above major sinking points would contaminate the Madison aquifer to a certain degree. It cannot be predicted at this time what level of contamination injected at the recharge areas would impair downslope groundwater consumers. The complexity of the karst areas would make cleanup efforts very difficult once pollutants entered the cave systems. Cleanup or retrieval of pollutants would be costly, if not impossible. Major pollution would realistically create a certain quantity of lost water resource. Alternatives to cleanup of the recharge area would be to forego the use of groundwater if the contamination was significant, or add costly treatment systems to remove the pollutants upon withdrawal of the groundwater resource.

Pollutants of the toxic variety, salts, or oil and grease are not generated within the vicinity of the proposed ACEC at this time. Tar sand extraction, if it occurs in the future, potentially presents the hazard of liquid hydrocarbon spills which could reach perennial waters.

Water Diversion

The impacts to cave systems and recharge are readily apparent if significant quantities of water are diverted upstream of major sinking points. Water diverted in this manner could eliminate underground streams and waterfalls, a significant recreational attraction within certain caves. Less water entering the karst systems also would mean less available water for recharge.

In addition to surface activities, caves and groundwater are susceptible to subsurface activities such as exploratory drilling for minerals and hydrocarbons. Potential threats to caves and water resources by exploratory drilling primarily include the possibility of penetrating the caves with the drillstem, thus creating a surface conduit into the caves. Drilling into the caves in this manner could affect water resources by injecting drilling fluids into the karst system. Damage of

this type has been documented in Horsethief Cave of the Cody Resource Area, which was penetrated by a drill rig exploring for uranium. Exploratory drilling has not extensively occurred within the Spanish Point area. However, any future subsurface disturbance by exploratory drilling should be managed in a manner to prevent penetration of caves or subkarstic waterways.

PROPOSED FUTURE MANAGEMENT

The importance and relevance of the karst areas of the Trapper and Medicine Lodge Creek basins have been described herein. Surface management of the karst areas should pursue a course of optimizing watershed opportunities over other

resource values that may be present. For purposes of optimizing management of quantity and quality of water from these vital watersheds, it is recommended that the areas be designated as the Spanish Point Area of Critical Environmental Concern. Upon designation, and subsequent preparation of an ACEC management plan, management of the watersheds should pursue a course of protecting known caves and appurtenant sinking stream segments from unnecessary sedimentation and chemical pollutants resulting from surface disturbing silvicultural, agricultural, and mineral activities. Subsurface management should ensure that caves are not penetrated by exploratory drilling activities. An array of four management alternatives for activities that could occur in the future in the vicinity of, and their affects on the proposed ACEC, including minerals, forestry, recreation, fire, and grazing, are analyzed within the Washakie RMP.

APPENDIX H

WATER WELL CONVERSION CRITERIA

The Mineral Leasing Act of 1920 as amended, The Federal Land Policy and Management Act of 1976, 43 CFR 3160, 2300, and Onshore Oil and Gas Order No. 1, give the Bureau of Land Management the authority for converting abandoned oil and gas wells to water wells.

The criteria used to determine if the BLM will convert abandoned oil and gas wells or exploration test holes into water wells in the Washakie Resource Area are as follows:

1. Wells with artesian flow would have priority for funding by the BLM.
2. Water quality must at least meet Wyoming State standards for surface discharge.
3. The well should be located in an "I" category allotment or be located so that it can service an "I" category allotment or be in a habitat management area if the project is to receive priority for BLM funding.
4. The water development must help achieve the objectives for the allotment.
5. The new water source should be at least one mile from existing reliable waters.

The BLM will not normally fund wells that do not meet these criteria. However, if the location of a water well is particularly advantageous, the BLM would consider funding non-flowing wells or wells within one mile of existing water sources. When the well is located in an "M" or "C" category allotment and/or the permittee/lessee wishes to fund the project, the well must meet the water quality criteria and help meet allotment management and habitat management plan objectives. All water rights will be reserved by the BLM and the project must be authorized under a cooperative agreement.

All conversions of oil and gas wells or exploration test holes into water wells will meet the standards and requirements of the Wyoming State Engineer's Office and the Wyoming Oil and Gas Conservation Commission.

If the BLM decides to acquire a well as a water well, it must assume responsibility at the time of abandonment. The operator will plug the well at the bottom of the desired fresh-water zone and leave casing in place. The operator then will begin surface cleanup as required. The BLM may reimburse the operator for any recoverable casing or surface equipment to be left in or on the hole.

APPENDIX I

WATERSHED BEST MANAGEMENT PRACTICES (BMPs)

Listed below are proposed watershed Best Management Practices, which are based on the Big Horn Basin 208 plan. These recommended practices, and the management prescriptions proposed in the preferred alternative may be certified for use by the State of Wyoming's Department of Environmental Quality.

208 RECOMMENDATIONS

Sedimentation is a concern resource area-wide, however, two drainages were cited by the Big Horn Basin 208 plan as having possible accelerated erosive problems due to livestock grazing. As required by the cooperative agreements, BMP's from this plan are cited verbatim.

Recommendation 1

That the BLM initiate intensive data gathering programs with water quality as the objective on the following drainages, water quality from which is suspected by the 208 Agency as being affected in part by grazing activities:

1. East Fork of Nowater Creek
2. Nowater Creek, and
3. Kirby Creek

Data needed from these drainages to make sufficient non-point loading assessments include rainfall characteristics, soil properties, slope factors, land cover conditions and cultural or conservation practices.

More specifically, the data collected should be sufficient to satisfy appropriate models which should be used to help determine proper grazing

intensity. Using these models and varying the value of certain inputs, such as vegetation cover and management practice factors, the effects of alterations in grazing use upon pollutant yield can be predicted and should be included in the BLM's Management Situation Analysis.

Recommendation 2

That once sufficient evidence is amassed to conclusively demonstrate that rangeland quality in a specific area, as well as water quality, can be improved by control of grazing activities, the appropriate Federal agency identify and implement suitable Best Management Practices to reflect that control. Selected BMP's from which to choose shall include but not be limited to:

1. Reducing number of livestock
2. Regulating type and seasons to use of livestock
3. Implementing grazing systems which protect vegetation
4. Eliminating use from identified sensitive areas
5. Developing adequate water and salting systems
6. Reducing number of wildlife (including wild horses)
7. Revegetation of disturbed areas
8. Constructing of mechanical structures
9. Developing of cooperative watershed management plans
10. Control of sagebrush and noxious weeds in selected areas using proper techniques, and
11. Any combination of the above.

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IMPACTS COMMON TO ALL ALTERNATIVES

INTRODUCTION

The environmental impacts described in this section are common to each of the alternatives. This section also describes the general causal relationship between management actions and environmental consequences that exists with all of the alternatives. Therefore, these relationships are not always repeated in the description of impacts for each alternative.

MINERALS

Oil and gas production would continue to decline as existing fields are depleted. Production has decreased, on average, by approximately 34,000 barrels of oil (less than 2 percent of the 1982 production level) and 570 MMCF of gas per year over the last six years. In this same period new-field discoveries have added only an average 1,000 barrels of oil and 0.4 MMCF of gas per year for a net average annual decline of 33,000 barrels of petroleum per year and 570 MMCF of gas per year. This downward trend is expected to continue under any alternative considered.

There are currently no existing federal coal leases in the resource area and only one exploration license has been issued. Lack of leasing interest and past production as well as market outlook suggests little or no production is likely in the foreseeable future under any alternative.

Bentonite companies are conducting mining operations in five separate areas of the resource area. It is reasonable to expect that additional areas may be mined in the future. Based on past activity, bentonite mining could occur on an average of over 300 acres per year. Although the level of activity would probably be the same for each alternative, locations of activities would be constrained under Alternatives C and D.

Numerous gypsum claims exist in the resource area. However, past development of these claims has been extremely limited and the level of activity would not likely change in the future for any alternative.

The level of sand and gravel production would also be similar to past production levels for each alternative.

AIR QUALITY

With each alternative, air quality would be affected by mineral development, lands and realty actions, timber management practices, grazing management activities, ORV uses, recreation use, wildlife development, and fire control efforts. However, only acceptable reductions in air quality would be anticipated from any of the alternatives considered. For example, construction for roads, drill pads, pipeline, wildlife and water projects, and range improvements all cause periods of increased particulate concentrations. However, these concentrations generally are small compared to those resulting from continued use of access roads by oil field maintenance personnel, ranchers, farmers, and the general public.

Particulate emissions in the form of fugitive dust, caused by road, drill pad, pipeline, and other construction, usually do not result in ambient air quality violations or impair air resources on a regional scale. Controlled burning also releases particulates, but again, no violations of ambient standards would be anticipated.

Vehicle travel over unpaved roads causes dust composed of relatively large particles that settle out quickly thus limiting the area of impact.

The oil and gas production phase would produce air pollutants such as carbon monoxide, hydrocarbons, nitrogen oxides, sulphur oxides, and hydrogen sulfide. Specific causes of air pollutants would be separation facilities, disposal of liquid waste and unwanted gas, burning of waste petroleum products, routine emissions of objectionable odors, and venting of noxious vapors from storage tanks.

SOILS

Off-site soil impacts would include sedimentation in drainages and downslope soil

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contamination from eroded clays and salts. More important are the on-site impacts of soil compaction and erosion, especially since minimizing on-site impacts also minimizes off-site impacts.

On-site impacts usually involves removing vegetation which protects soils from raindrop impacts and obstructs overland water flow. Vegetation also increases soil organic matter, aggregation of soil particles, and soil porosity, all of which increase soil resistance to erosion.

Soil compaction is an on-site impact that compresses the soil volume, causes air spaces to collapse, increases bulk density and reduces the soil porosity to air and water. Compacted soils are less accommodating to plant roots. In extreme cases compaction can extend as deep as two feet below the surface and be irreversible if compaction happens when the subsurface soil layers are wet. Compacting soils increases water runoff and thereby promotes erosion.

Disturbances like excavation, injure the developed soil profile by destroying protective vegetation, root channels, and the structure of the soil horizons. Disturbances also disrupt the biological and chemical processes that contribute to soil fertility. Such disturbances expose soil materials to both wind and water erosion.

Erosion lowers water quality by causing sedimentation in streams and reservoirs. Erosion of highly clayey or saline upland soils can lead to contamination and degradation of downslope soils. This is especially harmful on arid rangelands where vegetative production depends on limited soil resources.

The B1, B2, B3, and B4 soils typically have thin, marginally fertile topsoil layers overlying infertile subsoils. These areas have low annual rainfall and constant depletions of plant materials from forage consumption. Their slow rates of soil forming processes cannot develop nutrient-rich topsoil rapidly enough to replace the accelerated soil losses that result from surface disturbances.

The relationship of soil loss to soil development is known as the soil loss tolerance. In the basin soils these tolerances to annual soil loss are less than 2 tons/acre/year, except for the very deep soils where tolerances approach 5 tons. Two tons of topsoil/acre equals a soil depth of less than two-hundredths of an inch. The erosion of topsoil at this tolerance level is virtually imperceptible without sophisticated measurements.

Soil erosion reduces productivity by decreasing the soil's capacity to hold water and reducing available plant nutrients. Erosion causes soil

surface crusting and sealing, which prevents moisture infiltration, seed germination, and usually compounds the soil's erosion susceptibility (National Soil Erosion - Soil Productivity Research Planning Committee 1981.) Soil erosion on hillsides gradually transports the few most valuable inches of growth medium to the valleys. This kind of surface erosion transforms rich upland grass communities into woodlands and rock outcrops; fertile riparian areas become barren gullies.

Research (Langbein and Shumm 1958) has shown that a given plant community may support 1.5 to 2 times the vegetative production of a similar community having 25 percent more erosion. Decreases in soil fertility lead to declines in forage availability for livestock and wildlife. Reduced vegetative production on uplands results in soils being eroded into streams and reservoirs, degrading water quality and reduces the life of reservoirs because storage volume is lost to sediment.

Table J-1 lists the extent of soil impacts expected from the various resource use activities. With many soil disturbing activities, the quantities of accelerated soil loss would decline following reclamation and revegetation. The soil loss figures in Table J-1 represent first year impacts. Year to year accumulations of soil loss are unknown; however it is assumed that reclamation and revegetation would substantially reduce most accelerated erosion within three years.

Exception to this are the impacts from minerals activities, since oil and gas facilities remain in place for indefinite periods. At the present time, approximately 116,000 tons of soil are eroding each year as a result of existing facilities, e.g., roads, drill pads, treater facilities, etc. This quantity would not change significantly under any alternative.

Some activities that cause short-term impacts to soils, such as range developments and wildlife habitat improvements, reduce long-term soil losses that result from other uses such as livestock grazing.

Soil impacts from ORV and recreational use depend on the kind and frequency of recreational activity. Repeated four-wheel drive or motorcycle use on newly disturbed moist soils could cause up to 150 tons of soil loss/acre/year because of compaction, direct soil displacement, and runoff channelization in ruts. On previously compacted soils of existing trails losses would be less, but lateral expansion of impacts from disturbed areas could prolong the period of soil loss indefinitely. Hiking trails could receive impacts causing up to

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TABLE J-1
ESTIMATED AREAS OF DISTURBANCE AND MAXIMUM
SOIL LOSSES PER ACRE FROM RESOURCE AREA ACTIVITIES

Activity	Acres of Disturbance/Unit	Estimated Maximum Soil Loss (Ton/Ac/Yr)
Minerals		
Seismic Activity	1.0/mile	15.0
Wildcat Well	9.0/well	80.0
Production Well (new)	3.0/well	80.0
Production Well (existing)	1.0/unit	10.0
Tanks, Treater Facility (new)	3.0/well	75.0
Tanks, Treater Facility (existing)	3.0/well	5.0
Pipeline	3.5/mile	50.0
Gravel Pit	2.0/pit	60.0
Surface Mine (new)	1,000.0/mine	100.0
Surface Mine (abandoned)	/mine	15.0
Waste Water Disposal Well	10.0/well	80.0
Realty		
Powerline (overhead)	1.0/mile	5.0
Telephone Line	0.5/mile	50.0
Communication Site	0.2/site	80.0
Powerline (buried)	0.5/mile	50.0
Access Road (new)	3.5/mile	80.0
Access Road (existing)	3.5/mile	10.0
Desert Land Entry	320.0/DLE	50.0
Sanitary Landfill	5.0/site	40.0
Fire		
Suppression Methods (Full)	—	10.0
Forestry		
Sawmill	10.0/site	20.0
Logging (clearcut)	—	30.0
Two-Stage Shelterwood Cutting	—	20.0
Precommercial Thinning	—	10.0
Tree Planting	—	0.5
Fencing	0.5/mile	5.0
Range and Wildlife		
Grazing (Excessive)	—	2.5
Grazing (Moderate)	—	1.5
Grazing (Light)	—	0.5
Reservoir Construction	5.0/unit	70.0
Pipeline Construction	1.0/unit	30.0
Sagebrush Spraying	1.0/unit	10.0
Prescribed Fire	—	5.0
Fencing	0.5/mile	5.0
Pothole Development	0.2/site	80.0
Wildlife Guzzler Construction	—	2.0
Recreation		
Trail Use	1.5/mile	1.0
ORV Use	1.0/mile	10.0
Hiking Trails	0.2/mile	0.1
Cultural Resources		
Inventory	—	15.0

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5 tons/acre/year of soil loss, if trails were used repeatedly when soils were moist. Camping, fire pit building, and associated disturbances, could cause up to 10 tons/acre/year of soil losses.

WATER

Generally, the same activities that affect soils also affect surface water. Soil disturbances that cause erosion also increase sediment delivery to surface water. The U. S. Environmental Protection Agency (1973) reports that sediment delivery ratios range from over 60 percent for small drainage areas to about 5 percent for large drainage areas.

Since the entire Washakie Resource Area is in the Bighorn River drainage, it is assumed that a minimum of 10 percent of all erosion occurring in the resource area would be delivered to the Bighorn River.

Increased sedimentation would degrade water quality and affect the whole food chain of aquatic life, from plants to invertebrates to fish. For example, increased sedimentation decreases sunlight transmission which results in decreased photosynthesis and production of plants and algae, important food sources for small fish and other aquatic life. Sedimentation also destroys fish spawning habitat, eggs, and fry, as well as invertebrates which form the foundation of the aquatic food pyramid. Water temperatures would increase and dissolved oxygen concentrations be reduced, both of which would cause direct mortalities to fish and other aquatic life.

Some produced water discharges from oil and gas operations create additional aquatic habitat and make additional water available to irrigation. However, quality of discharged water may degrade the water quality of the receiving ephemeral or perennial stream enough to preclude its use for municipal drinking water, wildlife, recreation, and irrigation purposes. The quality of produced water discharges is required to meet or exceed the State of Wyoming's Chapter VII Water Quality Regulations.

A potential impact on surface water could also come from oil spills. The information displayed on Table J-2 shows the number of oil spills in 1984 and part of 1985. About five percent of the spills reached live water. An oil or salt water spill entering a live water body could have a significant and long-lasting effect by making the water unsuitable for domestic livestock, wildlife,

agricultural, and industrial uses. The impact from a spill, if unchecked, could extend miles throughout many drainages.

TABLE J-2
OIL SPILLS IN THE
WASHAKIE RESOURCE AREA

Year	Total Number of Spills	Major Spills ¹	Other Spills	Number of Spills That Reached Live Water
1984	36	4	32	2
1985 (First Half)	28	7	21	1

¹ A major spill exceeds 100 bbls. of liquid.

Oil spills and soil related chemicals entering aquatic habitats coat stream bottoms and riparian zones and the chemicals contaminate the water. This could kill fish and wildlife directly, cause chronic sickness among animals, or cause wildlife to move out of the affected areas. Affected wildlife includes birds and aquatic invertebrates, fish, and other cold-blooded animals which inhabit or depend upon the riparian zone for survival. Warm-blooded mammals such as beaver, muskrat and mink are probably harmed through contact or ingestion. Oil spills also cause a loss of feeding and spawning habitat for fish.

Some efforts to control oil spills such as constructing holding ponds, allowing access to spill or control sites, or burning riparian vegetation that is covered with oil may degrade riparian zones. For example, silt enters the waterway from annual wash-outs of the emergency holding ponds and runoff of denuded areas used to acquire soil for dam structures.

Ground water contamination during drilling operations could occur if circulation of the drilling materials is lost or water-bearing formations are improperly cemented and cause interaquifer mixing. Ground water contamination could also occur due to blowouts and improper fracturing of hydrocarbon formations.

VEGETATION

Like soils, vegetation would be affected by surface disturbing activities. For example, there

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would be a loss of plant cover from construction of drill pads, roads, drainage crossings, pipelines, power lines, and other structures, as well as from forage consumption by livestock and wildlife, and loss of forage from fires.

It is estimated that 80 percent of the area disturbed by oil and gas related activities would be reclaimed and revegetated within three years after disturbance. Impacts to vegetation result from erosion, soil compaction, siltation, mechanical injury and disturbance of plants, and competition from species that invade disturbed sites. Riparian vegetation would increase along drainages that receive discharged treater water. However, if temperatures or salt concentrations are too high, the type of riparian vegetation would change.

Discharged treater water increases moisture in drainages and could accelerate aquatic plant establishment, and change the existing vegetation composition. Warm discharge water would promote algae and moss production, while poor quality discharge water or oil spills which reach live water could poison existing aquatic plants. These direct toxic effects also occur as a result of mud pit washouts or runoff from drill sites.

Although sites would be reclaimed to as near original condition as possible, there would be some residual impacts, especially on the more sensitive or fragile areas. For example, reclamation could result in a change in aspect. Even well established vegetation may not completely match the surrounding native plant community.

A loss of vegetation could result from accidental blowouts, fires or spills of oil, salt water, or caustic solutions. However, it is estimated that fewer than 10 acres of vegetation would be affected annually from any alternative. Loss of vegetation in these situations could be short- or long-term, depending upon the severity of the event and the success of cleanup activities. Long-term disturbance would occur on sites occupied by structures and facilities used in the production phase.

There would continue to be a loss of timber because of mortality under all alternatives. A portion of the timber would degenerate because of overmaturity and decadence, stagnation, insect attacks, and diseases (primarily parasitic mistletoe infestations). In unmanaged stands, old growth would continue to die and timber resource values would be lost. Where understory stands of regeneration are present, some would be infected with mistletoe and other diseases, resulting in a loss of some growth potential.

Precommercial thinning would occur on about 70 acres per year and would increase yield per acre of timber production by an average of 8 to 20 MBF/acre. Planting trees on an additional 15 acres per year could increase timber supply on a sustained yield basis by 600 MBF.

Construction of roads, powerlines, pipelines, communication site and other land and realty actions would remove vegetation on approximately 300 acres per year. Here too, it is expected that 80 percent of the area disturbed would be reclaimed within three years and vegetation would be reestablished within 10 years. At least 20 AUMs of forage would be permanently lost to these activities each year.

Several grazing allotments have had AMPs developed on them. With some update and revision, the range condition on these allotments should improve or at least remain unchanged over the short-term. Impacts to livestock grazing are discussed in the land use section.

The overall condition of wetland/riparian areas would stabilize and improve with each alternative. Implementation of the Bighorn River and West Slope HMPs, and grazing allotment management plans would stabilize and improve wetland/riparian conditions.

Wetlands would continue to be adversely affected, at least indirectly, by mineral development, lands and realty actions, timber management practices, wild horse and livestock grazing, ORV use and water projects. These activities tend to directly or indirectly cause such impacts as soil compaction, bank sloughing, streamside vegetation loss, channel widening, increased channel erosion, increased water temperature, increased sediments, reduced stream depth, lowered water table, loss of fish habitat, decreased fish spawning success, and lower fish population. Wildlife habitat projects, wetlands projects, and fire management practices all tend to produce wetland benefits.

FISH AND WILDLIFE

Actions which excavate, bury, overturn, clear, or grade previously undisturbed terrestrial habitat would continue to displace animals and cause indirect mortality to big game, small mammals, reptiles, and birds. Noises associated with these actions would cause the same effects. The construction of drill pads, roads, pumping

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stations, pipelines, power lines, reservoirs, fences, spring developments, and communication sites removes cover for wildlife. This cover is lost for the lifespan of the development, and in areas where sagebrush or timber is a major component of the vegetation, the loss of cover could last for more than 30 years after site reclamation is completed (University of Wyoming, 1976). Loss of habitat would be expected to continue primarily in the sagebrush or grass vegetative type for oil and gas activity and in timbered areas for timber harvest. Livestock grazing would affect fish and wildlife habitat throughout the resource area, especially in crucial habitat and wetland/riparian areas.

In addition to direct loss of habitat by physical destruction, some wildlife would abandon habitat because of its proximity to human disturbance, noise, noxious odors, soil and water contamination, or use by other animals.

Wildlife benefits could result from other activities. For example, new water sources occasionally become available from abandoned oil and gas wells. Reclamation of disturbed areas in seemingly monotypic vegetative communities would increase an edge effect during the years that revegetation is occurring. This would increase the number and diversity of wildlife species because of increased habitat diversity.

In addition precommercial thinning would improve wildlife forage. In the short-term, forage would improve on 70 acres per year and would be maintained for 10 to 15 years. Overall, thinning would improve habitat to support additional elk and increase the local deer population.

Any oil and gas activity, realty related actions, timber management activities, livestock grazing, ORV use, and other recreation activity on crucial elk habitat during the winter and spring months could cause physiological stress to the animals and could result in actual displacement. Physiological stress could lead to lowered overall animal health, higher mortality and lowered levels of reproduction. Since the availability of suitable winter habitat is limited, displacement could cause death for some animals and decrease herd population (Lockman & Johnson, 1979). Year-round activity such as mineral development in areas that contain sparse escape and hiding cover along the west slope of the Bighorn Mountains would probably reduce or eliminate winter use by the animals. Activities during the late May and early June calving period could also cause physiological stress to cows and newly born calves and abandonment of calving habitat (Johnson, 1985).

The construction and upgrading of roads would allow greater human access to what have been elk escape cover and feeding areas (Thiessen, 1976; Leege, 1974; Hershey and Leege, 1976). This would increase the amount of stress on elk and cause them to abandon the habitat until the amount of human activity decreases or the road is closed.

Construction of roads to timber sales or oil well pads in elk habitat may not leave enough buffer area between the roads and escape cover (Hershey and Leege, 1976; Ward, 1976; Coggins, 1976; Perry and Overly, 1976). Roads may cut across major trails and human use of these roads could inhibit elk movement, leading to habitat abandonment and over utilization of other portions of the habitat and reduction in carrying capacity. Changes in habitat use due to human disturbance are also documented by the Montana Game and Fish Department (1979), Marcum (1976), Lockman and Johnson (1979) and Johnson (1985).

Destruction of browse vegetation, particularly sagebrush, aspen, juniper, and curlleaf mountain mahogany, from fire, road building, mining, etc., in a crucial winter area could cause a long-range reduction in herd size due to loss of adequate habitat.

Physical loss of native range vegetation caused by livestock grazing and mineral activities could result in the loss of big game forage, browse, and habitat. Human activities would disrupt animals, especially during the crucial winter and parturition periods.

Destruction of riparian vegetation, increased sedimentation, and bank erosion results when truck-mounted equipment crosses drainages at non-established sites or explosives are set too close to the stream channel.

Seasonal restrictions on oil and gas leases protect important habitat during the exploration phase and allow animals to slowly become accustomed to disturbance; however, impacts from human activity occur during the operation phase of the life of the well or road. Oil and gas leases issued prior to 1976 do not contain any stipulations to protect wildlife habitat. Adverse impacts to wetland/riparian areas result when oil and gas wells or roads are constructed adjacent to them. Such concentrations also cause sedimentation and a deterioration of fishery habitat.

Timber harvest and woodcutting removes cover and sets back succession to the grass/forb stage. This creates "edge effect" and improves forage

areas. It also removes cover, especially for elk. Many timbered areas on public land are small in size and barely provide adequate cover for elk. Harvesting these stands would reduce habitat for local elk populations. Timber harvest near riparian areas would increase sedimentation in streams and reduce habitat quality.

Probably the greatest impact on bighorn sheep concerns forage competition and the tendency for livestock, elk, and people to displace the bighorn sheep from their traditional ranges. For example, there is an estimated 75 percent dietary overlap between bighorn sheep and cattle.

Waterfowl habitat, used for both breeding and brood rearing, and during migration, would continue to improve as projects and new management practices are implemented on reservoirs and streams.

Since sage grouse depend on sagebrush for habitat, sagebrush eradication, as well as use of herbicides and insecticides, would significantly limit their population.

Existing conflicts between livestock and chukars or Hungarian partridge would continue to occur as a result of cover destruction and forage competition in riparian communities.

Stream habitat for fish would stabilize or slowly improve as projects and additional management practices are implemented to eliminate wetland/riparian habitat degradation caused by excessive livestock grazing and other activities. Fish habitat in reservoirs would remain static as old reservoirs silt in and new ones are built.

The environmental consequences on threatened or endangered species are unknown. However, a biological assessment which addresses the consequences of each alternative on threatened or endangered species will be completed and used in the final EIS.

VISUAL RESOURCES

The area's aesthetics would be affected by oil and gas activities, realty actions, timber activities, livestock grazing, ORV use, recreation use, and watershed projects. Although drilling rigs cause prominent structural impacts, these would be short-term when compared to the more permanent pump jacks, tank batteries, pipelines, and other facilities that would be constructed if the well is completed. Surface alterations such as seismograph trails, drill pads, roads, pipelines, and general grading to serve oil and gas operations

are generally less visible than structural facilities and can often be restored to their former condition. However, if revegetation is unsuccessful, the ground remains open and barren or becomes infested with weedy species and creates visual impacts which may cause significant long term visual contrasts with the surrounding landscape.

Drill pads and roads that are placed on drainages or in broken country are difficult to reclaim. Thus, visual impacts in these areas would be fairly severe and long-standing. The significance of the impact depends on the scenic quality of the area and the management class.

Minerals activities would affect the line, form, color, and texture of the natural landscape. Approximately half would cause long-term or permanent changes in the existing natural landscape. Much of this would likely occur adjacent to or near landscapes that have already been altered by minerals activities.

Desert land entries and recreation and public purpose patents would cause impacts such as changes in land forms or amounts and types of vegetation in limited locations or viewsheds. Other actions such as power lines or pipelines would affect the line, form, color, and texture of natural landscapes for miles. About 20 percent of the disturbed area would have long-term or permanent visual impacts.

Visual quality would be affected by timber harvest on a much greater area than is actually harvested because of the very apparent contrast in line, form, texture and color. These impacts would usually last less than 50 years or until the timber stands are reestablished and approach-commercial height.

Generally, visual quality would either not be affected by livestock grazing on "M" category allotments or it would improve slightly as range conditions improve. To a large degree, visual quality is related to vegetative composition and range condition. As the vegetative composition changes so does the visual variety and the form, line, color, and texture elements of the landscape. Visual impacts would be most severe where livestock concentrate and have the greatest impact on range condition. This creates a visual contrast between heavily grazed and other areas.

Although ORV use would also continue to degrade the visual characteristics of the natural landscape throughout the resource area, the greatest impact would be apparent near populated areas and roads because of the intensive use of those areas.

OUTDOOR RECREATION

Noise, odors, noxious fumes, hazardous chemicals, access restrictions, and surface disturbances would all affect recreation activities because the opportunities for certain types of recreation would be lost, or the recreation experience would be degraded.

Access provided by oil and gas activity, timber harvest, range improvements, etc., often opens previously inaccessible areas to the recreationist. However, the increased traffic might degrade the recreational experience of those who enjoy solitude. In addition, access to remote areas would also increase off-road vehicle activity and cause additional surface disturbance. Hunting opportunities are often lost or reduced within areas of intensive development.

Since cave formations are fragile, surface disturbance near caves can affect percolation of water into the caves or the surface waters that flow directly into caves. Cave use would continue with all alternatives.

CULTURAL RESOURCES

With each alternative most surface-disturbing activities would be preceded by a Class III pedestrian inventory to identify all cultural resources. Exceptions would occur in previously disturbed areas, in areas covered by prior Class III surveys, for projects that disturb little or no surface (e.g., some fencelines), or for projects occurring in areas demonstrated to be of low potential for containing cultural resources.

Adverse impacts to cultural resources would continue to occur from trespass actions, illegal collecting, vandalism, failure to recognize or report important sites, and natural and accelerated erosion.

WILDERNESS

See the Wilderness Supplement to the RMP/EIS for a description of environmental consequences.

LAND USES

Levels of mineral production are discussed in the minerals section. The level of exploration, development, production, and close-out activities for oil and gas would be approximately the same for all alternatives except Alternative D. It is assumed that the level of these activities would be slightly less with Alternative D than with the other alternatives. Location of activities could be different among the alternatives.

The level of activity associated with coal, bentonite, gypsum, and sand and gravel exploration, development, and production would also be similar among the alternatives.

The types of land use realty actions authorized by each alternative would be similar to those listed in Table 24. The number of authorizations would also be similar for each alternative, although locations could differ among alternatives. Land and realty actions would affect about 300 acres annually.

Although the level of activity would not vary significantly among alternatives, the location of the facilities would be more strictly constrained with Alternatives B, C, and D. For example, utility lines, roads, etc., would be concentrated in right-of-way corridors where feasible. Public lands within avoidance areas would be open to right-of-way use but not as preferred locations.

Rights-of-way may be granted in avoidance areas, but only when no feasible alternative route or designated right-of-way corridor is available. Therefore, the location of facilities would be most constrained under Alternative D and not constrained at all under Alternative A. With alternatives C, and D, the exclusion areas are those areas where rights-of-way may be granted only because they are required by law.

Grazing use would be authorized with all alternatives although the level of use would differ among alternatives. Trail use would be authorized with all alternatives and existing AMPs would be updated and modified.

Timber harvesting would be characterized by a two-stage shelterwood cutting of mixed conifers and clear-cutting of lodgepole pines. The size of the sales would differ among the alternatives. Precommercial thinning would occur on 450 acres of commercial forest land and timber stands in the 20 to 30 year age class would occur with each alternative.

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Water based recreation use, hunting, fishing, trapping, ORV use, cave use, and other types of recreation use would continue with all alternatives. The level of use and location of recreation activity would be different among the alternatives.

SOCIOECONOMICS

Mineral exploration and development, farming and ranching, and recreation would remain the area's major economic activities. Government would remain the leading employer, followed by agriculture, services and retail trade, and mining.

The socioeconomic impacts of all minerals activities, except for tar sands development, would be essentially the same for all alternatives and would change very little from current levels.

In the agricultural sector of the economy, only the livestock portion would be affected by the alternatives. Business activity and employment related to other aspects of the agricultural economy would also change little from current levels.

The economic activity generated by any of the timber management alternatives would account for less than one-tenth of one percent of total local business activity and related employment.

Changes in hunting, fishing, and trapping activities would result in no more than 0.4 percent change in regional business activity or employment levels.

Economic analysis indicates that none of the alternatives would cause significant economic impacts to the local economy, although some local individuals or businesses may experience sizeable impacts from various alternatives.

None of the alternatives would change the general attitudes or values presently held by local residents but they could affect attitudes toward, and expectations of, the BLM and the Federal government in general.

UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts would be common to all alternatives, although the level of impacts would depend on the alternative.

Regardless of the alternative selected, no unavoidable adverse impacts are anticipated for minerals, air quality, threatened or endangered species, recreation use, land uses, or the local economy.

Surface disturbing activities would cause some soil loss, salinity, sedimentation, and soil compaction. Soil disturbances that cause erosion also increase sediment delivery to surface water which degrades water quality. Between 5 and 60 percent of the soil loss caused by surface disturbances would be delivered to streams as sediment.

Any oil spill reaching surface water could have long-lasting effects which make the water unsuitable for agricultural, municipal, industrial, wildlife, or recreation use.

Vegetation and wetland/riparian habitat would be affected by surface disturbing activities, erosion, soil compaction, siltation, fires, oil spills, timber harvest, livestock grazing, and ORV use.

Actions which excavate, bury, overturn, clear, grade, or increase access to previously undisturbed terrestrial habitat would displace animals and may increase wildlife mortality.

The area's aesthetics would be affected by oil and gas activities, lands and realty actions, timber management activities, livestock grazing, ORV use, and recreation use. The significance of the impact would depend on scenic quality of the area and the management class as well as the extent of the disturbance. Activities that cause noise, odors, noxious fumes, and surface disturbance would all adversely affect recreation opportunities.

Adverse impacts to cultural resources would be caused by trespass actions, vandalism, failure to recognize and report important sites, and accelerated erosion.

SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY

Regardless of the alternative selected, short-term uses would not significantly affect the following:

- anticipated levels of production for coal, bentonite, gypsum or sand and gravel,
- air quality,
- visual resources, or
- cultural resources.

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Short-term uses would affect the long-term productivity of other resources as described here.

During construction and drilling of oil and gas wells, pollutants such as total suspended particulates (TSP), NO_x , and SO_2 are released in relatively small amounts for short periods. These pollutants could cause some slight localized impacts to the air resource and visibility, but for the most part, cause no lasting impact on natural ecology. Other industrial construction in the resource area would result in much the same chain of impact events to air resources. Controlled burning for range or forest improvement also would add relatively small amounts of particulates (smoke) to the atmosphere for short time periods. Although this could affect visibility and slightly inconvenience some local residents, the impacts from controlled burns are localized and of short duration. During seasonal hunting use, air resource impacts would increase due to increased vehicle miles traveled by hunters, but traffic is so dispersed as to generally cause insignificant impact.

BLM requires oil and gas operators to submit and follow accidental H_2S release contingency plans. These plans would be executed during unforeseeable and very unlikely events, such as well blowouts. They are designed to reduce impacts, such as loss of life. At worst, there would be restrictions on entering some well areas for short periods of time, and some short-term addition of H_2S or SO_2 to the atmosphere.

Oil and gas development does not affect long-term productivity as far as the air resource is concerned since impacts subside as soon as production stops.

Oil and gas production would continue to decline as existing fields are depleted. Production has decreased on average, approximately 34,000 barrels of oil and 570 MMCF of gas per year over the last six years. In the same period new-field discoveries have added only an average 1,000 barrels of oil and 0.4 MMCF of gas per year for a net average annual decline of 33,000 barrels of petroleum per year and 570 MMCF of gas per year. This downward trend would be expected to continue under any alternative considered.

In addition, mineral exploration and production would supply mineral resources to the economy to the detriment of other resources, such as wildlife. However, reclamation of disturbed areas would, in the long-term, eventually restore some of the productivity lost by other resources.

Short-term uses, especially those that cause severe soil compaction, soil contamination, or loss

of topsoil result in loss of long-term productivity. Examples of these short-term uses include bentonite and gypsum mining, sanitary landfills, logging operations, livestock grazing, and ORV use, especially when these activities occur on fragile soils.

Soil productivity on some reclaimed areas would be regained depending on soil characteristics, reclamation procedures, and treatment of topsoil. For example, in areas with steeper slopes, reclamation would be less successful.

Any degradation of surface or groundwater quality could last beyond the surface disturbing or groundwater disturbing activity.

Any short-term activities that degrade long-term soils productivity would also affect vegetation by reducing the long-term vegetative productivity or changing vegetative composition. For example, sites may be reclaimed to as near original condition as feasible, but residual impacts would still occur, especially on sensitive or fragile areas. Even well established vegetation may not completely match the surrounding native plant community.

There would also continue to be a long-term loss of some timber products because of overmaturity, decadence, stagnation, insect attacks and diseases with all the alternatives.

Some timber harvesting creates an "edge effect" and thus improves wildlife forage and habitat, but it can also cause significant long-term losses of crucial habitat where the amount of cover is limited. This is the case with elk habitat where cover is limited.

Overall, the long-term condition of wetland/riparian areas would stabilize and improve although the rate of change would vary with each alternative. Some localized short-term uses would degrade the long-term wetland/riparian condition. For example, exploration or unrestricted grazing could result in long-term water quality and fish habitat problems if the stream channel is degraded and results in a sustained sediment load and loss of habitat until a dynamic equilibrium is reached.

The long-term productivity of waterfowl habitat and fish habitat would improve as projects and wetland/riparian management practices are implemented. The rate of improvement would, however, vary among alternatives.

Land disposal could create a long-term loss of parcels of public lands for such uses as licensed livestock grazing, recreation use, or access.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Although some impacts caused by the alternatives would be difficult to restore or reverse in the short-term, most would be reversible in the long-term. However, certain resources would be committed and would not be retrievable in the foreseeable future.

There would be some irretrievable soil loss due to erosion.

There would be an irretrievable loss of information when cultural sites are disturbed without recovery.

On all types of land disposal, except for recreation and public purposes, the ability to manage lands for public purposes would be lost to the federal government.

SUMMARY

Air Quality

Air quality would be affected by mineral development, lands and realty actions, timber management practices, grazing management activities, ORV use, wildlife developments, and fire control. Only acceptable reductions in air quality would be anticipated from any of the alternatives.

Soils

Surface disturbing activities cause on-site and off-site soil impacts. Off-site soil impacts include sedimentation in drainages and down-slope soil contamination. On-site impacts include soil compaction and erosion.

Water

Generally, the same activities that affect soils and vegetation also affect surface water.

Vegetation

Vegetation is also affected by surface disturbing activities, e.g., construction of drill pads, roads,

pipelines, power lines, as well as forage consumption by livestock and wildlife, and loss of forage by fire or timber harvest. Implementation of grazing systems would cause long-term improvements in range condition.

Fish and Wildlife

Actions which excavate, bury, overturn, clear, or grade previously undisturbed terrestrial habitat displace animals, increase stress, and cause animal mortality to big game, small mammals, reptiles, and birds. The construction of drill pads, roads, pumping stations, pipelines, power lines, reservoirs, fences, spring developments, and communication sites make wildlife habitat unusable until site reclamation is completed. Loss of habitat would be expected to continue primarily in the sagebrush or grass vegetative type due to oil and gas activity and in timbered areas due to timber harvest. Livestock grazing would affect fish and wildlife habitat throughout the resource area, especially in crucial habitat and wetland/riparian areas. In addition to direct loss of habitat by physical disturbance, some wildlife would abandon habitat temporarily or permanently because of its proximity to human disturbance, noise, noxious odors, soil and water contamination, or use by other animals.

Visual

Aesthetics would be affected by mineral exploration and development (especially oil and gas activities), realty actions, timber activities, livestock grazing, ORV use, recreation use, and watershed projects that change the line, texture, form, and color in ways that contrast with the natural surroundings.

Outdoor Recreation

Noise, odors, noxious fumes, hazardous chemicals, access restrictions, and surface disturbances would all affect recreation activities because the opportunities for certain types of recreation would be lost or the recreation experience would be degraded.

Cultural Resources

With each alternative most surface disturbing activities would be preceded by a Class III

pedestrian inventory to identify all cultural resources. Adverse impacts would continue to occur from trespass actions, illegal collecting, vandalism, failure to recognize or report important sites, and natural and accelerated erosion.

Wilderness

See the Wilderness Supplement.

Land Uses

Land uses are affected by land and resource protection stipulations, mineral leasing, livestock grazing and other special use restrictions. The level of activity associated with coal, bentonite, gypsum, sand and gravel exploration, development, and production would be similar among the alternatives. The number of lands and realty authorizations would be similar for each alternative although the locations could differ among alternatives. Trailing livestock along livestock driveways would be authorized with all alternatives. Existing AMPs would be updated and

modified. Timber harvesting would be characterized by two-stage shelterwood cutting of mixed conifers and clear-cutting of lodgepole pines. Precommercial thinning would occur on 450 acres of commercial forest land and timber stands in 20-30 year age class.

Socioeconomics

Mineral exploration and development, farming and ranching, and tourism and recreation related businesses would remain the area's major economic activities. Government would remain the leading employment sector, followed by agriculture, services and retail, and mining. The socioeconomic impacts of mineral activities, except for tar sand development, would be essentially the same for all alternatives and would change very little from current levels. In the agricultural sector, only the livestock portion would be affected. The economic activity generated by any of the timber management alternatives would account for less than 0.1 percent of total local business activity and related employment. Changes various alternatives.

APPENDIX K

SUMMARY OF COMPARABLE IMPACTS ON WETLAND/RIPARIAN AREAS BY ALTERNATIVE

This appendix consists of Table K-1, which summarizes the impacts on wetland/riparian areas in the Washakie Resource Area.

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**TABLE K-1
SUMMARY OF COMPARABLE IMPACTS ON
WETLAND/RIPARIAN AREAS BY ALTERNATIVE¹**

Program/Activities	Alternative				
	Preferred Alternative	A	B	C	D
Streams					
Minerals	-2	-3	-3	-2	-1
Lands	-2	-2	-3	-2	-1
Forestry	-2	-1	-3	-2	-2
Wild Horses	0	-3	0	-1	0
Livestock Grazing	-2	-3	-1	-2	-1
Range Development Project	+1	0	+2	+1	+1
Off-Road Vehicle Use	-1	-3	-2	-1	-1
Other Recreation Use	-1	0	0	-1	-1
Wildlife	+2	+2	+1	+2	+3
Water	+1	-1	-1	+1	+1
Fire	-1	+1	+1	-1	-1
Wetlands	+2	+1	+1	+2	+3
Springs/Seeps					
Minerals	-1	-1	-1	-1	0
Lands	-2	-2	-3	-2	-1
Forestry	0	0	0	0	0
Wild Horses	0	-1	0	-1	0
Livestock Grazing	-2	-3	-1	-2	-1
Range Development Project	+1	0	+2	+1	+1
Off-Road Vehicle Use	0	-2	-1	0	0
Other Recreation Use	0	0	0	0	0
Wildlife	+2	+2	+1	+2	+3
Fire	-1	+1	+1	-1	-1
Wetlands	+2	+1	+1	+2	+3
Reservoirs					
Minerals	-2	-3	-3	-2	-1
Lands	-2	-2	-3	-2	-1
Forestry	0	0	0	0	0
Wild Horses	0	-3	0	-1	0
Livestock Grazing	+1	0	+2	+1	+1
Range Development Project	+1	0	+2	+1	+1
Off-Road Vehicle Use	-1	-3	-2	-1	-1
Other Recreation Use	0	0	0	0	0
Wildlife	+2	+2	+1	+2	+3
Water	+3	0	0	+3	+3
Fire	-1	+1	+1	-1	-1
Wetlands	+2	+1	+1	+2	+3

Note: - Actions that cause an adverse impact on wetland/riparian values.

+ Actions that cause a beneficial impact on wetland/riparian values.

0 Actions that cause no net change on wetland/riparian values.

1,2,3 Ordinal measurement 1 is less impact than 2 which is less impact than 3.

¹ Impacts are not comparable among programs or activities, but are comparable among alternatives for each program.

TABLE 1
SUMMARY OF CONTRACTS NEGOTIATED BY YEAR
BY ALTERNATIVE

Alternative	1980-81		1981-82		1982-83		1983-84		1984-85	
	Number	Value	Number	Value	Number	Value	Number	Value	Number	Value
Alternative 1	1	100	2	200	3	300	4	400	5	500
Alternative 2	2	200	3	300	4	400	5	500	6	600
Alternative 3	3	300	4	400	5	500	6	600	7	700
Alternative 4	4	400	5	500	6	600	7	700	8	800
Alternative 5	5	500	6	600	7	700	8	800	9	900
Alternative 6	6	600	7	700	8	800	9	900	10	1000
Alternative 7	7	700	8	800	9	900	10	1000	11	1100
Alternative 8	8	800	9	900	10	1000	11	1100	12	1200
Alternative 9	9	900	10	1000	11	1100	12	1200	13	1300
Alternative 10	10	1000	11	1100	12	1200	13	1300	14	1400
Alternative 11	11	1100	12	1200	13	1300	14	1400	15	1500
Alternative 12	12	1200	13	1300	14	1400	15	1500	16	1600
Alternative 13	13	1300	14	1400	15	1500	16	1600	17	1700
Alternative 14	14	1400	15	1500	16	1600	17	1700	18	1800
Alternative 15	15	1500	16	1600	17	1700	18	1800	19	1900
Alternative 16	16	1600	17	1700	18	1800	19	1900	20	2000
Alternative 17	17	1700	18	1800	19	1900	20	2000	21	2100
Alternative 18	18	1800	19	1900	20	2000	21	2100	22	2200
Alternative 19	19	1900	20	2000	21	2100	22	2200	23	2300
Alternative 20	20	2000	21	2100	22	2200	23	2300	24	2400

1. The data in this table are based on the information provided by the contractors in their bids.

2. The values in this table are in thousands of dollars.

3. The number of contracts in this table is based on the number of contracts awarded during the period.

4. The values in this table are based on the values of the contracts awarded during the period.



Glossary

ACCELERATED SOIL LOSS. Soil loss that happens as a direct or indirect result of man's historic and present activities. This soil loss is in addition to the soil loss attributable to natural processes acting on undisturbed landscapes.

ACTIVE GRAZING PREFERENCE. The total number of animal unit months (AUM) of livestock grazing on public lands apportioned and attached to the base property owned or controlled by a permittee.

ALLOTMENT CATEGORIZATION. The grouping of livestock grazing allotments into one of the following: maintain (M) current satisfactory condition, improve (I) current unsatisfactory condition, and manage custodially (C) while protecting existing resource values. The criteria used to determine the categorization are: range condition, resource potential, presence of resource use conflicts or controversy, opportunity for positive economic return, the present management situation and other criteria as appropriate.

ALLOTMENT EVALUATION PROGRAM. An ongoing program set up to periodically evaluate resource conditions, management practices, and facilities for a particular allotment. The evaluation includes a comparison of actual use data with utilization studies, an evaluation of trend, other special studies data, and climatological data. It may also include range inspection tours by BLM and affected users to jointly evaluate on-the-ground conditions. The frequency and intensity of evaluation will depend on the level of resource values and use conflicts occurring in the allotment, e.g., "I" category allotments would receive more frequent and intense monitoring and evaluation than "C" category allotments (see *Allotment Categorization*).

ALLOTMENT MANAGEMENT PLAN. A documented program which applies to livestock operations on the public lands, prepared in consultation, cooperation, and coordination with the permittee(s), lessee(s), or other affected interests.

ALLOTMENT. An area of land designated and managed for grazing of livestock.

ALLOWABLE CUT. The amount of wood permitted to be harvested within a given time period.

ALLUVIUM. Unconsolidated rock or soil material deposited by running water, including gravel, sand, silt, clay, and various mixtures of the same.

AMBIENT AIR QUALITY. The prevailing condition of the atmosphere at a given time; the outside air. All lands are categorized in one of the Prevention of Significant Deterioration (PSD) classes. *Class I* is the most restrictive and generally applies to specific national parks and monuments. No decrease in air quality is allowed under this class. *Class II* areas allow some decrease in air quality. *Class III* areas allow for a substantial decrease in air quality, such as is found in urban areas.

ANIMAL UNIT MONTH (AUM). The amount of forage necessary to sustain one cow, one horse, or five sheep for one month. Wildlife Ratio: Forage necessary to sustain 9.6 antelope, 5.8 deer, or 1.9 elk for one month.

AQUIFER. A water bearing bed or stratum of permeable rock, sand, or gravel capable of yielding considerable quantities of water.

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). An area of public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes; or to protect life or provide safety from natural hazards.

AVERAGE LIVESTOCK USE. The average livestock grazing use during three representative years.

AVOIDANCE AREA. Areas on public lands where rights-of-way may be granted only when no feasible alternative route or designated right-of-way corridor is available.

BEST MANAGEMENT PRACTICE. A practice, or a combination of practices, that is determined by a state or a designated area-wide planning agency, after problem assessment, examination of alternative practices, and appropriate public participation, to be the most effective, practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.

BLOCKING. A process of consolidating or making isolated land tracts contiguous through sale or exchange with other land holders, both public and private.

BROWSE. That part of the current leaf and twig growth of shrubs, woody vines, and trees available for animal consumption.

CAVE SYSTEM. A group of caves in the same drainage or area that are affected by a similar set of circumstances, such as water flow. The caves may or may not be physically connected, although the probability is good that they are connected.

CLEAR-CUT. The removal of an entire stand of trees in one cutting. Reproduction is obtained artificially, or by natural seeding from adjacent stands, or from trees cut in the clearing operation. This harvest method creates a new even-aged stand of trees.

CLOSED. Designated areas and trails where the use of off-road vehicles is permanently or temporarily prohibited. The use of emergency vehicles is allowed.

GLOSSARY

- COMBINED HYDROCARBON LEASE (CHL).** A lease issued in a Tar Sand Area which entitles the lessee to remove any gas and nongaseous hydrocarbon substance other than coal, oil shale, or gilsonite.
- COMMERCIAL FOREST LANDS.** All forest lands that are capable of yielding at least 20 cubic feet of wood per acre per year from commercial tree species.
- CORD.** A unit of measure of wood volume; it is the amount of cut logs or wood in a stack measuring 4 by 4 by 8 feet.
- CORRIDOR.** A strip of land (of variable width) within which one or more existing or potential facilities or rights-of-way may be located. A designated corridor is the preferred location for existing and future right-of-way grants that has been identified by law, Secretarial Order, through land use planning, or by other management decision.
- CRITICAL GROWTH PERIOD.** A period in the growth cycle of plants which begins with the start of growth and ends with seedripeness.
- CRUCIAL RANGE.** Range on which a wildlife species depends for survival. There are not alternative ranges available due to climate conditions or other limiting factors. Crucial range may also be called critical or essential range for T&E species welfare and survival.
- CULTURAL RESOURCE INVENTORY.** A descriptive listing and documentation, including photographs and maps, of cultural resources. Included are the processes of locating, identifying, and recording sites, structures, buildings, objects, and districts through library and archival research, information from persons knowledgeable about cultural resources, and varying levels of intensity of on-the-ground field surveys.
- CULTURAL RESOURCE SITE.** A physical location of past human activities or events. Cultural resource sites are extremely variable in size and range from the location of a single cultural resource object to a cluster of cultural resource structures with associated objects and features. Prehistoric and historic sites which are recorded as cultural resources have sociocultural or scientific values and meet the general criterion of being more than 50 years old.
- CULTURAL RESOURCES.** Those fragile and nonrenewable remains of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in human events. These resources consist of (1) physical remains, (2) areas where significant human events occurred even though evidence of the event no longer remains, and (3) the environment immediately surrounding the resource.
- DESIGNATED CORRIDOR.** An area of land with legally defined and recognized boundaries and capacities having ecological, technical, economic, social, or similar advantages over other areas for the present or future location of facilities or transportation or utility rights-of-way, and which have been identified and designated by legal public notice.
- DISPOSAL AREA.** A parcel of public land that could pass from government ownership through sales or exchanges or both. Some land may be retained in public ownership based on site-specific criteria.
- ECOLOGIC CONDITION.** The present state of vegetation of an ecologic site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site. Ecological condition is rated as follows: excellent-more than 75 percent of the climax vegetation; good-51 to 75 percent of the climax vegetation; fair 26 to 50 percent of the climax vegetation; poor-less than 26 percent of the climax vegetation, unclassified rock outcrop, woodland, or unmapped.
- ECOLOGIC SITE.** A distinctive geographic unit that differs from other kinds of geographic units in its ability to produce a characteristic natural plant community. An ecologic site is the product of all the environmental factors responsible for its development. It is capable of supporting a native plant community typified by an association of species that differs from that of other ecologic sites in the kind or portion of species or in total production.
- EDGE EFFECT.** The phenomenon that occurs when two or more habitat types come together and create more favorable wildlife habitat than either type could provide alone.
- EXCLUSION AREAS.** Land areas determined to be unavailable for corridor allocation or facility siting for reasons of unsuitability, legislative classification or allocation to uses incompatible with facility siting.
- EXTENSIVE RECREATION MANAGEMENT AREA (ERMA).** Areas where dispersed recreation occurs and where visitors have the freedom of recreational choice with minimal regulatory constraint. Significant public recreation issues or management concerns are limited in these areas, and nominal management, consistent with the Bureau's stewardship responsibility, suffices.
- FEDERAL LANDS.** Lands owned by the United States, without reference to how the lands were acquired or what Federal agency administers the lands, including mineral estates underlying private surface.
- FIRE MANAGEMENT PLAN.** A source document containing fire history, ecological impacts, and proposed fire actions for manageable units of public lands.
- FISHERMAN DAY.** See *Recreation Visitor Day*.
- FIRE MANAGEMENT.** The use of full suppression, limited suppression, and prescribed fire to achieve desired management objectives.
- FIVE YEAR MONITORING PERIOD.** See *Monitoring*.
- FLOODPLAIN.** The nearly level alluvial plain that borders a stream and is subject to inundation (flooding) during high water.
- FORAGE MONITORING.** An ongoing program designed to measure changes in plant composition, ground cover, animal populations, and climatic conditions on the public rangeland. Vegetation studies are used to monitor changes in rangeland condition and determine the reason for any changes that are occurring. The vegetation studies consider actual use, utilization, trend, and climatic conditions.

GLOSSARY

- FORAGE POTENTIAL.** The optimum amount (lbs/acre) of forage that could be produced in a grazing allotment that is stable, self-perpetuating and in equilibrium with its physical habitat.
- FORAGE.** All browse and herbaceous foods that are available to grazing animals. It may be grazed or harvested for feeding.
- FULL GRAZING PREFERENCE.** The total number (active and suspended nonuse) of animal unit months (AUMs) of livestock grazing on public land apportioned and attached to base property owned or controlled by a permittee.
- FULL SUPPRESSION.** Taking aggressive action on all fires on or threatening the public lands, with sufficient forces to contain the fire during the early burning period.
- GAS (NATURAL).** Any fluid, either combustible or non-combustible, which is produced in a natural state from the earth and which maintains a gaseous or rarefied state at ordinary temperature and pressure conditions.
- GRAZING SYSTEM.** A systematic sequence of grazing treatments applied to an allotment to reach identified multiple-use goals or objectives by improving the quality and quantity of vegetation.
- GRAZING TREATMENT.** A prescription under a grazing system which grazes or rests a unit of land at particular times each year to attain specific vegetation goals.
- GUZZLER.** A permanent, man-made, self-filling water catchment structure consisting of a water tight tank which is filled by a rain-collecting apron.
- HABITAT.** The place where animals or plants normally live, often characterized by a dominant plant and co-dominant form (e.g., pinyon-juniper habitat).
- HAZARDOUS WASTES.** Those materials defined in Section 101 (14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 and listed in Title 40, Chapter 1, Part 261 of the *Code of Federal Regulations (CFR)*.
- HUNTER DAY.** See *Recreation Visitor Day*.
- HYDROCARBONS.** Organic chemical compounds of hydrogen and carbon atoms which form the basis of all petroleum products.
- KARST.** A type of topography that results from dissolution and collapse of limestone, dolomite, or gypsum beds and is characterized by closed depressions or sinkholes, caves, and underground drainage.
- KARSTIC WATERWAY.** A stream or river that flows in a karstic region and is typified by underground movement of large quantities of water.
- KEY AREA (FORAGE).** A relatively small portion of a rangeland selected because of its location, use, or grazing value as an area on which to monitor the effects of grazing use. It is assumed that key areas, if properly selected, will reflect the effects of current grazing management over all or a part of a pasture, allotment, or other grazing unit.
- KNOWN GEOLOGIC STRUCTURE (KGS).** "The trap in which an accumulation of oil or gas has been discovered by drilling and determined to be productive, the limits of which include all acreage that is presumptively productive." 43 CFR 3100.0-5(k)(1), revision of 1984.
- LEASABLE MINERALS.** Minerals such as coal, oil shale, oil and gas, phosphate, potash, sodium, geothermal resources, and all other minerals that may be developed under the Mineral Leasing Act of 1920, as amended.
- LEASE (MINERAL).** A contract between an owner of mineral rights and another, granting the latter the right to search for and produce gas, hydrocarbons, or other mineral substances upon payment of an agreed-upon rental, and royalties based on production.
- LEASE.** A document through which interests are transferred from one party to another, subject to certain obligations and considerations.
- LIMITED.** Designated areas and trails where the use of off-road vehicles is subject to restrictions, such as limiting the number or types of vehicles allowed, dates, and times of use; limiting use to existing roads and trails; or limiting use to designated roads and trails.
- LIMITED SUPPRESSION.** A deviation from normal fire suppression which is based on a fire land use decision, or where controlling fire is extremely difficult, or where the values-at-risk, do not warrant the expense associated with normal suppression procedures.
- LOCATABLE MINERALS.** Minerals that may be acquired under the Mining Law of 1872, as amended, such as bentonite, gypsum, and uranium.
- LONG-TERM.** A period of time in excess of ten years, but not exceeding 50 years.
- MITIGATION MEASURES.** Actions which could be taken to lessen the adverse effects of proposed project development upon existing resources.
- MODERN URBAN.** Areas with recreation opportunities to experience affiliation with individuals and groups are prevalent as in the convenience of sites and opportunities. Experiencing the natural environment, and the use of outdoor skills are largely unimportant. One of the six classes of the *Recreation Opportunity Spectrum (ROS)*.
- MONITORING (VEGETATION SOILS).** The orderly collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives.
- MULTIPLE-USE MANAGEMENT.** The management of public lands and their various resource values so that they are used in the combination that will best meet the present and future needs of the people and maintain the environmental integrity of the land and its resources.
- NONIMPAIRMENT CRITERIA.** A series of guidelines which govern surface disturbing activities on lands being studied by BLM for inclusion in the *National Wilderness Preservation System*. The guidelines require that lands be managed so as to not impair their suitability for designation as wilderness. Any authorized activities must be temporary in nature and not degrade the area's wilderness values. Disturbed areas must be capable of being reclaimed so that they are substantially unnoticeable by the time the Secretary of the Interior makes his recommendation on Wilderness Areas to the President.
- OFF-ROAD VEHICLE (ORV).** Any motorized vehicle capable of or designed for travel on or immediately over land, water, or other natural terrain.
- OIL.** All nongaseous hydrocarbon substances other than those substances leasable as coal, oil shale, or gilsonite (including all vein-type solid hydrocarbons).
- OPEN.** Designated areas and trails where off-road vehicles may be operated without restriction.
- OUTCROPS (TAR SAND).** Those parts of a tar sand deposit exposed at the surface.
- OVERBURDEN.** Material of any nature that overlies a deposit of useful materials, such as tar sand or oil shale.

GLOSSARY

PALEONTOLOGY. The geologic science dealing with the plant and animal life of past geological periods as known from fossil remains.

PLANNING AREA. See *Resource Area*.

POPULATION. All the individuals belonging to a single plant or animal species occupying a particular area of space.

PRIORITY MANAGEMENT AREA. An area where high quality oil shale deposits exist and oil shale development would generally be acceptable. Oil shale lease tracts would be located within these areas at a future date.

PRIMITIVE. Areas with recreation opportunities for isolation from the sights and sounds of man, to feel a part of the natural environmental, to have a high degree of challenge and risk, and to use outdoor skills. One of the six classes of the *Recreation Opportunity Spectrum (ROS)*.

PUBLIC LAND. Lands administered by the Bureau of Land Management. Vacant, unappropriated, and unreserved lands which have never left Federal ownership. Also, lands in Federal ownership which were obtained by the Government in exchange for public lands or for timber on public lands.

RANGE CONDITION. See *Ecologic Condition*

RMP AREA. See *Resource Area*.

RECREATION OPPORTUNITY SPECTRUM. A continuum used to characterize recreation opportunities in terms of setting, activity, and experience opportunities. The spectrum contains six classes as shown below:

- P — Primitive
- SPNM — Semi-Primitive Nonmotorized
- SPM — Semi-Primitive Motorized
- RN — Roaded Natural
- R — Rural
- U — Modern Urban

RECREATION VISITOR DAY. Recreation use totalling 12 hours by one or more persons.

REGIONAL CONTINGENCY PLAN. A plan that insures the coordination of various federal state agencies and other organizations to bring a timely, effective response to hazardous waste discharges.

RESOURCE AREA. The Washakie Resource Area, a management unit of the BLM's Worland District. The resource area covers portions of Big Horn, Hot Springs, and Washakie Counties. A detailed description is found in Chapter 1, under the heading *Description of the Planning Area*.

RIPARIAN HABITAT. A highly valued wetland vegetation community found along or around streams, lakes, ponds, and other open water (both perennial and intermittent). This unique habitat is crucial to the continued existence of many fish and wildlife species known to occur in the area, riparian vegetation helps maintain high water tables, stabilize pond and streambanks, create quality fish and wildlife habitat, and maintain water quality.

ROADED NATURAL. Areas with about equal recreation opportunities for affiliation with other user groups and for isolation from sights and sounds of man. Involves the opportunity to have a high degree of interaction with the natural environmental. Challenge and risk opportunities are not very important except in specific challenging activities. The practice of outdoor skills may be important. Opportunities for both motorized and nonmotorized recreation are present. One of the six classes of the *Recreation Opportunity Spectrum (ROS)*.

ROTATION GRAZING SYSTEM. An intensive system of management where grazing is deferred on various parts of the range during succeeding years.

RURAL. Areas with recreation opportunities to experience affiliation with individuals and groups are prevalent as is the convenience of sites and opportunities. These factors are generally more important than the natural setting. Opportunities for wildland challenges, risk taking, and testing of outdoor skills are unimportant, except in those activities involving challenge and risk. One of the six classes of the *Recreation Opportunity Spectrum (ROS)*.

SALABLE MINERALS. Minerals such as common varieties of sand, stone, gravel, and clay that may be acquired under the Materials Act of 1947, as amended.

SATURATION. A measure of the extent to which pore space in the sand or rock is occupied by bitumen or oil. Also, the extent to which pore space in soil is occupied by water.

SCOPING PROCESS. An early and public process for determining the nature, significance, and range of issues to be addressed related to a proposed action.

SEASON-LONG USE. Grazing of a management area or range allotment continuously for a specified season or period of time (e.g., November 1 to April 30).

SEMI-PRIMITIVE MOTORIZED. Areas with some recreation opportunity for isolation from the sights and sounds of man, but not as important as for primitive opportunities. Involves the opportunity to have a high degree of interaction with the natural environment, to have moderate challenge and risk, and to use outdoor skills. Provides an explicit opportunity to use motorized equipment while in the area. One of the six classes of the *Recreation Opportunity Spectrum (ROS)*.

SEMI-PRIMITIVE NONMOTORIZED. Areas with some recreation opportunity for isolation from the sights and sounds of man, but not as important as for primitive opportunities. Involves the opportunity to have a high degree of interaction with the natural environmental, to have moderate challenge and risk, and to use outdoor skills. One of the six classes of the *Recreation Opportunity Spectrum (ROS)*.

SHELTERWOOD. Harvesting trees in a stand in a series of cuttings (two cuttings in a two-stage cut) establishes a new, even-aged stand of trees before the last trees of the old stand are removed.

SHORT-TERM. A period of time less than ten years.

SELECTIVE CUT. A timber harvest system that removes trees in groups or strips (or in single-tree selection) and creates or maintains uneven-aged stands. This system creates space so that new trees can start and grow in height.

SITE INDEX. A method of dividing site quality into various classes and assigning a number value. Site quality is an expression of the relative productive capacity of a site.

SITE POTENTIAL. The expression of an ecologic site relative to the climax plant community. It represents the full ability (natural potential) of a particular site as influenced by soils, topography, climate, etc. to produce a certain mix of plants and volume of vegetative matter.

SPECIAL RECREATION MANAGEMENT AREAS (SRMA). Areas where special or more intensive types of recreation management are needed. Recreation activity plans are required and greater managerial investments (e.g., facilities, supervision, etc.) can be anticipated.

GLOSSARY

SPECIES, CANDIDATE. An animal or plant which may be designated threatened or endangered in the near future. This status offers no legal protection under the Endangered Species Act of 1973.

SPECIES, ENDANGERED. An animal or plant whose prospects of survival and reproduction are in immediate jeopardy, and as is further defined by the Endangered Species Act of 1973, as amended.

SPECIES, SENSITIVE. (Federal government definition) One of two groups of plants or animals: (A) Those which could be appropriate for listing as threatened or endangered, but do not have sufficient data to be used in the listing process. These species need more study; or (B) Those which are not being considered as candidates for the listing process, but are known to be rare, site specific, endemic or in potentially threatened land use areas (the BLM gives *sensitive* the same consideration for protection as *threatened or endangered species*).

SPECIES, SENSITIVE. (State of Wyoming definition) Wildlife species found in Wyoming that because of man's activities are in need of management emphasis. Three levels of sensitivity exist. They are:

Priority I. Those species in need of immediate attention and active management programs to insure that extirpation or significant declines of breeding populations in Wyoming does not occur.

Priority II. Those species in need of additional study to determine whether intensive management is presently warranted or whether low levels of management would suffice (i.e., monitoring population trends and encouraging resource management planning and programs to accommodate the species' needs). Until warranted intensive actions are identified, such low levels of management should be implemented.

Priority III. Those species whose needs should be accommodated in resource management programs and planning. However, intensive management programs to enhance or maintain populations do not appear warranted under present conditions. They are species whose population and habitat trends should be monitored to determine if low levels of management continue to be adequate.

SPECIES, THREATENED. Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, and as is further defined by the Endangered Species Act of 1973, as amended.

STUDY AREA. See *Resource Area*.

SUSTAINED YIELD. A silvicultural practice in which the volume of wood cut is equal to growth over the long run.

TAR SAND DEPOSIT. A natural bitumen (oil-impregnated) containing or appearing to contain an accumulation of tar sand, separated or appearing to be separated from any other such accumulation.

TAR SAND. Any consolidated or unconsolidated rock (other than coal, oil shale, or gilsonite) that either: (1) contains a hydrocarbonaceous material with a gas-free viscosity at original reservoir temperature greater than 10,000 centipoise; or (2) contains a hydrocarbonaceous material and is produced by mining or quarrying.

TERTIARY. Of, belonging to, or designating the geologic time, system of rocks, and sedimentary deposits of the first period of the Cenozoic era, extending from the end of the Cretaceous period of the Mesozoic era to the beginning of the Quaternary period of the Cenozoic era, characterized by the appearance of modern flora and of apes and other large mammals. The tertiary period is from 66.4 million to 1.6 million years before present.

TIMBER PRODUCTION BASE. Commercial forest lands determined to be capable of sustaining timber production over time. Suitability is determined through the *Timber Production Capability Classification (TPCC)* process.

TIMBER PRODUCTION CAPABILITY CLASSIFICATION (TPCC). The process of partitioning forest land into classes that indicate the relative suitability to produce timber on a sustained yield basis. The partitioning is site specific based upon physical and biological characteristics and **not** economic or multiple-use considerations.

TOTAL SUSPENDED PARTICULATES. All solid or semi-solid material found in the atmosphere, i.e., dust.

TREND. The direction of change in range condition. The factors that influence trend are: changes in plant composition, abundance of young plants, plant residues, plant vigor, and the condition of the soil surface.

VISUAL RESOURCE MANAGEMENT (VRM). The planning, designing, and implementation of management objectives for maintaining scenic value and visual quality on public lands.

VISUAL RESOURCE MANAGEMENT CLASSES. The five degrees of acceptable visual change within a characteristic landscape:

Class 1. Natural ecological changes and very limited management activity are allowed. Any contrast created within the characteristic landscape must not attract attention. This classification is applied to wilderness areas, wild and scenic rivers, and other similar situations.

Class 2. Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape. Contrasts are seen, but must not attract attention.

Class 3. Contrasts to the basic elements caused by a management activity are evident, but should remain subordinate to the existing landscape.

Class 4. Any contrast attracts attention and is a dominant feature of the landscape in terms of scale, but it should repeat the form, line, color, and texture of the characteristic landscape.

Class 5. This classification is applied to areas where the natural character of the landscape has been disturbed to a point where rehabilitation is needed to bring it up to one of the four other classifications. The classification also applies to areas where there is potential to increase the landscape's visual quality. It would, for example, be applied to areas where unacceptable cultural modification has lowered scenic quality. It is often used as an interim classification until the objectives of another class can be reached.

WATERSHED. A total area of land above a given point on a waterway that contributes runoff water to the flow at that point.

GLOSSARY

WETLAND. Lands where at least periodic inundation or saturation with water (either from the surface or subsurface) is the dominant factor determining the nature of soil development and the types of plant and animal communities living there. These include the entire zones associated with streams, lakes, ponds, springs, canals, seeps, wet meadows, and some aspen stands. Wetlands support all the fish and higher densities and more species of wildlife than any other habitat type in the resource area. They comprise less than one percent of the public land acreage.

WILD HORSES. All unbranded and unclaimed horses and their progeny that roam public lands, or that use those lands as all or part of their habitat after December 15, 1971.

WILD HORSE HERD AREA. The area utilized by wild free-roaming horses or burros as all or part of their habitat at the date of passage of the Wild Free-Roaming Horse and Burro Act (Dec. 15, 1971).

WILD HORSE HERD MANAGEMENT AREA. A designated area of public land where herds of wild free-roaming horses or burros will be maintained and managed in the long-term.

WILD HORSE MANAGEMENT AREA PLAN (WHMAP). A written program of action designed to protect, manage, and control wild free-roaming horses and burros and maintain a natural ecological balance on the public lands.

WILDERNESS CHARACTERISTICS. Factors identified by Congress in the Wilderness Act of 1964 which should be used to determine the suitability of land for inclusion into the National Wilderness System. They include: size; naturalness; outstanding opportunities for solitude or a primitive and unconfined type of recreation; and supplemental values such as geological, archaeological, historical, ecological, scenic, or other features. It is required that the area possess at least 5,000 acres or more of contiguous public land or be of a size to make practical its preservation and use in an unimpaired condition; be substantially natural or generally appear to have been affected primarily by the forces of nature, with the imprint of cultural modifications being substantially unnoticeable; and have either outstanding opportunities for solitude or a primitive and unconfined type of recreation. Congress stated that a wilderness area may also have supplemental values or other features of scientific, educational, scenic, or historical value.

WILDERNESS STUDY AREA (WSA). A roadless area which has been found to have wilderness characteristics.

WITHDRAWAL. Actions which restrict the use of public land and segregate the land from the operation of some or all of the public land and/or mineral laws. Withdrawals are also used to transfer jurisdiction of management to other Federal agencies.

WOODLANDS. Lands producing tree species that are not typically utilized as sawtimber products and are sold in units other than board feet (e.g., pinyon and juniper). Woodlands are not included in the commercial forest land allowable cut base.

YEAR-LONG USE. Grazing of a management area or range allotment continuously throughout the year.



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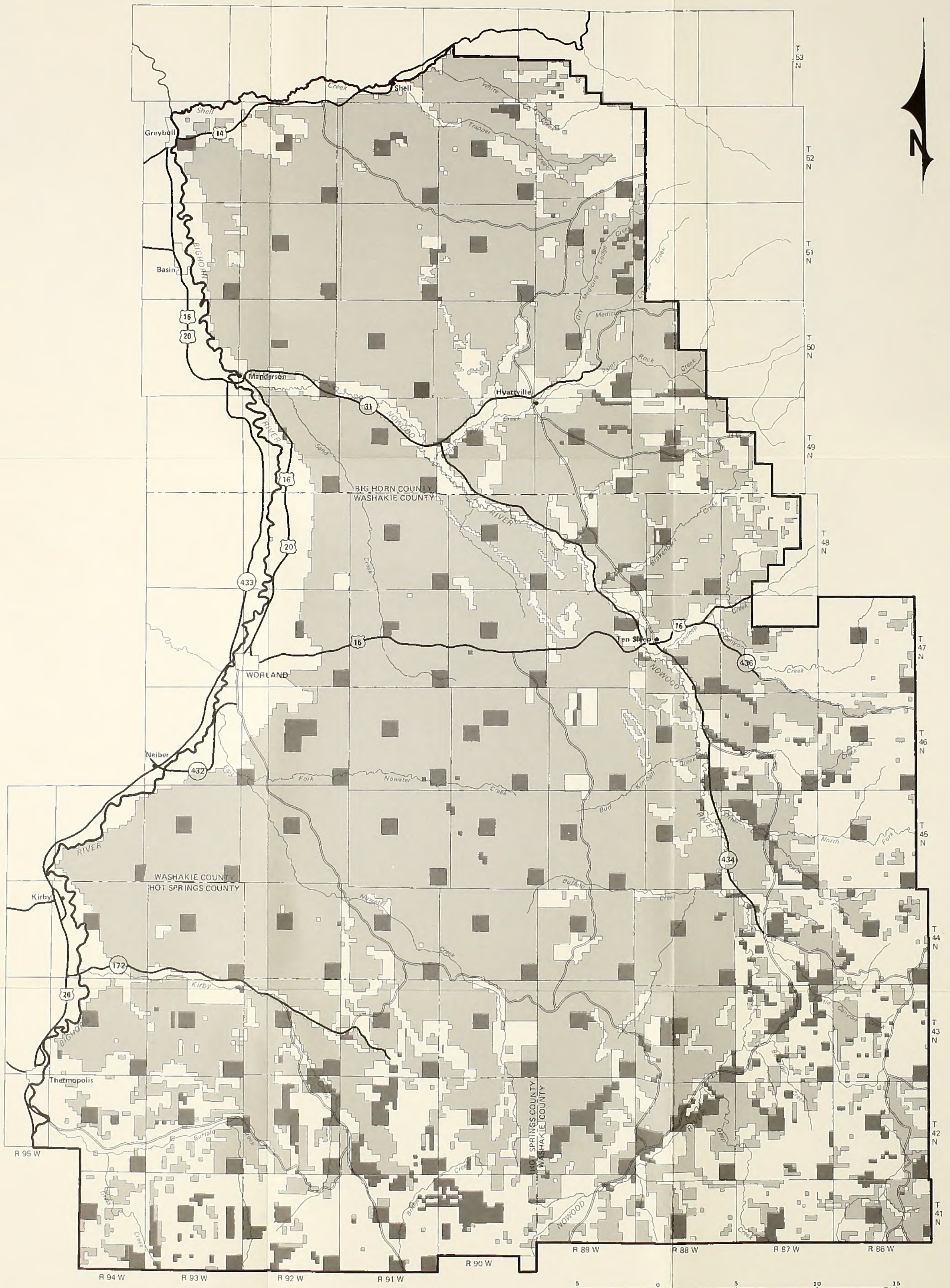
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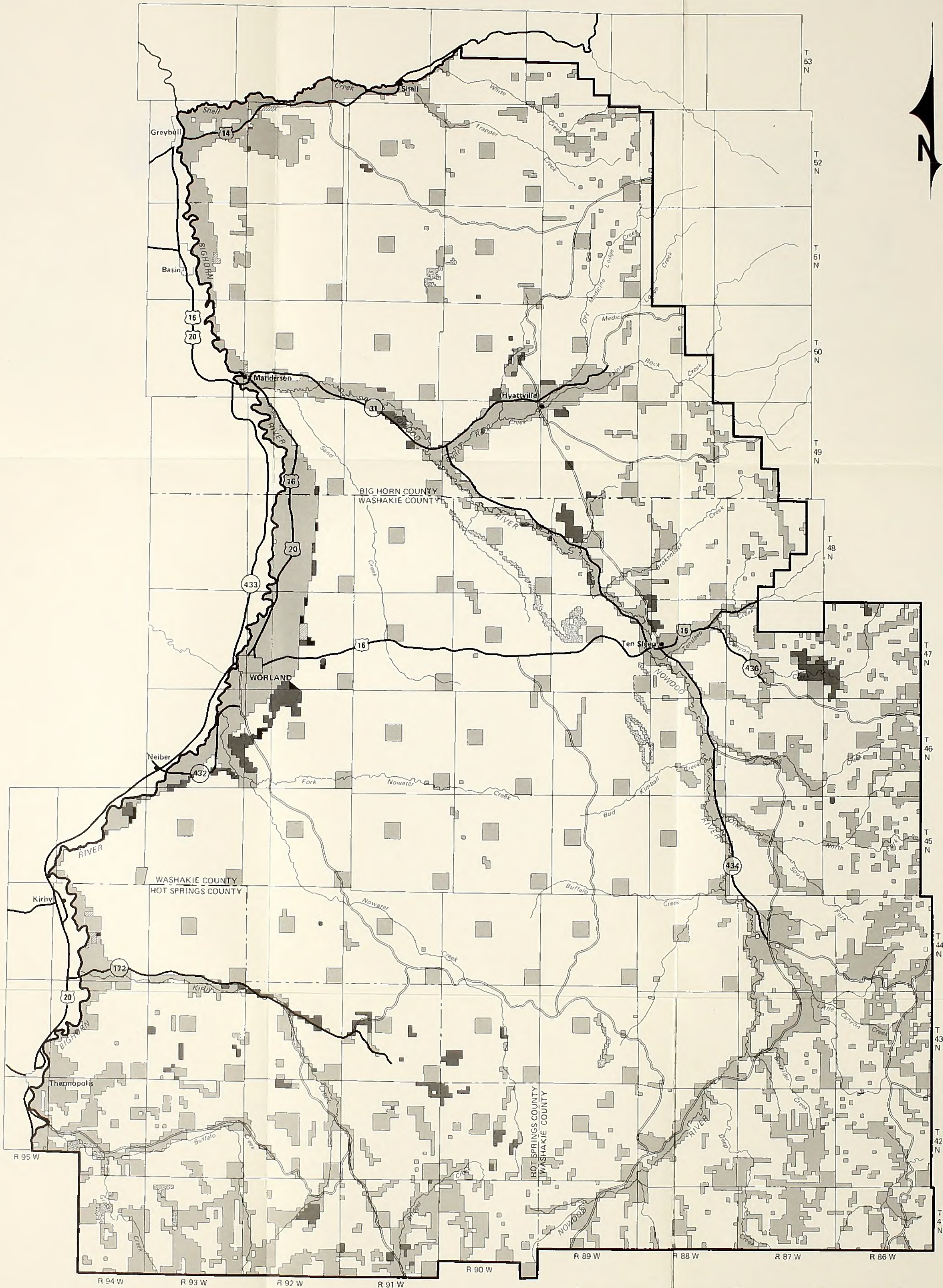
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- Private Land
- Public Land (administered by BLM)
- State Land



Map 2
LAND STATUS
Washakie Resource Management Plan



- All Minerals
- No Minerals
- Oil and Gas
- Other
- Coal
- Oil, Gas and Coal



Map 3
MINERAL STATUS
Washakie Resource Management Plan



U. S. Department of the Interior
Bureau of Land Management
Washakie Resource Area, Wyoming

1986