PROPOSED
WEST/MIDDLE FORK BLACKTAIL CREEK
TIMBER SALE

FINAL ENVIRONMENTAL IMPACT STATEMENT

September 19, 1997

Prepared by: Montana DNRC
Central Land Office
8001 North Montana Ave
Helena, Mt. 59602

Proposed Decision
West/Middle Fork Blacktail Creek
Timber Sale

PROPOSED DECISION:

I have reviewed the Final EIS prepared for the West/Middle Fork Blacktail Creek Timber Sale, the comments received on the draft and the response to the comments included in the Final Document. I have evaluated the advantages and disadvantages of the alternatives presented in the EIS and propose to implement the Helicopter Alternative (Alternative I) as described in the Final EIS.

Rational for the Decision

I believe the Helicopter Alternative is consistent with the management of the state lands for trust beneficiaries and will provide long term benefits while producing short term revenue. I propose to implement the Helicopter Alternative because it will:

- apply silvicultural treatments to forest stands to improve growth, reduce insect and disease potential and provide for regeneration opportunities in a manner that is consistent with the historic forest development in this vicinity.

- improve drainage on existing roads reducing long term sedimentation and improving water quality.

- physically close some existing roads that are poorly located and are a contributing sediment source.

- provide an estimated income of approximately $300,000 to the trust beneficiaries.

Upon execution and distribution of the Final Decision and completion of the sale package, the Blacktail Timber Sale will be presented to the Board of Land Commissioners for approval at a regularly scheduled meeting expected to be no later than May 18, 1998.

Signed:

Garry T. Williams
Forest & Lands Manager
Central Land Office
DNRC
September 19, 1997

EXECUTIVE SUMMARY
West/Middle Fork Blacktail Creek Timber Sale
EIS

PROPOSED ACTIVITY

The Montana Department of Resources proposes to harvest up to 4 million board feet of timber from State land in the West and Middle Forks of the Blacktail Creek Drainage.

PROJECT AREA

The Blacktail Timber Sale project area is located approximately 28 air miles southeast of Dillon, Montana, in Beaverhead County. It is along the southwest end of the Snowcrest range, just north of the Clover Divide and a few miles south of the Blacktail Game Range. The project area contains approximately 10,560 acres of school trust lands of which approximately 2772 acres are forested. Other ownerships within the project area but not proposed for treatment include 3,080 acres of private land and 3,280 acres of land administered by the Bureau of Land Management. Forested stands are primarily composed of overstocked Douglas fir second growth with a scattered large diameter overstory.

The West Fork of Blacktail Creek bisects the project area from north to south. The Blacktail County road parallels Blacktail Creek, crosses the Clover Divide and drops into the Centennial Valley. The primary land use in the area is livestock grazing, conducted under grazing leases administered by the BLM, USFS and DNRC from June through September. The area is also used for dispersed recreational activities consisting primarily of big game hunting during the general hunting season and fishing, hiking or camping during the summer.

OBJECTIVES

The lands involved in this proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions such as public schools, state colleges and universities, and other specific state Institutions such as the School for the Deaf, Dumb and Blind (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article x, Section 11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these benefit institutions (section 77-1-202, MCA). On May 30, 1996, the Department released the Record of Decision on the State Forest Land Management Plan (the Plan). The Plan outlines the management philosophy of DNRC in the management of state forested trust lands, as well as sets out specific Resource Management Standards for ten resource categories.

The Department will manage the lands involved in this project according to the philosophy and standards in the Plan, which states:

> "Our premise is that the best way to produce long-term income from the trust is to manage intensively for healthy and biologically diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long-term revenue stream . . . In the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives."

The objective for this proposal is to generate revenue for the trust through the harvest of timber from the project area and to promote a diversity of stand structures and patterns for a long-term sustainable forest. Other resource values associated with this ownership such as recreation, commercial permits, conservation licenses and aesthetics do not appear to have the revenue production potential of this proposal.

PREFERRED ALTERNATIVE

The preferred alternative (Helicopter Alternative) would harvest an estimated 3005 MBF of standing green timber in 40 cutting units over an estimated 1100 acres. The harvested timber would be yarded to landing areas by helicopter to minimize road development. There are four basic treatments proposed as follows:

> Treatment 1 - Approximately 764 acres would be marked to retain a component (8-14 trees/acre depending on the stand) of the large diameter (>16" DBH), dominant and scattered Douglas fir trees that exist throughout this area. The remaining merchantable components of these stands would be thinned to approximately an 18-foot spacing (134 trees/acre). There would be numerous patches or clumps, greater than five acres in size, of submerchantable trees that would remain essentially undisturbed through the area.
>
> Treatment 2 - An estimated 296 acres would be marked to commercially thin the stands to a residual spacing of approximately 134 trees per acre. These stands consist of trees that are primarily 8-16 inches in DBH and have a component of larger diameter, dominant trees of only 1 to 3 trees per acre. The residual stand would consist of well-formed, healthy codominant trees with the occasional dominants scattered throughout.
>
> Treatment 3 - There is approximately 30 acres of timber that is open growth due to dry site conditions. These stands would be marked to remove poorly formed and overtopped trees. An estimated 30-50 trees would remain depending on existing stand conditions.
>
> Treatment 4 - Approximately 10 acres of timber is dominated by lodgepole pine with few desirable leave trees present. This area would be marked to remove all lodgepole pine and retain a stand of 8 Douglas fir trees per acre.

This alternative would require an estimated 3.4 miles of new road to be constructed. All new road would be physically closed to restrict vehicle use and revegetated upon conclusion of the timber harvest activity. In addition, existing roads that are currently contributing sediment sources in the drainage would be physically closed, have drainage features installed and

revegetated. These roads are currently administratively closed to motorized recreational use. The road closures are designed to prohibit unauthorized motorized vehicle use and to reduce the potential for sediment delivery to streams.

OTHER ALTERNATIVES CONSIDERED

Alternatives considered but not preferred, include 1) a traditional skidding alternative and ii) a helicopter alternative that defers harvest of areas of close proximity to the Blacktail Winter Range and iii) No action. Those alternative can be summarized as follows:

i) The "skidding alternative" would harvest an estimated 1518 MBF from approximately 530 acres. Stand treatments would be similar to the preferred alternative. An estimated 11.6 miles of new road would be constructed, closed and revegetated. The same road closures proposed under the preferred alternative would be conducted.

This alternative is not preferred due to the extensive road development required. Some of the road would necessarily be constructed on steep slopes or on areas of marginal slope stability and consequently has potential for impacts not associated with the helicopter yarding alternatives.

ii) The "Winter Range" alternative would harvest an estimated 1731 MBF from approximately 803 acres. The harvested timber would be yarded by helicopter in a manner identical to the preferred alternative exept it defers units in close proximity to the winter range. This alternative is not preferred due to the lesser volume harvested, forest area treated and reduced income potential.

iii) The "No Action" alternative is not preferrred because it does not address problems in forest stand condition, does not address existing road or sedimentation problems and does not produce trust revenue from timber resources.

ANTICIPATED IMPACTS

Reduced stocking levels in forested stands would likely increase the vulnerability of bull elk using the project area during the hunting season. Harvesting timber from an estimated seven acres of mature spruce that provides potential boreal owl nesting habitat would reduce the potential nesting habitat on State land in the project area by 50%. Physical road closures on roads that are administratively closed to recreational use would more effectively enforce the road closures but may dissuade some hunters from using the area, while encouraging others to use it.

Disturbance associated with logging activity may temporarily preclude use of the project area by grizzly bears or wolves travelling through the area. The use of helicopters to yard logs into decks will create noise that would disturb recreationists. Road closures and road improvements designed to address drainage and sedimentation concerns are expected to improve water quality

by reducing potential sources of sediment delivery. We expect the treatment of forested stands to move forest structure towards conditions that historically existed in this vicinity, reduce the potential for insect and disease infestations while generating trust income of approximately $300,000.

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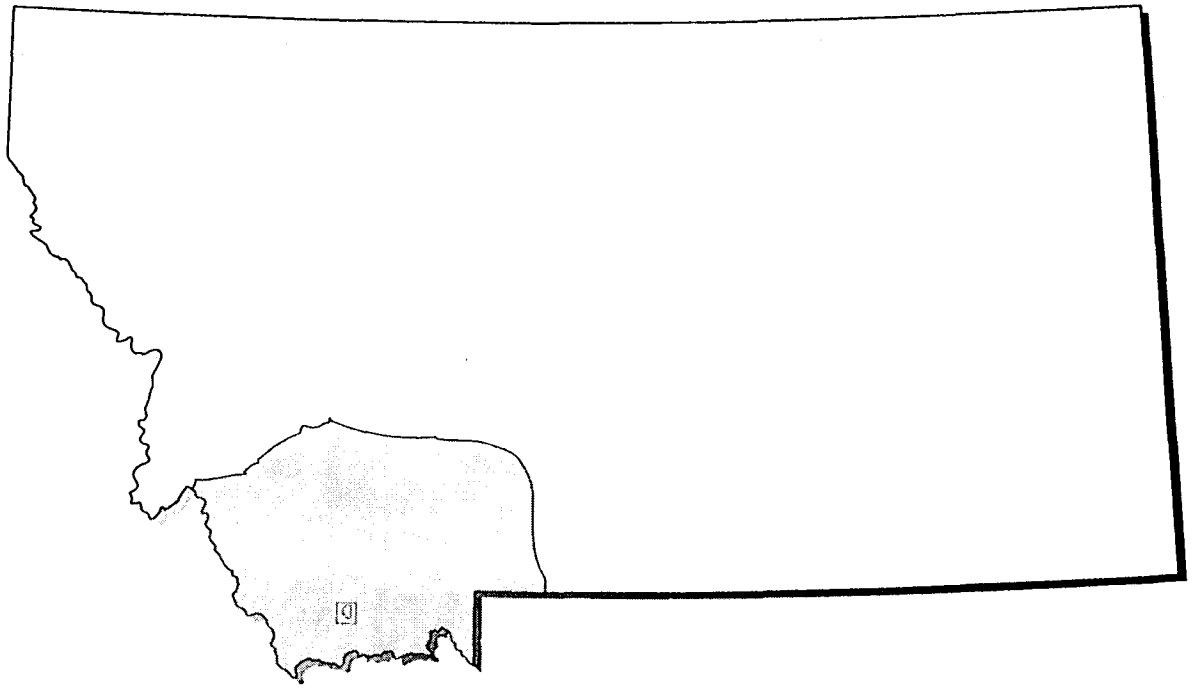
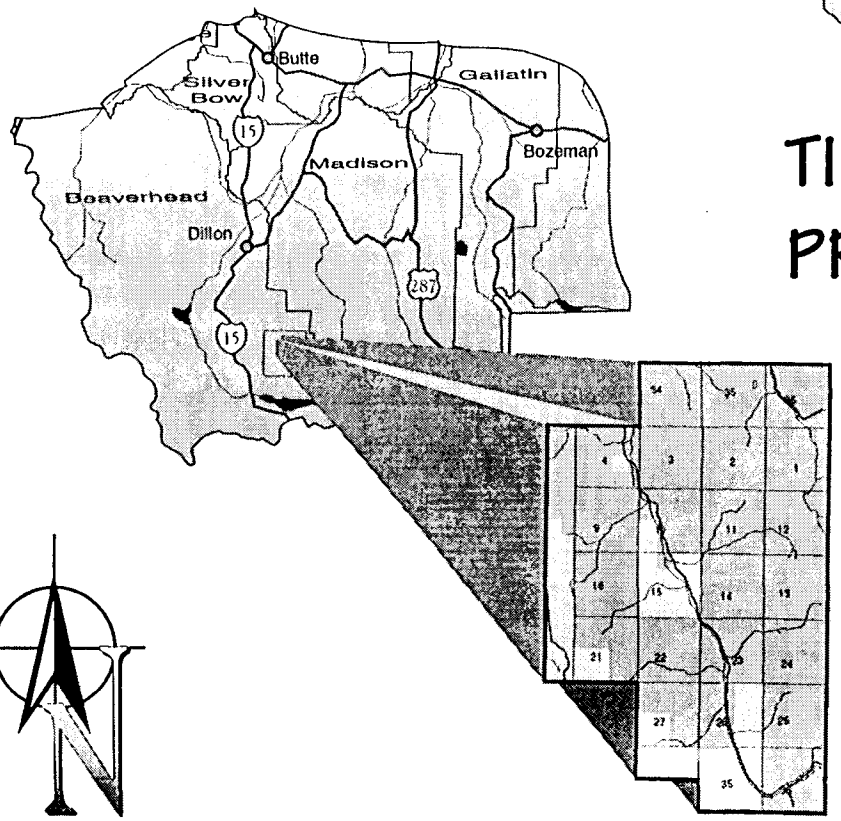




TIMBER SALE
PROJECT AREA

CHAPTER I
PURPOSE, OBJECTIVES AND SCOPE

I. PROPOSED ACTIONS

A. DESCRIPTION

The Montana Department of Natural Resources and Conservation (DNRC), Dillon Unit, proposes to harvest timber, and to regenerate trees in the West and Middle Fork Drainages of Blacktail Creek, in Beaverhead County. The project area contains approximately 10,560 acres of School Trust Lands of which approximately 2772 acres are forested.

The proposed activity is to harvest up to 4 million board feet (MMBF) of mostly decadent and suppressed Douglas-fir and Lodgepole pine sawtimber. Up to 12 miles of new road maybe constructed and up to 4 miles of road reconditioned or reconstructed depending on which alternative is chosen.

B. OBJECTIVES

The lands involved in this proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions such as public schools, state colleges and universities, and other specific state institutions such as the School for the Deaf Dumb and Blind (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article x, Section 11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these benefit institutions (section 77-1-202, MCA). On May 30, 1996, the Department released the Record of Decision on the State Forest Land Management Plan (the Plan). The Plan outlines the management philosophy of DNRC in the management of state forested trust lands, as well as sets out specific Resource Management Standards for ten resource categories.

The Department will manage the lands involved in this project according to the philosophy and standards in the Plan, which states:

> "Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biologically diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long-term revenue stream...In the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives."

The objective for this proposal is to generate revenue for the trust through the harvest of timber from the project area and to promote a diversity of stand structures and patterns for a long term sustainable forest. Other resource values associated with this ownership such as recreation, commercial permits, conservation licenses and aesthetics do not appear to have the revenue production potential of this proposal. A

conservation license, that would compensate the Trust without harvesting timber, was discussed with the Montana Department of Fish, Wildlife and Parks but that Department decided they were not interested in pursuing such an agreement. No other revenue generating proposals were discovered during the development of this proposal nor are any known by the DNRC at this time. The proposal would not exclude present uses and it is not anticipated that the proposal would preclude realizing revenue from other resource values in the future.

II. SCOPE OF THE PROPOSED ACTION

The scope of the proposed actions addressed in the EIS is limited to the specific timber harvest, and associated activities. The EIS is not intended as a programmatic or area plan.

A. GEOGRAPHICAL AND SPATIAL BOUNDARY

The West/Middle Fork Blacktail Creek Timber Sale is in Southwest Montana, approximately 28 air miles southeast of Dillon, Montana. The project area lies in the Blacktail valley from approximately 7,000 to 8,200 feet elevation. The northern boundary lies approximately 1 mile north of Whiskey Springs, the southern boundary is at Clover Creek Divide, the East boundary is the Beaverhead Forest Boundary and the West boundary is the Blacktail Divide. The following sections are included in the proposal (see proposal maps in chapter II):

T11S, R6W, SECTION 36
T12S, R6W, SECTIONS 1,2,3,10,11,12,13,14,16,21,22,23,24,25,26,27,36

B. TEMPORAL BOUNDARY

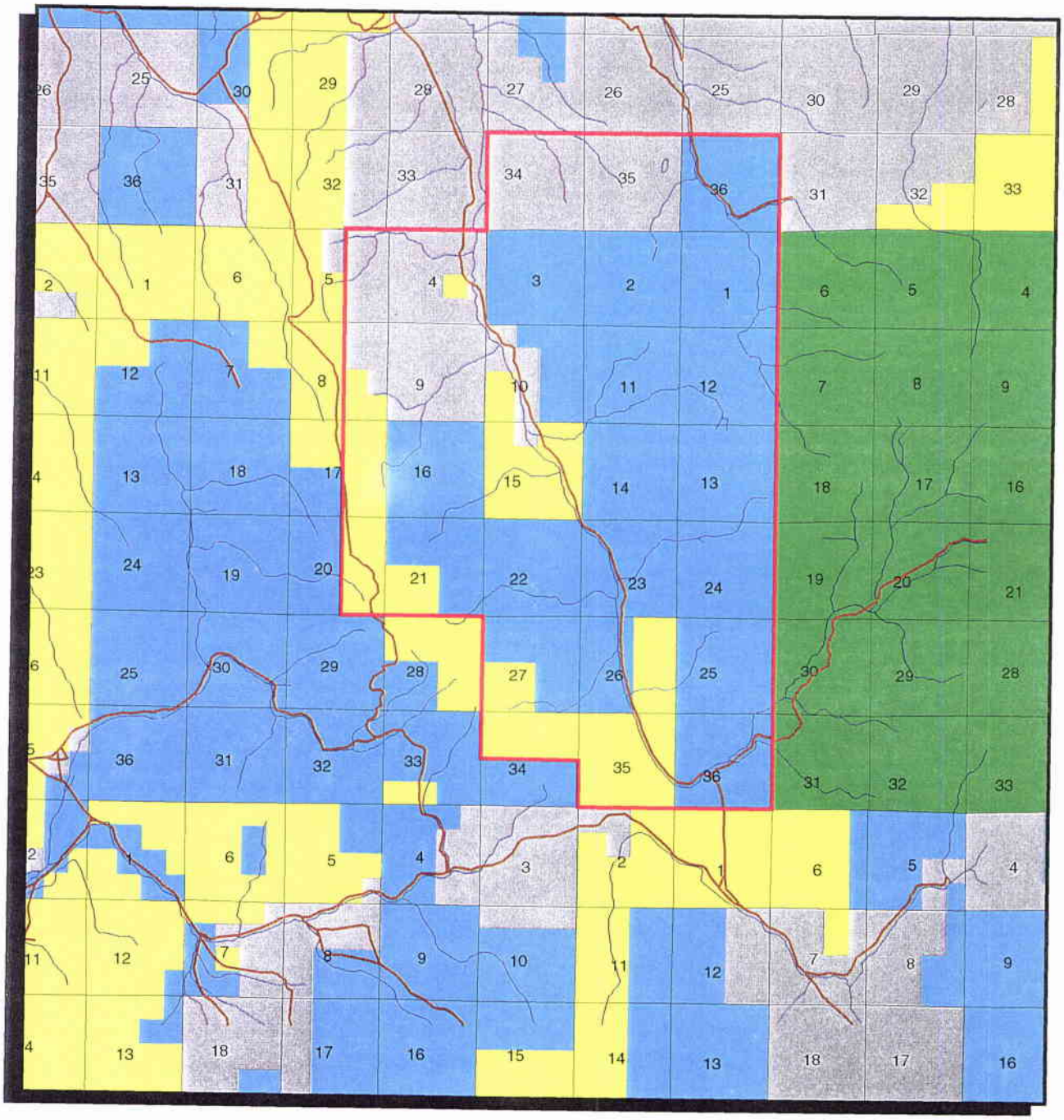
Under the proposed action, the timber would be sold in 1997 or spring of 1998. Harvesting and road improvements could take place over a five year period, with completion in 2002. Fire hazard reduction activities would be completed by 2004. Specific operational periods would be required within each calendar year for individual activities, such as culvert installations, road construction and timber harvest to reduce environmental impacts associated with some resources.

III. CONNECTED AND CUMULATIVE ACTIONS

Connected actions include post-harvest fire hazard reduction (slash treatment), road construction and closure activities, grass seeding and rehabilitation of landings. Cumulative past and foreseeable future actions within the project area include wildfire suppression, timber harvesting on State and private lands, reforestation, and recreational use.

Whenever possible connected and cumulative actions have been evaluated in each resource description.

LAND OWNERSHIP - BLACKTAIL TIMBER SALE



BLM LANDS

STATE LANDS

PRIVATE LANDS

USFS LANDS

TIMBER SALE PROJECT AREA

IV. OTHER KNOWN ENVIRONMENTAL ASSESSMENTS THAT MAY INFLUENCE THE PROJECT PROPOSAL

A Preliminary Environmental Review was prepared by DSL in 1987 for the Blacktail Timber Sale. The timber sale encompassed approximately 66 acres located on state land in sections 23 and 24, T12S, R 06W. The timber sale was sold in January 1988 and harvested from May through July, 1988. A total of 728 MBF was removed from the sale area.

In June 1996, DNRC began a phased-in implementation of the State Forest Land Management Plan (Plan). The Plan established the agency's philosophy for the management of forested state trust lands. The management direction provided in the plan comprises the framework within which specific project planning and activities take place. The Plan also defines the Resource Management Standards which guided the development of this proposed action. The Plan philosophy and appropriate resource management standards have been incorporated into the design of the proposed action.

An EA is currently being prepared for the Crow Land Exchange proposals between the Crow Tribe, DNRC and the Bureau of Land Management. The exchange has been proposed as a result of the Crow Boundary Settlement Act signed into law in 1994. Under the exchange proposal, the Crow Tribe would acquire state land within the Reservation and the State would acquire public land administered by the BLM. Portions of sections 15 and 10, T12S, R06W, currently managed by the BLM are under consideration for exchange to state ownership. The EA is expected to be completed during the spring or summer of 1997.

V. OTHER AGENCIES WITH JURISDICTION AND PERMITS REQUIRED

A. A Stream Preservation Act Permit (124 Permit) is required for activities conducted by any government agency in a stream. Activities such as culvert installation or bridge construction requires a "124" permit. Alternatives I and III propose a temporary crossing on Blacktail Creek that would require a 124 permit.

B. A Short-term Exemption from Montana's Surface Water Quality Standards (3A Authorization) is needed whenever activities cause unavoidable short term violations of state surface water quality standards for turbidity, total dissolved solids or temperature. This permit from Montana Department of Environmental Quality is occasionally needed for some culvert placements, however, a 3A Authorization is not anticipated for activities proposed in any of htese alternatives.

C. Slash burning activities are regulated and air quality is monitored through the Montana Airshed Group, of which DNRC is a member.

D. A Road Use permit is required by the Bureau of Land Management for roads located on BLM ownership.

E. Temporary road easements are required from two private landowners.

VII. DECISIONS TO BE MADE

A Record of Decision will be published with the adoption of a final EIS and will include the following:

1) A decision on which alternative to implement,
2) Any special conditions under which one selected alternative is to be implemented.

VIII. RESOURCE ISSUES AND CONCERNS

Resource concerns were identified through scoping and during data collection phases of the analysis. Resource concerns and issues were brought to our attention by the general public, other natural resource agencies, various organizations and internally from DNRC natural resource specialists and land managers. Input opportunities for the public were ongoing throughout the analysis and included the initial project proposal (mailing and news ads) mailing of issue statements, correspondence by mail and a thirty-day public review period for the draft EIS. A list of all correspondence and concerns received by DNRC is available in the project file.

As a matter of course, all timber sales designed by DNRC incorporate many routine mitigation measures to reduce impacts, resolve issues and address resource concerns. Some of the other issues and concerns we received are outside the scope of the proposed action because they are either irrelevant to the decision, already decided by law or DNRC standards, beyond the geographical influence, or have nothing to do with the proposal.

Issues that were either controversial or represented unresolved conflicts were used to design alternatives to the proposed action. Following are the major environmental issues addressed in the effects analysis. See the project file, for a further description of issue statement development.

Below is a list of major environmental issues:

A. WATER QUALITY AND WATER YIELD

There is concern that the timber harvest and road maintenance activities conducted under the proposed sale would increase sediment levels in the West Fork and Middle Fork Blacktail Creek drainages and consequently affect fisheries. The cumulative impacts of past and proposed timber harvests in this vicinity on sedimentation and water yield is also a concern.

B. FISHERIES

The Blacktail Drainage flows directly into the Beaverhead River near Dillon. There is concern the timber sale activity will impact the fish habitat in Blacktail Creek.

C. OLD GROWTH AND ASSOCIATED SPECIES

There is concern that the proposed timber sale would impact old growth stands in the area and consequently plant and wildlife species that are associated with old growth forested stands.

D. THREATENED AND ENDANGERED SPECIES

The Gravelly and Snowcrest Mountains provide possible habitat for the threatened grizzly bear and the endangered bald eagle, gray wolf and peregrine falcon. There was concern regarding potential impacts to these species.

E. ECONOMICS

Concern has been expressed that the expense of road developments and harvest operations would exceed the timber value and result in little monetary return to the Trust.

F. BULL ELK VULNERABILITY

There is concern that a timber harvest in the area may cause a reduction of elk security cover which increases bull elk vulnerability. Specifically, loss of hiding cover may increase the number of bull elk harvested during the first week of the hunting season, and would consequently require the MDFWP to further restrict hunter opportunity in the Blacktail area.

G. ROADS

This issue relates to the development, condition, extent, and type of construction of new and existing roads in the area. Public involvement has identified a concern that new roads could cause multiple potential impacts associated with the construction, development and use of forested roads. Some of the associated impacts include sedimentation, increased traffic, spread of noxious weeds, and increased access for recreational purposes.

H. OTHER SENSITIVE SPECIES

There are several wildlife species identified as "sensitive" by DNRC that may use the Blacktail vicinity and surrounding area. There is concern that the proposed harvest may have unacceptable impacts to those species.

I. WINTER RANGE

It was asked if harvesting timber in the Blacktail area would have an adverse effect on the wintering big game species such as deer, antelope, and elk.

J. SOILS AND SLOPE STABILITY

Areas of marginal slope stability occur within the project area which would be difficult or costly to construct roads across. Road construction and timber harvest may result in slumping, lost site productivity, erosion and increased road maintenance needs.

CHAPTER II
ALTERNATIVES

I. INTRODUCTION

Chapter II explains how alternatives were developed, describes the three action alternatives, the No-Action Alternative, and the alternatives that were considered but not given detailed study. Chapter II also summarizes environmental effects from chapter IV in a comparison table.

II. DEVELOPMENT OF ALTERNATIVES

A. INITIAL PROPOSAL

This proposal was initiated by the planning process DNRC uses to provide a listing of future timber sale proposals. Areas of possible harvest are selected using a wide range of management and resource-related considerations, including, among others, sale volume targets, salvage of insect and disease infestations, accessibility, and environmental considerations.

B. INITIAL SCOPING

An informational letter containing the project objectives, proposed management activities and a map of the project area was developed. The letter and a map were sent out to individuals, interested groups, adjacent landowners, other agencies and DNRC resource specialists on January 9, 1996. A public notice was put in the Dillon Tribune on February 7, 1996 and again on February 14, 1996. A newspaper article appeared in the Montana Standard on March 2, 1996, and was distributed by the Associated Press to newspapers all over the State. Comments received were compiled and analyzed to provide the initial concerns and issues.

C. PUBLIC INPUT

Public comment from the scoping letters were requested by February 9, 1996 and comment from the Public Notice in the newspaper was requested by March 1, 1996. Comments were received in writing and by telephone. Comments received from the Montana Department of Fish, Wildlife and Parks indicated a timber harvest in this area may conflict with their goals and plans for elk management in the Gravelly Range. One of the criteria for preparing an EIS under MEPA rules, is conflicts with formal plans of another State Agency, consequently an EIS has been prepared.

D. DEVELOPING ALTERNATIVES

The issues identified during the scoping process are summarized in Chapter I. Some issues led to the development of mitigation measures that can be incorporated into all alternatives. Others became the primary concern for developing an alternative. The helicopter yarding alternative is proposed because it would harvest a substantial volume of timber with a minimum amount of road development and soil disturbance.

A traditional ground skidding alternative is being considered due to the concern regarding helicopter yarding expense. A ground-based sale would harvest less timber but may provide greater trust revenue.

A third alternative is being considered due to concerns related to bull elk security and the proximity to the Blacktail Game Range. The Blacktail Alternative would defer timber harvest in the areas that are closest to the Blacktail Game Range and where it is possible that bull elk likely seek security prior to moving onto the Game Range.

The No Action Alternative is evaluated as the basis for comparing the other alternatives to the option for not conducting the project.

III. DESCRIPTION OF ALTERNATIVES

A. MITIGATIVE MEASURES COMMON TO ALL ACTION ALTERNATIVES

1. New road construction is primarily designed to be temporary and of minimum standard and shall be physically closed, at specific locations so they are impassable by a motorized vehicle at the end of the sale. Logging slash and brush will be used when available to discourage foot traffic along its right-of-way, then seeded with weed free grass seed.

2. Existing roads will either be physically closed when not needed for management purposes or closed by locked gate where periodic management use is anticipated.

3. Road reconditioning and reconstruction across private lands would bring the existing haul routes up to BMP standards and could improve up to 8 miles of existing roads. The majority of this reconditioning and/or reconstruction would consist of minor blading where necessary and road drainage improvements where needed to reduce potential sedimentation that is currently occurring.

4. All access through private land would be temporary for the sole purpose of implementing this proposal and is not designed for public access purposes.

5. Protection for any improvements within the gross sale area is provided in the timber sale contract. Improvement protection includes the immediate replacement of any damaged fence, stock waterlines, stock tanks or roads.

6. Soil scarification for adequate seedbed preparations would be kept to a minimum to limit potential soil and watershed impacts. Scarification is expected to range from 5 to 45%.

7. Up to 20 tons per acre of slash and woody debris greater than 3" in diameter would be left for nutrient recycling, and soil wood recruitment to maintain soil productivity, seedling micro-climate, habitat for some species of small mammals, and old growth stand characteristics.

8. Road construction will be minimized and located on most stable ground feasible. All road proposed road construction will be reviewed by the soils

scientist for site specific mitigations designed to maintain slope stability.

9. Road use and equipment operations during harvest and post harvest activities will be limited to dry, frozen or snow covered conditions.

10. Road drainage will be installed concurrent with construction and will be maintained. If cut or fill slope slumps occur, they will be stabilized within the course of the harvest project to control erosion.

11. On areas of marginal slope stability, large diameter trees with stem sweep will be removed. Younger, actively growing codominants will be retained at a minimum 30' spacing. Even aged management will not be conducted directly adjacent to identified sites of instability.

12. Equipment will not be operated on identified unstable sites. Skid trails will be closed and drainage features installed to direct away from sites of instability.

13. Slash disposal methods would be limited to spot piling, whole tree skidding, lop and scatter and jackpot burning to minimize compaction and soil displacement.

14. Money will be collected from the purchaser for the treatment of noxious weeds. All equipment used in the sale area would be power washed and inspected before being brought on-site.

15. All current Best Management Practices (BMP'S) would be implemented as they pertain to all action alternatives of this EIS.

16. All current Streamside Management Zones (SMZ) laws and procedures would be followed as they pertain to all action alternatives.

17. If Cultural Resources or Threatened and Endangered species are found in the area, the project would be suspended pending further analysis by appropriate resource specialists.

18. If an active wolf den or rendezvous site is discovered within one mile of the harvest activity, operations would be suspended until the den or site is vacated.

19. If large aggregations of bats are discovered in the project are during sale preparation or administration, the Forest Management Wildlife Biologist will be notified and appropriate mitigative measures developed.

20. Portions of stands have been identified as having old growth characteristics. These areas are typically small acreages on micro-sites within larger stands of timber. Four of these areas totalling approximately 45 acres (portions of stands 11, 29, 37, & 42) have been excluded from harvest to maintain old growth characteristics.

21. All newly disturbed soils on road cuts and fills would be promptly reseeded to site adapted grasses, including native species, to reduce weed encroachment and stabilize roads from erosion.

22. If spot infestations of noxious weeds occur, herbicide treatments may be required by the forest officer. Herbicide must be applied under the supervision of a licensed applicator following label directions in accordance with Department of Agriculture regulations, applicable laws and rules and regulations of the local weed board.

23. **Helicopter flights are not to be conducted over the Blacktail Game Range, unless during emergency situations. If flights occur over the game range, the yarding operations will be immediately suspended and a $1000.00 penalty may be assessed.**

B. ALTERNATIVE I--HELICOPTER ALTERNATIVE

This alternative would harvest approximately 3005 MBF of standing green timber that is in need of harvest due to stand over crowding and over maturity of some of the stand components. The timber would be harvested on approximately 1100 acres in 40 cutting units units located in sections 36, T11S, R6W, sections 1,2,3,11,12,13,14,22,23,24,25,26,27 and 36, T12S, R6W. The majority of the stands are dominated by Douglas-fir which are in need of silvicultural treatment to keep the stands healthy and to avoid overstocking and insect and disease problems. The stands would be treated using commercial thinning and overstory removal via improvement harvest to remove individuals of poor form, quality and damage. The harvest trees would for the most part be marked to cut. There are four basic treatments proposed that differ by the existing stand conditions. Under all treatments, snags that would not pose a safety hazard to operators would be retained as well as trees that would likely develop into a snag within 10 years:

Treatment 1--Approximately 764 acres would be marked to retain a component (8-14 trees/acredepending on the stand) of the large diameter (>16" DBH), dominant and scattered Douglas fir trees that exist throughout this area. The remaining merchantable components of these stands would be thinned to approximately an 18 foot spacing(134 trees/acre). There would be numerous patches or clumps, greater than five acres in size,of sub-merchantable trees that would remain essentially undisturbed through the area.

Treatment 2--An estimated 296 acres would be marked to commercially thin the stands to a residual spacing of approximately 134 trees per acre. These stands consist of trees that are primarily 8-16 inches in DBH and have a component of larger diameter, dominant trees of only 1 to 3 trees per acre. The residual stand would consist of well formed, healthy codominant trees with the occasional dominants scattered throughout.

Treatment 3--There is approximately 30 acres of timber that is open grown due to dry site conditions. These stands would be marked to remove poorly formed and overtopped trees. An estimated 30-50 trees would remain

depending on existing stand conditions.

Treatment 4--Approximately 10 acres of timber is dominated by lodgepole pine with few desireable leave trees present. This area would be marked to remove all lodgepole pine and retain a stand of 8 Douglas fir trees per acre.

Under this proposal an estimated 3.4 miles of new road would be constructed, and approximately 3.1 miles of the new road would be physically closed at the conclusion of the sale. Approximately 3.2 miles of road would be reconstructed. In addition 11 miles of existing road would be closed via gates or barrier closures. **The road construction could be conducted from June 1 through October 15 and the harvest activity conducted from December 1 through October 15 each year of the sale contract, with all work concluding by October 15, 2002.**

C. ALTERNATIVE II--SKIDDING ALTERNATIVE

This alternative would harvest areas that are operable with conventional ground based harvesting systems. Areas of slope instability and steep terrain in the Blacktail drainage substantially limits the forested area and amount of timber that can be harvested by convential ground systems. The silvicultural methods would be the same as in Alternative I. This alternative would harvest an estimated 1518 MBF of timber from 13 harvest units over an area of approximately 530 acres. The treatments would be similar to to those proposed in Alternative I except the acreages would differ as follows:

Treatment 1--342 acres
Treatment 2--175 acres
Treatment 3-- 13 acres
Treatment 4-- 0 acres

Under this proposal an estimated 11.6 miles of new road would be constructed, of which 11.3 miles would be physically closed at the conclusion of the sale. In addition approximately 3.4 miles would be reconstructed and 11 miles of existing roads would be gated or closed with barriers. All road construction and harvest activity could be conducted from June 1 through October 15, each year of the sale contract is in effect with all work concluded by October 15, 2000.

D. ALTERNATIVE III--BLACKTAIL WINTER RANGE ALTERNATIVE

This alternative was generated in response to concerns voiced by the Department of Fish, Wildlife and Parks. As in Alternative I, the logs would be yarded by helicopter, but harvest in areas of close proximity to the Blacktail Game Range would be deferred. The closest stand to the game range, harvested under this proposal, is Stand VI located approximately 1.5 air miles east of the southern border of the game range. An estimated 1731 MBF of live timber would be harvested from approximately 803 acres. The harvest would include 33 harvest cutting units located in Sections 3,11,12,13,14,22,23,24,25,26,27 and 36, T12S, R6W. The treatments would be identical to those proposed in Alternative I, excluding the Middle Fork areas:

Treatment 1--657 acres
Treatment 2--111 acres
Treatment 3-- 25 acres
Treatment 4-- 10 acres

Under this proposal an estimated 1.9 miles of new road would be constructed, and approximately 1.7 miles of the new road would be physically closed at the conclusion of the sale. In addition 3.2 miles of existing road would be reconstructed but 11 miles of existing road would be closed via gates or barrier closures. **The road construction could be conducted from June 1 through October 15 each year and harvest operations conducted from December 1 through October 15 each year the contract is in effect, with all work concluding by October 15, 2002.**

E. NO ACTION ALTERNATIVE

This alternative would not harvest any timber, build any roads, or conduct any road closures. Licensed grazing and recreational activities would continue. No timber revenue would be generated and the site would be reevaluated in the future for timber harvest at a later date.

F. ALTERNATIVES CONSIDERED BUT NOT GIVEN DETAILED STUDY:

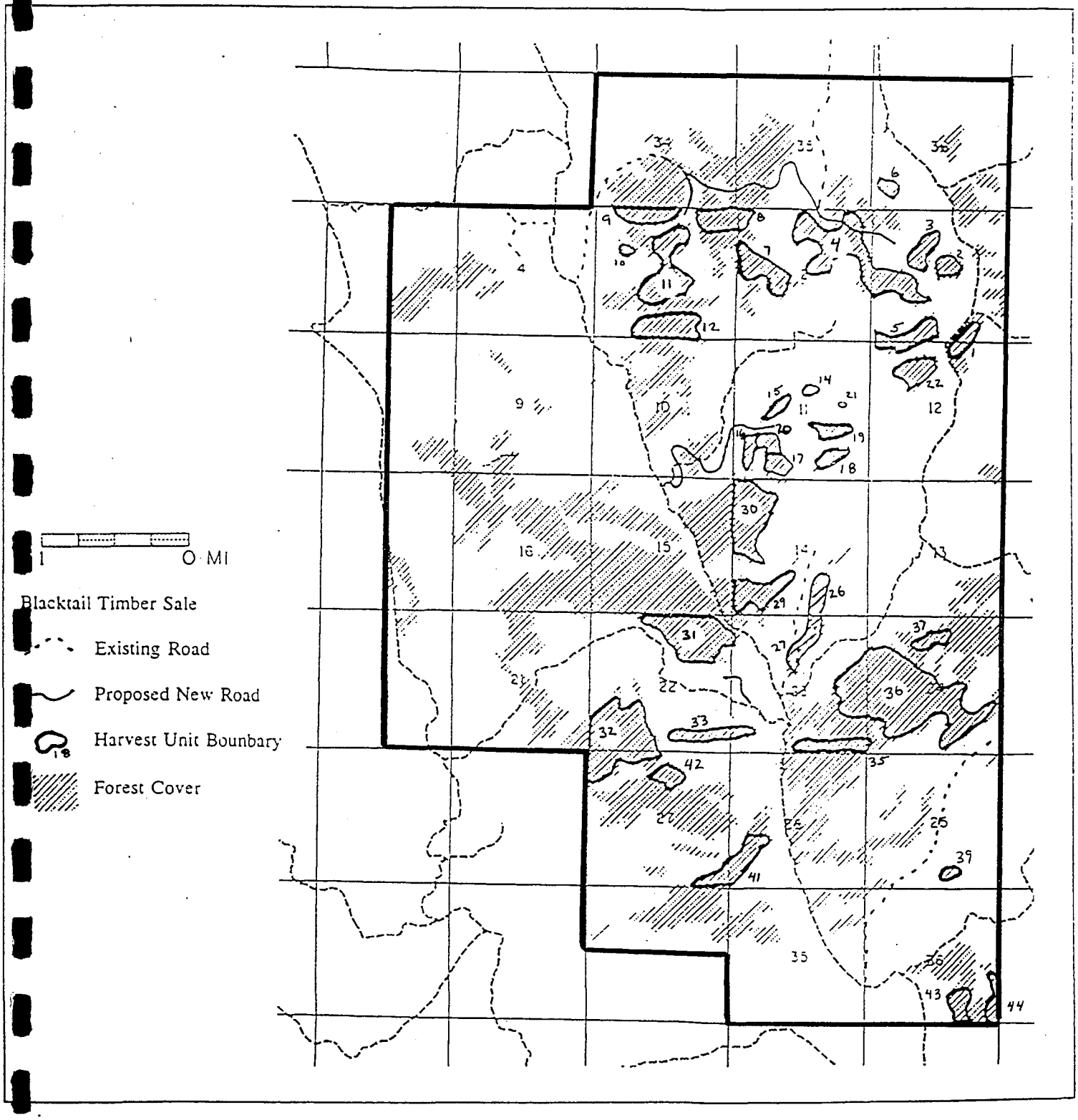
1. Defer Harvest for Compensation - Due to concerns expressed by the Montana Department of Fish, Wildlife and Parks regarding Bull Elk vulnerability and their inability to meet their management objectives, the DNRC asked DFWP if they would compensate the trust to defer the timber harvest. The DFWP has declined to consider such an option.

2. The DFWP asked that harvest be restricted to areas west of the Blacktail Road. This alternative was not considered due to:

   - The extensive amount of road development needed to access a viable sale proposal
   - The economics of combining an expensive helicopter yarding sale with an expensive road development package
   - Most of the timber types west of the Blacktail Road are in less need of treatment than those included in the helicopter harvest.

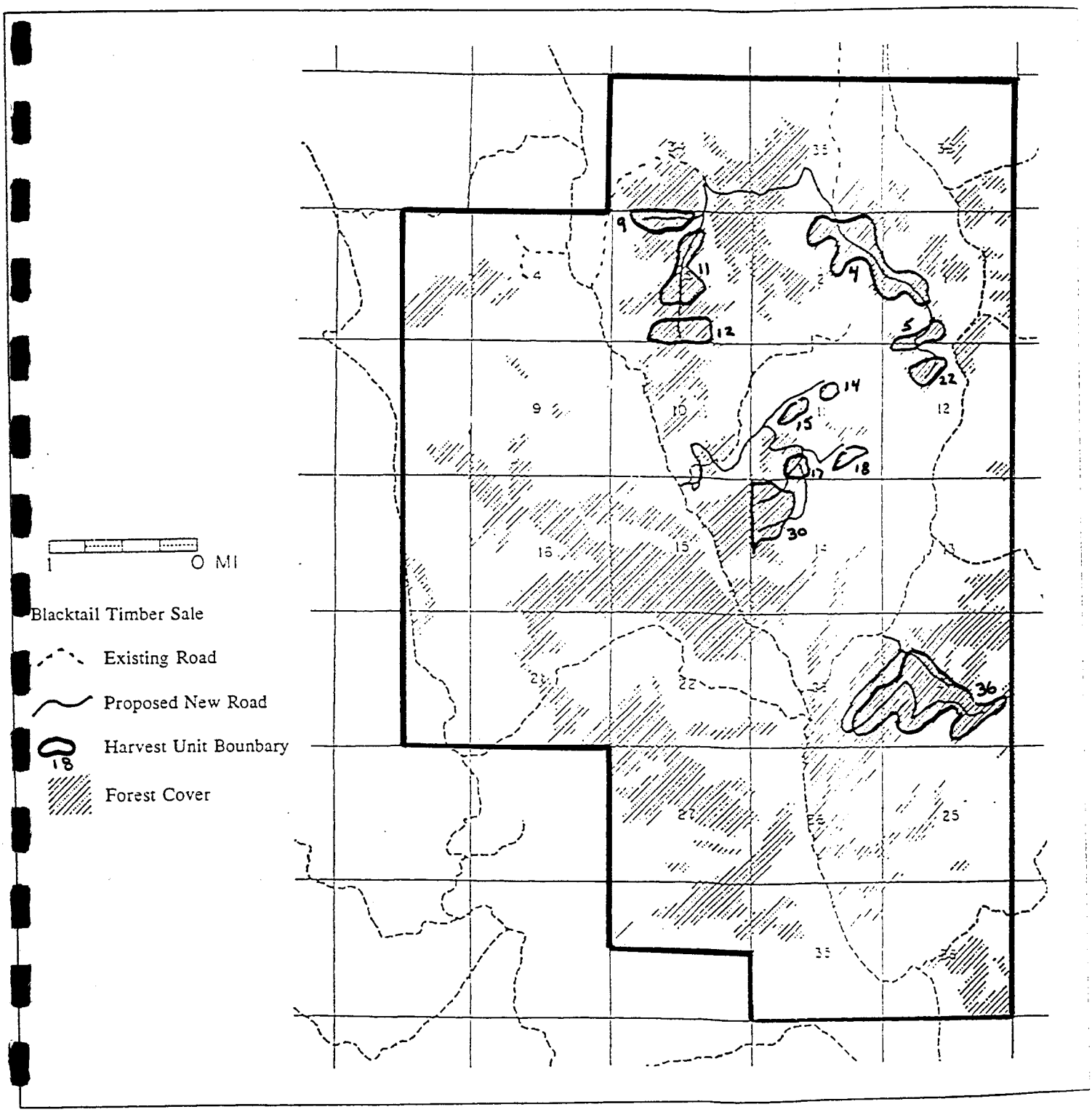
BLACKTAIL TIMBER SALE

Alternative I



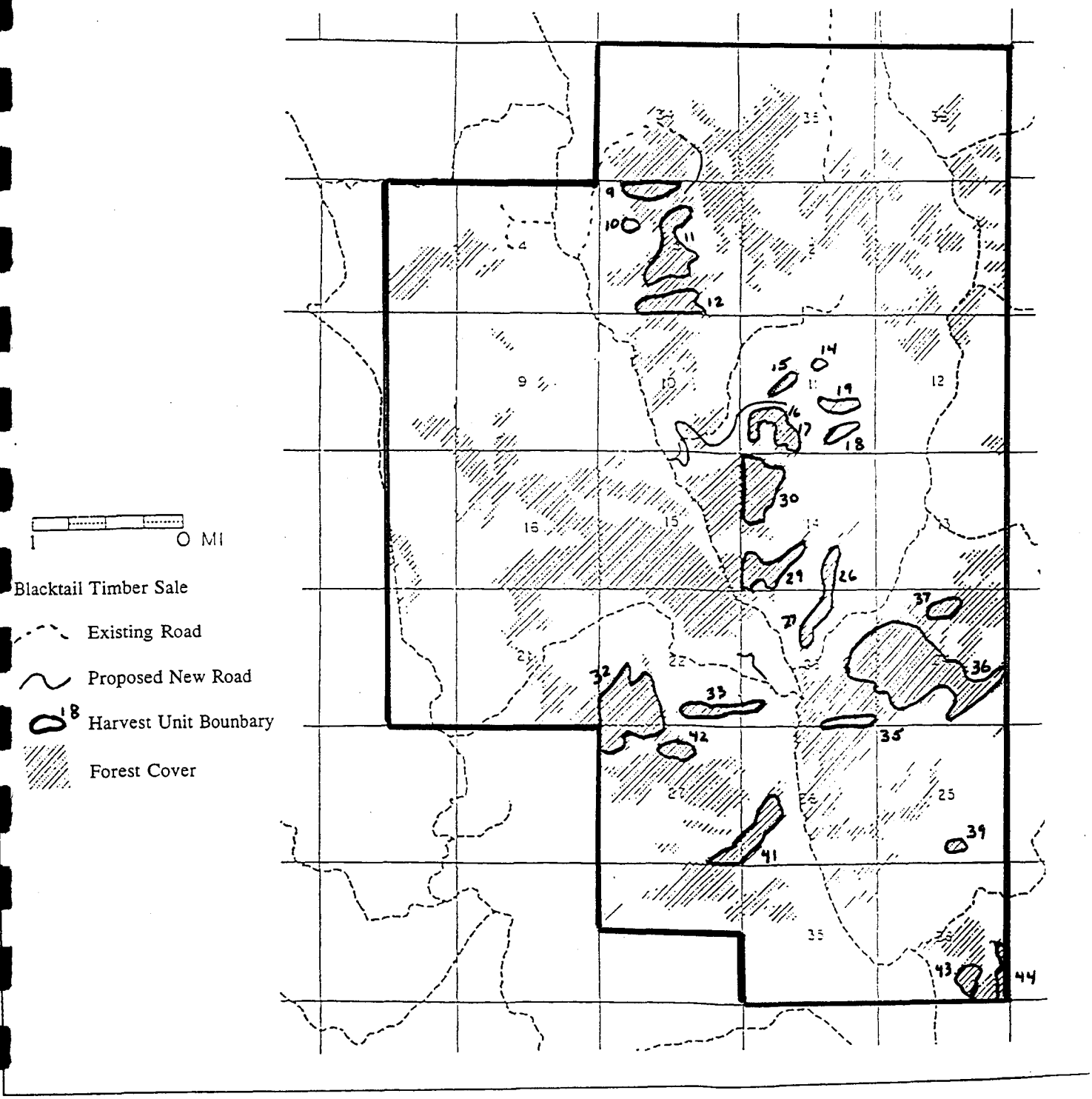
BLACKTAIL TIMBER SALE

Alternative II



BLACKTAIL TIMBER SALE

Alternative III



COMPARISON OF ALTERNATIVES				
PROPOSED ACTIVITY OR ENVIRONMENTAL COMPONENTS	**NO ACTION**	**ALTERNATIVE I HELICOPTER HARVEST**	**ALTERNATIVE II SKIDDING ALTERNATIVE**	**ALTERNATIVE III WINTER RANGE ALTERNATIVE**
ESTIMATED HARVEST VOLUME	0 MBF	3005 MBF	1518 MBF	1731 MBF
FORESTED ACRES TREATED	0 ACRES	1100 ACRES	530 ACRES	803 ACRES
MILES NEW ROAD CONSTRUCTION	0 MILES	3.4 MILES	11.6 MILES	1.9 MILES
MILES NEW ROAD CLOSED	0 MILES	3.2 MILES	11.3 MILES	1.7 MILES
MILES EXISTING ROAD CLOSED	0 MILES	11.0 MILES	11.0 MILES	11.0 MILES
IMPACTS ON VEGETATION	NO CHANGE IN VEGETATION--FORESTED STANDS CONTINUE OVERSTOCKED, UNEVEN-AGED CONDITION.	1060 ACRES THINNED TO APPROXIMATELY 134 TREES PER ACRE WITH SCATTERED LARGE DIAMETER OVERSTORY. 30 ACRES THINNED TO APRROXIMATELY 40 TREES PER ACRE. 10 ACRES LODGEPOLE PINE REGENERATION HARVEST WITH 8 LARGE DIAMETER DOUGLAS FIR TREES PER ACRE REMAINING.	517 ACRES THINNED TO APPROXIMATELY 134 TREES PER ACRE WITH SCATTERED LARGE DIAMETER OVERSTORY. 13 ACRES THINNED TO APRROXIMATELY 40 TREES PER ACRE.	768 ACRES THINNED TO APPROXIMATELY 134 TREES PER ACRE WITH SCATTERED LARGE DIAMETER OVERSTORY. 25 ACRES THINNED TO APRROXIMATELY 40 TREES PER ACRE. 10 ACRES LODGEPOLE PINE REGENERATION HARVEST WITH 8 LARGE DIAMETER DOUGLAS FIR TREES PER ACRE REMAINING.
IMPACTS ON WATERSHED				
EQUIVALENT CLEARCUT ACRES	NO CHANGE	674 ECC ACRES	360 ECC ACRES	511 ECC ACRES

COMPARISON OF ALTERNATIVES				
PROPOSED ACTIVITY OR ENVIRONMENTAL COMPONENTS	**NO ACTION**	**ALTERNATIVE I HELICOPTER HARVEST**	**ALTERNATIVE II SKIDDING ALTERNATIVE**	**ALTERNATIVE III WINTER RANGE ALTERNATIVE**
WATER QUALITY	EXISTING ROADS CONTINUE AS LONG TERM SEDIMENT SOURCE	LOW POTENTIAL FOR SHORT TERM IMPACTS DUE TO HELICOPTER HARVEST. LONG TERM IMPACTS REDUCED DUE TO ROAD CLOSURES AND BMP IMPLEMENTATION	HIGHEST POTENTIAL FOR SHORT TERM IMPACTS DUE TO GROUND BASED YARDING AND ROAD CONSTRUCTION. LONG TERM IMPACTS REDUCED DUE TO ROAD CLOSURES AND IMPLEMENTATION OF BMP'S.	SLIGHTLY LOWER POTENTIAL THAN ALTERNATIVE I FOR SHORT TERM IMPACTS DUE TO LESS ROAD CONSTRUCTION.
COLD WATER FISHERIES	NO CHANGE-SEDIMENT SOURCES NOT CORRECTED, MAY AFFECT FISHERIES	POTENTIAL LONG TERM BENEFIT DUE TO SEDIMENT REDUCTION FROM ROAD CLOSURES AND BMP'S	LESS POTENTIAL FOR LONG TERM IMPROVEMENT DUE TO INCREASED ROAD CONSTRUCTION AND SOME ROADS ON MARGINAL SLOPES.	SAME AS ALTERNATIVE I
IMPACTS TO SOILS				
SLOPE STABILITY	LOCALIZED AREAS OF SOIL CREEP. POTENTIAL FOR CATASTROPHIC FAILURE DURING EARHTQUAKE OR CLIMATIC EVENT	SAME AS NO ACTION	LOCALIZED AREAS OF SOIL CREEP. SOME ROADS ON SLOPES OF MARGINAL STABILITY INCREASED POTENTIAL FOR LOCALIZED SLOPE FAILURE.	SAME AS NO ACTION

COMPARISON OF ALTERNATIVES				
PROPOSED ACTIVITY OR ENVIRONMENTAL COMPONENTS	**NO ACTION**	**ALTERNATIVE I HELICOPTER HARVEST**	**ALTERNATIVE II SKIDDING ALTERNATIVE**	**ALTERNATIVE III WINTER RANGE ALTERNATIVE**
IMPACTS TO WILDLIFE AND HABITAT				
SUCCESSIONAL STAGES	CONTINUED SUCCESSION TOWARDS OLDER STANDS WITH DENSE UNDERSTORY. MATURE AND OLD STAND COMPONENTS EXCEED HISTORIC REPRESENTATION UNTIL FIRE EVENT HIGH PROBABILITY OF INSECT AND DISEASE INFESTATION COULD LEAD TO STAND REPLACEMENT FIRE EVENT.	4% CHANGE IN LODGEPOLE PINE COVER TYPE FROM MATURE STAGE TO NONSTOCKED OR STAND INITIATION STAGE. SUCCESSIONAL STAGES OF OTHER COVER TYPES UNCHANGED BUT STOCKING LEVELS REDUCED. PROBABILITY OF I&D INFESTATION REDUCED AND INCREASED PROBABILITY THAT A FIRE EVENT WOULD BE AN UNDERBURN RATHER THAN STAND REPLACEMENT	NO CHANGE IN SUCCESSIONAL STAGES. REDUCED RISK OF I&D INFESTATION. FIRE EVENT IS MORE LIKELY AN UNDERBURN.	SAME AS ALTERNATIVE I
SNAGS AND WOODY DEBRIS	SNAG ABUNDANCE WOULD SLOWLY INCREASE OVER TIME. SNAGS WILL LIKELY BE SMALL DIAMETER. WOODY DEBRIS WOULD INCREASE OVER LONGER PERIOD FOLLOWING SNAG DEVELOPMENT.	FEWER TREES AVAILABLE FOR SNAG DEVELOPMENT. SNAGS ABUNDANCE WOULD SLOWLY INCREASE OVER TIME. SNAGS WOULD BE LARGER DIAMETER THAN NO ACTION. SLASH FROM HARVEST WOULD CONTRIBUTE UP TO 20 TONS/ACRE OF DOWNED WOODY DEBRIS.	SAME AS ALTERNATIVE I	SAME AS ALTERNATIVE I

COMPARISON OF ALTERNATIVES				
PROPOSED ACTIVITY OR ENVIRONMENTAL COMPONENTS	**NO ACTION**	**ALTERNATIVE I HELICOPTER HARVEST**	**ALTERNATIVE II SKIDDING ALTERNATIVE**	**ALTERNATIVE III WINTER RANGE ALTERNATIVE**
THREATENED AND ENDANGERED SPECIES	OCCASSIONAL OR INCIDENTAL USE BY GRIZZLY BEAR AND POSSIBLY WOLF OVER THE LONG TERM.	USE OF AREA BY WOLF AND GRIZZLY BEAR UNLIKELY DURING PERIODS OF LOGGING ACTIVITY. LONG TERM USE PROBABLY UNAFFECTED	SAME AS ALTERNATIVE I	SAME AS ALTERNATIVE I
SENSITIVE SPECIES	LITTLE HABITAT VALUE FOR SENSITIVE SPECIES OTHER THAN 15 ACRES OF POSSIBLE BOREAL OWL NESTING HABITAT.	50% REDUCTION OF POSSIBLE BOREAL OWL NESTING HABITAT	SAME AS ALTERNATIVE I	SAME AS ALTERNATIVE I
ELK	NO CHANGE IN ELK HABITAT.	ELK SECURITY REDUCED ON 1100 ACRES OF TIMBER HARVEST. ROAD CLOSURES WOULD PARTIALLY MITIGATE SECURITY LOSS.	ELK SECURITY REDUCED ON 530 ACRES OF TIMBER HARVEST. ROAD CLOSURES WOULD PARTIALLY MITIGATE SECURITY LOSS.	ELK SECURITY REDUCED ON 803 ACRES OF TIMBER HARVEST. ROAD CLOSURES WOULD PARTIALLY MITIGATE SECURITY LOSS.
RECREATION	NO CHANGE IN DISPERSED, NONMOTORIZED RECREATION. UNAUTHORIZED MOTORIZED VEHICLE USE WOULD CONTINUE.	NO CHANGE IN DISPERSED NONMOTORIZED RECREATION. PHYSICAL ROAD CLOSURE WOULD REDUCE UNAUTHORIZED MOTORIZED VEHICLE USE.	SAME AS ALTERNATIVE I	SAME AS ALTERNATIVE I
GRAZING	NO CHANGED--2773 AUM'S LEASED	POSSIBLE SHORT TERM INCREASE OF 30 LEASED AUM'S	POSSIBLE SHORT TERM INCREASE OF 15 AUM'S LEASED	POSSIBLE SHORT TERM INCREASE OF 20 AUM'S LEASED

COMPARISON OF ALTERNATIVES				
PROPOSED ACTIVITY OR ENVIRONMENTAL COMPONENTS	**NO ACTION**	**ALTERNATIVE I HELICOPTER HARVEST**	**ALTERNATIVE II SKIDDING ALTERNATIVE**	**ALTERNATIVE III WINTER RANGE ALTERNATIVE**
TRANSPORTATION	NO CHANGE-26.1 TOTAL MILES OF ROAD AND 26.1 DRIVEABLE MILES IN PROJECT AREA.	29.5 TOTAL MILES OF ROAD AND 15.4 DRIVEABLE MILES OFROAD IN PROJECT AREA.	37.7 TOTAL MILES OF ROAD AND 15.4 DRIVEABLE MILES IN PROJECT AREA.	28.0 TOTAL MILES OF ROAD AND 15.4 DRIVEABLE MILES IN PROJECT AREA.
ECONOMICS	$11,092/YEAR GRAZING. NO TRUST INCOME FROM TIMBER HARVEST.	$11,092/YEAR GRAZING $298,905 INCOME TO TRUST FROM TIMBER HARVEST.	$11,092/YEAR GRAZING $185,651 INCOME TO TRUST FROM TIMBER HARVEST	$11,092/YEAR GRAZING $149,885 INCOME TO TRUST FROM TIMBER HARVEST.

CHAPTER III
AFFECTED ENVIRONMENT

This chapter describes the environment within which the proposed action would occur. It serves as a baseline against which action alternatives may be compared. The Affected Environment describes the area and its relationships to the issues identified in Chapter II.

I. GENERAL DESCRIPTION:

The West/Middle Fork Blacktail proposal area is located in the upper reaches of the West and Middle Forks of the Blacktail Creek drainage, in the west foothills of the Snowcrest Mountains (southeast of Dillon, Montana). The state ownership included in this proposal encompasses an estimated 10,560 acres of which approximately 2772 acres are forested. The total estimated acreage in the project area including state, federal and private land is 15,640 acres. The state ownership is bordered on the east by the U.S. Forest Service lands (Madison District, Beaverhead National Forest), on the south and west by the Bureau of Land Management (Dillon Resource Center).

TABLE AE-G1: Total acres, forested acres and nonforested acres in the project area by land ownership.

OWNERSHIP	FORESTED ACRES	NON-FORESTED ACRES	TOTAL ACRES
STATE LAND	2772 ACRES	7788 ACRES	10,560 ACRES
BLM	1172 ACRES	1908 ACRES	3,080 ACRES
PRIVATE	414 ACRES	2866 ACRES	3,280 ACRES
TOTAL	4358 ACRES	12,562 ACRES	16,920 ACRES

The Blacktail valley is a remote valley consisting primarily of open rangeland in the lower and middle portions of the valley and scattered timber and rangeland in the upper reaches of the valley. The lower and middle reaches of the Blacktail valley are mostly state and private lands in the valley floor with the Bureau of land Management administered federal lands in the mountains. In the upper reaches of Blacktail Creek the ownership pattern changes to state and federal lands administered by both the Bureau of Land Management and the U.S. Forest Service.

The primary land use is livestock grazing (mostly cattle) conducted under grazing leases administered by the USFS, BLM and DNRC. Grazing activity is conducted from June through September.

Recreational use of the area is limited due to the remote location and travel distance from the major population centers. Most recreational use is associated with fishing on Blacktail Creek and big game hunting during the general hunting season. The major use period is June through December with most activity occurring during the elk season in November.

The closest year-round residence is south of Price Creek, more than 10 miles from the

project area. Since the road is not maintained in the winter, snowmobile travel is the only feasible way to access the area in the winter months.

II. VEGETATION:

There are an estimated 2772 acres of forested land on the state ownership. The largest continuous block of forest cover on the state land in the project area is a 369 acre parcel in section 16. There are also several blocks of forested land between 200 and 300 acres on state land. The reminder of the forest cover is located in scattered patches of small acreage (some as small as two acres in size) where micro climatic conditions allow tree growth.

The area forests are dominated by Douglas-fir located mostly on north facing slopes. The next most prevalent timber cover type in the area is lodgepole pine. These stands are located mostly on very steep and rocky sites. Engelmann spruce is located in the creek bottoms and on terraced ground that holds moisture. The present Douglas-fir stands are multi-storied with trees ranging in age from 10 to 200+ years. The older trees in the stands are relics that have survived past wildfires. Historically, fires **appear to have been** underburns that killed most regeneration and sapling size trees, leaving larger diameter trees in a more open stand than exists today. The current understory layers are **likely** a result of wildfire control during the 20th century. The lack of underburns have allowed regeneration to survive and grow into a multi-storied stand. The lack of fires have also allowed the Douglas-fir forest to encroach on the montane grassland and the sage steppe in the area. Most Douglas-fir stands in the area show evidence of this encroachment. Old photographs of the area **indicate** that the stands have increased in size in the area.

The two Douglas-fir habitat types that make up the bulk of the area in the proposed harvest units are PSME/ARCO and PSME/CARU(see Table AE-V1), these habitat types are listed in Fire Group 5 and 6 (Fischer and Clayton 1983). Arno and Gruell, (1983) estimate a Group 5 mean fire interval of 35 to 40 years in presettlement southwest Montana stands, in Group 5 and a mean fire interval of 42 years for presettlement stands in Group 6.

The lodgepole stands in the area are approximately 90 to 120 years old and are predominately evenaged. The lodgepole stands are in poor health but are located on very steep ground with limited merchantability. These stands were the result of stand replacing fires that occurred approximately 100 years ago.

TABLE AE-V1: CURRENT SPECIES, HABITAT TYPE AND AGE OF STANDS PROPOSED FOR HARVEST.

Stand #	Species	Avg. Age	Habitat Type	Acres	Gross Volume MBF/Acre	Total Vol. MBF
1	DF	100	PSME/ARCO	24	6.3	150 MBF
2	DF	110	PICEA/SEST	20	10.5	210 MBF
3	DF, ES	100	PSME/CARU	36	14.4	518 MBF
4	DF, ES	120	PICEA/SEST	129	13.7	1770 MBF
5	DF, AF	100	PSME/ARCO ABLA/ARCO	27	13.7	370 MBF
6	ES	180	PICEA/SEST	5	2.0	10 MBF
7	ES, DF, AF,	150	PICEA/SEST	43	11.6	500 MBF
8	DF, ES	200	PICEA/SEST	26	5.0	130 MBF
9	DF	180	PSME/CARU	34	11.4	500 MBF
10	DF	110	PSME/CARU	2	2.5	5 MBF
11	DF, ES	200	PSME/SYAL	44	2.8	140 MBF
12	DF, ES	200	PSME/SYAL	47	3.0	140 MBF
13	DF	140	PSME/ARCO	17	9.4	160 MBF
14	DF	100	PSME/ARCO	10	10.0	100 MBF
15	DF	130	PSME/ARCO	10	8.0	80 MBF
16	DF	140	PSME/ARCO	3	3.3	10 MBF
17	DF	140	PSME/ARCO	16	10.6	170 MBF
18	DF	120	PSME/ARCO	11	6.4	70 MBF
19	DF	120	PSME/ARCO	8	10.0	80 MBF
20	DF	120	PSME/ARCO	2	5.0	10 MBF
21	DF	120	PSME/ARCO	12	8.3	100 MBF
22	DF	130	PSME/CARU	13	4.6	60 MBF
24	DF	130	PSME/ARCO	42	2.9	120 MBF
26a	DF	130	PSME/FEID	15	1.3	20 MBF

Stand #	Species	Avg. Age	Habitat Type	Acres	Gross Volume MBF/Acre	Total Vol. MBF
27	DF, LPP	180	PSME/FEID ABLA/ARCO	50	4.7	215 MBF
28	DF	120	PSME/ARCO	37	3.8	140 MBF
29	DF, ES	130	PSME/ARCO	62	6.6	410 MBF
30	DF	180	PSME/ARCO	50	4.7	215 MBF
36	DF	200	PSME/SPBE	38	6.3	300 MBF
39	DF, ES	130	PSME/ARCO	18	15.6	280 MBF
40	DF, LPP	130	PSME/ARCO	31	6.8	68 MBF
40a	DF	120	PSME/ARCO	10	5.3	165 MBF
41	DF	120	PSME/ARCO	12	10.8	130 MBF
42	DF, ES, LPP	200	PSME/ARCO PICEA/SMST	92	6.8	762 MBF
44	DF, ES	120	PSME/ARCO PICEA/SMST	4	3.8	15 MBF
45	LPP, DF	90	PSME/SPBE ABLA/ARCO	10	4.0	40 MBF
46	DF, ES	180	PICEA/SEST	51	4.3	220 MBF
47	DF, ES	230	ABLA/GATR	31	.8	25 MBF
49	DF	200	ABLA/ARCO	8	9.4	75 MBF
50	DF,ES	200	ABLA/ARCO	10	9.4	75 MBF

The forested areas surrounding the Blacktail project have had relatively little timber harvesting activity. We estimate a total of 126 acres of forest land in the upper Blacktail drainage has had timber harvested during the past twenty years. According to the Beaverhead Forest Plan, this area is not part of the Beaverhead National Forest timber base and consequently, no timber harvest has occurred on the USFS ownership. The BLM has not harvested timber in this area but it is part of their timber management base. The DSL (DNRC) harvested 66 acres within the project area in Section 23 and 24 T12S, R6W in 1988-89. An additional 200 mbf of timber from 45 acres was harvested on state land outside the project area in Price Creek (T11S, R07W, Sec 3) during 1992. DNRC records relating to the administration of the Montana Hazard Reduction laws were searched to estimate the acreage of private forested land harvested in the last 20 years. Those records indicate that Mr. Keith Andersen harvested approximately 60 acres north portion of the project area, in 1987 (portions of sections 34, T11N, R06W and section 4, T12N, R06W). To our knowledge no other timber harvest activity has taken place in the drainage during the past 20 years.

A. INSECT AND DISEASE:

1. Spruce budworm

Spruce budworm activity was noted on state lands during inventory reconnaissance conducted during 1984. The stands do not show much spruce budworm activity at the present time but have all the attributes need for a spruce budworm outbreak. High stand densities, multi-storied stand structure and climax host species, along with being in a high frequency area for budworm out breaks (Silvicultural Strategies to Reduce Stand and Forest Susceptibility to the Western Spruce Budworm, Agricultural Handbook No. 676), all indicate high risk stands for a spruce budworm outbreak.

2. Dwarf Mistletoe

The lodgepole stands in the area are infected with dwarf mistletoe, the infestation is generally light and mistletoe-cause mortality was not observed.

B. NOXIOUS WEEDS

No noxious weed occurrences were noted within the proposed harvest units.

III. WATERSHEDS--WATER QUALITY AND WATER YIELD

A. WATERSHED DESCRIPTION

The proposed timber sale is located across 15 different parcels of State land that lie within the Middle Fork and the West Fork of Blacktail Deer Creek. Both drainages are tributaries to Blacktail Deer Creek which is tributary to the Beaverhead River in the upper Missouri River basin. Blacktail Deer Creek drains an area of approximately 409 square miles. Only a small portion of the Blacktail watershed area is forested. Most of the drainage area consists of range foothills and valley bottom pastures. The drainage is extensively utilized for livestock grazing and hay production. The lower portions of the watershed are chronically de-watered due to heavy irrigation demand and the numerous ditches and diversions located there. The extreme lower portion of the drainage has undergone some recent subdivision and residential development.

The mainstem, Middle Fork and West Fork of Blacktail Deer Creek are Class I streams under the Montana SMZ Law and Rules, and all contain a known cold water fishery. The mainstem of each drainage contains a well defined stream channel with perennial flow and continuous surface delivery to the Beaverhead River.

Most of the proposed harvest areas are located in areas that are drained by ephemeral draws, and to a lesser extent small intermittent or perennial stream channels which are tributary to the Middle Fork and West Fork. These first and second order stream channels originate from numerous seeps and springs that are scattered throughout the sale area. Most of these unnamed tributaries are discontinuous with surface flows going subsurface before reaching the East Fork or West Fork of Blacktail Deer Creek.

Areas with marginal slope stability are common throughout the proposed sale area. Several historic and active large mass failures are located within the affected drainages. Historic and geologic mass wasting, which occurred even under natural conditions, has greatly influenced the landscape in this area. Local drainage

patterns, channel morphology and flow regimes have been affected by these processes.

The proposed sale area has been divided into 17 tributary watersheds to facilitate more detailed hydrologic evaluations and cumulative watershed effects assessments. A description of the hydrology and existing conditions of each of these drainage areas follows:

1. Upper Middle Fork Blacktail Deer Creek - Forest Stands # 1,2,3,4,5,6,7,22,23 and 25 are located in the upper portions of the Middle Fork Blacktail Deer Creek Watershed. The Middle Fork is a large perennial tributary with a drainage area of approximately 9775 acres. Most of the watershed area is unforested range and grass covered foothills. Approximately 20 % of the drainage area is forested. The headwaters of the drainage contain several large slumps which have affected channel stability and impacted water quality. Channel grade adjustments to valley bottom deposition due to mass wasting have led to segments of deeply incised gully (Rosgen G-3, G-4 stream channels). The middle segment of the basin contain wider valley bottoms with wet meadow complexes. This area is characterized by Rosgen E-3,4 and F-3,4 type channels. Physical bank damage due to livestock grazing has impacted channel stability in these reaches. The Rosgen E-type channels are being converted to F type channels due to an increase in the width to depth ratio. Willow and other shrub species have been entirely removed from the riparian plant community. Forest Stand #3 and #4 are drained by several small perennial tributaries to the Middle Fork. These spring fed creeks are in relatively good and stable condition.

2. Unnamed Tributary #1 - Forest Stand #8 is drained by several ephemeral draws and swales that are located within the watershed of a second order perennial tributary to the West Fork of Blacktail Deer Creek. The main drainage feature in this watershed contains a short reach of well defined channel which is fed by several perennial springs. This channel is discontinuous with no direct channel conveyance to the mainstem of the West Fork.

3. Face Drainages #1 - Forest Stand #10 is drained by ephemeral draws which are located up slope of the West Fork of Blacktail Creek. Neither of these draws contain a discernable stream channel or evidence of concentrated surface flows.

4. Unnamed Tributary #2 - Forest Stand #9 contains several springs and seeps which are the origins of a small Class I perennial stream. The stream feeds a small impoundment used for livestock watering before entering the West Fork. The forested portions of this stream were evaluated and found to be in good condition. Aerial photo analysis indicate that this stream is also discontinuous downstream of the pond.

5. Unnamed Tributary #3 - Forest Stand #11 is drained by a broad ephemeral swale that does not contain a stream channel. Down slope from this stand, the swale narrows into a well defined ephemeral draw. Segments of this draw contain spring fed, class II, perennial stream channels. However, the channels are discontinuous with no direct channel delivery to down slope segments of the drainage feature. At the bottom of the draw ephemeral discharge empties out onto a broad alluvial fan located just up slope of the county road. Segments of this fan feature contain a poorly defined channel. Most of this reach can be characterized as a sedge filled, wet swale bottom. The springs and Class II stream segments have been heavily impacted by

concentrated livestock use. As evident by the high level of shrub browsing and physical bank trampling.

6. Whiskey Springs - Whiskey Springs - Stand #12 is located in complex terrain that is highly dissected by dry ephemeral draws. These draws do not contain stream channels. Many of the draws end abruptly or simply open up to unconfined slopes. None of the ephemeral draws draining the forest stand are continuous to Whiskey Springs. The upper 1/3 of the slope contains numerous old landslide scarps. Near the bottom of the slope several springs emerge to form a substantial amount of surface flow. The area where this flow crosses the county road has been named Whiskey Springs. Contrary to the USGS quad map of this area there is no direct or continuous discharge from the proposed harvest area to the springs.

7. Unnamed Tributary #4 - Forest Stands #13, 14, 15, 16, 17, 18, 19, 20, 21, 24 and 29 are located within the watershed of an unnamed perennial tributary to the West Fork of Blacktail Deer Creek. This watershed drains an area of 1447 acres. Only a portion of the watershed area is forested. The upper reaches of the drainage a contain several highly entrenched gullies, coulees and ephemeral draws (Rosgen A-3, E-3, and G-3 channel types). These drainage features are largely intermittent or ephemeral. Moving Down slope several springs eventually contribute enough discharge to form a perennial flowing main channel. The middle portion of the drainage contains several large active slumps. Reaches of E-3, G-3/4 stream channel types characterize this area. Channel conditions are relatively poor and unstable. One reach contains a deeply incised "head-cut" and actively eroding gully. The lower segments of the stream flow through a narrow, confined limestone canyon. At the mouth of this canyon the channel crosses an old alluvial fan feature as it enters the wide valley bottom and floodplain of the mainstem of the West Fork of Blacktail Deer Creek. This reach is also in poor condition and is characterized by Rosgen C-3 and D-3 channel types. During a flood event in May-June 1995, upstream reaches of the drainage were severely scoured. Large amounts of bedload were deposited in these lower reaches of the stream. The existing culvert at the county road crossing became totally plugged with bedload deposition which resulted in a partial road washout.

8. Unnamed Tributary #5 - Forest Stand #28 is located on a steep rocky hillslope in the SW 1/4 of Section 14. This area is drained by a steep and well defined ephemeral draw. Some portions of the draw bottom contain a poorly defined intermittent stream channel. No perennial flowing segments were identified. The draw drains a watershed area of approximately 275 acres. The drainage feature is discontinuous, ending on a broad alluvial fan feature just before its confluence with Blacktail Deer Creek. The drainage is relatively stable due to the high rock content of banks and side slopes.

9. Face Drainage #2 - Forest Stand #38 is the state's portion of a larger forested area located on a moderately steep face directly above the mainstem of the West Fork of Blacktail Deer Creek. There are no stream channels or well defined ephemeral drainage features occurring on this slope.

10. Unnamed Tributary #6 - Forest Stand #26 is located on a moderate slope in an area drained by a discontinuous ephemeral draw. Portions of the draw contain a spring fed stream channel. However, this stream channel disappears in a broad, grass filled, swale bottom. The lower segment of this drainage feature is also discontinuous . Surface discharge flows subsurface due to a large amount of deposition from historic mass wasting activity.

11. Unnamed Tributary #7 - Forest Stands #26A, 27, 40, 41 and 42 are located

within an area drained by a Class 1 perennial tributary to the West Fork of Blacktail Deer Creek. Discharge originates from a series of springs located in the draw bottom between stand #41 and 42 and the draw bottom located immediately adjacent to stand #27. Stream flow is continuous to the West Fork of Blacktail Deer Creek. Several large slumps and recent earthflow deposits are located on slopes directly above the stream channel. However, channel stability does not appear to have been affected by any recent mass wasting activity.

12. Unnamed Tributary #8 - Forest Stands 37, 34 and 47A are located within the watershed of an unnamed perennial tributary to the West Fork of Blacktail Deer Creek. Forest Stand #47 is drained by two well defined ephemeral draws. Neither of these draws contain a discernable stream channel and both eventually turn into broad grassy draws before reaching the tributary channel. Stands #37 and #34 are located immediately adjacent to the main channel of this tributary drainage. The upper reaches of the stream are perennial. However, flows are discontinuous due to the large amount of material deposited by a series of massive slumps that completely filled the valley bottom in the middle portions of the drainage.

13. Unnamed Tributary #9 - Forest Stand #40A is located on a slope immediately adjacent to a well defined and deeply incised ephemeral draw. There is no discernable channel in the draw bottom. The draw empties into a broad swale feature that does not contain evidence of scour or concentrated surface runoff. Continuing down-slope the draw bottom becomes a complex system of old mass failures and deposits. Numerous springs with limited segments of channelized flow appear. All of these channels are discontinuous. Just above the county road crossing a spring feeds a small stream channel which does have direct delivery to the West Fork.

14. Unnamed Tributary #10 - Forest Stands #45 and #46 are drained by a Class I perennial stream. The mainstem channel of this tributary flows through a broad shallow swale bottom located in largely unforested meadows and rangeland. The stream channel originates at a set of springs located approximately ½ mile up slope from its confluence with the West Fork of Blacktail Deer Creek. The E-3 channel (Rosgen Classification) is relatively stable despite a lack of shrub bank cover. Several smaller slumps have occurred near this channel's confluence with the mainstem of the West Fork of Blacktail Creek. These slumps do not appear to have affected channel morphology or function.

15. Unnamed Tributary #11 - Forest Stand #50 is located near the top of Clover Divide in the SE 1/4 of Section 36. This area is drained by several ephemeral draws which are located within the watershed area of a small second order tributary to the Upper West Fork of Blacktail Deer Creek. This unnamed tributary contains stable reaches of Rosgen type E-3 and E-4 stream channel. There are no apparent livestock impacts in this area.

16. Unnamed Tributary #12 - Forest Stand #43 is located on a slope high above the upper reaches of the West Fork. The stand is drained by an ephemeral draw that contains several seeps and springs with short segments of poorly defined stream channel. There is no continuous channel delivery from the forest stand to the West Fork.

17. Face Drainage #3 - Forest Stand #49 is also located near the top of Clover Divide in the SE 1/4 of Section 36. This area lies high on a slope above the

upper reaches of the West Fork. There are no well defined drainage features in this area.

18. Face Drainage #4 - Forest Stand # 44 is located in the SW 1/4 of Section 25 on a hillslope facing directly above the upper reaches of Blacktail Deer Creek. There a short segment of a well defined ephemeral draw that drains this area. There is no discernable stream channel in this draw feature.

B. REGULATORY FRAMEWORK

This segment of the Missouri River basin, including, Blacktail Deer Creek and all its tributaries, are classified B-1 in the Montana Water Quality Standards. The B-1 Classification is for multiple use waters suitable for domestic use after conventional treatment, growth and propagation of cold water fisheries, associated aquatic life, wildlife, agricultural and industrial uses. Among other criteria for B-1 waters, no increases are allowed above naturally occurring concentrations of sediment which will harm or prove detrimental to other beneficial uses. Downstream beneficial uses in the Mainstem, West Fork and Middle Fork of Blacktail Deer Creek include irrigation, cold water fisheries, and livestock watering. The most sensitive beneficial use in both drainages is cold water fisheries.

Naturally occurring includes conditions or materials present from runoff on developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. The State of Montana has adopted Forestry Best Management Practices (BMP'S) through its Nonpoint Source Management Plan as the principle means of controlling nonpoint source pollution from silvicultural activities.

Both the mainstem Blacktail Deer Creek and the West Fork of Blacktail Deer Creek have been identified as impaired water bodies in the 303(d) list that appears in the 1994 Montana 305(b) Report. The 303(d) list was compiled by the Water Quality Division of the Montana Department of Health and Environmental Sciences as required by Section 303(d) of the Federal Clean Water Act and the EPA Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, the State was required to identify water bodies that do not fully meet water quality standards or beneficial uses are threatened. Such streams or lakes are referred to as "water quality limited". Both the mainstem and the West Fork of Blacktail Deer Creek appear on the "Low-Priority" list of Water Quality Limited Water bodies.

The West Fork was included in the "Low Priority" 303 (d) list because of the threatened status given to the cold water fisheries beneficial use. The "threatened" status is defined as: Beneficial uses are fully supported but a new activity or an increase in existing activities may result in water quality standard violations or use impairment. The probable cause of impairment has been identified as "other habitat alterations" and "siltation". The probable sources of impairment were identified as Highway maintenance and runoff, rangeland, and natural. The magnitude of the impairment is listed as threatened.

Blacktail Deer Creek is listed due to the threatened status given to the drinking water supply beneficial use and the partially supporting status of its cold water fisheries, recreation, swimming and aquatic life support beneficial uses. Probable cause of impairment are nonpriority organics, siltation and flow alteration. Sources of these impairments have been identified as natural, streambank modification /

destabilization, agriculture, flow regulation / modification, removal of riparian vegetation, nonirrigated crop production and rangeland.

The Middle Fork of Blacktail Deer Creek does not appear on the 303(d) list.

The Montana Streamside Management Zone Law and Rules regulate forest practices that occur adjacent to streams, lakes and other bodies of water. The law prohibits or restricts timber harvest and associated activities within a width of SMZ that varies from 50-100 feet of either side of a stream, depending on the steepness of the slope and the class of stream.

The Montana Stream Protection Act (MCA 87-05-501) regulates activities conducted by government agencies that may affect the bed or banks of any stream in Montana. The law provides a mechanism to require implementation of BMP's in association with stream bank and channel modifications carried out by governmental entities. Agencies are required to notify the Department of Fish, Wildlife and Parks (DFWP) of any construction projects which might damage or modify the natural existing shape and form of any stream.

C. CUMULATIVE WATERSHED EFFECTS

There has been a moderate level of development activity in both the Middle Fork and the West Fork of Blacktail Deer Creek. Both drainages are extensively utilized for summer livestock grazing. Dispersed recreational activities are also a major use of the area. Only a relatively minor amount of timber harvesting has occurred in either of these watersheds in the recent past. Approximately 60 acres of timber were harvested in 1987 from private ownership in the south ½ of section 34, T11S, R06W and portions of section 4, T12S, R06W and approximately 66 acres were harvested in 1989 from School Trust land in sections 23 and 24. Silviculture was not identified in the State's 303(d) report as a source of impairment for either watershed. The existing harvest levels are well below those levels known to cause detrimental increases in peak flows, duration of peak flows or overall average annual water yield.

Both the West Fork and Middle Fork drainages are only partially forested. Most of the watershed area consists of range foothills and pasture valley bottoms. The limited amount of forest crown naturally occurring in this area has little if any influence on the timing and intensity of water yield and peak flows in either basin. Range encroachment and a long history of fire suppression have led to a more extensive forest canopy cover than would be expected under natural conditions.

Large segments of both drainages remain largely undeveloped and unroaded, particularly in the headwaters areas. Locations which were historically logged have successfully regenerated and appear to be at or exceed natural stocking and canopy closure levels. These older harvest activities are considered hydrologically recovered.

Field evaluation by a DNRC hydrologist have determined that there is no evidence of cumulative watershed effects resulting from timber harvest in either watershed. Stream channel condition and stability surveys were conducted on all stream channels and ephemeral draw bottoms draining the proposed harvest area. Channel conditions were rated using the Pfankuch method outlined in Forest Hydrology Part II, USFS, 1974. Stream conditions and channel stability range from poor to good in those portions of the Middle Fork and West Fork Blacktail Creek draining the proposed sale area. Existing stream channel impacts are localized and generally attributed to either naturally occurring slope instability, poorly located roads, substandard stream crossings, livestock grazing, flooding and other channel

alterations. Excessive channel scour and bedload deposition are evident at several locations due to the extreme runoff that occurred during May and June of 1995. Specific mitigation and remedial action measures designed to eliminate or reduce existing sources of water quality impact have been integrated into all action alternatives.

D. WATER QUALITY

The primary impacts to water quality in the West Fork and Middle Forks of Blacktail Deer Creek has been siltation and other habitat alterations as already described under the section concerning the State 303(d) listing. Those impacts described in the 305(b) report are largely associated with roads, livestock grazing and the naturally occurring high degree of slope instability common in the sale area.

While impacts of grazing have been considered in this EIS, the actual management of grazing practices on state lands is not within the scope of this EIS. The grazing activities are evaluated and monitored as leases come up for renewal under administration of the State grazing licences (or leases) within the sale area. Any change in leases terms are conducted at that time.

Areas with naturally occurring slope instability are common throughout the proposed sale area. Many historic and active large mass failures are located within the affected tributary drainages. Both historic and recent water quality in the Blacktail drainage has been impacted by this mass wasting. Mass failures have had considerable influence on channel instability in many tributary streams as well as providing a mechanism for large amounts of direct sediment delivery to streams.

Road access to the sale area is provided by an existing high standard Beaverhead County road system located on private, BLM and State ownership. Road access within the sale area would utilize this County road as well as several existing lower standard roads and jeep trails located on State and private ranch land.

Most of the County road is in good condition and adequately meets Best Management Practices (BMP's). The road is of high standard with gravel surfacing and is frequently maintained. However, portions of the County road are in poor condition and do not currently meet minimum BMP's. Several segments of this county road are located immediately adjacent to the West Fork and they are impacting water quality by contributing direct sediment delivery to the stream channel. Several partial road fill failures occurred during a high flow event that occurred during May-June of 1995. At another location a culvert located on a tributary stream crossing became plugged resulting in a complete road washout. Several other stream crossings are functioning well, but lack the appropriate mitigation measures that would further reduce potential sediment delivery. There are several other locations where seeps and springs discharge directly onto the road surface without adequate surface drainage relief. These problematic road segments had not been adequately repaired or mitigated by the time that watershed conditions were inventoried (June,1996).

Several of the lower standard access roads existing on private and State land within the proposed sale area also do not meet BMP's. Portions of these roads may also be contributing to water quality impacts due to direct sediment delivery to streams or ephemeral draws. These sites include unimproved drive-thru stream crossings on closed road systems, open road systems located immediately adjacent to streams, uncontrolled season of use, and segments of open and closed roads that lack adequate surface drainage features.

Many of the problems associated with the existing road system have been exacerbated by damage sustained during the high runoff and flooding that occurred during May and June of 1995. However, properly designed road drainage, stream crossings, and mitigation measures probably would have been able to accommodate runoff and flows of this magnitude. These road segments would continue to be a chronic source of potential sediment input into the affected steams unless maintenance and remedial action measures are undertaken.

E. COLD WATER FISHERIES

The two major fishery streams in the project area are the West Fork and the Middle Fork of Blacktail Creek, that flow into the Blacktail Creek. Brook trout are the predominant fish species in both streams.The West fork does contain some Rainbow trout but they are listed as uncommon in the waterway. Westslope Cutthroat do not occur within the proposed sale area.(Montana Department of Fish, Wildlife & Parks, Montana River Information System, Hess and Oswald 1981 & 1991).

The population in both streams is considered fair, although the condition of the trout is above average. The reason for the fair population rating is unknown although poor reproductive rates may be related to sediment load reducing egg survival, as well as decreasing the production of fish food (Montana Department of Fish Wildife and Parks, Memo, 1980).

IV. SOILS

A. GEOLOGY

The Snowcrest Range is essentially a long anticline that is in part overturned and overthrust from the west. The major mountain building of the range is believed to occur in the Cretaceous age, with secondary faulting in the Tertiary age. The sale area is located on moderate to steep slopes with shallow to deep soils weathering from limestone, quartzite, shales and metamorphic bed rocks.

From Clover divide, Blacktail creek flows south along a deep canyon cutting through the overturned bedrock of limestone, quartzite and localized shale. Conglomerates and deep clayey, tertiary age deposits occur on the northern edge of the project area and some concave slopes to about 7000ft. Limestone forms the ledges and predominant ridges in the area. Interbedded shales and clays occur in portions of the project area (mainly SE) and are more prone to slope instability.

B. SLOPE STABILITY

There are no especially unusual or unique geologic features in the proposed harvest area. There are extensive areas of active and historic, dormant, slumps, mainly on grasslands in the general project area. Bedrock slides and mass movements are common in the Snowcrest and Gravelly ranges. Landslides in the area can vary from large, deep seated geologic failures over 100 acres in size to small slump areas less than 1 acre in size. Indicators of slope instability are misaligned trees and abrupt slope breaks or scarps.

The large mass failures in the project area are more commonly associated with seeps and clay-rich soils on steep slopes and rangeland sites. Many of the larger slides appear to be relatively stable near the toe deposits with varying degrees of more recent secondary slumping near the upper source areas of the mass failures.

Slope stability is affected by bedrock type/ structure, the dip angle of the bedrock,

slope steepness and occurrence of water which may lubricate a slope failure. Earthquakes are often the trigger mechanism, such as when the large Hebgen Lake slide occurred during an earthquake in 1959. Both old dormant slumps and active slumps occur in the general project area.

Three general types of mass movements occur in the project area; deep seated rockslides of fractured rock, deep seated landslide/earthflows of soft sediments and soils, and smaller scale slumps. Deep seated rockslides and earthflows are more affected by seismic events and abnormal climate events. Steeper slopes, especially over 65% and wet sites on historic mass movements have increased risk of slope instability. Activities that intercept and concentrate water into unstable areas increase the risk of instability. Forest stands and vegetation are generally too shallow rooted to provide support for deep seated failures.

On smaller slump features large trees with sweep can be a destabilizing force on slopes that may instigate a slide or secondary erosion if toppled by wind or mortality. Removal of these high risk trees can reduce the chance of windthrow. Maintaining healthy, actively growing codominant trees on an well-stocked even spacing can enhance slope stability by providing a safety net of anchoring roots to bind surface soils and transpire subsoil water.

C. GRAVEL SOURCES

There are several talus slopes and alluvial fans in the project area that have been used as pit-run sources. There is a good exposure of fractured shale on the State road in section 36 that is a possible rock surfacing source. If gravel is needed for road sites, it would be hauled from the nearest available source area based on site review.

D. SOILS

Most forest soils have shallow surface layers and are weakly developed with properties strongly influenced by the underlying parent materials. Southerly slopes supporting bunchgrass, sage and scattered conifers, are typically grassland derived with deep dark humus layers. Northerly aspects on moderate slopes have deeper soils supporting mixed conifer stands of Douglas-fir and Lodgepole.

Alluvial soils are narrow stringers of poorly drained mixed gravelly and clays adjacent to creeks. Alluvial fans of deep cobbly gravels form at the mouth of smaller creeks that flow into main Blacktail Creek. Rapid runoff in spring of 1995 led to flooding and outwash torrents that added several feet of aggraded gravels and sands to existing fan deposits and covered portions of the Blacktail County road. Terrain features of alpine glaciation are most apparent on north slopes and basins, oversteepened by past glacial ice.

UNIT 1-Mountain sideslopes of 0-45% from limestone. Mainly forest vegetation of Douglas-fir types on northerly aspects. Shallow to moderately deep soils from limestone have cobbly loams on ridges and convex slopes with deeper cobbly clay loam soils in draws. Rock outcrops occur throughout the unit on ridges and convex slopes in about 20-25% of the soil unit and limit equipment operations. Carbonates in the limestone subsoils limit rooting depth and preclude lodgepole. Clay rich soils have low bearing strength in some areas and may require gravel surfacing on stream crossings. North aspects limit season of use to later summer months or winter.

UNIT 2-Mountain sideslopes of 0-45% from limestone. Mainly grassland soils on southerly aspects. Shallow to moderately deep soils from limestone have cobbly

loams on ridges and convex slopes with deeper cobbly clay loam soils in draws. Surface soils are deep dark silty clay loams common to grassland sites supporting bunchgrass and sage. Subsoil carbonates limit rooting depth. Clay rich soils have low bearing strength in some areas and may require gravel surfacing on stream crossings. These soils have a longer season of use.

UNIT 3-Mountain sideslopes of 0-45% from sandstone and mixed sedimentary rocks. Mainly forest soils on northerly aspects. Shallow to moderately deep soils from sandstone and limestone have cobbly sandy loams on ridges and convex slopes with deeper cobbly sandy loams and sandy clay loam soils in draws. Subsoil carbonates limit rooting depth. Clay rich soils have low bearing strength in some areas and may require gravel surfacing on stream crossings. North aspects limit season of use to latter summer months or winter.

UNIT 4-Mountain sideslopes of 0-45% from sandstone and mixed sedimentary rocks. Mainly grassland soils on southerly aspects from sandstone and mixed sedimentary rocks. Shallow to moderately deep soils from sandstone and limestone have cobbly loams on ridges and convex slopes with deeper cobbly sandy loams and clay loam soils in draws. Surface soils are deep dark silty clay loams common to grassland sites supporting bunchgrass and sage. Subsoil carbonates limit rooting depth. Clay rich soils have low bearing strength in some areas and may require gravel surfacing on stream crossings. These soils have a longer season of use.

ROADS-Existing range roads that provide access to State parcels are mainly low standard range type/two track roads, portions of which are on steep grades that are eroding and or rutted from occasional use. Range access roads across clay rich soils of poor bearing strength soils can be impassable when wet if not graveled. These limitations can be overcome by installing adequate road drainage and limiting the season of operations. Steep road grades and narrow roads make winter logging difficult. The logging road built to access state section 23 for timber harvest in the late 1980's is closed, adequately drained and revegetated. This road serves as an example of the type of temporary use road planned for harvest alternatives.

V. WILDLIFE:

We employ the concepts of "coarse" and "fine filters" as useful metaphors for looking at the effects of human activities on wildlife. Briefly, the coarse filter asks if the suite of habitat elements that supports all the constituent species is compromised, and/or if habitat and landscape characteristics are altered beyond the range of naturally occurring variation. The fine filter views specific habitat requirements of individual species. We first apply the coarse filter because species and their individual habitat requirements are too numerous to consider all of them simultaneously. However, because some species are under particular threat due to past habitat loss, or are of particular interest, we also apply a fine filter for selected species that may have "fallen through" the coarse one. In this latter category are threatened and endangered species, sensitive species, and game species.

A. Coarse Filter: Habitat Elements Supporting Biological Diversity

1. Landscape Characteristics

The project area lies on the frontier between predominately forested and grassland landforms. Forests are absent south and west of the project area, and trees are present only in small, isolated patches where micro-climatic conditions allow. The largest forested patch lies predominately on BLM land (in Section 15), and is estimated at approximately 300 acres in extent. Within the Blacktail Project Area(BPA), 29 identifiable (from ortho-photo quads)

forested patches vary in size from 8 to 148 acres, with a mean within the BPA of 43.1 acres. The largest contiguous forested patch within the BPA is centered in Section 24 (units 34, 36, and 37); the second largest, about 120 acres, is situated in Sections 1 and 2 (Unit 4).

Previous logging in the vicinity has been limited to the following:

- Approximately 66 acres of seed-tree cutting on Trust lands in Sections 23 and 24, conducted in 1988;
- Approximately 60 acres of seed-tree and clear-cutting just north of the project area in the southern ½ of section 34, and N1/2 of section 4, conducted in 1987.

Marcot et al. (1994), in a landscape-level analysis, draw a useful distinction between "multitype" and "unitype" species. Among the former, elk is chosen as a good example; because elk divide their time between open and forested patches, proximity to edge is advantageous. Among the latter, some species can further be categorized as "forest interior" species, i.e., species for which edge is inimical. Observation of the current pattern of forests and grasslands suggests that the natural condition of the project area is one of relatively small patches, close interspersion of forests and grasslands, and high density of edges. Forest interior conditions are uncommon within the project area due to the naturally small forest patch size.

2. Forest Types, Successional Stages, and Fire History:

a. Forest Types

Losensky (1997) under contract with DNRC completed a report describing historical vegetation of Montana. Using the best available data (inventory information from surveys conducted during the 1930's and 1950's), Losensky described vegetative cover conditions that existed during the 1930's. Losensky's climatic section 13 (Section M332E) encompassed the southwest corner of Montana and the upper Salmon and Lemhi drainages in Idaho and included Beaverhead County. Forested cover types were found on about 39 percent of the area, with the remainder being grassland and shrubland. Within forested types, lodgepole pine accounted for some 56% and Douglas fir types made up 31%. The remainder was spruce, aspen or alpine (non-commercial) forest types.

b. Stand Size Classes

Losensky (1997) also estimated the age structure of each forest cover type that may have existed in 1900, within climatic sections, by back-dating inventory data. Table AE-W2 compares these estimates with those resulting from stand level inventory data obtained on state land in the project area during the 1990's.

Table AE-W2:. Percentages of area within age-classes by cover types. Historic figures are from Losensky (1997), and represent an estimate of conditions that existed in the year 1900 in climatic section 13. Current figures are from a stand level inventory conducted on state lands in the project area during the early 1980's.

Cover Type		Non-stocked	Seedling/ Sapling (1-40 yrs old)	Pole (41-100 yrs old)	Mature (101-OS*)	Old Stands
Doug-Fir	Historic	6%	22%	21%	28%	23%
	Current	4%	0%	20%	47%	29%
Spruce	Historic	1%	3%	42%	28%	26%
	Current	0%	0%	10%	76%	14%
Lodgepole	Historic	11%	41%	40%	5%	3%
	Current	0.0	0.0	88%	12%	0%

* OS represents "old stand" age for various cover types as follows; Douglas fir--170 yrs, lodgepole--140 years and other species--180 years.

Green et al. (1992) classified Montana old growth forests into a number of types, and supplied minimum guidelines for designating old-growth stands. We used those guidelines to estimate acreage of old-growth in the project area. Based on ground reconnaissance, we estimate that there are currently 78 acres of old-growth within the project area. All of these fall under the East-Side Zone Type 2 old-growth of Green et al. (1992). This type of old-growth is typified by Douglas-fir, growing on warm to cool, dry to wet environments, a rather broad classification, encompassing all but the wet and dry extremes of Douglas-fir cover types. Green et al. (1992) suggest the cool underburns at intervals of 10 to 40 years promoted open stands, and that such old-growth can be maintained for moderate to long durations.

Data on old growth characteristics and amounts on neighboring ownerships are lacking.

c. Fire History

The emphasis on fire suppression the past 85 years has limited the natural role of fire in forest development in the project area. Ground fires have normally been suppressed as quickly as possible, allowing a build-up of fuels over time. Mortality from insect and disease infestations has contributed to heavy fuel loadings that, if ignited, would **likely** surpass conventional wildfire initial attack capabilities. Aspen stands also appear to have suffered from fire exclusion; most appear to be decadent with little regeneration.

Continued fire suppression efforts (along with livestock grazing, Hansen et al.

1995) have **apparently** led to an increase in forest cover generally in the Gravelly range over the past 100 years. Comparisons of photos taken in the early 1900s with photos taken in the 1980's (Gruell 1983) suggest a substantial increase in forest cover.

3. Special Elements

a. Snags

Snags are an important habitat element for a wide array of wildlife species. Large-sized snags are not currently abundant on forested sections of the project area. In some of the stands examined (notably unit 4), it appears that earlier, unregulated logging has taken some of the large trees that might have later contributed to the snag component. However, descriptions of stand development and fire dynamics (Fischer and Bradley 1987) suggest that large snags would not normally be abundant in these types of stands, due to heavy stocking of young trees and frequent fires.

b. Down woody debris

Down woody debris is also an important habitat element for many wildlife species. Currently, woody debris appears to be moderately abundant in most forested stands. However, following the pattern of snags summarized above, large sized boles are not abundant.

c. Riparian zones

Riparian habitat has been altered extensively throughout the project area. Livestock grazing, uncontrolled road use, road maintanence, and a naturally occurring high degree of soil and slope instability have contributed to the alteration of riparian habitat (see section Watersheds, Water Quality and Water Yield).

d. Rare Habitat Features

There are no bogs, fens, potholes, or particularly rare forest types within the project area.

B. Fine Filter: Selected Species Considered Individually

1. Species Listed under the Endangered Species Act

The Centennial Valley and Gravelly Mountains provide possible habitat and/or linkage between occupied habitat for bald eagle, peregrine falcon, grizzly bear, and wolf.

a. Bald Eagle (*Haliaeetus leucocephalus*)

The Bald Eagle is classified as endangered. Strategies to protect it are outlined in the Pacific States Bald Eagle Recovery Plan (USFWS 1986) and the Montana Bald Eagle Management Plan (MBEWG 1994). Management direction involves identifying and protecting feeding, nesting, perching, roosting, and wintering/migration areas.

Food habits of eagles vary seasonally, reflecting seasonal availability and

abundance of major food items. Prey includes fishes, ground-dwelling sciurids, waterfowl, ungulate carrion, and lagomorphs (MBEWG 1994).

Nest sites are usually as close as possible to areas with the best foraging opportunities. These are usually distributed around the periphery of large lakes and reservoirs, or linearly along forested corridors of major rivers, usually within 1 mile of shore (MBEWG 1994).

There are no known bald eagle nests within the project area (Montana Natural Heritage Database, March 1996). The nearest known nest is located on the Beaverhead River in Township 12N, Range 9W, and is located some 20 miles west of the Project Area. Other documented eagle nests exist in Township 9S, Range 10W, and Section 14S, 9W, that are somewhat more distantly located. Given these distances, it is unlikely that activities on the Project Area would have any affect on nesting bald eagles. Thus bald eagles are not considered further in this analysis.

b. Peregrine Falcon (*Falco peregrinus*)

The Peregrine Falcon is listed as Endangered. Cliffs are generally considered preferred nesting habitat. Peregrines feed primarily on other birds and usually hunt in areas that attract a variety of bird species. Areas such as riparian zones, seeps and marshes are preferred. Peregrines may seek riparian areas within a 10 mile radius of their nests to forage and feed their young. Like eagles they will feed on waterfowl, but unlike eagles, they will often take smaller birds that may be attracted to seeps or other microsites.

Timber harvest activities may affect peregrine foraging activity. When peregrines are nesting and feeding young (approximately March 15 - July 30), they may abandon their nest or an essential part of their home range if disturbed. This is a period when peregrines experience increased demands of nesting and feeding young and are most sensitive to disturbance.

There are no known peregrine nests on the project area (Montana Natural Heritage Database, March 1996), however there is some cliff habitat in Section 15 that may be appropriate for peregrine falcon nesting. Falcons noted near these cliffs were not identified to species, but probably are prairie falcons (*Falco mexicanus*). The nearest documented nesting pairs of peregrine falcons are along Lima Reservoir and upstream from that, along the Red Rock River, some 10 and 15 miles distant from the Project Area.

c. Grizzly Bear (*Ursus arctos*)

The grizzly bear is listed as a Threatened species. Grizzly bears are habitat generalists, and have large home ranges. Management concerns primarily focus on reducing the potential for grizzly/human interactions, which generally increase the risk of mortality for bears.

The project area lies outside the geographic scope of existing Grizzly Bear Recovery Zones (USFWS 1993). (Recovery zones are defined as areas in which "population and habitat criteria for achievement of recovery will be measured" and which "will be managed primarily for grizzly habitat", USFWS 1993). Thus, Federal policy is that full recovery of grizzly bears is possible without occupance of areas outside these Zones. Nonetheless, grizzly bears "outside the recovery zone are listed as threatened under the [Federal Endangered Species] Act and are protected under provisions of the Act

against illegal killing" (USFWS 1993). Thus, the location of the project area outside of recognized Recovery Zones removes any requirement that specific Inter-Agency Grizzly Bear Guidelines (IGBC) be met even were this a Federal action, but does not, in any case, remove the burden of avoiding harm to a listed Threatened species.

We know of no documented use of the project area per se by grizzly bears. However, grizzly bear use of the Gravelly Mountains on the adjacent BNF has been documented in recent years, although the most recent and reliable observations appear to be from the southeastern portion, roughly 20-25 miles east of the Project Area (unpublished map, R. Wiseman, Beaverhead National Forest, 1995). USFS (1992) considered grizzlies in the Gravelly Mountains "at least a remnant population", although it is not clear whether such animals might alternatively represent disperses or potential colonizers from the Yellowstone Ecosystem population. The closest documented observation to the project area dates from 1984, when BNF staff received a reported observation by a hunter, approximately 8 air-miles due east of the eastern boundary of the Project Area.

Because we lack specific data on grizzly bear ecology in either the Gravelly Range or the Centennial Valley, our best estimate is that grizzly food and cover requirements are similar to those in high-elevation plateau areas in the Yellowstone Ecosystem. There, Mattson et al. (1991) reported that ungulates and graminoids (grasses) constituted the majority of early-season diets, graminoids and forbs predominated in mid-summer, and whitebark pine (*Pinus albicaulis*) seeds became important in late summer/autumn. Wet areas and riparian zones within the project area are generally considered preferred habitats, and may encourage use by any bears in the general vicinity. Blanchard (1978, cited in USFWS 1993) reported that 90% of aerial radio-locations of instrumented bears were in forest cover too dense to allow visual observation, but that only 1% were more than 1 km from a forest opening. Forested cover was preferentially used as areas for day-beds (Blanchard 1978), although it was unclear whether this preference reflected avoidance from humans.

Regardless of whether the project area is currently occupied by grizzly bears, or whether the area is included within recognized Recovery Areas (1993), it is still useful to assess the potential of this project to affect potential future use of the area by grizzlies, should populations recover (by natural increase or re-introduction) to the point where the area would become important. To this end, we consider levels of a) human influence (residences, campsites, livestock operations, etc.), b) road density, c) vegetative cover, and d) riparian areas, as important variables influencing functional linkage (Servheen and Sandstrom 1993).

1) Level of Human Influence

Human influence in the project area and its immediate surroundings is low, except during the hunting season. There are no permanent structures or dwellings in the area. There are a small number of minor developments made for livestock grazing (corrals, water troughs), etc. State land within the project area is leased for livestock grazing; current authorized use is 8,716 AUM's BNF lands directly north of the project area are managed to provide dispersed recreational opportunities. Grazing allotments are maintained while timber harvest is not scheduled or considered suitable.

During big-game hunting season, human use increases. There are no data on hunter use of the project area per se, however, data compiled by the Montana Department of Fish, Wildlife and Parks indicate that during the period 1986-1994 hunting district 324 (which includes the project area but extends northward and eastward to Robb Creek, the Ruby River, and the Gravelly Range Road) supported from 2000 to 2500 elk hunters annually, spending from 10,000 to 14,000 hunter days in the area (R. Brannon, MDFWP, correspondence, Nov. 1995).

2) Road Density

Currently, there is an average density of 1.0 mi/mi^2 open, driveable road on the project area. (Most roads on the project area are legally closed; however, they are considered "open" for this analysis because there are no impediments to travel).

3) Cover

Currently, roughly 26% of the project area is forested (i.e., likely provides cover to any grizzly bear that might be in the area).

4) Riparian areas

Grizzly bears are often associated with moist habitats and riparian areas. In part, cover is often higher in riparian areas than others, and in part, vegetation used as food is more prevalent in riparian areas. As noted earlier, riparian vegetation is currently rare on the project area.

d. Wolf (*Canis lupus*)

The wolf is classified as Endangered. Like the grizzly bear, it is a habitat generalist, and will occur almost anywhere that its preferred prey (most often large ungulates) are sufficiently abundant and vulnerable, and that persecution from humans is tolerably low.

Similarly to the grizzly bear situation, the project area lies outside the scope of existing wolf recovery areas (USFWS 1987). Downlisting to threatened is envisioned by USFWS (1987) when at least two of the three delineated areas (Northwestern Montana, Idaho, Wyoming) maintain a minimum of 10 breeding pairs for at least 3 successive years. However, any wolves using the project area remain fully protected by the Endangered Species Act, and thus merit consideration even if occupance is not considered a pre-requisite to downlisting.

The project area is also included within the "Nonessential Experimental Population" region for wolves reintroduced into Yellowstone in November, 1994 (J. Till, USFWS, pers. comm., April 1995). Special rules apply to wolves within this zone that are discovered attacking livestock; however, all wolves remain classified endangered.

Also, as in the case of grizzly bears, the project area has been suggested as an "important corridor" between identified wolf recovery areas in Idaho and Yellowstone (USDI 1985, cited in USFS 1995). Thus, we find it useful to delineate two elements of the affected environment when considering wolves:

i) current use by wolves, and ii) the potential for the project area to function as part of a linkage between the Yellowstone and other wolf recovery areas.

1) Wolf Use of the Project Area

Within the Project area there have been no recent, confirmed reports of wolves; however, there were some reported wolf observations (of uncertain reliability) in the area during the early-to-mid 1970's. Wolves have also been reported from the general vicinity (i.e., Gravelly Mountains) routinely (R. Wiseman, Beaverhead National Forest, pers. comm., May 1995; J. Till, USFWS, pers. comm., May 1995). These reports are of variable reliability; some likely are accurate reports of wolves, others may represent confusion with coyotes, domestic dogs, or mountain lions (in the case of tracks or scats). We have no way to determine credibility of past reports.

However, almost all reports are of single animals. No reliable reports of pack activity or breeding have been made in recent years for southwestern Montana. Thus, we believe a reasonable conclusion is that wolves observed during the past 20 years in the general vicinity represent long-distance disperses from established packs elsewhere in Montana or Canada. (Because natural wolf recovery has been occurring in Montana since the mid 1980's, we now have some experience with relating observational data to the status of known, breeding packs. This experience suggests that when wolf packs use an area consistently, reports from the general public will reflect this fact. The lack of reports of packs thus suggests that, indeed, no packs occupy the area; J. Till, op. cit).

2) Potential Linkage to Other Populations

The fundamental biological dynamics of isolated populations apply to wolves as much as they do to any other species. Thus, the long-term viability of newly established wolf populations in Yellowstone and central Idaho ultimately may depend on connectivity with each other, and/or with other wolf populations.

However, wolves appear to differ substantially from grizzly bears in their metapopulation dynamics (Fritts and Carbyn 1995). Whereas female grizzly bears generally disperse relatively short distances from parental home ranges, and thus colonize range frontiers slowly, wolves exhibit both philopatric and allopatric dispersal. In particular, individual wolves are known to make occasional long-distance movements, often through landscapes that would not be expected to maintain resident populations (Mech 1995, Mladenoff 1995). Thus, over the long term, apparently isolated wolf populations appear to have the capability to maintain "connectivity" without formal designation of corridors or linkage zones.

Nonetheless, excepting only the most remote areas, the largest source of mortality affecting wolf populations comes from mankind (Fuller 1989, Thurber et al. 1994, Mech 1995). Therefore, effective linkage between patches of established wolf populations requires that mortality risk in the matrix between patches be acceptably low, allowing a sufficient number of allopatric disperses to survive. Thiel (1985), Jensen et al. (1986), Mech et al. (1988), and Mladenoff et al.

(1995) have noted the correspondence between wolf occupance and human habitation, as quantified by road density, in the Great Lakes region of the U.S. and Canada. In contrast, Thurber et al. (1994), working in Alaska's Kenai peninsula, concluded that although wolves avoided open, heavily traveled roads, they frequently traveled along secondary, gated, or little-used roads. Thurber et al. (1994) concluded that "Gated or seasonally closed roads away from settled areas represent management recommendations that will provide wolf travel corridors with low human impact". Mech (1989) also noted that wolf populations could persist alongside relatively high road densities if ingress of wolves from nearby roadless areas was possible. Thus, in general, limitations to wolf occupance arise from excessive human-induced mortality, not from roads per se (Mech 1995, Mladenoff et al. 1995).

e. Other T&E Species Not Considered

Other species listed by the U.S. Fish and Wildlife as either threatened or endangered, and that have been documented from the state of Montana include Whooping Crane (*Grus americana*), Piping Plover (*Charadrius melodus*), Least Tern (*Sterna antillarum*), Black-footed Ferret (*Mustela nigripes*), and Woodland Caribou (*Rangifer tarandus caribou*). None of these species have geographic ranges in or near southwestern Montana, and thus are not considered further.

2. Sensitive Species on DNRC Central Land Office

Here, we consider each species identified as being Sensitive on the Central Land Office according to criteria developed in the State Forest Land Management Plan. Documented presence of the species is not required for us to consider the species; rather, we consider the presence of habitat elements important to each listed species.

a. Harlequin Duck (*Histrionicus histrionicus*)

Harlequin ducks inhabit fast moving, low gradient, braided streams that have segments of riffles and slow moving water with moderate to dense streamside vegetation and mid-stream loafing sites. Such habitat is not present in the vicinity of the project area. Additionally, harlequin ducks have not been documented from this area of the state (Bergeron et al. 1992).

b. Ferruginous Hawk (*Buteo regalis*)

This species mainly occupies open country, primarily prairies, plains and badlands, sagebrush, saltbush-greasewood shrubland, and the periphery of pinyon-juniper and other woodland types.

c. Mountain plover (*Charadrius montanus*)

The mountain plover inhabits short grass prairie habitats, east of the Rocky Mountains. No such habitat exists in or near the project area, and no mountain plovers have been recorded from the general vicinity (Bergeron et al. 1992))

d. Flammulated Owl (*Otus flammeolus*)

Flammulated owls breed in warm, dry habitats typified by in large, old

Ponderosa pine and Douglas-fir trees. Ponderosa pine is not present in or near the project area. The project area does contain some large, old Douglas-fir trees that are of a type that flammulated owls might use, however the area is, in general, in a colder region than flammulated owls have been documented from. To date, flammulated owls have not been documented from the vicinity of the project area (Bergeron et al. 1992).

e. Boreal Owl (*Aegolius funereus*)

Boreal owls nest at high elevations (generally > 5,200 ft.) in mature spruce/fir forests, dominated by Englemann spruce, with representation by subalpine fir, Douglas-fir, western larch, and minor amounts of lodgepole pine. Mature aspen stands are also frequently used by Boreal Owls. Boreal owls nesting in the general area has been suggested though indirect means (Bergeron et al. 1992). Many forested stands in the project area, although dominated by mature Douglas-fir, do not posses habitat attributes such as large snags and coarse down woody material preferred by boreal owls (Hayward 1994). However, some stands, notably the old-growth stand in section 14, appear to be appropriate for boreal owl nesting.

f. Black-backed Woodpecker (*Picoides arcticus*)

The black-backed woodpecker is generally associated with recently burned, or opened up mature stands of coniferous forest. Nesting has been recorded as tied to presence of dead trees, and management concerns have included limiting salvage sales and retaining sufficient numbers of snags.

There are no confirmed reports of black-backed woodpeckers within the project area per se. However, MNHP reports indirect or circumstantial evidence of black-backed woodpecker breeding activity in Beaverhead county, and also within the quarter lat-lon in which the project area is situated.

g. Townsend's Big-Eared Bat (*Plecotus townsendii*)

Townsend's big-eared bat is a widely distributed species that evidently exists in low densities wherever it is found. It appears to be sensitive to disturbance, and has a low intrinsic rate of increase, making population recovery following reduction slow and difficult.

In western Montana, Townsend's big-eared bats are most closely associated with cavernous habitat and rocky outcrops of sedimentary or limestone origin, which are used for roosting. In old growth forests, large diameter hollow trees may be used for roosting. Maternity colonies are found in warm areas of caves, mines and occasionally buildings. Hibernacula are typically in caves or mines with winter temperatures 2-7 deg. C and relative humidity >50%.

There are no documented records of this bat from the project area per se, however, Thompson (1982) indicates a verified specimen taken from the general area.

h. Northern Bog Lemming (*Synaptomys borealis*)

Bog lemmings in Montana are closely associated with the presence of large, thick moss mats, particularly sphagnum moss (Reichel and Beckstrom 1994). A few, small populations have also been found in other mesic sites with

sedge or brush vegetation. The southernmost population documented in the Rocky Mountains is at Maybee Meadows in the Beaverhead National Forest, approximately 90 miles northwest of the Project Area. Although the possibility of finding additional populations in southwestern Montana cannot be ruled out (Reichel and Beckstrom 1994), the combination of geographic distribution and habitats within the Project Area makes the probability of occupance extremely low. Accordingly, northern bog lemmings will not be considered further in this analysis.

i. Lynx (*Felis lynx*)

Lynx in the Rocky Mountains are generally considered to be associated with three habitat features: i) densely stocked early successional forests (principally lodgepole pine) that create optimum conditions for snowshoe hares (*Lepus americanus*), their preferred prey; ii) dense, mature forest habitats that contain large woody debris, such as fallen trees or upturned stumps, to provide security and thermal cover for kittens, and iii) connectivity between the first two, in the form of contiguous forested cover.

Based on the above summary, the project area does not appear to provide high-quality lynx habitat. Lodgepole pine is not as abundant as Douglas-fir and spruce (among coniferous forest types), and sapling stage lodgepole forests are especially uncommon (none documented in the most recent Stand Level Inventory, see (Table AE-W2). Descriptions of the fire type in which the project area's forests are situated (Fischer and Bradley 1987) suggest that dense forests with large sized woody debris do not frequently develop in these stands. Finally, forested cover is naturally fragmented into relatively small patches, with the intervening matrix being made up almost entirely of open (i.e., non-forested) landscapes. Thus, even under management that prioritized lynx habitat, it appears unlikely that the project area would support more than the occasional or accidental presence of lynx.

3. Game Species: Elk

a. Background - Elk Habitat Needs

Biologists generally recognize the "fundamental role of elk habitat in producing and sustaining elk populations and perpetuating current levels of elk-related public recreation..." (MDFWP 1992). Four elements are identified as important: nutrition, winter range, thermal cover, and security. The project area considered here functions primarily as fall season transitional range for Gravelly Mountains elk but is quite close to an important winter range, we focus particularly on security concerns during winter and hunting season.

b .Winter Range

Elk requirements during winter include the presence and accessibility of palatable forage, plus topographic and thermal cover conditions conducive to energy conservation (MDFWP 1992). Timber cover can also be important on some elk winter ranges, to provide thermal protection and areas of relatively shallow snow that enable elk to avoid predators or other disturbance. Radio-locations from elk captured on the Blacktail and Robb-Ledford winter ranges, however, suggests that during 1984-1994, timbered areas south and east of the MDFWP-managed winter range areas were rarely used by wintering elk (Fig. ELK-1).

c. Hunting Objectives

Security is defined by MDFWP (1992:6) as "protection inherent in any situation that allows elk to remain in a defined area despite an increase in stress or disturbance associated with hunting season or other human activities". While MDFWP recognizes that a number of factors are involved in determining the level of security (see section below on Bull Elk Vulnerability), it has become policy to "...focus on management options that maintain healthy elk population without reducing existing levels of hunting opportunity (MDFWP 1992:9).

In general, existing levels of hunting opportunity are viewed within "...the framework of an annual five-week general hunting season.." (MDFWP 1992:17), and further, that elk harvest be "...distributed throughout the hunting season" (MDFWP 1992:14), i.e., that legally-harvestable animals remain available beyond the earliest part of the hunting season. To assess and guide the temporal distribution of harvest, MDFWP (1992) assigned numerical targets to 94 elk hunting districts (HDs) for proportion of the general season's total bull harvest that occurs during the general season's first week. These targets vary from "20-30%" to 55%; most are 40% or less.

d. Bull Elk Vulnerability.

In recent years, elk populations throughout Montana have prospered, but carry-over of bulls through the hunting season has been problematic. The issue of limiting bull vulnerability to hunting has thus generated much discussion and research. Thomas (1991) summarized management situations that contributed to increased elk vulnerability to hunting, and proposed actions to "partially offset" them (Table AE-W5).

TABLE AE-W5: Summary of problems with bull elk vulnerability, and possible solutions. Taken from Thomas (1991:319).

Situation	Management Action
1. Increased density of roads	1. Design roads to minimize impacts. Close roads permanently or temporarily. Enforce road closures.
2. Increasing density of hunters	2. Restrict hunter numbers.
3. Decreasing amounts of cover	3. Control stand configuration, juxtaposition and size through modifications in timber management program
4. Fragmentation of cover into smaller patches	4. Retain adequate "escape cover" stands of several hundred or more acres
5. No restriction on antler class in bull harvest	5. Impose regulations on what bulls can be e.g., such as allowing the kill of spike bulls only
6. Setting of open seasons that include the rutting period	6. Insure the open seasons do not include the rutting period
7. Improving technology	7. Preclude "modern weapons"
8. Long open seasons	8. Shorten the open season
9. Relatively gentle terrain	9. Decrease road density, maintain more cover, increase size of cover patches, decrease hunter numbers.
10. Increasing number of hunter days	10. Related to both items 2 and 8 above. Reduce hunter numbers and/or reduce length of hunting season.

Of the situations listed by Thomas (1991), MDFWP has primary authority to take management actions for numbers 2, 5, 6, 7, 8, and 10. On the project areas, DNRC has principal authority for numbers 1, 3, and 4. Number 9 is a shared authority.

Christensen et al. (1993), referring specifically to managers of forested lands, listed the main issues to consider for elk vulnerability as:

1. Roads (season of use, density)
2. Security areas (distance from roads, size, cover characteristics, area closures, topographic characteristics
3. Cover management (description, connectiveness, scale, terrain relationships)
4. Mortality models - demonstrated predictors of elk mortality based on habitat quality, hunter density, or other factors.

Hillis et al. (1991) emphasized the role of security areas in maintaining low elk vulnerability (and thus high hunter opportunity). They defined security areas as being nonlinear blocks of hiding cover at least 250 acres in size, and no less than 0.5 mile from any open road. They further suggested that such security blocks must equal at least 30% of analysis units to avoid increasing elk vulnerability. It should be noted,

however, that most data available to Hillis et al. (1991) were from further west in Montana or Idaho, where landscapes naturally support more extensive forests than in the vicinity of the project area, and they cautioned that guidelines developed were intended for use west of the Continental Divide in Montana.

Christensen et al. (1992) noted, regarding the Hillis "paradigm" that "...there appears to be a gradient from west to east regarding the significance of cover in this equation. In northern Idaho...cover is so ubiquitous that security can be controlled with road management alone. As you move east...over the Continental Divide, cover considerations become more important because cover is less abundant and less contiguous." Later, Christensen et al. (1992) urged consideration of cover in the "more naturally open elk habitat in central and southwestern Montana...where...a landscape-level perspective is absolutely necessary. Size, location on the landscape, connectiveness with other cover, and vegetative composition are important considerations (Hillis et al. 1991). Data from Montana hunting seasons suggest that elk are less selective about the specific vegetative characteristics of coniferous cover and more responsive to size of units, connectiveness with adjacent units, and the scale of cover on the landscape (Lyon and Canfield 1991)...Where coniferous cover may be a limiting factor, it will be important to develop long-term perspectives (rotation length) on cover management that address condition, quantity, location, and configuration".

Thus, retaining cover is often cited as an important element of elk security, particularly in habitats such as are found in the project area. Nonetheless, there are suggestions in published literature that managing the type of hunter and hunter density through road management alone may help achieve harvest objectives, even in the relatively open Gravelly mountains. Working approximately 17 miles northwest of the project area, also in the Gravelly mountains, Basile and Lonner (1979) noted that hunting pressure and proportion elk killed became more equitable through the general season after an area had been closed to vehicle traffic. Because the number of hunters entering the restricted area during the early portion of the season was significantly less than the number entering a similar, unrestricted area, elk apparently stayed in the former area longer. Basile and Lonner (1979) concluded that, for this particular study area, "...travel restrictions appeared to increase the capability of the area to hold elk".

e. Affected Elk Population

The Blacktail and Robb-Ledford winter ranges, located just north of the project area, are important elk winter ranges (Hamlin and Ross 1995). Almost 2,500 elk were counted during aerial flights in winter 1994-95, and the total number of elk wintering in these areas was probably somewhat higher (Hamlin and Ross 1995). Most wintering elk use the broad, open grasslands that are now managed by MDFWP as wintering areas. Because of its location near the Blacktail winter range, the project area constitutes important transition habitat for elk migrating between, to and from ranges..

1) Seasonal Use of the Project Area by Elk.

Since 1984, MDFWP has been conducting research entitled "Gravelly-Snowcrest Mountains Elk Study - Elk Population Dynamics and Breeding Biology" (PR Project W-100-R-2, see Hamlin and Ross 1994). This radio-telemetry study enabled us to estimate the intensity and timing of use by elk

of the project area[1].

Methods. To depict general geographic patterns of use by elk by season, we selected radio-locations of those adult female elk known to be associated with the Blacktail winter ranges. We created a list of locations for each season (winter: December 3 - April 15; spring: April 16 - June 15; summer: June 16 - August 31; fall: September 1 - December 2), for all 11 years (1984-1994) combined. We then calculated 25%, 50%, 75%, and 95% composite home range isopleths of the adaptive kernel home range estimator (Worton 1989) using program CALHOME (Kie et al. 1994). Available sample sizes for each season were - winter 646, spring 359, summer 560, and fall 876. Because CALHOME can accept a maximum of 500 data points, the first 500 points of each data set were used for data sets larger than 500 points. Sample sizes varied among years, but we judged any bias resulting from inequitable sampling unimportant for depicting general seasonal patterns with large sample sizes. We also searched for locations of male elk (from within any sampling sub-unit of the entire Gravelly herd) to describe patterns of use within the project area.

Results. As expected, the composite winter home range of the Blacktail herd focused on the main wintering area, and was fairly small in size (Fig. ELK-1). Relatively few animals wintered far from the main wintering ranges managed by MDFWP (Blacktail, Robb-Ledford). In spring, the composite ranges began expanding as many (but not all) animals moved upwards in elevation, largely eastward and southward (Fig. ELK-2). The composite home range during summer consisted of two large concentrations within the southern Gravelly mountains, one near the Snowcrest divide, the other near Divide and Freezout Mountains. Few elk from the Blacktail winter range sample remained near their winter range (Fig. ELK-3). During fall, the composite home range contracted somewhat toward the Snowcrest range, as most animals began migrating back toward the winter range (Fig. ELK-4).

Based on these data, it appears that the principal migration route to and from the Blacktail winter range was located to the east of the project area. Of the total 2,441 location points of female elk captured on the Blacktail winter range during 1984-1994, 19 (less than 1%) were located within a rectangular polygon that roughly approximated the extent of the project area. Of these, the majority were located within the northeast portion of the project area. Little pattern of seasonal use emerges from these few location points (Table AE-W6); it would appear that use of the project area by Blacktail female elk was most common during late winter/early spring (9 of 19 points during February-April), and least common during summer (2 locations points during June-August) and mid-winter (1 point during December-January). Some elk also used the area during fall.

MDFWP researcher K. L. Hamlin kindly allowed us to use raw data from this as-yet uncompleted research project, for which we are greatly appreciative. Mr. Hamlin has also reviewed our use of these data for general accuracy and appropriateness; however, nothing in either our presentation of these data or conclusions based on them relative to the proposed project, imply endorsement or concurrence of either Mr. Hamlin or MDFWP.

Fewer data were available with which to assess if location patterns of bull elk were similar to those of females. A search of all locations obtained during the Gravelly study (n = 6,813) yielded 10 locations of male elk within the polygon approximating the project area. Thus, a total of 29 locations of all elk (about one-half of one percent) obtained during the Gravellys study were within the project area. The 10 bull elk locations within the project area were distributed widely, with a weak tendency toward being in the southcentral portion. All male locations within the project area came from September-November (of the various years), but it is unclear whether this seasonal pattern represents true preference of seasonal use, or, alternatively, periods of time during which researchers prioritized locating male elk.

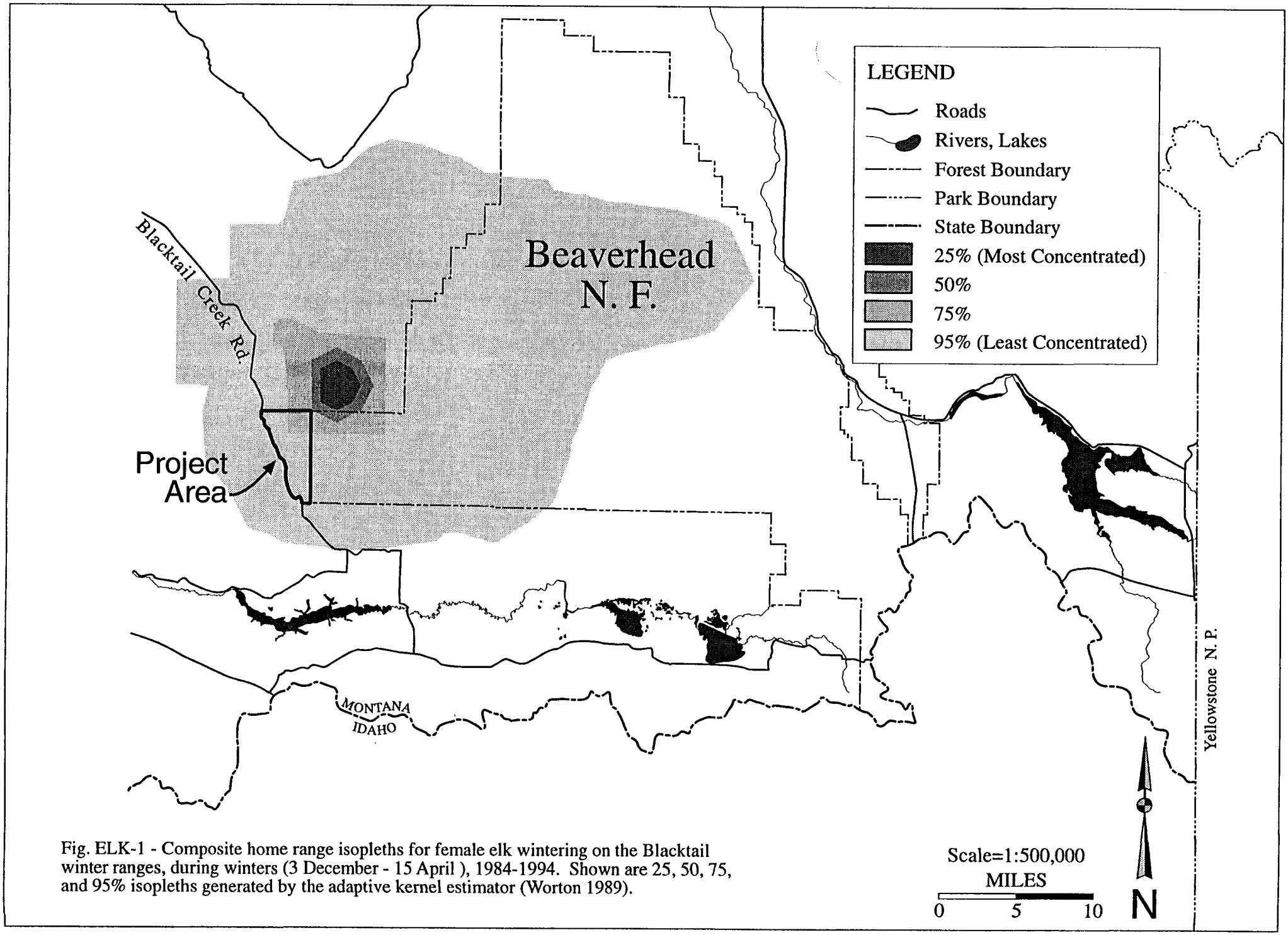


Fig. ELK-1 - Composite home range isopleths for female elk wintering on the Blacktail winter ranges, during winters (3 December - 15 April), 1984-1994. Shown are 25, 50, 75, and 95% isopleths generated by the adaptive kernel estimator (Worton 1989).

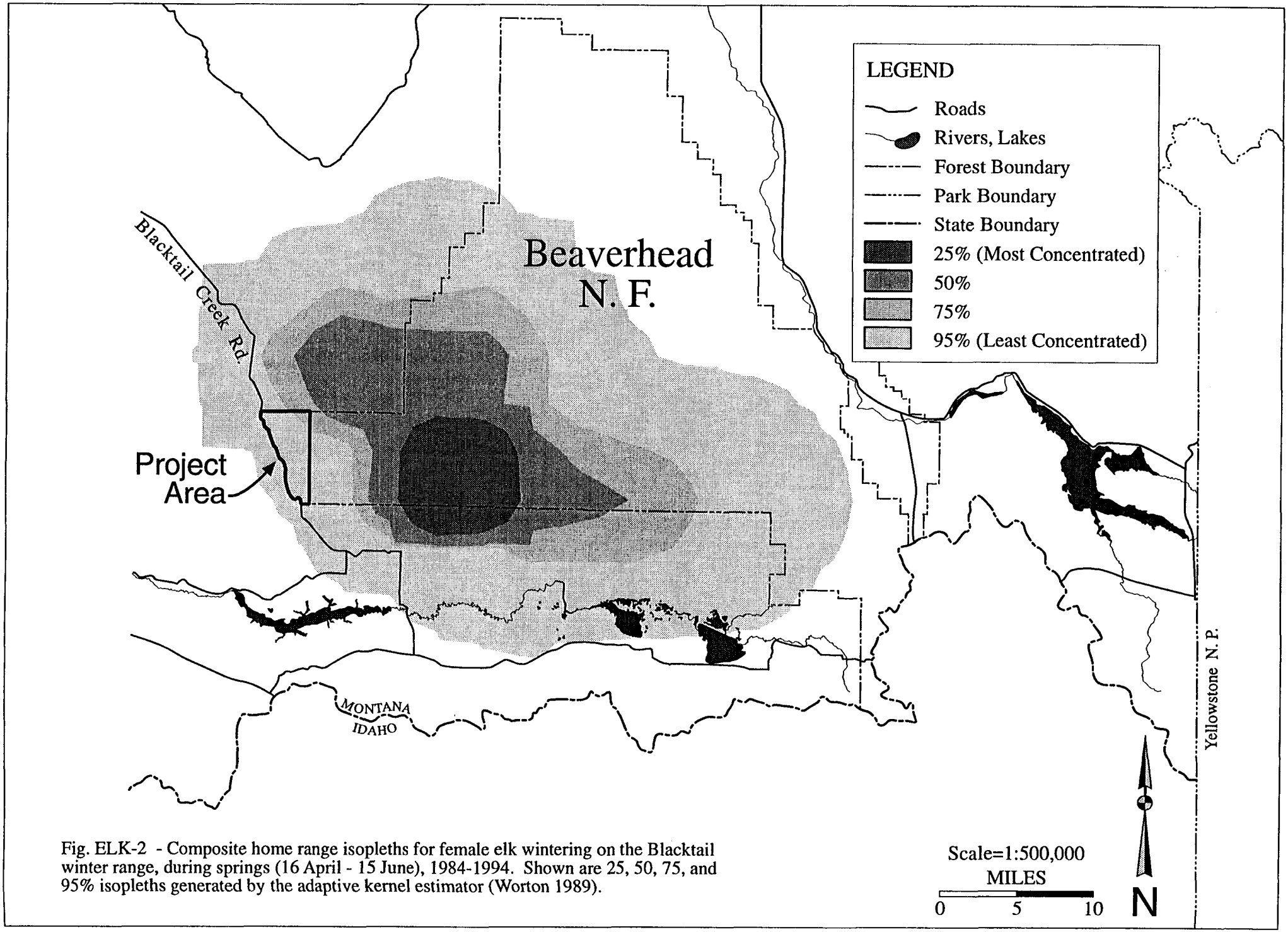


Fig. ELK-2 - Composite home range isopleths for female elk wintering on the Blacktail winter range, during springs (16 April - 15 June), 1984-1994. Shown are 25, 50, 75, and 95% isopleths generated by the adaptive kernel estimator (Worton 1989).

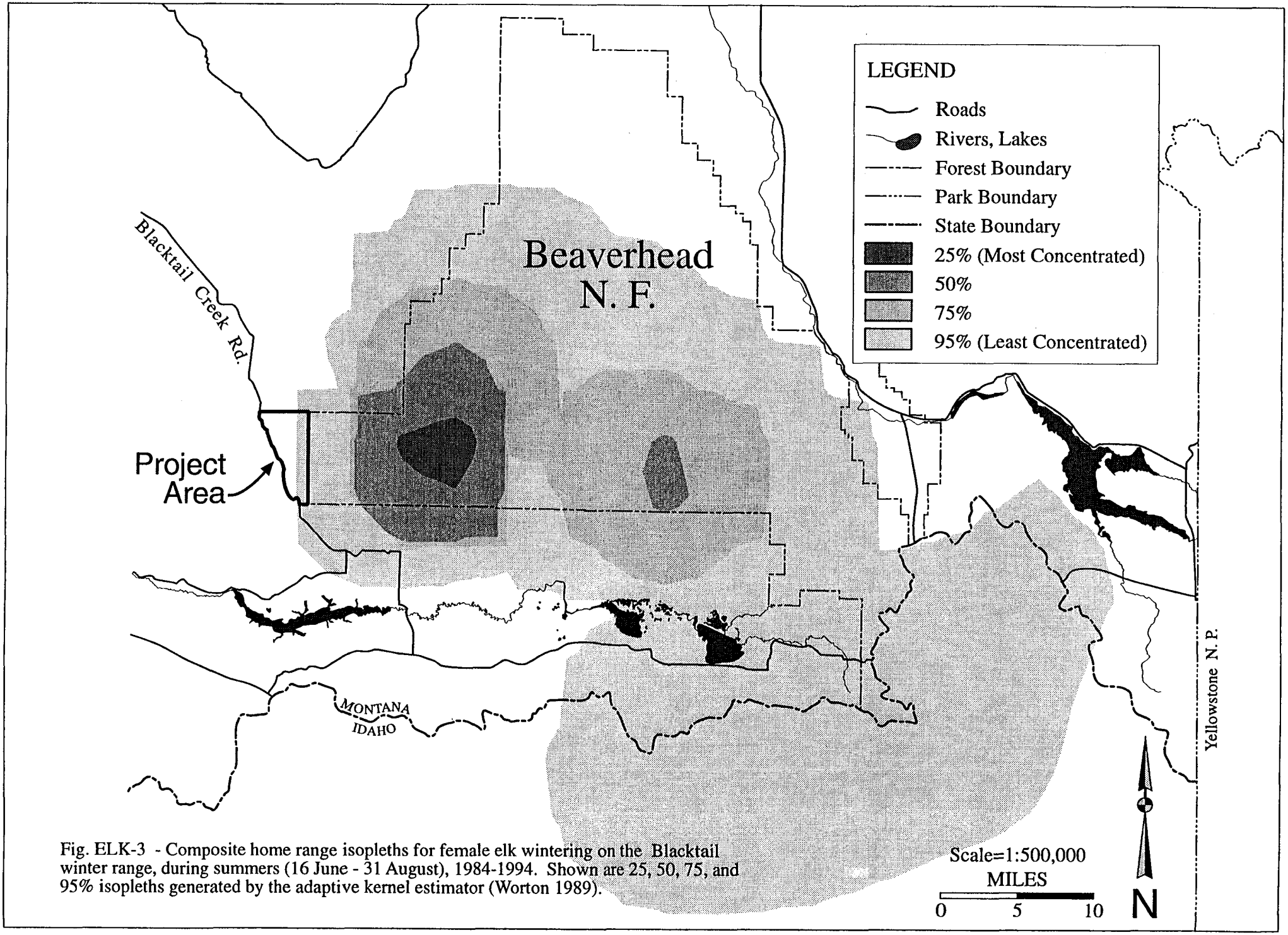


Fig. ELK-3 - Composite home range isopleths for female elk wintering on the Blacktail winter range, during summers (16 June - 31 August), 1984-1994. Shown are 25, 50, 75, and 95% isopleths generated by the adaptive kernel estimator (Worton 1989).

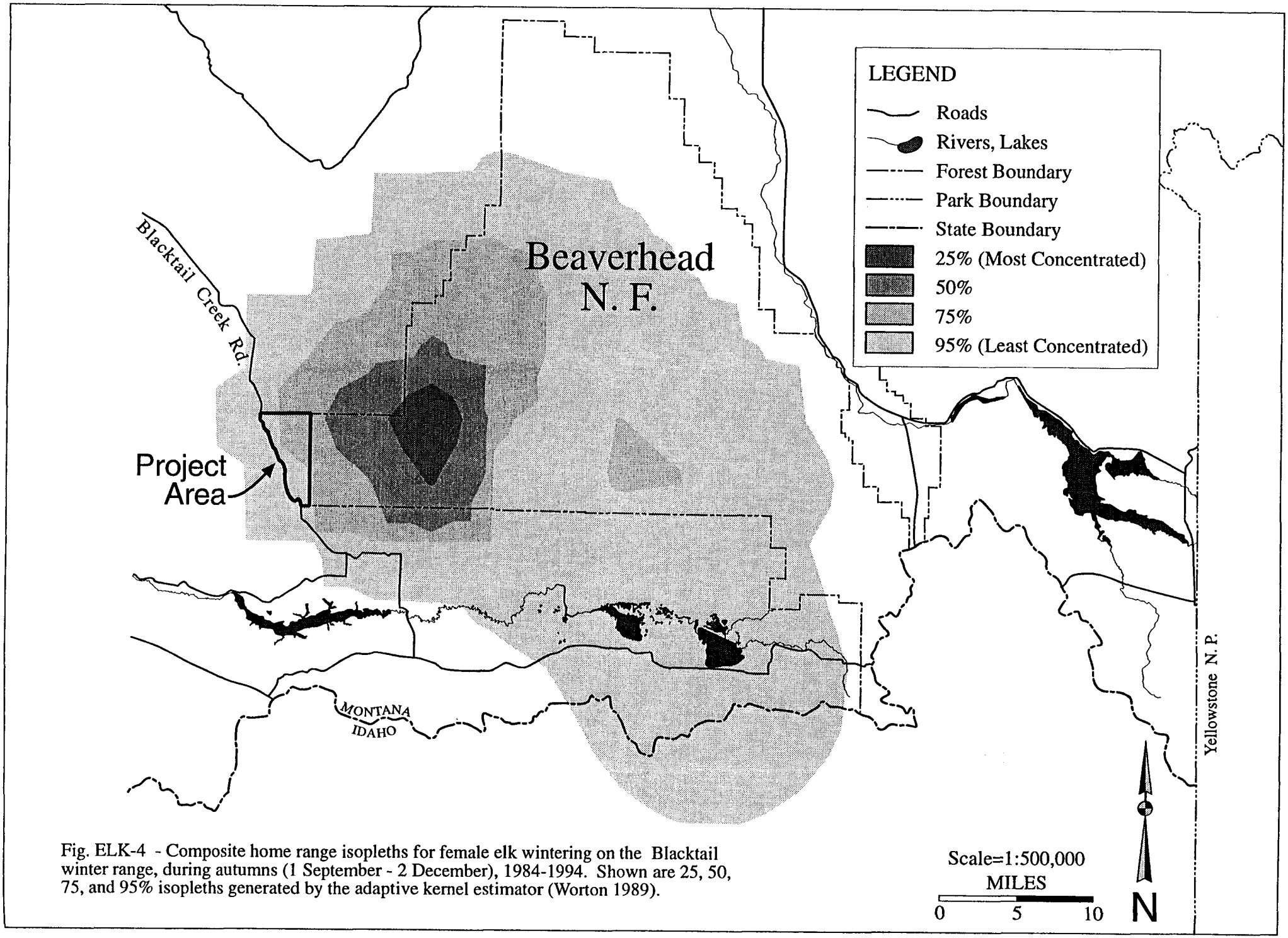


Fig. ELK-4 - Composite home range isopleths for female elk wintering on the Blacktail winter range, during autumns (1 September - 2 December), 1984-1994. Shown are 25, 50, 75, and 95% isopleths generated by the adaptive kernel estimator (Worton 1989).

TABLE AE-W6: Number and proportion of elk locations within the project area by month, and numbers and proportion of all elk locations, by month. The total number of elk locations made by the MDFWP study during 1984-1994 was 6,813.

	Within Project Area	
Month	Female Locations	Male Locations
Jan	1 (0.05)	0 (0)
Feb	2 (0.11)	0 (0)
Mar	5 (0.26)	0 (0)
Apr	2 (0.11)	0 (0)
May	1 (0.05)	0 (0)
Jun	0 (0)	0 (0)
Jul	1 (0.05)	0 (0)
Aug	1 (0.05)	0 (0)
Sep	1 (0.05)	3 (0.3)
Oct	3 (0.16)	6 (0.6)
Nov	2 (0.11)	1 (0.1)
Dec	0 (0)	0 (0)
TOTAL	19	10

Although we have access to data only from elk originally captured on the Blacktail winter range, there are additional elk (i.e., that do not traditionally winter on the Blacktail or Robb-Ledford winter ranges) that may use the project area (R. Brannon, MDFWP, pers. comm; K. Hamlin, MDFWP, pers. comm). We know nothing of any areas or seasons of concentrated use by these other elk. It is safe to assume, however, that the picture of elk use obtained by considering only Blacktail winter range elk is incomplete. Other elk no doubt use the project area, although we are unable to describe specific use patterns.

2) Current Elk Hunting Situation in the Gravelly Mountains

Although individual land-management agencies control the types and degree of activities occurring on the land (including access), MDFWP manages elk populations. MDFWP has defined Elk Management Units (EMU) throughout the state of Montana; the project area is situated within the Gravelly EMU (approximately 1800 mi^2). Within each EMU, management is further refined by Hunting Districts (HDs). The Blacktail Deer Creek road, which bisects the project area, also forms the boundary between HDs 324 and 325 (there are 5 others within the EMU).

Elk numbers as of 1991 in the Gravelly EMU were estimated at 9,000 pre-hunting season, and about 7,500 post-hunting season (Hamlin and Ross 1991). This represents approximately an 87% increase since 1980, and an even larger magnitude increase from historical (late 1940's) population levels (Hamlin and Ross 1994). Since 1991, counts on the principal winter ranges have suggested that the population has remained approximately stable or increased slightly (Hamlin and Ross 1994, K. Hamlin, pers. comm., 1995).

The Gravelly EMU has among the highest number of hunters of any EMU in

Montana (MDFWP 1992). The EMU provides almost 35,000 days of hunter recreation to about 6,300 hunters annually (MDFWP 1992). Total harvests have varied from approximately 1,400 to 1,800 elk annually. Bull harvests in recent years have varied from a low of 525 in 1993 to a high of 1,255 in 1994 (K. Hamlin, unpubl. data, 1995).

Hunting regulations over the last 20 years within the Gravelly EMU have gone from either-sex seasons to antlered bull to branch-antlered bull to brow-tine bull. Branch-antlered bull (BAB) regulations were first introduced in 1981 in hunting district 324 in an attempt to reduce the number of bulls harvested and help increase the low bull:cow ratios observed on the winter range (Hamlin and Ross 1991).

By 1987, all hunting districts in the EMU (including HD 325) had adopted branch-antlered bull regulations. A high illegal mortality rate of spike bulls was noted under these regulations (Hamlin and Ross 1991). In 1990, all branch-antlered bull regulations were changed to brow-tine bull in an attempt to reduce the illegal mortality of spikes. All cow harvests are now by permit only.

Management objectives that have been quantified (MDFWP 1992) for the Gravelly EMU include:

--*Numbers*: A total EMU elk population of 8,000-8,500 (an increase over current estimates of 7-7,500 due to desired increases on the Robb-Ledford winter range of 500-1,000).

--*Calf:cow ratios*: A late-winter calf:cow ratio of at least 45:100.

--*Harvest*: An annual harvest of 700-900 antlered and 800-1100 antlerless elk.

--*Hunting*: A minimum of 34,700 days of hunting recreation annually for a minimum of 6,300 hunters.

--*Temporal distribution of harvest*: Distribution of elk harvest within the hunting season so that no more than 40-45% of harvested bulls are taken during the first week.

Recent reports provide basis for suggesting that the first four of these targets are being met (Hamlin and Ross 1993, 1994, K. Hamlin, pers. comm. 1995):

--*Numbers Objective of 8,000-8,500*: Although Hamlin and Ross (1994) do not address total population directly, they suggest that "...the population should have been stable to increasing compared to previous years". Calculations made in 1993 using varying assumptions yielded 1992-93 estimates of 8,069 to 10,381 elk (Hamlin and Ross 1993). Similarly, the 1994 population was estimated to be 10,453 (K. Hamlin, pers. comm., 1995).

--*Calf:cow ratios at least 45:100*: Counts on 3 winter ranges during winter-spring 1993 and 1994 suggested that the 45:100 standard was generally being met (Table AE-W7).

TABLE AE-W7: Late-winter calf:cow ratios from four winter ranges in the Gravelly Mountains EMU. Data from Hamlin and Ross (1994, 1993).

	1993 Calf:Cow	n	1994 Calf:Cow	n
Wall Ck.	43.1	1225	50.0	612
Blacktail	47.6	1225	45.7	574
Blacktail Ridge	48.9	335	-	-
Robb-Ledford	-		51.3	289

--Harvest Objective of 700-900 antlered and 800-1,100 anterless elk: Estimated number of harvested bulls has varied yearly, but since 1977 has varied between 500 and 1,300. In most of those years, bull harvest has been between 700 and 900 (data interpreted from Hamlin and Ross 1994: Fig. 5). The estimated mean number of bulls harvested during the four years 1991-1994 was 934 (K. L. Hamlin, unpubl. data). Estimated number of antlerless elk harvested has varied depending on the number of permits allowed, varying from as low as 109 (in 1974) when 300 antlerless permits were allowed, to 1,613 (in 1994) when 3,540 permits were allowed. Estimated antlerless harvest has exceeded 1,000 since 1991.

--Hunting opportunity objective of 6,300 hunters and 34,700 hunter days: The estimated number of hunters using the Gravelly EMU during the 1994 season was 8,911 (of which 6,487 were hunting bulls), and the estimated total hunter days was 44,511 (of which 31,959 were spent in pursuit of bulls; K. L. Hamlin, unpubl. data). The number of hunters during 1994 was higher than for any recent year excepting 1993, but number of hunters has exceeded 6,300 during all years since 1987.

--Temporal distribution of harvest, maximum 40-45% bulls taken during first week: However, the fifth objective, minimizing harvest during the first week to allow opportunity for hunters to harvest bull elk throughout the full five-week season, has generally not been met. During only 2 of the past 9 general hunting seasons has the percentage of bulls harvested during the first week been as low as the hoped-for 45% (Table AE-W8).

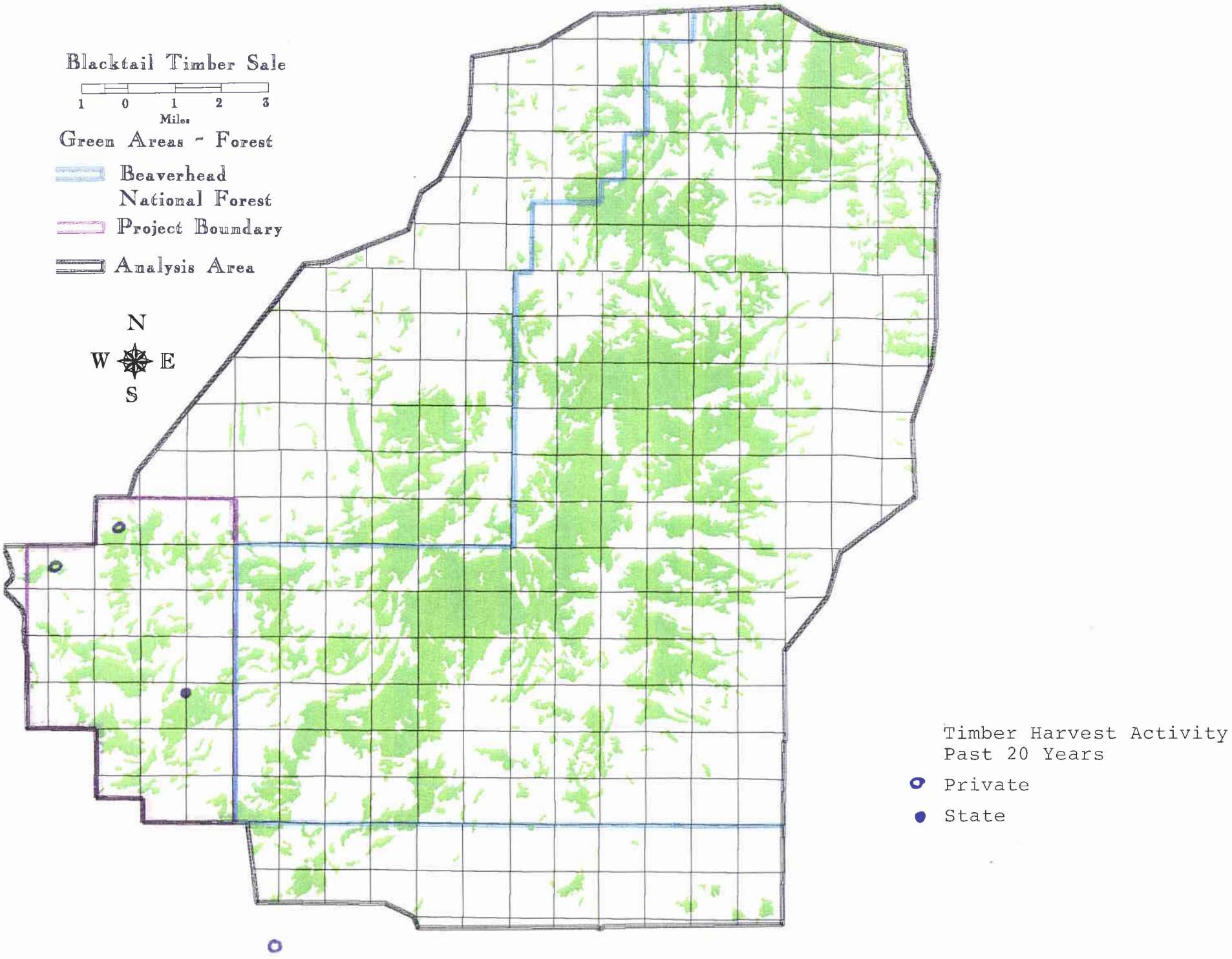
TABLE AE-W8: Percentage of harvested bulls taken during the first week of the general season, success rate for bulls, total bulls harvested, and total elk harvested within the Gravelly EMU, 1986-1994. Data courtesy of K. L. Hamlin, MDFWP.

Year	% Bulls Harvested First Week	Bull Hunting Success Rate	Total Bulls Harvested	Total Elk Harvested
94	46	16	1255	2868
93	65	10	525	1525
92	47	12	736	1847
91	48	19	1080	2197
90	52	10	549	1263
89	44	12	677	1531
88	42	16	797	1669
87	55	14	722	1395
86	51	14	672	1261

3) Elk Security in and near the Project Area

Because of the relatively gentle topography, number of roads accessible to four-wheel drive vehicles, and predominance of open grassland habitats, the Gravelly EMU has inherently low security for bull elk during hunting seasons. This relatively low security is one reason that the targeted percentage of bulls harvested during the first week is 45% (rather than a lower figure, which is more common in other EMUs with higher security).

Christensen et al. (1993) emphasized the importance of configuration and connectivity of cover patches for elk security. Patches of cover in the project area are naturally small and discontinuous, making it difficult to achieve effective security based on vegetative characteristics alone. **Figure ELK-5 displays the forest cover and non-forest vegetation in an area that is approximately equivelant to the 75% isopleth for female elk that winter on the Blacktail winter range. The area depicted is the estimated composite home range (75% isopleth) for those elk during autumn (September 1, through December 2) as indicated in Figure ELK-4. The natural lack of connectivity in the proposed sale area is evident. The primary continuous block of cover is located on USFS ownership along the Snowcrest Range. There is an estimated 177,490 acres within the area, of which 56,130 acres is forested (32%) and 121,360 acres (68%) is non-forest. Timber harvest during the past 30 years has occurred on a very small percentage (less than 0.5%) of the forested area. No harvest has been conducted on BLM or USFS ownership. Approximately 66 acres was harvested on state land in 1989 and approximately 90 acres from two harvests on private land (Thomas property near Clover creek in 1994 and Anderson property in 1987).**


Blacktail Timber Sale
1 0 1 2 3
Miles
Green Areas - Forest
Beaverhead National Forest
Project Boundary
Analysis Area
N
W
E
S
Timber Harvest Activity
Past 20 Years
Private
State

4. Other Game Species

Other large mammal species known to use the project area include mule deer (*Odocoileus hemionus*), and moose (*Alces alces*). Moose use riparian areas, and occasionally winter in dense stands dominated by Douglas fir and Englemann spruce. Mule deer use predominately open habitats in the project area.

VI. RECREATION

The Upper Blacktail Valley receives very little recreational use outside of the general big game hunting season. The West Fork and Middle Fork of Blacktail Creek support a typical brook trout fishery and are occasionally used by anglers but they are not heavily fished.

State lands are available for non-motorized recreational use to anyone purchasing a Recreational Use License for State Lands. Licenses are not site specific and allow use of all legally accessible state lands. Therefore, it is very difficult to determine the amount of recreational use and income resulting from license sales for a specific area. The Department may also issue a Special Recreational Use License for concentrated activities such as outfitting on state lands, however, in the past five years there have not been any Special Recreational Use Licenses issued in the project area. Statewide, from March 1, 1995 through February 28, 1996 (the recreational use licensing year), 34,683 General Recreational use Licenses and 150 Special Recreational Use Licenses were sold, for a total Trust income of $204,889 during fiscal year 96.

The access road to the Upper Blacktail Valley is not maintained in the winter. Consequently recreational use from December through April is limited to occasional snowmobiling.

VII. GRAZING RESOURCES

The state lands within the project area are classified grazing and are leased for livestock use on an animal unit month basis (AUM). Grazing leases are generally issued for a 10 year period and are open for competetive bid. During the past five years a total of 2,773 AUM's for cattle use has been leased in the project area under 10 leases and to 4 seperate lessees. The sections proposed for timber harvest under Alternative I has 2457 of the leased AUM's. The leases were field evaluated individually from 1981 through 1994. All leases were considered to be in good condition with static or upward trend and slight to moderate forage utilization. The following tables summarize the five year grazing history.

TABLE AE-G1: Grazing lease summary for all state lands within the Blacktail Project Area.

ALL DNRC LANDS IN PROJECT AREA		
T12S, R6W		
SECTION	**AUM'S**	**ACRES**
1	180	485
2	207	453
3	186	619
10	99	360
11	196	470
12	163	491
13	199	591
14	165	437
16	96	565
21	121	450
22	176	484
23	129	402
24	118	364
25	192	640
26	84	275
27	99	350
36	216	640
TOTAL	**2,626**	**8,076**
T11S, R6W		
36	147	640
TOTAL FOR BOTH TOWNSHIPS	**2,773**	**8,716**

TABLE AE-G2: Grazing summary for the sections proposed for timber harvest under Alternative I of the Blacktail Timber sale proposal.

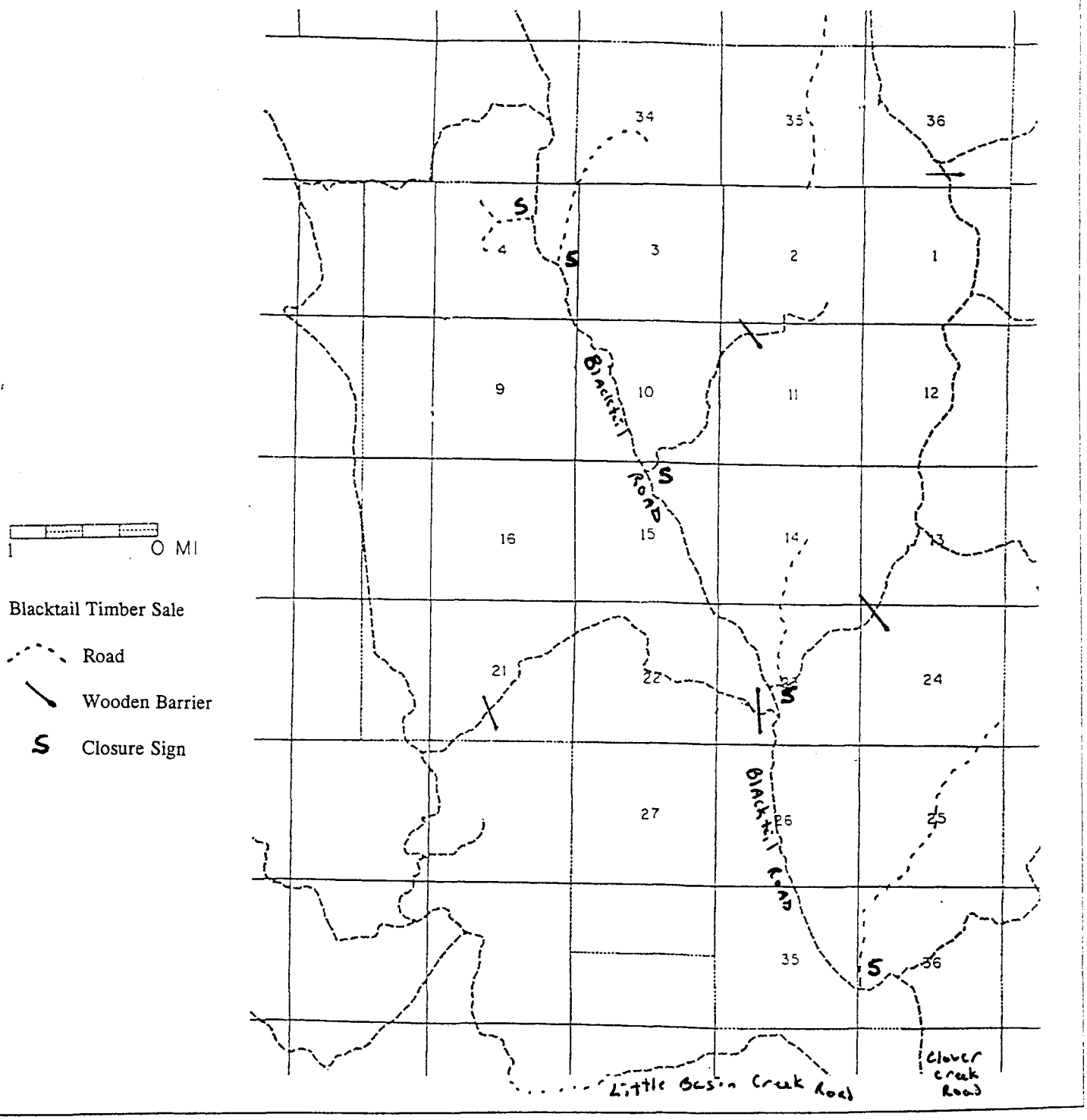
TIMBER HARVEST SECTION ONLY:		
T12S, R6W		
SECTION	**AUM'S**	**ACRES**
1	180	485
2	207	453
3	186	619
11	196	470
12	163	491
13	199	591
14	165	437
22	176	484
23	129	402
24	118	364
25	192	640
26	84	275
27	99	350
36	216	640
TOTAL	**2,310**	**6 ,701**
T11S, R6W		
36	147	640
TOTAL FOR BOTH TOWNSHIPS	**2,457**	**7,341**

VIII. TRANSPORTATION

There is an estimated 28 miles of existing road of various standards within the project area. The primary access route is a high standard, gravel surfaced road maintained by Beaverhead County. The county road (approximately 9 miles in the project area) is not maintained during the winter and generally drifts shut from December through April but is open for public use throughout the spring, summer and fall. The remaining roads are low standard or four wheel drive roads located on state, private and federal lands. These roads are generally open for ranching or land management activities and are used to varying degrees for recreational activities. An estimated one mile of these lower standard roads is located within the project area on land administered by the Bureau of Land Management and is open for recreational use. The remaining low standard roads, located on state and private lands are administratively closed to public motorized use. However, non-authorized use frequently occurs during the hunting season.

Roads on state lands are closed to public motorized use unless designated open by the Department. None of the roads within the project area have been designated open. Signs have been posted at five locations within the project area notifying the public of road use restrictions. In addition, the DFWP has constructed at least five wooden barriers within the project area to discourage vehicle use during the hunting season (Map AE-1). These barriers however are not completely effective since there are many places to circumvent the barriers and return to established trails. Most of these roads are poorly located, are not maintained, have unimproved stream crossings and consequently pose sedimentation and water quality problems.

Map AE-1--Existing Roads, Road Closure Signs and Wooden Barriers



IX. CULTURAL RESOURCES

A cultural resources inventory of sites that would be disturbed under each alternative was conducted in 1996. Five cultural resource sites were identified (24BE1825-24BE1829) and recorded. Three of the sites are historic cabin remnants. The other two are primarily chipped stone tool debitage. None of the sites have been evaluated as to their significance or eligibility for listing in the National Register of Historic Places. There is also the potential for deeply buried cultural resources in this vicinity due to the landslides and slumps that have occurred in this vicinity. However, deeply buried sites are not likely to be disturbed under any of the harvest proposals.

X. ECONOMICS

A. TRUST REVENUE

School Trust Lands are held by the State of Montana in trust for the support of specific beneficiary institutions such as public schools, state colleges and universities and other state institutions such as the School for the Deaf, Dumb and Blind. Statewide, in fiscal year 1996, there were approximately 5,146,917 surface acres of school trust land (6,343,235 acres mineral estate).

Table AE-R1: Area of school trust land owned by the State of Montana during fiscal year 1996 by beneficiary institution.

TRUST	SURFACE ACRES	MINERAL ACRES
COMMON SCHOOLS	4,620,487	5,658,841
PUBLIC BUILDINGS	185,751	231,390
STATE REFORM SCHOOL	68,837	78,810
MSU-MORRIL GRANT -SECOND GRANT	63,780 30,896	77,600 47,277
STATE NORMAL SCHOOL	62,462	88,102
MONTANA TECH	59,705	86,250
SCHOOL FOR THE DEAF AND BLIND	36,614	41,211
UNIVERSITY OF MONTANA	18,556	33,754
TOTAL	5,146,917	6,343,235

Revenue generated from School Trust Lands may be either "distributable" or "nondistributable" depending on income source. Nondistributable funds are those generated from the sale or permanent disposition of any trust land or interest and are deposited in the Permanent Fund. Revenues generated from activities such as land sales, issuance of rights-of-way, oil, gas and coal royalties, are all considered nondistributable income, representing a permanent disposition of trust resources. In addition, five percent (5%) of the interest generated by the Permanent Trust Fund and timber sale receipts from trust lands other than common schools are deposited into the permanent fund. The nondistributable income has averaged $10,309,060 per year for the past 5 fiscal years (fy 1992-1996). The total nondistribuatable income for fiscal year 1996 is shown in table AE-R3:

AE-R3: Permanent Trust Fund revenue for fiscal year 1996 by income source:

INCOME SOURCE	FY96 NONDISTRIBUTABLE RECEIPTS
INSTALLMENT ON LAND SALES	$14,790
5% OF SCHOOL FUND INTEREST	$2,212,199
TIMBER SALES (NON COMMON SCHOOL LANDS)	$1,722482
RIGHTS-OF-WAY	$269,642
OIL ROYALTIES	$2,569,615
GAS ROYALTIES	$781,015
COAL ROYALTIES	$3,028,972
SAND AND GRAVEL	$118,458
MISCELLANEOUS	$76,473
TOTAL	$10,793,646

Distributable funds are those receipts generated from the sale of renewable resources or temporary rights of state lands. Distributable funds include revenues from grazing leases, agricultural leases, oil and gas leases and recreational use licenses, in addition to ninety five percent (95%) of the interest from the Permanent Fund and and revenue from timber sales on common school trust lands. These funds are available annually for the support of the specific beneficiary. The distributable income has averaged $46,017,165 during the past five fiscal years (fy 1992-1996). The total distributable income for fiscal year 1996 is shown in Table AE-R4:

The total statewide revenue distribution for fiscal year 1996 by beneficiary institution is shown in table AE-R5. The 10,500 acres of school trust land within this project area are held in trust specifically for the benefit of common schools. They are classified grazing lands managed principally for their grazing resource values. The grazing lease revenue and stumpage from a timber sale conducted in 1988 produced the only income from these tracts in recent years. Distributable Revenue from the grazing leases in the project area has averaged $11,092 per year over the past 5 fiscal years. The grazing lease revenue for fy 1996 was $11,231 (distributable).

The timber sale conducted on 66 acres in section 23 and 24, T12S, R06W, during 1988 generated $61,191.92 of nondistributable income (prior to January 1992 all timber sale receipts were nondistributable income, the treatment of timber sale receipts from common school trust lands was changed by legislation in 1991).

Table AE-R4: Total Distributable income from the school trust system during fiscal year 1996 by income source.

INCOME SOURCE	FY96 DISTRIBUTABLE RECEIPTS
GRAZING LEASES	$4,385,636
AGRICULTURAL LEASES	$10,087,192
OIL & GAS LEASES	$1,437,709
OIL & GAS PENALTIES	$209,445
OIL & GAS BONUSES	$2,574,287
TIMBER SALES (COMMON SCHOOL TRUST LANDS)	$1,754,060
INTEREST ON CERTIFICATES OF PURCHASE	$3,817
TRUST AND LEGACY INTEREST	$29,952,079
OTHER REVENUE	$1,132,377
TOTAL	$51,671,145

Table AE-R5: Total revenue from the school trust system during fiscal year 1996 by beneficiary institution.

TRUST	DISTRIBUTABLE REVENUE	NONDISTRIBUTABLE REVENUE
COMMON SCHOOLS	$48,460,280	$8,927,814
PUBLIC BUILDINGS	$603,130	$0
STATE REFORM SCHOOL	$371,743	$91,922
MSU-MORRILL GRANT -SECOND GRANT	$342,197 $611,905	-$3,395 $684,319
STATE NORMAL SCHOOL	$482,783	$299,961
MONTANA TECH	$570,897	$159,945
SCHOOL FOR THE DEAF AND BLIND	$232,032	$287,453
UNIV. OF MONTANA	$218,357	$6,501

CHAPTER IV
ENVIRONMENTAL EFFECTS

I. GENERAL DESCRIPTION:

The Blacktail Valley would not change substantially as a result of implementing any of the action alternatives. The valley would remain remote, the county road leading to the sale area would not receive improvements as a result of the harvest alternatives. Grazing would remain the primary land use of the area. Recreational uses would not change substantially and residential development would neither be enhanced or discouraged as a result of implementing any of the alternatives.

II. VEGETATION:

Under the No Action Alternative, and without a fire event, existing stands would continue to mature towards an uneven-aged Douglas fir, Engelmann spruce or subalpine fir climax forest. However, current stand conditions are very conducive for natural stand replacement disturbance. Overstocked, multi-storied Douglas fir and Engelmann spruce stands in dry climates are very susceptable to Western Spruce Budworm infestations. The likelihood of an outbreak in this vicinity during the next fifty years is high due to the abundance of overstocked Douglas fir timber types that exist in the region. Tree mortality from budworm infestations would contribute dead and downed woody fuels, creating conditions that are ripe for large stand replacement fires. Consequently the likelihood of a large fire event would increase substantially over time. A fire occurring in stands under the No Action Alternative would likely be a stand replacement fire, reverting the forested stands to primarily a grassland-sage cover type with possibly some few scattered old remnant trees that survived due to microsite conditions or location.

Under Alternative I, Approximately 40% of the forested area on state lands in the project area would be included in harvest units. An estimated 25% to 35% of the live volume would be harvested from 41 stands. The primary species harvested would be Douglas-fir. All units would be harvested with a helicopter yarding system. There would be four general types of treatment that would result in somewhat different residual stand types:

Treatment 1--Approximately 764 acres of primarily Douglas fir timber type would be harvested so the residual stand would consist of 8 to 14 scattered, dominant Douglas fir that are greater than 170 years old, with a younger, understory or codominant layer of Douglas fir that has been thinned to approximately 134 trees per acre. The stands would contain patches of submerchantable, seedling, sapling or pole sized material that are greater than 5 acres in size.

Treatment 2--On an estimated 296 acres the residual stands would have approximately 134 trees per acre that are 8 to 16 inches in diameter with only a few (1 to three per acre) larger diameter trees that are scattered throughout.

Treatment 3--Approximately 30 acres of timber would be open stands with 30 to 50 trees per acre in a single canopy with essentially a grass undergrowth.

Treatment 4--An estimated 10 acres of lodgepole pine timber type would have all lodgepole removed and have a residual stand of approximately 8 to 16 inch Douglas fir trees per acre.

The post treatment stands would be somewhat less susceptable to Spruce Budworm infestations since primarily healthy, well spaced trees would remain. Consequently the stands would also be less susceptable to stand replacement fires.

Under Alternative II, all yarding would be ground based, tractor or cable skyline machine. Approximately 25% to 35% of the live total volume in 13 stands would be harvested from an estimated 22% of the forested area on state land. The residual stands would be similar to those described under Alternative I for each treatment type as follows:

Treatment 1--342 acres
Treatment 2--175 acres
Treatment 3-- 13 acres
Treatment 4-- 0 acres

Alternative III, would not treat the stands in the Middle Fork of Blacktail Creek drainage. Under this alternative all units would be yarded with a helicopter. An estimated 25% to 35% of the total live volume from 33 stands representing 29% of the forested area on state land within the project area, would be harvested. The residual stands would be similar to those described in Alternative I for each treatment type as follows:

Treatment 1--657 acres
Treatment 2--111 acres
Treatment 3-- 25 acres
Treatment 3-- 10 acres

All the alternatives would attempt to move the treated stands toward a more open presettlement condition by commercial thinning from below and removing trees that have poor form or thinning crowns. Some areas within harvested stands that have old trees or characteristics associated with old growth timber values would remain unharvested. All action alternatives would reduce the likelihood of stand replacement events occurring by reducing the stands susceptibility to insect and disease infestations and subsequent fuel build-up.

There are no other planned timber harvests on any ownership in the project area. Past timber harvest has affected only 1% of the forested area. Consequently the risk of cummulative impacts from timber harvest in the project area is very low.

A. Insect and Disease

1. Western Spruce Budworm

All of the action alternatives would reduce the likelihood of a spruce budworm infestation in harvested stands. Open, single storied stands are less likely to sustain budworm populations and generally, silvicultural practices that encourage tree growth, increases tree vigor and produces a mosaic of age classes in a drainage would encourage resistance to spruce budworm infestation (Carlson, 1983).

III. WATERSHEDS--WATER QUALITY AND WATER YIELD:

A. Cumulative Watershed Effects

A cumulative watershed effects analysis was completed for the harvest alternatives using the Equivalent Clearcut Area (ECA) methods as outlined in Forest Hydrology Part II, USFS - Region 1, 1974. Equivalent Clearcut Area (ECA) is a function of total area roaded and harvested, % crown removal in harvest areas and the amount of vegetative recovery that has occurred in harvest areas. No additional harvest

activities are currently planned by the Forest Service or the BLM in the Blacktail drainage. The results of that analysis are summarized in table EE-WA1

There is little risk of cumulative watershed impacts due to increases in water yield, peak flow or duration of peak flows occurring under either of the proposed action alternatives due to the following reasons: 1) The affected watersheds are only partially forested. Most of the forested areas are located at high elevations in the extreme headwaters of both the West Fork and the Middle Fork of Blacktail Deer Creek. The proposed harvest units are located in predominately rangeland areas where forest crown has minimal influence on overall water yields, timing of runoff or duration of peak flows. 2) The low level of existing ECA from past harvest activity in the affected drainages. 3) Lack of direct and continuous surface drainage features draining most of the proposed harvest areas. 3) The low level of additional ECA generated by all of the proposed action alternatives and with little potential for substantial increases in water yield. 4) The lack of evidence of existing cumulative watershed impacts or channel instability due to water yield or peak flow increases in all of the affected drainages. 5) The long term benefits of the proposed improvements to the existing road system would have on water quality and watershed conditions in both the West Fork and the Middle Fork.

Alternative I and III pose less risk than Alternative II that increases in sediment yield would occur. Both of these alternatives utilize helicopter yarding with little potential for ground disturbance and would require the least amount of new road construction. Alternative II poses a somewhat higher risk of increased sediment yield. This alternative would require more road construction and result in more ground disturbance due to the use of conventional harvest systems with ground based skidding. However, through proper design and implementation of BMP's and site specific erosion control measures (see next section addressing "Water Quality"), even Alternative II poses little the risk of cummulative watershed effects.

TABLE EE-WA1: Equivalent clearcut area by drainage

WATERSHED			Proposed Harvest Acres			Proposed New Roads (miles)			Cumulative Equivalent Clearcut Area (acres)		
Name	Total Acres	% Forest	ALT I	ALT II	ALT III	AL I	ALT II	ALT III	ALT I	ALT II	ALT III
Middle ForkBlacktail	9775	20	297	166	0	1.5	2.4	0	163	91	0
West Fork Blacktail	32665	30	803	364	803	1.9	9.2	1.9	511	269	511
Tributary #1	393	35	26	0	26	0.8	0.6	0	50	36	50
Tributary #2	182	30	34	34	34	0	0.65	0	19	19	19
Tributary #3	205	40	44	44	44	0	1.0	0	24	24	24
Whiskey Springs	74	70	47	47	47	0	.35	0	26	26	26
Tributary #4	1447	35	151	116	151	1.3	3.9	1.3	83	64	83
Tributary #5	275	20	37	0	37	0	0	0	20	0	20
Tributary #6	160	35	42	0	42	0	0	0	23	0	23
Tributary #7	1211	40	170	123	170	0	2.7	0	127	101	127
Tributary #8	1170	60	64	0	64	0.6	0	0.6	35	0	35
Tributary #9	152	50	31	0	31	0.1	0	0	17	0	17
Tributary #10	650	40	92	0	92	0	0	0	51	0	51
Tributary # 11	106	60	10	0	10	0	0	0	6	0	6
Tributary #12	145	10	3	0	3	0	0	0	2	0	2
Face Drainage # 1	150	5	2	0	2	0	0	0	1	0	1
Face Drainage # 2	248	95	38	0	38	0	0	0	21	0	21
Face Drainage # 3	189	10	8	0	8	0	0	0	4	0	4
Face Drainage # 4	135	5	4	0	4	0	0	0	2	0	2

B. Water Quality

Harvest units can directly impact water quality if not properly located or buffered. The risk of impacts is greatest along streams, wetlands and areas with marginal slope stability. All proposed harvest units have been located to avoid areas with marginal slope stability. The Streamside Management Zone Law (SMZ Law) regulates forest management activities that occur adjacent to streams, lakes and other bodies of water. All proposed harvest activities would be conducted in accordance with the SMZ Law and Rules. All areas requiring SMZ delineation would be field reviewed by a DNRC hydrologist to determine their adequacy in meeting the requirements of the law, and in protecting water quality and aquatic resources.

Most of the proposed harvest areas are drained by ephemeral draws and other topographic features that lack discernable stream channels. These features are recognized as areas that have the potential to carry a considerable amount of concentrated seasonal runoff. Most of these draw features are discontinuous, with

ephemeral surface flows going subsurface or dispersing overland before reaching an actual stream channel or other body of water. A selective harvest prescription and equipment operation restrictions would be utilized to protect all ephemeral draw bottoms, isolated wetlands and wet areas.

The primary risk to water quality are associated with roads, especially roads constructed along or crossing streams. Most of the proposed access and haul routes would utilize existing road systems. Only a small portion of the planned access involve new road construction. All proposed roads have been located to avoid areas with marginal slope stability which are prone to mass wasting.

Many of the existing roads within the proposed harvest area are poor condition and do not currently meet BMP's. Most of the existing roads are poorly maintained and lack adequate surface drainage. Several segments of road are located immediately adjacent to stream channels or ephemeral draws. Some of the new road construction is associated with the relocation of poorly designed and severely eroding roads.

The existing road system has been inventoried by a DNRC hydrologist and soil scientist. Improvements designed to reduce, eliminate or mitigate water quality impacts from the existing road system are planned under all of the action alternatives. Partial relocations, installation of surface drainage features and additional mitigation measures are planned to bring the roads up to a standard that would fully comply with BMPs. Remedial measures would be implemented at locations that are causing or contributing to erosion or water quality impacts. DNRC would abandon and permanently close several existing road segments under the proposed action. These abandoned roads include road segments that are to be either re-located or closed because they cannot be improved to a standard that fully complies with minimum BMPs. Drainage features would be installed on all abandon road segments to reduce potential erosion until the area is re-vegetated.

DNRC would utilize all reasonable BMPs, mitigation and erosion control practices during the design, reconstruction and construction of all roads, streams and draw crossings. Site specific design recommendations from DNRC Hydrologist, Soil Scientist and Dept. Fish, Wildlife and Parks (FWP) Fishery Biologist would be fully implemented under the action alternative. All stream crossings are subject to approval from the Department of Fish Wildlife and Parks through the permitting process required under the Montana Stream Protection Act. All provisions and mitigation measures stipulated in the 124 permit would be fully implemented.

Some short term impacts to water quality in ephemeral draw bottoms may occur due to sediment induced during or shortly after construction activities. Application of BMPs, site specific designs and mitigation measures would reduce erosion and potential water quality impacts to an acceptable level as defined in the water quality standards. Acceptable levels are defined under the Montana Water Quality Standards as those conditions occurring where all reasonable land, soil and water conservation practices have been applied. Erosion control measures aimed at stabilization of abandoned roads and improvements to the existing road system are expected to result in long term improvements to downstream water quality and improved protection of beneficial uses. There is little risk of adverse impacts to beneficial uses occurring as a result of the proposed action.

C. Cold Water Fisheries

Neither of three proposed action alternatives include harvest units or new road locations in the immediate vicinity of the West Fork or Middle Fork of Blacktail Deer

Creek. Activities planned adjacent to the West Fork include use of the existing county road system and replacement of an existing unimproved drive through stream crossing with an temporary bridge under Alternatives I and III. No new crossings are planned on the Middle Fork.

A sediment source survey was completed on State and adjacent private ownership by DNRC hydrologist and soil scientist as part of the analysis of existing conditions. The results of sediment source survey would be used to design site specific watershed improvement measures that would be implemented under the proposed action.

Sediment delivery to streams may affect egg survival of trout and food production. Implementation of best management practices, mitigation measures and other site specific recommendations of DNRC hydrologist and soil scientist would reduce the risk of potential impacts to brook trout habitat. Remedial action measures designed to address existing road sources of sediment would help provide for long term improvement of brook trout habitat in the both the West Fork and the Middle Fork of Blacktail Deer Creek. Under the No Action Alternative, road improvements and road closures would not be implemented. Consequently existing sediment sources would continue delivery to streams and potentially have long term impacts to trout populations. Alternatives I and III would implement BMP's and road closures while conducting helicopter yarding operations. These alternatives would reduce sedimentation and would have the greatest potential of all the alternatives to improve fish habitat. Alternative II would improve existing sediment sources but would construct the most new road and include some construction on slopes of marginal stability. Cosequently, this alternative has less potential to have positive impacts on fisheries.

IV. SOILS

The No-action alternative would have continued effect on soil resources. Existing roads with inadequate drainage would continue to erode without maintenance. The area is accessed by existing primary and low standard roads, some of which do not comply with BMP's. Erosion will persist on segments of low standard roads and on existing active landslide areas, more dramatically along streams. Sedimentation is a soil-related effect which is discussed in the hydrology section. Landslides and marginally stable slopes may continue to move as influenced by seismic activity or severe climatic conditions.

All timber harvest alternatives have the potential to impact soil resources. Primary soil concerns are slope instability associated with road construction and potential soil impacts and erosion associated with harvest operations and site preparation. Potential site impacts include difficulty with regeneration, reduced site productivity, increased runoff and erosion. The likelihood of impacts occurring varies with soils type, harvest method, type of equipment, season of use and mitigations applied.

An extensive field review was conducted across the project area. Sensitive sites, with wet soils, steep slopes or marginal stablility have been avoided or protected through implementation of BMP'S and site specific mitigation measures.

If an action alternative is selected, existing road conditions and drainage features would be inventoried for site specific improvements to provide for temporary access and control erosion. Portions of existing roads that have inadequate drainage and do not comply with BMP's would be repaired to improve drainage during use. Existing range roads not suitable for use would be closed and stabilized to control erosion and access. Road closures and stabilization would improve conditions compared to the no-action alterative.

A. SLOPE STABILITY

Dillon Unit was initially concerned with maintaining current conditions, by avoiding destabilizing activities and minimizing risk of instigating slope failures. Slope instability can be partially mitigated by: minimizing road construction and depth of excavation, avoiding obvious scarp areas when skidding timber, partial cutting, and providing adequate road drainage.

Project alternatives were designed to minimize road construction or harvest on sensitive and unstable slopes. The number of roads were minimized and located on most stable locations available. Within proposed harvest areas there are some localized area of marginal or unstable slopes.

In marginally stable sites within harvest units, a combination of mitigation measures may be employed such as Equipment Restriction Zones, leave areas and selection harvest to reduce (control) stocking in stands with priority on removing trees that are high risk of mortality or sweeping.

A Oregon study of 276 unstable headwall areas (Froehlich, 1992) compared undisturbed, clearcut, and use of leave areas on unstable slopes within clearcuts. Headwalls at risk of instability were considered to have an increased risk of instability if the site is susceptible to windthrow. Harvested areas may go thru a period of maximum vulnerability to landsliding several years after harvest when roots decay and lose strength.

Maintaining slope stability of shallow mass movements/soil creep depends in part on retaining a well spaced stand of actively growing trees. Retaining well spaced trees provide root reinforcement of soil surface and removes subsoil moisture thru evapotranspiration. Retention of straight intermediate/codominate douglas fir trees provide the greatest benefit to maintaining slope stability.

Implementation of site specific mitigation measures would reduce the risk of slope instability, but would not prevent catastrophic failures associated with earthquakes or severe climatic events.

ALTERNATIVE 1 Helicopter Harvest would construct 3.4 miles of road that would impact less than 6 acres. Reclaimed roads would maintain range values but would have reduced forest productivity. Reconstruction would improve drainage and reduce erosion on 7.8 miles of existing road. Road closures would provide long term erosion control and sediment reduction on 11 miles of existing road.

Alternative 1 involves the largest number of acres (1100) of the three alternatives and includes harvest of steep slopes and some marginally stable areas. Timber harvest would be completed by helicopter which would have negligible ground disturbing effects on soils and low risk of erosion. Timber harvest would retain over 50% of standing timber and focus on removal of high risk trees and overstocking to promote healthy forest stands.

ALTERNATIVE 2 Ground Skidding would involve 11.6 miles of road construction that would reduce forest productivity on less than 22 acres and convert it to mainly grass. Reconstruction would improve drainage and erosion control on 6.2 miles of road. Alternative 2 would control soil effects associated with timber harvest and site preparation activities. This alternative would involve the least acres of harvest of the three action alternatives and requires more temporary road construction to access harvest units.

All road construction would implement BMP'S and site specific mitigation to control erosion and reduce the potential for slope instability. Alternative 2 would construct roads across limited segments of marginal slope stability. The access road to Unit 30 crosses one segment of active soil creep. Road construction may increase the risk of soil movement. Mitigation measures to reduce this risk are temporary road construction and obliteration conducted during one summer season. Site specific road location and design to minimize excavation, and provide adequate drainage.

Harvest- Ground-based skidding with rubber-tired skidders, tractors or clippers are the most economical methods of timber harvest on well drained soils of moderate slope. Harvest equipment could detrimentally affect 17.5 to 20% of harvest unit of which 7.5 to 10% would be severely impacted as main trails and 10% moderately impacted. Mitigation measures include planned skid trail systems and winter harvest operations that would likely reduce the area and degree of soil effects to less than the estimated. Sale administrator and operator would agree to a general skid trail plan prior to operations and emphasize use of existing trails and landings where suitable for needs.

Slash disposal and site preparation when properly done, can maintain or enhance long term productivity and seedling establishment of seral species. There is always a chance that machine piling can excessively displace or compact soils and affect productivity. Scarification would be controlled to the minimum needed to meet silvicultural objectives, minimize the area of disturbance, and provide an even distribution of retention of large woody debris for nutrient cycling. Equipment piling of slash and site preparation would be limited to less than 40% scarified soils within regeneration harvest units.

Tractor skidding would be limited to acceptable slopes. Soil displacement can be controlled by limiting skidding equipment to slopes less than 45% and limiting dozer piling to slopes less than 35%. Skid trails could concentrate surface runoff. Skid trail planning would be used to limit the area of soil disturbance and damage to the residual stand and soils. Designated skid trial location and equipment restriction zones would be located as needed to avoid area of marginal slope stability.

ALTERNATIVE 3 Helicopter Harvest Would construct 1.9 miles of road that would reduce forest soil productivity on about 3 acres and convert these sites to mainly grass. Reconstruction would improve drainage and erosion control on 3.2 miles of road. This alternative would involve the least area of harvest and least effects on soil resources. Soil effects of timber harvest would be similar on a per acre basis as action alternative 1. The existing access roads would be reconstructed and maintained to provide drainage and comply with BMP's. Active landslides within the project area would continue to erode until a project was completed in this area.

Timber harvest would be completed by helicopter which would have negligible ground disturbing effects on soils and low risk of erosion. Timber harvest would retain over 50% of standing timber and focus on removal of high risk trees and overstocking to promote healthy forest stands. Alternative 3 would have similar ground effects as Alt. 1 on a proportional basis and involve less acres.

CUMULATIVE EFFECTS TO SOIL PRODUCTIVITY

Cumulative effects could occur from repeated entries into a harvest area. There is no previous harvest or skid trails in the proposed harvest area and there is little risk of cumulative effect on soils.

Only Alternative 2 involves ground skidding that could contribute to cumulative effects, and that risk is low. Site specific road and harvest unit planning would implement mitigation measures to conserve soil resources. Large woody debris would be retained for nutrient cycling and long term productivity. Future harvest would likely use existing skid trails and landings to reduce area of impact and provide for future entries.

Noxious Weed Management
Ground disturbing activities that have the potential to introduce or spread noxious weeds in susceptible habitat types, would occur with all action alternatives. Following an Integrated Weed Management approach for this project, prevention would be the primary focus. To reduce the possible infestation and spread of weeds associated with this project, prevention measures listed in the Mitigative Measures Common to All Alternatives (chapter II) would be implemented with all action alternatives. Consequently weed infestations are anticipated to be minor and temporary.

V. WILDLIFE:

A. Coarse Filter: Habitat Elements Supporting Biological Diversity

1. Landscape Characteristics

Under the No Action Alternative, general landscape characteristics would remain unchanged. Gradual encroachment of forested patches into grassland would probably continue as long as fire suppression remains DNRC policy.

None of the Action Alternatives changes the fundamental characteristics of the landscape. Forest patches would remain forested, albeit with substantially reduced stocking and with small, irregular patches of much younger trees with simpler structure. Forest interior conditions, currently uncommon in the Project Area, would remain so. Forest/grassland edge, currently common in the Project Area, would remain common.

a. Forest Types

The No Action alternative would result in no appreciable change in forest types; existing succession patterns would continue, but most stands would continue to be dominated by Douglas-fir for the foreseeable future. None of the Action Alternatives would produce fundamental changes in forest types, although all would result in changes along a gradient within the naturally occurring range of variation of these types. Because most stands subject to harvest under any Action Alternative are naturally dominated by Douglas-fir at all structural stages (Fischer and Clayton 1983), we expect dominance by Douglas-fir to continue.

No cumulative effects from other actions are expected relative to forest types.

b. Successional Stages

The No Action Alternative would result in continued succession unless fire intervened to move succession back to the seedling stage. Little change would be expected within stands currently categorized as old growth. The effects of the Action Alternatives on successional stages are difficult to summarize, because silvicultural treatments are not designed as regeneration treatments (except for 10 acres of lodgepole pine under Alternatives I & III) and consequently would not change the successional stage. Proposed

treatments would reduce stocking levels in stands but not substantially change the overstory structure. Therefore, post harvest stands would have the same successional stage but more closely resemble stands that historically existed.

All action alternatives would harvest no more than 50% of the of the acreage identified as old growth. Therefore the maximum harvest area in stands with old growth qualities is expected to be 39 acres. By harvesting no more than half of the existing old growth, we expect to meet the standards set forth in the SFLMP. Old growth qualities would be diminished on the 39 acres to the degree that large tree boles, large snags, and/or large coarse woody debris were removed. However, this type of old growth was apparently not abundant in the area (Losensky 1993)

However, even if old-growth qualities are lost in 39 acres, many large, old Douglas-fir trees would be maintained under any of the Action Alternatives. These are trees that are too few to merit designation as separate "stands", but that frequently exist mingled with, or surrounding younger and/or smaller trees. Most of these would be maintained under the silvicultural regimes envisioned. We expect the post harvest percentage of old stands (scattered overstory trees) to exceed the percentage that historically existed based on Losensky's estimate (Losensky 1996).Thus, species that have evolved to use these large trees (albeit in a relatively open and scattered spatial configuration) would be little affected by any of the proposed Action Alternatives.

Table EE-W1:. Percentages of area within age-classes by cover types. Historic figures are from Losensky (1997), and represent an estimate of conditions that existed in Beaverhead County in the year 1900. Current figures are a stand level inventory conducted on state lands within the project area during the early 1990's. The post harvest figures represent our estimate of conditions that would exist if alternative I or III is selected. Alternative II and the No Action Alternative would not change current conditions and are consequently not displayed.

Cover Type		Non-stocked	Seedling/ Sapling (1-40 yrs old)	Pole (41-100 yrs old)	Mature (101-OS*)	Old Stands
Doug-Fir	Historic	6%	22%	21%	28%	23%
	Current	4%	0%	20%	47%	29%
	Post Harvest (Alts I&III)	4%	0%	20%	47%	29%
Spruce	Historic	1%	3%	42%	28%	26%
	Current	0%	0%	10%	76%	14%
	Post Harvest (Alts I&III)	0%	0%	10%	76%	14%
Lodgepole	Historic	11%	41%	40%	5%	3%
	Current	0%	0%	88%	12%	0%
	Post Harvest (Alts I&III)	4%	0%	88%	8%	0%

* OS represents "old stand" age for various cover types as follows; Douglas fir--170 yrs, lodgepole--140 years and other species--180 years.

c. Fire History

None of the Alternatives provides for a natural fire regime; fire suppression would continue as Departmental policy. However because of the area's remoteness, response to fire ignition would probably not be immediate. Under the No Action Alternative, the probability of an ignition causing a large crown fire would be higher than under the remaining Alternatives, because Action Alternatives would reduce existing build up of ladder fuels. Such a fire in the area would be more likely to consume large acreages of mature forests than under a natural fire regime.

All action Alternatives probably result in a similarly-sized reduction in the probability that any naturally-occurring fires would become large conflagrations, because all reduce the quantity of understory and dead material that could serve as ladder fuels. Such reductions are probably proportional to the acreage treated in each Action Alternative.

3. Special Elements

a. Snags

The No Action alternative would have little immediate impact on the number and characteristics of snags. Snag abundance would gradually increase, but because many stands are currently growing very slowly and large trees are not abundant, most snags created in the near future would likely be relatively small in size. (Large snags are generally more valuable for an array of wildlife species than are small ones).

Under any of the Action Alternatives, existing snags would be protected wherever possible. However, some loss of snags would likely occur incidentally to timber harvesting operations. Fewer trees would remain to eventually die and become snags, thus snag abundance would be reduced relative to that expected under the No Action Alternative. As well, snag abundance post-harvest would be considerably less than the number that would result immediately from a natural fire, in which most trees become snags. It is less clear how the abundance of snags post-harvest would compare with the long-term trend in snags, post-fire. Fires tend to produce a flush of snags, but many of them do not survive long, and few large, mature trees exist to replace them after they have fallen. In contrast, timber harvest such as is envisioned under any of the Action Alternatives would protect a few (existing) snags over the short-run, but retain a greater number of live trees, some of which would eventually become snags, than would a fire. As well, reducing stocking density would generally enhance the growth rate of remaining trees, and thus those that do remain and eventually become snags are more likely to be the more valuable large-diameter snags.

b. Down woody debris

We would expect the pattern of large, down woody debris to generally follow that described above for snags. Within areas harvested, specifications call for no less than 20 tons/acre of slash and woody debris to be retained. These amounts of residual coarse woody debris are generally in accord with recommendations made by Graham et al. (1994) for these habitat types to maintain forest productivity.

c. Riparian zones

As noted in Chapter III, riparian zones are currently not well developed in the Project Area. Determining factors are more closely related to livestock grazing practices than to timber harvesting. Thus, it is unlikely that any of the Alternatives, including the No Action Alternative, would, of themselves, be capable of affecting riparian condition in the Project Area.

d. Rare Habitat Features

Because there are no bogs, fens, potholes, or particularly rare forest types within the project area, these are not considered further.

B. Fine Filter: Selected Species Considered Individually

1. Species Listed under the Endangered Species Act

a. Bald Eagle

Because eagle activity is concentrated in lacustrine and riparian areas some distance from the project area, none of the Alternatives are expected to impact bald eagle activity. Consequently, no special stipulations should be required for bald eagles under any Action Alternative. We similarly expect no cumulative effects on bald eagles arising from future and/or nearby actions.

b. Peregrine Falcon

Peregrine falcons have not been documented from the vicinity of the project areas. Because the nearest nests are at least 10 miles distant, we do not expect substantial use by of the project area by peregrines. None of the Alternatives are expected to impact peregrine falcon activity. Consequently, no special stipulations should be required for peregrines under any Action Alternative. We expect no cumulative effects on peregrine falcons arising from future and/or nearby actions.

c. Grizzly Bear

Data on current use of the project area by grizzly bears are lacking, but sighting information suggests that any use is incidental. It is likely that any grizzly bear that might otherwise use the area would be deterred from doing so during the period of timber harvest activity. More important is that Alternatives considered not appreciably elevate the probability of confrontation between bears and people. We treat this probability through the same four attributes assessed under "Affected Environment", namely level of human influence, road density, cover, and presence and status of riparian areas.

1) Level of Human Influence.

The project area is currently used infrequently by people. In general, none of the Alternatives would change this. All action Alternatives would produce disturbance during June through February of years in which road building, harvest, and/or timber hauling took place, that would probably cause any grizzly bears traveling through the area to choose others for feeding, traveling, or resting. Thus we would expect some reduction of habitat effectiveness during those years. We project that more effectively closing all access roads to vehicle use through a road-closure program would reduce total human presence in the project area. Such closures would be conducted under any of the Action Alternatives, but would not be conducted under the No Action Alternative. Additionally, if road closures are effective, the number and/or type of hunter may change, from a predominately vehicle-based hunter to foot and/or horseback-based.

2) Road Density.

Tables EC-Wildl-1 and EC-Wildl-2 summarize miles of road projected to exist following completion of the project, under the various Alternatives. Table EC-Wildl-1 considers only the immediate project area; Table EC-Wildl-2 considers an additional 17.6 mi^2 to the north, west, and southwest of the project area per se, to provide a larger context.

In either case, the same general patterns emerge. There are roughly 0.4 mi/mi^2 of existing open roads that are beyond the administrative control of DNRC, and that will continue to exist as open roads under

any Alternative. There are an additional 0.67 mi/mi^2 of administratively closed roads in the project area (0.53 mi/mi^2 within the larger area) that either lack closure indications completely, have only a closure sign, or are behind a wooden barricade which can easily be circumvented. For these analyses, all such roads are considered to be "driveable" because there are no physical impediments to access.

Under the No Action Alternative, these roads would remain in their current condition (legally closed but open for all practical purposes). Under all three action Alternatives, obstructions would be placed in locations that would render approximately 11 miles of these roads operationally closed. Thus, density of these additional "legally closed but operationally driveable" roads would decline to approximately 0.22 mi/mi^2 on the project area, and to 0.27 mi/mi^2 on the larger area.

Under the No Action Alternative, no additional roads would be built. Under Alternative I, 3.4 miles of new road would be built, but obstructions placed following completion of the project would render all but 0.3 miles of this undriveable. Under Alternative II, 11.6 miles of new road would be built, but obstructions would similarly leave only some 0.3 miles accessible to vehicles. Under Alternative III, the least amount of new road would be constructed (1.9 miles), and a similar amount (0.2 miles) would remain driveable following project completion.

In considering all roads on the landscape, Alternative II would produce the highest road density (1.55 mi/mi^2 on the project area itself; 1.25 mi/mi^2 as assessed over the larger area), and the No Action Alternative the lowest (1.07 mi/mi^2 on the project area; 0.97 mi/mi^2 over the larger area). Alternative I (1.21 mi/mi^2 and 1.05 mi/mi^2, respectively) and Alternative III (1.15 mi/mi^2 and 1.01 mi/mi^2, respectively) would produce total road densities intermediate between those two, although closer to the No Action than to Alternative II.

However, because of projected road obstruction work following completion of timber harvesting, all Action Alternatives would reduce the density of roads accessible to motor vehicles, from the current 1.07 mi/mi^2 on the project area (0.97 mi/mi^2 on the larger area) to 0.63 mi/mi^2 on the project area (0.71 mi/mi^2 on the larger area), notwithstanding the creation of new roads.

The higher density of road beds under the various Action Alternatives could allow increased walk-in (or horse-back) use of the area, particularly during hunting season, and thus elevate the risk of human confrontations with grizzly bears. However, foot and horse-back access in this area is not heavily dependent on road-beds, because neither forest-cover nor topography limit where people or horses can travel. During hunting season, people are widely dispersed on the landscape. Additionally, even these higher total road densities are lower than the 2.0 mi/mi^2 density which is recognized in northwestern Montana as one which must be limited to accommodate grizzly bear use (e.g., Mace and Manley 1993).

Physically obstructing existing and newly constructed roads would likely have the effect of reducing human presence on the area during

all seasons of the year. Unless these obstructions were removed or destroyed illegally, or all-terrain vehicles were used to access areas devoid of road-beds, we project that these closures would generally improve security for any grizzly bears using the area following completion of the any of the Action Alternatives.

Table EC-Wildl-1. Roads estimated to exist following completion of the project under each of the Alternatives, within the project area. Total size of this analysis area: 24.4 mi^2.

Status	Type	Alternative			
		No Action	I	II	III
Existing Open					
	General Use (County)	8.8	8.8	8.8	8.8
	Secondary Use	0.9	0.9	0.9	0.9
(Sub-total)		9.7	9.7	9.7	9.7
Existing Closed					
	4WD; Wooden barricade, sign, or none; ineffectively closed	16.4	5.4	5.4	5.4
	Physically Closed	0.0	11.0	11.0	11.0
(Sub-total)		16.4	16.4	16.4	16.4
New Construction					
	Total Mileage	0.0	3.4	11.6	1.9
	Physically Closed	N/A	3.1	11.3	1.7
Total Road Miles		26.1	29.5	37.7	28.0
Total Driveable Miles		26.1	15.4	15.4	15.4

Table EC-Wildl-2. Roads estimated to exist following completion of the project under each of the Alternatives within Township 12S, Range 6W, plus the southernmost 6 miles of Township 11S. Total size of this analysis area: 42 mi^2.

Status	Type	Alternative			
		No Action	I	II	III
Existing Open					
	General Use (County)	12.5	12.5	12.5	12.5
	Secondary Use	5.8	5.8	5.8	5.8
(Sub-total)		18.3	18.3	18.3	18.3
Existing Closed					
	4WD; Wooden barricade, sign, or none; ineffectively closed	22.3	11.3	11.3	11.3
	Physically Closed	0.0	11.0	11.0	11.0
(Sub-total)		22.3	22.3	22.3	22.3
New Construction					
	Total Mileage	0.0	3.4	11.6	1.9
	Physically Closed	N/A	3.1	11.3	1.7
Total Road Miles		40.6	44.0	52.2	42.5
Total Driveable Miles		40.6	29.9	29.9	29.9

3) Cover

The discussion of the effects of changes in amount and distribution of cover on elk security are relevant to grizzly bears as well (see below).

4) Riparian areas. We project no substantial changes in the quality or quantity of riparian areas under any Alternatives.

5) Cumulative effects on grizzly bears.

There are no additional projects in the area that would have a cumulative effect on the probability that grizzly bear would use the area, or that any grizzly bears using the area would be at risk of mortality.

In summary, it is likely that, during periods of road construction, timber harvest, and/or timber hauling, that any grizzly bears that might use the area would be deterred from doing so. Thus, any of the Action Alternatives would likely have a short-term deterrent effect. Following that time period, however, none of the Alternatives are likely to influence the capability of the area to provide habitat for grizzly bears. None of the Alternatives are likely to have a substantial effect on food sources for grizzly bears, the primary determinant of

their habitat use. Under the No Action Alternative, cover would remain high, but road access for humans, the greatest mortality risk for bears, would also remain high. The Action Alternatives all remove varying amounts of cover, but are accompanied by an aggressive road closure program, which is intended to reduce access to the areas.

d. Wolf (*Canis lupus*)

The primary needs of wolves are i) adequate prey resources, ii) seclusion during denning and pup-rearing periods, and iii) tolerably low probability of direct mortality from humans. These are treated in turn, below.

None of the Alternatives are expected to have substantial influences on prey availability or distribution. Temporal distribution of elk during autumn may be modified slightly by removal of cover (in the action Alternatives) and closure of roads (under all Alternatives), but we cannot confidently predict what such effects might be.

Human use of the project area during denning and pup-rearing periods is currently low; thus the No Action alternative would likely cause no loss of seclusion. Effective closure of roads to motorized vehicles would result in a similarly low use of the area under each of the action Alternatives. In no case would road building/timber harvest activities be expected to affect wolf denning, because wolves generally leave their den sites before June 1, the earliest date of entry. Action Alternatives also include mitigation measures that would defer road building/harvest within a 1 mile radius of any active den or rendezvous sites discovered, until such time as wolves using the rendezvous site have moved on. Thus, seclusion during denning and pup-rearing periods would not be compromised under any of the Alternatives.

The probability of direct mortality from humans is, once again, best approximated by the density of humans on the area, for which road densities provide the best surrogate measure. Here, our best projections again follow that for grizzly bears. In short, by reducing access during all seasons to non-motorized traffic, we expect human density on the project area to continue to be low, with a correspondingly low probability of human-caused wolf mortality on the area.

Because we project that wolf occupance of the project area would not be precluded or made substantially less likely under any of the Alternatives, we similarly project that the area's potential to act as a linkage between the recently established populations in the Yellowstone and central Idaho areas would not be compromised under any Alternative. Further, as Mladenoff et al. (1995) pointed out, "...a simple island/corridor habitat model applies poorly to the wolf, a species with low habitat affinity. Wolves readily move through a variable complex of habitat favorability...favorable areas are found and rapid population growth is therefore possible even in fragmented landscapes, as long as the source population remains high and a constant source of colonizers is available".

Cumulative Effects on wolves

Because we do not anticipate substantial increase in human access to either the Project Area or adjacent Forest Service lands, we do not expect cumulative impacts on wolves.

2. Sensitive Species

a. Harlequin Duck (*Histrionicus histrionicus*)

Because habitat for the Harlequin duck is not present in the Project Area or its vicinity, none of the Alternatives would be likely to adversely or beneficially affect habitat characteristics important for this species.

b. Ferruginous Hawk (*Buteo regalis*)

Ferruginous hawks in the Centennial Valley nest primarily in willows at lower elevations (Restani 1991). Such conditions typify only the southernmost portions of the State-owned tract in Blacktail, and no road building or timber harvesting is planned within a few miles of these habitats. Thus, it seems unlikely that any of the proposed Alternatives would have a direct effect on ferruginous hawks.

c. Mountain plover (*Charadrius montanus*)

Because habitat for the mountain plover is not present in the Project Area or its vicinity, none of the Alternatives would be likely to adversely or beneficially affect habitat characteristics important for this species.

d. Flammulated Owl (*Otus flammeolus*)

The No Action Alternative would have no appreciable effect on flammulated owl habitat. Large, old Douglas-fir trees that might serve as appropriate nesting habitat would continue to exist; small amounts of encroaching trees are probably of a nature that would not alter the generally open nature of such stands.

Under all of the Action Alternatives, general silvicultural guidelines call for retaining the majority of large, old Douglas-fir trees found on the warmer, drier habitats. Thus, Action Alternatives would similarly be unlikely to affect the capability of such areas to support flammulated owls.

e. Boreal Owl (*Aegolius funereus*)

Within the project area, only one stand (Unit 30, Section 14) appears to provide appropriate habitat for boreal owls. Under the No Action Alternative, this stand would remain unchanged. Because it appears to exist in a relatively infrequent fire area, little change is anticipated through time in the characteristics of this stand.

Under all three Action Alternatives, this stand would be subject to partial harvesting, as described above . Because this stand is already relatively open, it does not appear that timber harvesting can be beneficial to any boreal owls nesting within it, but would serve to remove potential nesting, perching, and/or roosting sites. Boreal owls have large home ranges, but do not appear to require a minimum-sized patch for nesting. Thus, adverse impacts on boreal owls would be expected from any of the Action Alternatives, with the magnitude of impact proportional to the amount of the stand removed or substantially altered by harvesting.

f. Black-backed Woodpecker (*Picoides arcticus*)

It is unclear whether timber harvesting contemplated under Action Alternatives would negatively affect black-backed woodpeckers. There are no recent burns in the Project area that provide optimal habitat for black-backed woodpeckers, although some relatively minor, foraging use may occur. In general, reduction of tree density, particularly trees vulnerable to beetle-attack, would be expected to reduce habitat quality; however, black-backed woodpeckers frequently use open-canopied stands for foraging. More certain is that a reduction in the probability of future fires constitutes an indirect negative impact on black-backed woodpeckers, because they appear to be tied to flushes in their preferred insect prey that are associated with recent burns. Thus, Action Alternatives that reduce the probability of a crown fire would have a minor, and indirect negative impact on black-backed woodpeckers.

g. Townsend's Big-Eared Bat (*Plecotus townsendii*)

Townsend's big-eared bats are very susceptible to disturbance and may permanently abandon hibernating sites and roosts if disturbed. Mitigation measures to defer activities in near any such sites discovered should avoid such disturbance. However, we doubt that any such concentration sites exist within the project area. Townsend's big-eared bats also occasionally use large snags for roosting. Any removal of large-sized snags, made necessary by timber removal, could slightly decrease habitat quality for Townsend's big-eared bats. Silvicultural prescriptions would emphasize retention of existing snags, thus minimizing this reduction.

h. Northern Bog Lemming (*Synaptomys borealis*)

Because habitat for the northern bog lemming is not present in the Project Area or its vicinity, none of the Alternatives would be likely to adversely or beneficially affect habitat characteristics important for this species.

i. Lynx (*Felis lynx*)

As noted in Chapter III, the project area does not appear to provide high quality lynx habitat. Of the three summarized attributes that appear to provide for good lynx habitat (dense, young lodgepole stands which support high densities of snowshoe hares; dense, mature forests that contain high concentrations of large, woody debris providing security and thermal cover for kittens; and connectivity between the two in the form of contiguous forested cover), none are currently common on the Project Area. The third of these, connected forested cover, does not appear to characterize the area naturally, and would be very difficult to create artificially.

The No Action Alternative would be unlikely to have any adverse or beneficial affect on the capability of the project to support lynx, unless a stand-replacing fire initiated the growth of young, dense lodgepole stands. Potential denning areas appear rare, and even with time and fire-suppression, few if any stands would develop characteristics preferred for denning.

Action Alternatives that modify existing old lodgepole pine stands into young lodgepole stands may result in an increased capability to support snowshoe hare populations for a few decades. This capability would depend on the characteristics of lodgepole regeneration, and on future management actions

(i.e., how much, if any, thinning takes place, and at what age). However, lodgepole pine stands are not common or of large acreage in the immediate project area. We estimate only 10 acres of lodgepole pine type, located in sections 23 and 24, would be affected by proposed harvests. If neighboring stands on the Beaverhead National Forest (where forest cover tends to be more contiguous) can provide denning opportunities, enhanced foraging opportunities from the creation of early-seral lodgepole stands could be beneficial to lynx.

j) Cummulative Impacts on Sensitive Species

We do not anticipate substantial increase in human access within the project area or adjacent Forest Service lands and there are no other plans for timber harvest in the vicinity. Consequently, we do not expect cummulative impacts on sensitive species.

3. Game Species: Elk

a. Winter Range

Under the No Action alternative, there would be no effect on wintering elk.

As described in Chapter III, the project area does not appear to be important to wintering elk, despite the relative proximity of two major wintering areas. Although elk sometimes prefer timbered habitat during winter, the Blacktail and Robb-Ledford herds have increased during the past ten years while using almost exclusively the non-timbered lands to the north of the project area for winter range. Thus timber harvest, as envisioned under the Action Alternatives, is unlikely to affect habitat characteristics used by these elk during winter.

Action Alternatives I and III require helicopters to yard logs from harvest units to landing areas. Helicopter activity can disturb elk (Olson 1981) , which during winter, can adversely affect energy balance. Thus, use of helicopters near elk which are entering an energy-deficit state is of some concern.

However, assuming that no helicopter overflights are made of the winter range itself (a prohibition which would be included in any contract language), the location of the project area is sufficiently distant from the main congregation areas of wintering elk (> 3 miles at closest) that such disturbance would be very unlikely. Although elk are disturbed by helicopters in close proximity, they do not react to helicopters at such a distance (G. Olson, MDFWP, personal communication, 1997). Thus, proper use of helicopters to yard logs, as required by Action Alternative I and III, should have no effect on wintering elk.

b. Elk Security in and near the Project Area

There exist no models that can be appropriately applied to this project, capable of providing a definitive answer to the question: How much (if at all) would elk vulnerability during hunting season be affected by the possible proposed actions? To attempt a general answer, one must begin with a general premise, accepted by all who have studied the issue, if unquantifiable here: When stressed by hunters, elk prefer timbered to open country, large patches of timber to small, and dense timber to sparse. Thus, any removal of forested cover would, for the period prior to effective cover regeneration,

increase the vulnerability of elk that remain in the area to hunters that enter the area.

Given this, there is little question that the No Action Alternative provides for higher security during hunting season, at least in the short term, than any of the Action Alternatives.

Among Action Alternatives, silvicultural prescriptions are similar, therefore the effects of timber cover removal on elk security during the hunting season are proportional to the acreage affected. An initial estimate, therefore, is that the greatest effect on elk security would be produced by Alternative I (1,100 acres affected), and that Alternatives II (530 acres affected) would produce somewhat more than half that effect, and Alternative III (803 acres affected) just over 3/4 that effect. Additionally, Alternative III defers harvest on the relatively large timbered stands in Sections 1, 2, and 3, providing elk with these relatively large security areas. The relatively large timber patches in Section 23 and 24 would be affected similarly under Alternatives I and III. In general, however, none of the Action Alternatives would affect patch size and/or shape directly. Rather, they would alter the amount of cover remaining within each timbered patch.

However, as noted in Table AE-W5,, cover removal is only one of the numerous elements affecting security during the hunting season. The principal mitigation measure proposed here for the loss of such security cover is substantially increasing the effectiveness of the closures on existing roads. Tables EC-Wildl-1 and EC-Wildl-2 (presented in the section on grizzly bears) summarized the current and projected mileage of roads by road status. We estimate that there are currently some 26.1 miles of driveable road on the project area per se (and some 40.6 miles of driveable road in the general vicinity). All of these roads would remain in their current status under the No Action Alternative.

The main Blacktail Creek road (a county road), as well as the secondary 4-wheel drive along the principal ridge west of the West Fork of Blacktail Creek would remain unaffected by any Action Alternative, leaving some 18.3 miles of open road (of which some 9.7 exist on the project area per se). As well, we estimate that even the aggressive road closure program envisioned by the three Action Alternatives would be only partially successful because i) Some roads can be effectively closed only at points some distance past their starting point, and ii) Some areas allow access by four-wheel drive vehicles even without any clearly articulated road, due to gentle topography and lack of tree cover. However, because closure on most existing (legally closed) roads is currently ineffective, the net effect of all Action Alternatives would be to substantially reduce the mileage of driveable roads (Table EC-W1), and thereby to reduce the amount of area accessible to vehicle-bound hunters. Mileage of driveable roads under each of the three Action Alternatives are similar: 15.4 miles within the project area per se, and 29.9 miles in the larger analayis area (Tables EC-Wildl-1 and EC-Wildl-2).

Action Alternatives thus all have the potential to reduce elk security during the hunting season. This reduction would be greatest under Alternative I. The reduction would be somewhat less under Alternative II because more timber cover would remain, and because there would be no short-term disturbance from helicopters. These benefits would, however, be partly negated by the greater mileage of road. The reduction in hunter opportunity would also be

somewhat less under Alternative III, because some of the larger timber cover patches would remain unaffected, and because road construction would be the least of any of the three.

If elk and hunter dynamics are similar to those documented by Basile and Lonner (1979), area-wide vehicle closures would reduce hunter density, while holding elk that would ordinarily use the area. Thus our best estimate would be that the success rate of hunters willing to venture afield from their vehicles into the Project Area would increase (due both to lower security for elk and less disturbance from fellow hunters), but that the overall mortality rate of elk passing through the Area would remain unchanged.

However, it is possible that higher hunter numbers now (compared with the mid 1970's) and/or greater willingness to use horses or mountain bikes, may overwhelm the positive effects of road closures. If this is the case, and our projection of lower hunter density due to vehicle restriction is therefore incorrect, and/or non-compliance with the vehicle closure is high, overall elk security would probably be reduced (because of the reduction in forested cover), resulting in either a higher mortality rate of elk within the project area, or in more rapid passage of elk through the project area toward the Blacktail and Robb-Ledford winter ranges.

If increased mortality occurred, and were to be focused on bulls, the proportion of the total bull kill occurring during the first week of the season would increase, moving this index further from current MDFWP objectives. If such increased bull mortality produced unacceptably low escapement (either through the entire hunting season, or merely its first portion), MDFWP might elect to respond with further regulatory action. It is beyond the scope of this analysis to speculate exactly what such regulatory changes would be. In general, it is unlikely, however, that such action would take the forms of a change in the definition of legal bulls, or of a change in season timing or duration. Neither of those changes would be likely to assist bull escapement in the face of both constant hunter density and reduced forested cover.

In addition to the reduction of forest cover and road access, Action Alternatives I and III require helicopter activity to yard logs (indeed, this is one reason they require fewer roads). Because of high elevations in the sale area, helicopter use would probably be restricted to relatively cold seasons, but snow cover may also preclude winter activity and wet soils may also preclude spring activity. Thus, it is possible that at least some helicopter flights would occur during the hunting season, unless it was specifically prohbited by terms of the contract. It is difficult to predict how long such disturbance would last; most likely for only a single hunting season, although the contracts would allow the possibility for up to 3 hunting seasons to be affected. Helicopter flight paths would be short (< 1 mile), and in no case would helicopters fly to areas other than the pickup and loading areas. At any given time, helicopter disturbance would likely be limited to a single sub-drainage. However, elk near helicopter flight paths would likely move toward other areas during the period of disturbance. Additionally, hunters traveling near helicopter flight paths would probably be disturbed by the noise and aesthetic incongruity of such machines intruding on an otherwise natural setting. Alternative II would not use helicopters and thus avoid this problem, although it would require the highest mileage of new road construction.

Thus, we expect any Action Alternative to produce, indirectly, a reduction in the present type and abundance of hunter opportunity. Under our estimate

of the most likely outcome for any Action Alternative (i.e., relatively effective restriction of the Project Area to vehicles), hunter opportunity would be denied those that cannot, or will not, leave their vehicles behind at closure devices. Hunter opportunity would be additionally reduced if elk leave accessible areas entirely due to disturbance from helicopters, and/or if hunters find helicopter disturbance unacceptable. If, alternatively, this type of hunter opportunity does not decrease (either because the inconvenience is considered minor, or because compliance is low), MDFWP may be forced to take alternative regulatory action to ensure acceptable bull escapement. More restrictive regulations would, in turn, again reduce hunter opportunity, although in presently unpredictable ways.

4. Other Game Species

We project no substantial changes on habitat suitability for other game species in the project area. Vulnerability to hunting, however, would largely mirror that projected for elk (see above).

VI RECREATION

All action alternatives would physically close roads that are currently used without authority for recreational purposes. The physical closures would result in a more effective road management program but would not close any roads that are not already administratively closed. State lands would continue to be available for non-motorized recreational use. Closure and revegetation of the existing roads that are producing sediment into the drainages may in the long run benefit fisheries but fishing use in the project area is not substantial.

VII GRAZING

None of the alternatives are expected to have a substantial effect on the grazing value or grazing lease arrangements within the project area. Timber harvest, through the removal of the timber canopy can result in a short term increase in forage production. Generally, vegetation response is at its peak 3-5 years after timber harvest. Increased forage production would continue until the regenerated tree stand reaches a height where the canopy begins to close (usually 10-15 years). Forage response is dependent on site productivity, forage value of the species present, the percent tree canopy removed and the configuration of the tree harvest. Range sites in the project area average approximately 3 acres per AUM. Forested acres if cleared of all trees would at most result in an allocation of approximately 5 acres per AUM. A 40% canopy reduction as prescribed would result in a maximum potential increase of 88 AUM's for a 10 year lease period (1100 acres*40%/5 acres per AUM), a 3% increase in authorized livestock use. However the actual increase is expected to be substantially less. Grazing leases are scheduled for evaluation prior to renewal to determine the lease terms for the next 10 year period. A tract evaluated just prior to or 1-2 years after a harvest would not recognize any increased grazing value because ther is no vegetative response to consider. In addition, much of the forested area is not suitable for grazing use due to terrain and productivity limitations. Consequently the change in grazing lease terms over the next 10 -15 years, if a harvest alternative is selected, is expected to result in an increase in authorized livestock use of approximately 30 AUM's (1%). After 10-15 years, there would be no effect on grazing values.

VIII TRANSPORTATION

New roads constructed under all harvest alternatives would be physically closed at locations effective for closure upon completion of use. Roads within harvest units would have logging slash and brush distributed within the road prism to discourage foot traffic along its right-of-

way. Existing roads would be revegetated and closed under each alternative at locations identified on Map EE-TR1, EE-TR2 and EE-TR3. Therefore, the amount of roads usable by motorized vehicles would decrease under all action alternatives. However, it must be recognized that roads even when revegetated and effectively closed to use do have some long term impacts that are difficult to quantify. The existence of a road prism, even if closed, provides an avenue or conduit for use and increases the likelihood of future development. Existing road prisms can be reopened at less expense than constructing new roads. Therefore the likelihood of future use and development is increased to some, albeit unknown degree. The road system, under the No Action alternative, would not change.

Alternative I: The helicopter alternative would construct an estimated 3.4 miles of new low standard road. Most of the road construction (1.8 miles) would take place in sections 34&35, T11S, R6W and section 2, T12S, R6W. This road would temporarily provide an access route from the West Fork of the Blacktail to the Middle Fork of the Blacktail drainage. The road would be effectively closed at it's origin with the Blacktail County Road by a locked gate, to prevent unauthorized use in the future. The new and existing road in this vicinity is primarily on private land and its use is controlled by the land owner.

Road construction in sections 10 and 11, T12S, R06W under this alternative is designed to replace an existing road that is too steep for logging use. The existing road would be closed and revegetated. The new road (1.4 miles) accesses an area similar to the existing one an consequently has few additional impacts. The new road would also be closed and revegetated upon conclusion of use. The existing road despite road closure signs and wooden barricades is used without authorization periodically throughout the year and consequently is subject to erosion. Both the new and existing road would be effectively closed near the junction with the Blacktail County road resulting in reduced erosion and improved road closure on the estimated 9340 feet of access road in this vicinity.

The Third are of new construction under this proposal is located in sections 22 & 23, T12S, R06W. This new road segment is estimated to be .2 miles in length and is needed to provide access to a helicopter decking area west of the Blacktail road. The new road begins from an existing trail that is closed by wooden barricade. The existing road has seen little use the past few years. In addition to the barricade, using the road requires fording Blacktail Creek, adding to the effectiveness of the administrative closure. Construction of the new road segment in this location would require the installation of a temporary stream crossing that would increase the potential of unauthorized use of the existing road. The temporary crossing however, would be in place for only one or two months and subsequent removal should be as effective as the existing situation.

Alternative II: The skidding alternative would construct an estimated 11.6 miles of new road and reconstruct approximately 3.4 miles of existing roads. The road construction in sections 34 & 35, T11S, R12W is similar to that proposed under Alternative I, however, the construction extends much more extensively into sections 1,2,3,and 12, T12S, R06W. The estimated 5.0 miles of new road in this vicinity would provide the same West Fork/Middle Fork access as Alternative I, but would extend into previously unroaded areas. This road network would be closed at the same locations as Alternative I.

The new road construction in sections 10, 11 and 14, T12S, R06W would consist of approximately 3.9 miles of low standard road. A portion of the new road construction would replace the existing road but areas currently without roads would be accessed under this proposal. Both the new and existing roads would be effectively closed at locations similar to Alternative I.

The third area of new road construction under this alternative would occur in sections 34 & 25, T12S, R06W. This development would use an existing road for approximately 3800 feet

and construct new road for an additional 2.7 miles to the harvest area. The new road would access an area that is currently unroaded. The new road would be closed at a stream crossing that was used and closed in 1988. The existing closure has been effective in preventing unauthorized use and is expected to continue in effectiveness.

Alternative III: The Blacktail Alternative would construct the least amount of new road. A total of 1.9 miles of new road would be constructed. Construction would take place in Sections 10, 11, 23 & 24, T12S, R06W and would be identical to the roads in this vicinity proposed under alternative I. All new construction would be effectively closed after use and no new areas would be accessed that are not already serviced by existing roads.

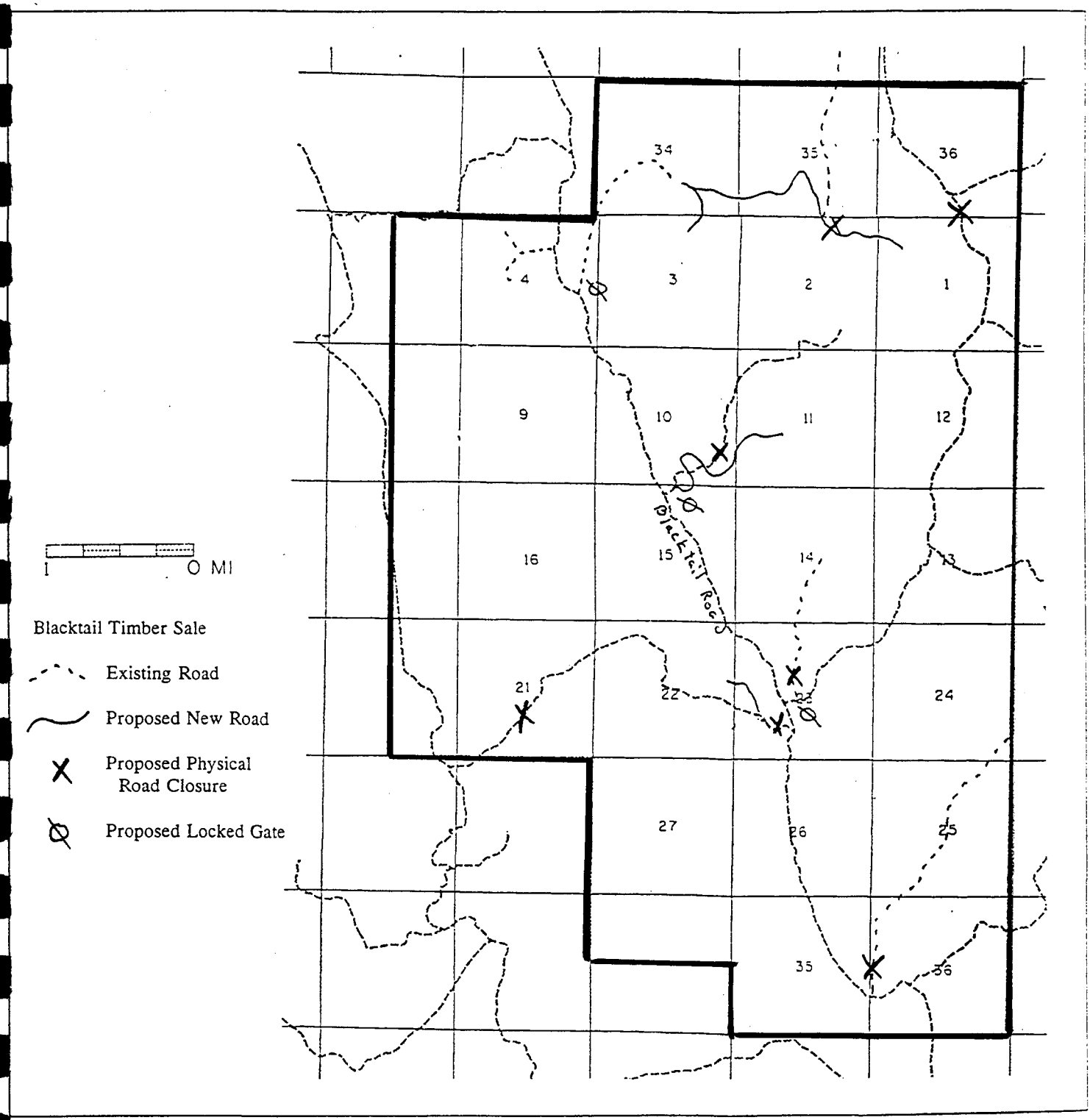
IX CULTURAL RESOURCES

Ground disturbing activities associated with a timber harvest (primarily road construction) have the potential to destroy cultural resource sites as well as expose previously unknown sites. Consequently the alternative with the most road construction (Alternative II) would have the greatest potential for cultural resource impacts. A cultural resources inventory has identified and recorded five sites within the project area. One of the chipped stone debatige sites may be impacted through skidding activity under Alternative II. However, if Alternative II is selected, a formal cultural resource evaluation will be conducted prior to disturbing any of the sites to determine their significance. If a significant site is identified, activity surrounding the site will be restricted in compliance with archaeological recommendations. Alternatives I and III will not disturb any known sites.

Map EE-TR1

ALTERNATIVE I

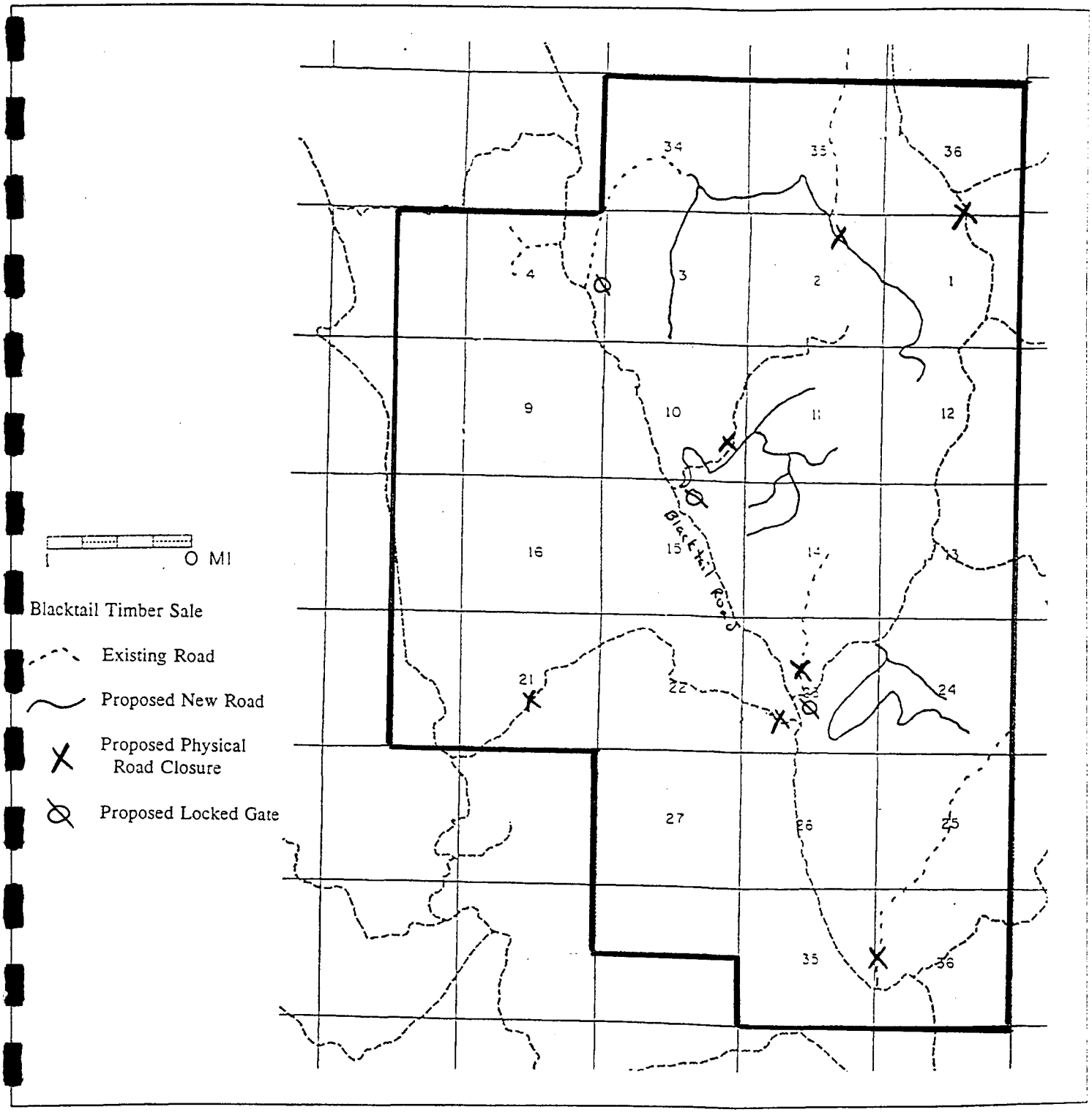
Roads and Road Closures After Implementation



Map EE-TR2

ALTERNATIVE II

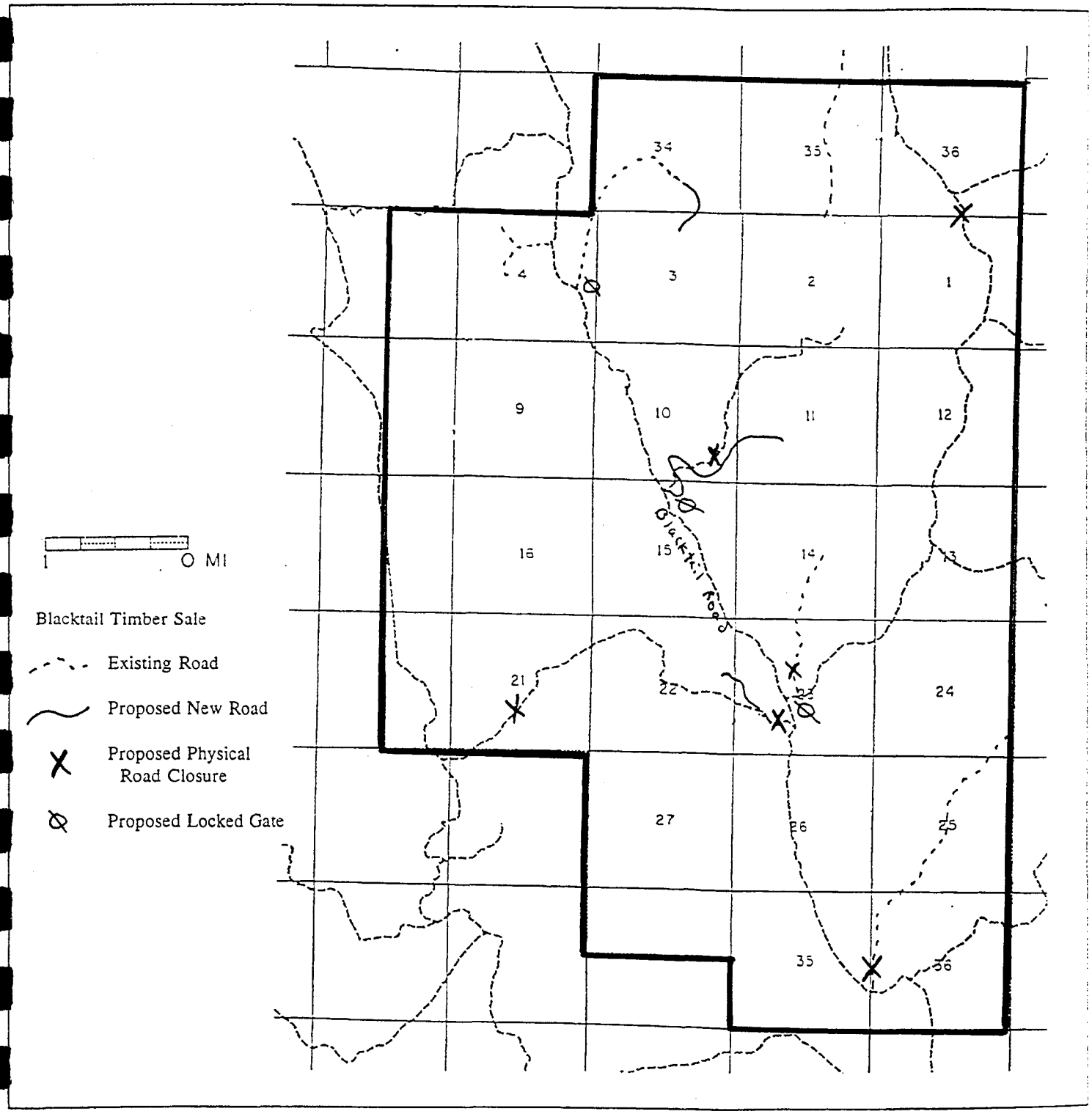
Roads and Road Closures After Implementation



Map EE-TR3

ALTERNATIVE III

Roads and Road Closures After Implementation



IX. ECONOMICS

A. Trust Revenue

The economic analysis for the Blacktail Timber Sale estimates the revenue from timber harvesting and non-administrative costs for the alternatives considered and displays the current returns from the Central Land Office timber program and the total program. The following assumption were used to estimate the revenue and non-administrative costs for each alternative:

1. The harvested volumes for the alternatives were based on estimates from Dillon Unit personnel.

2. The stumpage price was estimated using a residual value approach. The stumpage is an estimate for the winning bid for the timber sale. The estimated value of deliver log prices were subtracted from stump to mill costs, Forest Improvement fee, development costs and an amount for profit and risk.

3. The estimated delivered log price of $400 per MBF was based on a phone suvery of three mills (R & V Mill = $325-$350, Darby Lumber = $380-$410, and LP mill in Deerlodge = $400). Stump to mill costs were based on equations from Mike Niccolucci, 1996, Intermountain Research Station, Missoula, MT. Stump to truck costs were as follows; Alternative I = $237.07 per MBF (100% Helicopter, average yardling distance = 2770 feet), Alternative II = $103.97 per MBF (50% tractor, average yardling distance = 482 feet, stump to truck cost = $90.41 per MBF and 50% line skidding = $117.53 per MBF) and Alternative III = 224.02 (100 % Helicopter, average yardling distance = 2542 feet). Truck to Mill costs were as follows; Alternative I = $49.46 per MBF (paved road - 12 miles, unpaved = 40 miles), Alternative II = $66.58 per MBF (paved = 12 miles, unpaved = 45 miles) and Alternative III = $48.49 per MBF (paved = 12 miles, unpaved = 38 miles).

4. Development costs were estimated for each alternative by Dillon Unit personal. Development costs are, Alternative I = $14.64 per MBF, Alternative II = $75.09 per MBF, and Alternative III = $18.48. Development costs on this proposal are the estimated costs of road and watershed improvement items that would be paid for by the purchaser. These improvements provide access to the State Trust Lands involved and improve water quality on State Land.

5. Forest Improvement (FI) cost is based on the cost to maintain the ongoing staffing, stand and road maintenance treatments needs for the current year, right-away acquisition and program wide costs. Funds collected under FI from a purchaser provide the State funding to accomplish projects such as tree planting; site preparation; slash treatment; thinning; road maintenance; road acquisition; and for some timber sale related activities. Thus, the State is able to improve the long-term productivity of timber stands on State land and maintain or acquire access for future revenue-producing projects.

6. Sale Specific Forest Improvement costs (SSFI) are the current cost estimates for the amount and types of treatments (site preparation, hazard reduction, planting, etc) that would be done related to each of the alternatives being considered. Funding to complete these projects would be collected from future or current timber sales depending on the timing of the treatments.

7. The estimated Total $ return to the Trust is the stumpage value (bid price $/MBF) times the estimated harvest volume.

8. The estimated total dollar amount collected by the State (Total Revenue) is Forest Improvement costs plus the stumpage value times the estimated harvest volume.

9. The costs related to the administration of the timber sale program is only tracked at the Land Office and State-wide level. We don't keep track of costs for individual timber sales.

10. Limitations of the economic analysis: (1) Only known costs and benefits that are related to timber harvesting activities are considered; (2) None of the potential benefits associated with leaving trees (i.e. snag recruitment, structural diversity, aesthetics, wildlife habitat, nutrient recycling, etc.) are considered.

11. **NO ACTION ALTERNATIVE**--Within the project area, grazing is our only current revenue producing activity. The current grazing lease for the entire project area is 2773 AUM's. The five year average grazing fee collected from within the project area = $11,092. We assumed no increase in grazing AUM's from timber harvestactivity and therefore did not display the No Action Alternative in the following analysis.

TABLE EE-E1: Estimated Costs and Benefits Associated with Each Alternative.

ESTIMATED COSTS AND BENEFITS ASSOCIATED WITH ALTERNATIVES I,II AND III			
	ALTERNATIVE I	**ALTERNATIVE II**	**ALTERNATIVE III**
Estimated Total Harvest Volume (MBF)	2962	1518	1688
Development Cost ($/MBF)	$ 14.64	$ 75.09	$ 18.48
Stumpage Value ($/MBF)	$101.03	$122.30	$ 88.99
Forest Improvement ($/MBF)	$ 8.06	$ 8.06	$ 8.06
Stumpage Value, Forest Improvement and Development Cost ($/MBF)	$ 123.73	$ 205.45	$ 115.54
Total $ Value based on Stumpage, FI cost and development cost times estimated harvest volume	$366,488	$ 311,873	$ 195,032
Stumpage and FI ($/MBF)	$109.09	$130.36	$97.06
Total $ Revenue to the State (stumpage + FI times estimated harvest volume)	$323,125	$ 197,886	$ 163,837
Total $ Return to the Trust	$298,905	$185,651	$149,885

B. Costs and Revenues From the DNRC Forest Product Sales Program

The DNRC doesn't have an accounting system to track costs for individual projects from start to finish. We conducted a cash flow analysis of DNRC's forest product sales program. Revenue and costs are calculated by land office and state wide. The revenue to cost ratios for the Central Land Office for the fiscal years 1994 (FY94), 1995 (FY95) and 1996 (FY96) were 1.94, 1.44, and 1.45 respectively.

Table #. The Net Return/Total Revenue and Revenue/Cost ratios (Timber Sale Accounting Summary -- FY95 & Revised FY94 memo, FY96.)

	Net Return/ Total Revenue Ratio			Total Revenue/ Total Cost Ratio		
	FY94	FY95	FY96	FY94	FY95	FY96
Central	0.49	0.31	0.31	1.94	1.44	1.45
Total Program	0.63	0.52	0.40	2.68	2.07	1.68

Where total revenue is revenue from timber sales, permits, Forest Improvement and road maintenance, total cost is the sum of timber operating and general administration costs. Net Return is total revenue minus total cost. For specific

information on assumptions related to revenue or cost please consult the User's Guide for Timber Accounting Summary (TAS) Montana Department of State Lands.

C. Impacts on Local Communities

The impacts on local communities are estimated by quantifying jobs and income associated with harvesting and processing the timber into final products. The following regional response coefficients were estimated by Chuck Keegan III and Dan Wichman for the Southwestern part of Montana. The direct jobs per MMBF harvested is 12.36 per MMBF and total income per MMBF of harvested volume is $ 337,146 (Letter from Dan Wichman) or an average income of $ 33981 per job.

It is important to note that the response coefficients are an accounting of what has happened historically. These response coefficients are average values and are not marginal values. To say the consequence of not selling this sale would result in the loss of XX amount of jobs and YYY amount of income may not be appropriate. A marginal analysis would have to be done in-order to be more certain that there will be a reduction in income and employment. If a marginal analysis is not done and the average numbers are used, this commonly results in the total impacts to be over-estimated (Godfrey and Beutler 1993).

RV appraisals assumptions for Blacktail Timber Sale by alterntive.

Alternative # 1

Delivered Log Prices	= $ 400.00
Logging Cost	= $-202.63
Haul Cost	= $- 49.64
Road Development	= $- 14.64
Forest Improvement Fee	= $- 8.06
Profit and Risk	= $- 24.00
Estimated Stumpage	= $ 101.03

Alternative # 2

Delivered Log Prices	= $ 400.00
Logging Cost	= $-103.97
Haul Cost	= $- 66.58
Road Development	= $- 75.09
Forest Improvement Fee	= $- 8.06
Profit and Risk	= $- 24.00
Estimated Stumpage	= $ 122.30

Alternative # 3

Delivered Log Prices	= $ 400.00
Logging Cost	= $-211.98
Haul Cost	= $- 48.49
Road Development	= $- 18.48
Forest Improvement Fee	= $- 8.06
Profit and Risk	= $- 24.00
Estimated Stumpage	= $ 88.99

X. IRREVERSIBLE OR IRRETRIEVABLE COMMITTMENT OF RESOURCES

Forests are a renewable resource and consequently timber harvest does not represent an irreversible or irretrievable committment of resources. Harvest units under all alternatives would be harvested in a manner that resembles stand structures that would historically exist. The roads that are constructed however under each alternative could be considered an irretrieveable committment of resources. The roads would be closed and some partially recontoured but the road prisms would essentially be intact and easily reopened. Alternative III proposes the least amount of new road, estimated to be approximately 3 acres. Alternative I proposes an estimated 6 acres of road disturbance and Alternative II 22 acres.

XI RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG TERM PRODUCTIVITY

All harvest alternatives are designed to protect the long term productivity of the sites. It is anticipated the stocking reduction that would occur under each alternative would increase the health and growth of residual stands resulting in an increase in long term productivity. The post harvest stands would resemble stands that existed historically and would provide a variety of opportunities for use in the long term.

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Bob Brannon, Mt. Dept of Fish, Wildlife and Parks, Dillon
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COMMENTS RECEIVED ON THE BLACKTAIL DRAFT EIS

Comment #	Name	Organization	Date Received
1	Robert Brannon	Mt. Dept. of Fish, Wildlife and Parks	08/12/97
2	Scott Powers Bureau	of Land Management--Dillon	08/14/97
3	Tony Schoonen	Public Lands Access Assoc.	08/14/97

CHANGES MADE TO THE DRAFT EIS TO COMPLETE THE FINAL EIS

(Changes to the draft EIS were made in bold type)

CHAPTER	PAGE #	DESCRIPTION
Table of Contents	2-3	Page numbers
II-Alternatives	14	Added helicopter mitigation for flight over game range.
	15-16	Changed operating season in alternatives
III-Affected Environment	26	Minor editing
	41	minor editing
	61-62	added discussion of existing forest cover over elk home range.
	91	minor editing
Literature Cited	106	added reference

Montana Department of Fish, Wildlife & Parks

3391 Highway 287
Sheridan, MT 59749

August 8, 1997

Garry Williams
DNRC
8001 N. Montana Ave.
Helena, MT 59602

Dear Garry:

The following are comments prepared in response to the DNRC EIS for the proposed Blacktail Creek timber sale. A considerable amount of work has apparently gone into the preparation of this EIS and we would like to applaud those efforts. Please refer to my initial letter for more detailed and further comments on the proposal, those concerns and recommendations are still valid and still represent our position on the proposal.

Under the discussion of Connected and Cumulative Actions, the EIS states that such actions have been evaluated whenever possible. However, I was not able to find any discussion or inclusion of the cumulative impacts from future timber harvest or some past harvest. Included in foreseeable timber harvest is your proposal for the Blacktail Ridge area (Cottonwood Creek), and for Section 15 should DNRC acquire that from the BLM in the Crow land exchange. One of these possibilities in themselves would be significant. Considering them together and with your present proposal would be even more significant. I also could not find reference to your past Price Creek timber sale nor the harvest in Clover Creek, whether private or DNRC. These surely add to the cumulative significance of harvest activity in the area.

In the mitigative measures that will be a part of the contract if the timber sale proceeds, we are encouraged by the proposal to obliterate any new roads. We would encourage your agency to pursue this approach aggressively. As the EIS states, the openness of that area makes it difficult to implement road closures so that effective physical obliteration is the only really effective means. One additional measure that DNRC might want to consider is to allow activity related to the project, should it proceed, only from May 15 to October 20, annually. We understand that the EIS suggests that disturbance to wintering big game would not be expected from helicopter activity. However, that possibility does exist and this mitigation would help preclude it. Should elk be disturbed from our Blacktail Wildlife Management Area (WMA) onto adjacent private lands and cause depredation, it would pose some difficult problems.

Under Alternatives considered but not given detailed study, the EIS indicates that FWP has an inability to meet our management objectives regarding bull elk vulnerability. That our management objectives have not been met in recent years has been a result of the inherent lack of security cover in the Gravellys EMU (Elk Management Unit) and to some extent, past timber

harvest activities. As your EIS states, FWP has progressively restricted hunter opportunity from either sex in the past, to brow-tined bulls only now. Deferring timber harvest is an influencing factor that land managing agencies have not been willing to seriously consider in this EMU. This section goes on to state that DNRC asked FWP to compensate the trust to defer timber harvest in the area, and that FWP declined such an option. As I recall, I brought that idea up initially with Ken Bullman and DNRC's response was that if it were to be considered it would have to be on the basis of something like a lease and not in perpetuity. My response was that we would want something like a conservation easement similar to what we have engaged in with private landowners in the State. These have been executed in perpetuity. DNRC has declined to consider this option, and since, both agencies have lost interest in the possibility. We do not believe that playing the blame game is productive. As a result we recommend that DNRC revise this discussion accurately, to reflect that compensation to the trust for deferring timber harvest was considered by both agencies, but agreement could not be reached on the terms.

The EIS has many discussions that favor fire playing a large role historically, with regard to its frequency, the need for it and influence it may have had. For example, page 26 talks about the influence of fire and that colonization of Douglas fir is "encroachment". Establishment of Douglas fir is part of natural succession and is only negative, as "encroachment" implies, if one wants less of it. Considering the limited cover in the Gravellys EMU, that should not be the desire. Also, on page 40 there is a statement that there is more timber now than in the early 1900's, based on photo comparisons. However, we know nothing of prior to that time. These discussions are presented almost as fact, with some references cited. I am reminded of some children's videos I have seen recently on fossil records, dinosaurs and the like. Many scientists are continually telling us how old a fossil was, how prevalent dinosaurs were or what they ate, what eliminated them, how the Grand Canyon was formed, etc. In the videos, speakers continually reminded children that when presented with this information as fact, they should ask "how do you know, were you there?" We simply do not know many things and can only theorize. To present something as fact that isn't, can be misleading and some might interpret as attempting to predispose a decision.

Out of necessity, sometimes we make extrapolations and assumptions as managers. However, presenting these as facts when there is evidence to suggest otherwise may not be appropriate. If we have some projects we want to accomplish, we need to state that from the start, and not regard as indisputable, our justification for doing the projects. I have not had time to review Losensky (which is cited as 1997 in the text, but 1993 in the Literature Cited section) but I have reviewed other fire history literature. A representative example of this literature is Steve Barrett's recent draft report "Fire regimes assessment for the Beaverhead National Forest, Montana."

The methods section of the above report is fraught with assumptions and limitations: the author discusses how sample plots were *subjectively* located, few corrective measures were made on the initial data set because of time and budget constraints, when fire scar data were absent the earliest

pith year among *apparently* fire regenerated trees was used to *approximate* the fire year, no attempt was made to adjust estimated fire years between areas because there was no basis to do so (author was not involved in the study design or lab analysis), because *many* sites had evidence of only *one* fire interval, multiple-site average fire intervals were used, etc. In the results section he discusses further limitations: the author indicates that although some studies show stand replacing fires were important, his study suggested a preponderance of nonlethal or mixed severity fires; sampling biases were evident; etc. Including a discussion in the EIS that only presents the fire prevalence interpretation suggests a possible bias. We recommend that DNRC at least include some caveats on the limitations of interpreting the data. A discussion that these limitations suggest it is entirely possible that fire was not as prevalent or as significant an influence as the EIS presently indicates, would be preferable.

Page 46 of the EIS presents a list of sensitive species that the DNRC considers in its Central Land Office. Though probably not significant to this proposed action, DNRC may want to consider adding to that list the sage grouse, considering the status of that species and its habitat.

The discussion of elk under the Affected Environment, pages 48-51 is a good one. However, DNRC should probably consider including a discussion of another issue, and that is one of achieving adequate population management (i.e., antlerless harvest). With the number of elk that we presently have in the Gravellys EMU, reducing populations has been difficult if not impossible to this point in time. We have increased antlerless permits in many districts to the point where they are being under subscribed in our drawings, and still we have not significantly reduced populations. Coupled with this is the need to have adequate access to areas to help facilitate the needed antlerless harvest.

The discussion of seasonal use of the project area by elk is well done, but you may want to consider additional discussion. The discussion of the data Ken Hamlin and Mike Ross have collected should point out that the study was not designed to address habitat use. In fact, most radios were located only once per month and many times less frequently, which is not adequate for habitat evaluations. So using the data they collected to evaluate habitat concerns, especially during the hunting season, is probably not appropriate.

Also, caveats are pointed out under the discussion of bull elk use of the area. These caveats detract from the significance of the use of the area by bulls for security cover. However, caveats are not present in the discussion of cow use of the area, which the discussion suggests as insignificant. My discussion above about the potential inappropriateness of using data not designed to address habitat issues, for just that purpose, is important. It should be presented as a caveat in your discussion of cow elk use of the area, particularly if you are going to de-emphasize the significance of use of the area by bull elk. To leave it out would be to include a bias that may suggest a lack of objectivity.

Page 89, second full paragraph, indicates that Alternative II defers harvest from Sections 1, 2 & 3. If I have read the analysis and presentation accurately, I believe this should refer to Alternative III.

I would like to encourage a number of efforts described in the proposed harvest treatments. These include leaving submerchantable clumps of trees in harvest units, thinning rather than clearcutting, leaving a number of trees per acre in each unit (the more left the better), and as I mentioned earlier, obliterating and physically closing roads by heavily slashing, recontouring and reseeding them. These actions are positive in terms of reducing impacts. However, I do need to point out again that timber harvest in this area will likely have a significant impact on security cover due to the inherently limited security of the area.

If DNRC does decide to harvest timber in this area we suggest that Alternative III would have the least impact, although its impact will still be significant. To further mitigate this significant impact, we recommend that DNRC consider dropping at least a portion of unit 36 from this alternative. It is a significant block of security cover now, both because of its size and the fact it is on a north facing slope. Harvesting from large blocks is likely to have more significant impacts than harvest from smaller blocks.

Thank you for the opportunity to comment on your EIS and we hope that you will reconsider your interest in harvesting timber from this area. Should you decide to proceed we strongly encourage you to incorporate our recommendations in the EIS and in your selected alternative.

Sincerely,

Robert D. Brannon
Wildlife Biologist

c: Ken Hamlin

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Response to Comment #1 from Robert Brannon

We have considered cumulative impacts within the project area, of past and present actions as well as future actions under concurrent consideration by a State agency (DEIS, page 77-91). The proposed Cottonwood Creek Timber Sale is located outside of the project area, approximately 15 miles to the northwest. Initial scoping was conducted in January 1997. Alternatives for the Cottonwood Creek sale proposal are currently being developed and would likely include a range of timber harvest from a minimum of zero acres (No Action) to a maximum of approximately 380 acres. The analysis area regarding elk issues on the Long Cottonwood proposal has been delineated with the assistance of MDFWP and lies to the north and west of the Blacktail Sale. That analysis area is based on data indicating the elk population in the Long Cottonwood vicinity is primarily a seperate herd unit using forested areas on Blacktail Ridge and wintering on the Sage Creek side of the Ridge.

Section 15 is within the project area, currently owned by the BLM and is considered for exchange through the Crow Land Exchange. The DEIS (page 8) recognizes the potential exchange. There are no formal plans for harvest on Section 15 at the present time.

The Price Creek Timber sale, is outside of the project area but was identified on page 28 of the DEIS. An estimated 200 mbf of timber was harvested from 45 acres of state land in 1992.

The Clover Creek drainage is located south of the Blacktail Project area over the Clover Divide in the Centennial Valley. We are aware of approximately 30 acres of timber harvest conducted in 1994 on the Thomas property.

We expanded the discussion of timber resources in the Final EIS to include forested areas outside of the project area roughly corresponding to the 35% isopleth (during September 1 through December 1) for female elk wintering on the Blacktail Winter Range. However, this additional analysis did not change our assessment of impacts of the Blacktail proposal.

We appreciate your concern regarding road management in the Blacktail vicinity. The DEIS (pages 12, 14 and 16) describes the road closure activities proposed under the alternatives. New roads and some existing roads would be effectively closed with berms, Kelly humps, and brush distributed where appropriate. The road prism would remain substantially intact and therefore roads would not necessarily be obliterated.

We have changed the proposed operating season to reduce conflicts with recreationists during the general hunting season, under all alternatives, to allow timber harvest operations only from December 1, through October 15, each year of the project. The operating season, however, would not be restricted during the winter months. Our conclusion is it would be very unlikely that elk would be disturbed by helicopter flights over the sale area. A concern with helicopter logging on the Blacktail proposal is the high elevation and reduced load capacity for helicopters, particularly during the warmer summer months. Consequently, we would prefer to leave the option open for winter operations. In reality we expect snow depths to preclude a winter harvest, unless there is an unusually mild and dry winter. In such a winter, stress on wintering elk is much less an issue. We have added a mitigation to the EIS specifying a $1,000.00 penalty and suspension of contract if helicopter flights are conducted over the game range.

We disagree with your assertion of placing "blame" on MDFWP regarding an alternative that would compensate the trust for harvest deferral. There was no intent and we apologize if that is your perception. The DEIS was attempting to simply report statements from MDFWP included in correspondence to Ken Bullman, dated November 27, 1995:

> "As you'll recall, we discussed the possibility of negotiating a conservation easement or license on state lands in question. I was waiting for some indication from our administration whether this would

be feasible. For several reasons it appears that this will not be an option."

This is consistent with more recent discussions in Bozeman (May 22, 1997) at DFWP Region III Headquarters, where regional managers indicated funds were not available for conservation purposes on State trust lands. The DNRC however remains interested in any proposal for trust compensation that can be demonstrated to benefit the school trust.

We agree there is limited knowledge of fire history and forest conditions that existed prior to the mid-1900's. Consequently, the discussion in the DEIS regarding fire history frequently uses phrases such as; studies indicate, or suggest, or it appears. The reference to Gruell's study (page 4) correctly states that "comparisons of photos taken in the early 1900's with photos taken in the 1980's (Gruell 1983) suggest (emphasis added) a substantial increase in forest cover". The 1997 Losensky report has been added to literature cited. We did not review or cite Steve Barrett's draft report. All studies we are aware of indicate fire suppression during the past 85 years has generally limited the natural role of fire in forest development. It is a fact that fires have normally been suppressed as quickly as possible. However, the frequency of fires on a specific site has likely varied over the years and is open to conjecture. We have reviewed the discussion on fire history in the DEIS and made minor adjustments to ensure that the discussion is not presented as absolute.

The requirement for maintaining a list of sensitive species DNRC considers (DEIS page 46) was established as a result of the Statewide Forest Management Plan and is specific to management activities on forested State lands. The list was developed primarily from information provided by the USFS, Region 1 and the Montana Natural Heritage Program. Additions or deletions to the list require written justification. If MDFWP would believe sage grouse should be included on the list, please send us a request with an explanation explaining why sage grouse should be considered sensitive to activities conducted on forested State lands.

The issue of reducing the overall elk populations in the Gravelly's EMU was not addressed in the DEIS. Elk issues were developed primarily from MDFWP input that emphasized the inherent lack of security cover in the Gravellys and MDFWP's inability to meet its objective of harvesting no more than 40% of the bull harvest occurring during the first week of the general season. The DEIS (page 88-91) describes our assessment of the impacts to elk security in and near the project area. We accept the premise that any removal of forest cover would, for the period prior to effective cover regeneration, likely increase the vulnerability of elk. To partially mitigate the loss of cover, improve water quality and reduce sedimentation, we have proposed to substantially increase the effectiveness of closures on existing roads. We believe there are no reliable methods for evaluating differences in vulnerability of bull elk versus cow elk and therefore assume that activities associated with the proposed timber harvest that increase the vulnerability of bull elk will also decrease the security of cow elk and have a positive impact on MDFWP's objective to reduce overall elk populations in the Gravelly's EMU. There are many factors affecting elk populations and vulnerability that are not within the scope of the proposed timber harvest (DEIS, page 50). We will continue to work with MDFWP and consider creative solutions to MDFWP's elk management problems in the Gravelly's.

We understand and recognize (DEIS, page 52) that MDFWP may not endorse or concur with our conclusions relating to the proposed sale and impacts on elk associated with the Blacktail winter range. We also concur that the data is not appropriate for specific habitat evaluation. However, the data used, is the best available information and we believe its use is suitable and appropriate for indicating general patterns of use by those elk. Furthermore, we acknowledge (DEIS page 53) that the information on elk use in the project area is incomplete.

The reference to Alternative II on page 89 of the DEIS has been corrected to Alternative III.

The harvest treatments proposed include the provisions you encourage. Submerchantable clumps will be retained, an estimated 60-80% of the trees in each unit will be retained (except on approximately 10 acres of lodgepole pine timber type) and roads will be physically closed. We have not as yet determined the specific harvest unit configuration and will consider not harvesting portions of Unit 36 to maintain some security value in that unit.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Dillon Resource Area
1005 Selway Drive
Dillon, Montana 59725

IN REPLY REFER TO:

1793

August 11, 1997

Mr. Gary Williams
Department of Natural
Resources & Conservation
8001 North Montana Ave.
Helena, MT 59602

Dear Mr. Williams:

We have reviewed your Executive Summary of the Draft EIS for the West/Middle Fork Blacktail Creek Timber Sale. The following is a consolidation of specialists comments or questions that we hope you will address in your final EIS document.

Wildlife

Helicopter logging is preferable to skidding and road development. Will there be any timing considerations to mitigate impacts to elk migration and winter habitat use?

The executive summary did not address cumulative effects on wildlife habitat and movement across the project area. Will this be discussed in more detail in the completed EIS? Many of the stands proposed for treatment are small and isolated. Potential impacts from harvest treatments in these smaller stands could be more substantial than harvest in larger stands. Also, will treatments cover entire stands or will there be some buffer zones of untreated forest?

Uncut patches proposed in treatments 1 and 2 can be effective at minimizing cover impacts if they are retained in a pattern that provides corridors for wildlife movement and screens from open roads. This is usually most effective if entire stands are not treated at once.

Considering the scale of proposed treatment is there a need for treatments 3 and 4? These small areas represent valuable (or potentially valuable) wildlife habitat that will be lost by harvest treatments, particularly treatment 3. "Poorly formed" trees usually have reduced value as lumber. Even with the high value wood market, this may still be the case with the increased cost of helicopter logging. Thus, its probable that most of this material would be left in the woods. If so, these small stands would do little to provide revenue for the trust fund and probably be more cost effective if left untreated.

Recreation

Recent input concerning timber sales from the Gravelly's Citizen Advisory Group suggests that timber sale roads within the Gravelly's Landscape should be restricted during operations and rehabed immediately afterwards. This would maintain the current level of vehicle access and reduce the spread of weeds by vehicles.

Fisheries

It is difficult to determine the potential impacts on creeks from the map scale in the Executive Summary. We assume your EIS will describe any expected impacts in more detail. Will discussion of mitigation measures such as buffers or other measures that may be considered beyond standard BMP's be included in the final document?

Rangeland Management

The location of new roads or activities that could alter current livestock management on non state lands should be identified. It is assumed that any activities that would affect developments (ie. fencelines, water developments, etc.) on BLM lands would be restored before they are needed during the grazing season.

Realty

There will apparently be a need for use of some existing roads or new road construction that cross BLM lands. We ask that applications for such needs be submitted as soon as possible.

We appreciate the opportunity for involvement in this project prior to the final EIS. We encourage your Dillon Unit personnel to contact Joe Casey of our office at (406) 683-2337 if they have any questions concerning our input.

Sincerely:

Scott Powers
Area Manager

cc: Department of Natural Resources & Conservation, Dillon Unit

Response to Comment #2 - Scott Powers

Wildlife

The operating season for alternatives described in the DEIS is not restricted during the winter months. Our conclusion based on the best available information is it would be very unlikely that wintering elk would be significantly affected from helicopter flights over the sale area (DEIS, page 88). Our estimates indicate the majority of elk associated with the Blacktail winter range spend the winter season in non-forested areas to the north of the project area. One concern associated with a helicopter yarding operation is the high elevation of the sale area and reduced load capability of helicopters particularly in the summer months. Therefore, we would prefer to allow operations during the winter. In actuality we expect snow depths to preclude winter operations in all but a very mild season. In such a winter, stress on elk is much less an issue. We have added a mitigation to the Final EIS specifying a $1,000.00 penalty and suspension of contract if helicopter flights are conducted over the game range.

For safety reasons and to reduce conflicts during the hunting season, we have ammended the operating season of all alternatives to restrict harvest operations during the general rifle season. Under any of the action alternatives, timber harvest would be conducted only during the period from December 1, through October 15, each year the contract is in effect.

Cumulative effects on wildlife were considered (DEIS, pages 77-91).

Entire stands have been identified for treatment, however specific marking and configuration has not been completed. Due to existing stand structures, terrain and proposed treatments all alternatives would retain untreated areas within each stand. An estimated 60-80% of the trees would remain, often as untreated patches that would provide screening from roads and cover. While the entire stand has been delineated, treatment in practice would not encompass the entire area.

While treatments 3 and 4 encompass small acreages, we believe it is economically viable. The nature of helicopter yarding in particular does not add costs for small acreage units as long as yarding distances are reasonable.

Recreation

Roads that are currently administratively closed would be physically closed upon completion of use. This would result in more effective closures, reduced unauthorized use and the same level of open road access that currently exists.

Fisheries

Mitigations proposed under all alternatives are listed (DEIS, pages 12-14) in the complete EIS. Equipment restriction zones, buffer zones, leave areas etc. are proposed in areas of marginal slope stability or where soil erosion is a concern. (DEIS, page 75). Road

closures, improved road drainage and installation of improved stream crossings will likely reduce sedimentation and result in long term improvement of water quality (DEIS, page 73).

Range Management

Much of the forested area is not suitable for grazing and we do not anticipate harvest activity will alter current livestock management on non-state lands. Developments are not expected to be impacted however, inadvertent damage would be repaired as soon as practical.

Realty

Road use on the BLM would vary by alternative. Consequently we did not believe it was appropriate to submit a formal application for road use on BLM land until an alternative is selected and sufficient details are available. We have held preliminary discussion with the BLM and are aware of archaelogical recommendations. A formal application will be submitted when an alternative is selected.

THE PUBLIC LANDS ACCESS ASSOCIATION, INC.
P.O. Box 2 Ramsay, MT
59748-0002

RECEIVED
AUG 14 1997
DNRC

August 12, 1997

Mr. Bud Clinch
Department of Natural Resources
and Conservation (DNRC)
1625 11th Avenue
Helena, MT 59620

Dear Bud:

Thanks for allowing our group to comment on the Environmental Impact Statement (EIS) for the proposed West/Middle Fork Blacktail Creek timber sale. This particular sale has grave implications for the wildlife populations in the Blacktail area and on future recreational opportunities for the general public.

Since logging has been taking place on adjacent Bureau of Land Management (BLM) and United States Forest Service (USFS) lands, the total cumulative impacts for wildlife and recreational values have not been addressed in your EIS. In fact, the whole tone of the EIS holds timber above all other values even though the 1972 Constitution mandates that school trust lands shall be managed for all of their various resources, nowhere does it state that wildlife or its habitat be sacrificed for the benefit of logging interests. The Multiple Use Act of 1969 mandates the same thing, but unfortunately, trust lands have never been managed for wildlife. In fact, there is little cooperation between DNRC and other public agencies in the management of trust lands.

The alternatives in the EIS would close roads to offset and mitigate the loss of elk security by harvesting timber. Our group is opposed to this because of the loss of recreational opportunities for the elderly, the handicapped, and all members of the public. This type of mitigation would have people walking from the main highway so that more logging could be carried out on our public lands.

The Elk Logging Study should have been adhered to in this EIS. This document shows the devastation of logging and road building on elk security. Again, no cooperation with the Montana Department of Fish, Wildlife, and Parks (MDFWP). Wildlife is a valuable resource which provides jobs and income to surrounding communities such as Dillon and Lima. This income and economic stability allow for indirect contributions to our schools through property taxes and mill levies. Devastation of wildlife habitat erodes this economic stability.

One comment was made in the EIS which shows the attitude toward MDFWP and the recreating public. On page 16, alternatives are considered, but not given detailed study. In our opinion, MDFWP could provide some compensation to the trust to stop the logging in the Blacktail, but only after the total amount of revenues provided to DNRC from the General Fund for their forestry program is calculated and deducted. All taxpayers are footing the bill to harvest timber and to close our public lands and roads for recreational purposes.

Also, the amount of money spent annually for law enforcement and wildlife management on trust lands by MDFWP should be calculated and deducted from the no logging alternative. This management by MDFWP and the Montana taxpayers are an indirect form of compensation to the trust. Other western states have acknowledged this. If these calculations were included and deducted, the no logging alternative would make sense.

We recommend that the Land Board adopt the the no action alternative because if logging is allowed, the public loses the recreational opportunities we now enjoy and it would be decades before these same opportunities would be achievable, if ever.

Sincerely,

Tony Schoonen

C.C. Land board members

Response to Comment #3 from Tony Schoonen

Cumulative impacts were considered in Chapters 3 and 4 of the draft EIS. There are no known USFS or BLM timber harvests in or adjacent to the project area.

Federal lands were granted to the State of Montana, in the Enabling Act of 1889, for the support of common schools as well as other specific beneficiary institutions. In 1889, in the Montana Constitution, the state accepted the lands and promised they would be held in trust and managed to conform with the Enabling Act. Montana's 1972 constitution reaffirmed its acceptance of the terms of the enabling act. Trust lands may only be managed to provide income for the specific, designated trust beneficiary. Use of the lands must result in "full market value" of income to the intended trust beneficiary. The constitution gives the State Board of Land Commissioners the authority to manage and dispose of interests in trust lands. The board can take no action contrary to the trust principles however they have broad discretion in applying those principles in order to comply with other state statutes. Title 77-1-203 provides legal requirements relating to State Lands and Multiple Use Management and provides that:

1. "The board shall manage state lands under the multiple use management concept defined as the management of all of the various resources of the state lands so that:

    a. they are utilized in that combination best meeting the needs of the people and beneficiaries of the trust.....

    b. harmonious and coordinated management of the various resources, each with the other, will result without impairment of the productivity of the land, with consideration being given to the relative values of the various resources."

The Department of Natural Resources manages all resources on state lands to provide multiple uses across the state. Statewide programs include management of oil and gas, minerals, forest, agricultural, grazing and recreational resources. The DNRC completed the State Forest Land Management Plan on May 30, 1996 (DEIS, page 5) outlining our management philosophy on forested state lands. Our premise is that managing for heathy and biologically diverse forests will provide the best opportunity for generating sustainable long term income and maintaining the productivity of the land. We have incorporated the management philosophy and applicable resource management standards into the project design. We have consulted with MDFWP and included many of the MDFWP's recommendations in the sale design. We understand MDFWP does not support the proposed harvest. However we have and will continue to work with MDFWP on current and future projects to minimize impacts and allow the agencies to work towards their respective goals.

Existing roads proposed for closure under the action alternatives are all currently administratively closed. The physical closures are designed to increase effectiveness of the

existing closures and target illegal use. New roads proposed for construction under any of the alternatives would also be physically closed. None of the alternatives therefore either increase or decrease authorized road use.

Many of the recommendations of the elk logging study are incorporated in the proposed alternatives.

MDFWP and DNRC considered compensation to the trust for harvest deferral. However, MDFWP does not consider it an option. General fund contributions to DNRC was not an issue in those discussions. Law enforcement and wildlife management expenditures by MDFWP are not relevant to the decision in the EIS, since they would not be changed by the proposed timber sale and are not costs associated with DNRC programs. Even if they were, they would be applied equally to all alternatives, not solely to the no action alternative.