APPENDIX L:
Biological Evaluation/Biological Opinion
Blackleaf EIS

I. INTRODUCTION

This evaluation is presented as a supplement to the draft EIS (DEIS) and detailed descriptions of alternatives and other factors put forth in the DEIS will not be extensively duplicated here. Narratives necessary for background in this evaluation will be referenced by page number in the DEIS. The four alternatives to be evaluated are described in Chapter 2, pages 10 to 33. Wildlife values affected are described in Chapter 3, pages 46 to 61, and anticipated effects are given on pages 95 to 111, of Chapter 4.

Generally, the alternatives range from connecting only the five existing wells (two producing, two capable of producing, and one to be used as a water injection well) to a gas plant and not allowing any further exploration and development (Alternative 1), to fully developing the two defined geological gas structures with a series of nine step-out wells and six exploration wells and allowing production on site. (Alternative 2). In between these alternatives from a relative affects standpoint, is Alternative 3 which adheres to the timing windows given in the Rocky Mountain Front Wildlife Guidelines (BLM, et.al. 1987). This would allowing only four existing wells, one injection well, two step outs, and two exploration wells based on 90 day timing windows being the least amount of time necessary to accomplish any kind of drilling project. The preferred alternative (Alternative 4) allows only two less wells than Alternative 2 but applies significant mitigation, including remote monitoring of wellheads during production, which would facilitate minimal human disturbance and stringent road control.

This biological evaluation is prepared in accordance with the Endangered Species Act, Section 7, as amended, to determine if the alternatives in the DEIS **"may effect"** threatened and endangered (T&E) species or their habitats, whereby jeopardy to their continued existence would be suspected. If BLM makes such a **"may effect"** determination, it must formally present this biological evaluation to the Fish and Wildlife Service (FWS) for their biological opinion as to jeopardy. If the FWS determines jeopardy exists for a species, the proposal will not be allowed to go forth unless it can be modified to nonjeopardy status.

Biological evaluations of the affects of man's activities proposed on the Rocky Mountain Front (RMF), most concerning oil and gas exploration in the EIS area, have been submitted for consultation previously. A biological evaluation was prepared for the Headwaters Resource Management Plan/RMP/EIS in 1983. This RMP discussed oil and gas leasing along the RMF including necessary stipulations (time and space restrictions) to protect important habitats. Since that time, four assessments for exploratory wells in the Blackleaf EIS area have been prepared and submitted. Each assessment has built on our understanding of how best to evaluate effects from these projects and how to design them to least affect wildlife.

The FWS has indicated that the T&E species that must be considered on the Rocky Mountain Front are the bald eagle, peregrine falcon, gray wolf, and grizzly bear. Limited discussion has already been provided on these species and their habitats on pages 56 to 61 in Chapter 3 of the DEIS.

No rare or endangered plants are listed for this area and no additional plants or animals are proposed for listing.

Documented occurrence, abundance, relative importance of habitats, and other pertinent factors have been described in the numerous studies undertaken through the RMF Task Force effort which resulted in publication of the Interagency RMF Wildlife Guidelines (RMFWG)(BLM, et.al. 1987). Summaries of the findings of this research, as it relates to the four T&E species, follows complete with a determination of "effect" from the activities proposed by a full field gas development program.

II. SPECIES OCCURRENCE/DETERMINATION OF EFFECT

Bald Eagle
Haliaectus leucocephalus

Dubois, 1984, intensively surveyed raptors along the RMF and found no nesting bald eagles. She documented an historic nest site from the pre-1950 period along the Sun River and also indicated that the Teton River was suitable as nesting habitat. However, no other drainages appeared to be suitable for nesting bald eagles. The Blackleaf EIS area is in the latter category.

Bald eagles are present on the RMF from September through April as an uncommon winter resident and migrant. Observations of eagles are most likely to be made south and east of the EIS area where fisheries and open water are more prevalent. Some wintering habitat was delineated in the Antelope Butte Swamp locale (Figure 3.10 in chapter 3 of the DEIS).

A "no effect" determination is made for all alternatives, as nothing proposed for oil and gas development would be expected in the areas bald eagles would frequent during the breeding season. If the unlikely occurrence of nesting activity by a pair of bald eagles was ever documented in the Blackleaf EIS area or anywhere on the RMF, it would trigger a series of protective measures. BLM and other Task Force members would adhere to the RMF Guidelines, which would alleviate any "effect" possibilities. This would include preventing human visitation or other disturbing activities within influence zones of an active nest territory.

Peregrine Falcon
Falco peregrinus

Suitable, but presently unoccupied, peregrine falcon habitat occurs along the RMF which has been proposed as a possible reintroduction area. Occasional observations of adult peregrines have been made during the spring and fall. These peregrines are assumed to be migrants.

DuBois (1984) classified cliff habitats thought to be most suitable for peregrines (Figure 3.9, Chapter 3 in the DEIS). Characteristics of these habitats were cliffs close to extensive riparian habitat (within 5 kilometers), over 50 meters in height and 1 kilometer in extent, with numerous nesting ledges, and the majority of the cliffs under 2,300 meters in elevation. Potential nesting areas meeting these criteria are shown on Figure 3.9 in the DEIS.

Peregrines are being successfully hacked throughout the western U.S. which increases the liklihood that an adult pair may establish a breeding territory on the RMF. Should this occur, no human visitation or other disturbing activity would be allowed as prescribed in the Guidelines. Because there are presently no known pairs in the EIS area and because of the Guidelines, a no effect determination is made for peregrines. However, should a breeding pair be discovered near proposed oil and gas activity, consultation will be reinitiated.

Gray Wolf
Canis lupis

Habitat requirements for gray wolf are evident along the RMF, an area of extensive prey specie winter/spring ranges backed by the expansive Bob Marshall Wilderness Area. Wolf occurrence information on the RMF has been collected by the Wolf Ecology Project, University of Montana (Mattson and Ream 1978). Of 90 wolf occurence reports recorded on the RMF, including Glacier National Park east of the Continental Divide during the last decade (1978-88 U.S. Fish and Wildlife Service files), 60% have occurred within the last 3 years, and virtually all of these were in Glacier County. This was due to a group of wolves dispersing from the "magic pork" which had become established on the west side of the Continental Divide (Robbins, J., 1986, Ream, et.al. 1975, Ream 1985). This would indicate that occupation by a pack of wolves along the RMF within or near the EIS area is certainly likely in the near future. Ten of the 90 wolf occurrence reports were in Teton County where the EIS study area lies, but these were all made from 1978 to 1984.

Overcoming livestock/wolf conflicts may become the most limiting factor in wolf re-establishment on the east side of the Continental Divide as evidenced by the recent control effort necessary to prevent further depredation of livestock on the east side by wolves that had dispersed from the magic pack. If this particular group of wolves had traveled further south than the Blackfoot Indian Reservation, an area of relatively low big-game numbers, and taken up residence on the Blackleaf EIS area where wild prey is more abundant, their fate may not have been as disastrous. Thus, maintenance of prey species habitats could prove to be very important in meeting wolf recovery goals in the future as outlined in the revised Northern Rocky Mountain Wolf Recovery Plan (Fish and Wildlife Service, 1987).

This plan describes key components of wolf habitat as abundance of natural prey and minimal exposure to humans. Increased exploration and development of natural gas resources in the Blackleaf EIS area could possibly decrease the value of prey base habitat in the area and increase human activity, thus negatively effecting key components.

The acres of ungulate prey species winter range habitat that would be within a 1-mile zone of influence from drill sites or producing wells and size of big game herd unit located within and adjacent to the EIS area are given in Table L-1.

Table L-1:

Acres of Ungulate Prey Species Winter Range Habitat Within 1-mile Zone of Influence From Drillsites or Producing Wells

Species	Alternatives 1	2	3	4	Maximum Estimated Herd Size[1/]
Rocky Mountain Goat	2,050	8,390	2,050	7,680	113
Bighorn Sheep		530		430	105
Elk	12,060	33,810	17,810	35,820	325
Mule Deer	5,410	15,600	13,150	17,680	2,600

1/ Data taken from pages 48 to 52 in Chapter 3 of DEIS.

The principal prey in the area is mule deer. Herd units and descriptions of population parameters including densities found in the EIS area are discussed on page 48 of Chapter 3 of the DEIS. Of the four mule deer herds mentioned, the northern half of the Blackleaf-Teton herd consisting of 4-500 deer would be most effected. Industry activity as projected would, for the most part, occur south of the designated high density winter range for the other three herds. Also, a healthy white-tailed deer population occupies the Antelope Butte Swamp and could contribute significantly as prey for gray wolf. The swamp is centrally located to gas field activities.

The negative consequences that can be expected from oil and gas activity on wildlife, including ungulate prey species in general, are described on pages 95 to 111 in Chapter 4, as summarized by Bromley, 1985. Important prey species habitats that would be negatively effected by particular wellsites are detailed on Tables 4.17 through 4.20 and Figures 4.1 through 4.4 and their associated tables in Chapter 4 of this DEIS. Either elk or deer winter range or both occur at each site proposed, thus, negative trends in population that might result from field development could be reflected in a reduction of prey base and an indirect negative effect on gray wolf.

Increased human activity in the EIS area for whatever reason, especially during the winter season, also increases the likelihood of the killing of a wolf, either by mistake or purposefully.

A number of methods can be employed to reduce the chances of these negative effects occurring. Firearms should not be allowed on the job or in vehicles that transport workers to any job site. Industry officials should caution employees concerning strict enforcement and severe consequences of firearms violations, including loss of employment. In addition, employees should be made aware of the consequences under the Endangered Species Act (ESA) should they shoot a wolf or other threatened or endangered (T&E) species; bald eagle or grizzly bear. All roads in the Blackleaf EIS area that are non-essential should be closed to traffic, and all other roads should be locked and only opened when necessary. Remote monitoring of wells with gas processing occurring at a central point will greatly aid in developmenting a road management plan conducive to preventing an illegal shooting.

All of the above concepts for lessening effects plus additional measures are given in the RMFWG. General management guidelines for all species and specie specific guidelines for deer and elk are those most applicable as management methods to alleviate or lessen impacts to wolves. BLM and other participating agencies are committed to applying all of these guidelines when permitting any human activity on the RMF. Some minimal lengthening of timing windows and adjustment of timing windows based on on-site evaluation for particular wellsites was discussed in the DEIS for the preferred alternative, but overall effects of these changes would be negligible to the gray wolf, and possibly will lessen impact on high density mule deer winter range. If additional unforeseeable deviations from guidelines arise from site-specific inspections as development progresses, additional National Environmental Protection Act (NEPA) and ESA compliance and consultation will be required.

Considering that the above guidelines will be incorporated into any project to the highest degree possible, effects on gray wolf will be relative to the scope of the project and the success of applying the RMFWG. It is therefore obvious that Alternative 1 would have the least effect on gray wolf because of the few wells considered and production at a central facility with remote monitoring of wellheads. Alternative 2 would have the most effects because of the higher number of wells and production allowed on site. Production on site greatly increases road use throughout the life of a well and complicates good road managment, the key to lessening negative consequences. Alternatives 2 and 4 employ remote monitoring, but Alternative 3 is less negative as it has fewer sites. Alternative 4 (the preferred alternative) incorporates all of the best mitigation possible but could still affect wolves because of the number of wells programmed and the effects from production which cannot be avoided by application of timing stipulations.

In summary, both direct (illegal killing) and indirect (loss of prey base) effects are possible for the gray wolf for any of the four alternatives considered. The degree of effect is relative to the number of sites allowed and the mitigation applied. Full field development **"may effect"** gray wolf recovery, and therefore, BLM is formally requesting FWS's opinion as to jeopardy.

Grizzly Bear
Ursus arctos horribilis

Under the direction of the Interagency Grizzly Bear Committee (IGBC) all federal surface lands in the Northern Continental Divide Ecosystem (NCDE) were stratified as defined in the RMFWG (51FR42853). Private lands were not classified as such but could contain equally valuable habitat for bears. Most of the Rocky Mountain Front (RMF) is classified as Management Situation I (MS-I) habitat which indicates an area that contains grizzly bear population centers and habitat components needed for the survival and recovery of the species or a segment of its population. Management direction for MS-I lands is to give priority to maintenance and improvement of grizzly habitat. The Blackleaf EIS area is totally classified as MSI except for a very small portion (about 1%) at the southernmost boundary along the Teton River Road near human habitation which is classified as MS-III. Management direction there is to discourage grizzly bear presence and minimize grizzly-human conflicts.

The RMF grizzly bear population has been intensively studied (Jonkel, 1983, Schallenberger, 1974 and 1976, Sumner and Craighead, 1973, Hamlin and Frisina, 1974, Schallenberger and Jonkel 1978, 1979 and 1980, and Aune and Stivers, 1981-1986). The most recent efforts from 1981 to the present, supported by joint funding of the Interagency RMF Task Force and under the direction of principal investigator Keith Aune, have used the aid of radioed bears and telemetry. Aune has gathered information on distribution, home range, use of habitat by season, food habits, population biology, density estimates, mortality, and other factors including effects on bears from oil and gas activity. Aune's expertise and data were used to formulate the grizzly bear portion of the RMFWG (BLM et.al., 1987).

Concurrent to Aune's efforts, a process was being developed to analyze cumulative effects of human activities on grizzly bears and their habitats. Cumulative effects are defined as "**The combined effect upon a species or its habitat caused by the current program plus a proposed activity, as well as other reasonably foreseeable events which are likely to have similar effects upon that species or its habitat. Cumulative effects can result from individually minor but collectively significant events taking place over a period of time.**" Computer science was enlisted to store and manipulate the large amounts of data necessary to calculate cumulative effects and the process was labeled the Cumulative Effects Model (CEM) (U.S. Forest Service et al. 1987).

The CEM was designed to provide resource managers an analytical tool for evaluating existing as well as potential habitat effectiveness levels and mortality risk relative to a proposed activity. The analysis will be quantifiable for a defined area, which is small enough so that the data base can be processed, yet large enough so that it is biologically meaningful for evaluating survival implications to grizzly bears. That area is called the Bear Management Unit (BMU).

BMUs contain sufficient constituent elements and effective habitat to meet a subpopulation goal for adult female grizzly bears. The Blackleaf EIS area of 91 square miles lies within the boundaries of the 322 square mile Birch-Teton BMU. Determinations of one bear per 18 square miles with two breeding age females with young have been made for this BMU (Dood et al., 1986). This results in an estimated population of 18 bears.

Spring, following den emergence, is the most critical time of the year for grizzly bears. Aune and Brannon, 1987, gave emergent dates ranging between March 10 and May 13 with a median date of April 10. Much of the Birch-Teton BMU is spring habitat (Figure L-1) and the Blackleaf EIS area has been shown to be of high value as spring range (Figure L-2).

Aune's data shows the importance of river valley, creek bottom, and foothills habitat to grizzly bears in the spring. Others, (Schallenberger and Jonkel (1980), Servheen (1981), and Jonkel (1980)) recognized the importance of low elevation wet sites and creek bottoms to grizzly bears in the spring. Bears concentrate on these areas because of early snow melt from these sites and the phenology of important bear foods. On the RMF, bone yards located at low elevations also draw bears down to the foothills and flatlands at this critical time.

Bears distribute themselves more evenly throughout the BMU during summer and fall (Figures L-3 and L-4) but still make significant use of the EIS area because of the preferred habitat features found in Antelope Butte Swamp and other riparian areas. Also, as buffalo berry (Shepherdia canadensis) berries ripen in the understories of limber pine and other berries such as chokecherry (Prunus virginiana) do likewise in riparian areas bears are drawn into the habitats. represented in the EIS area.

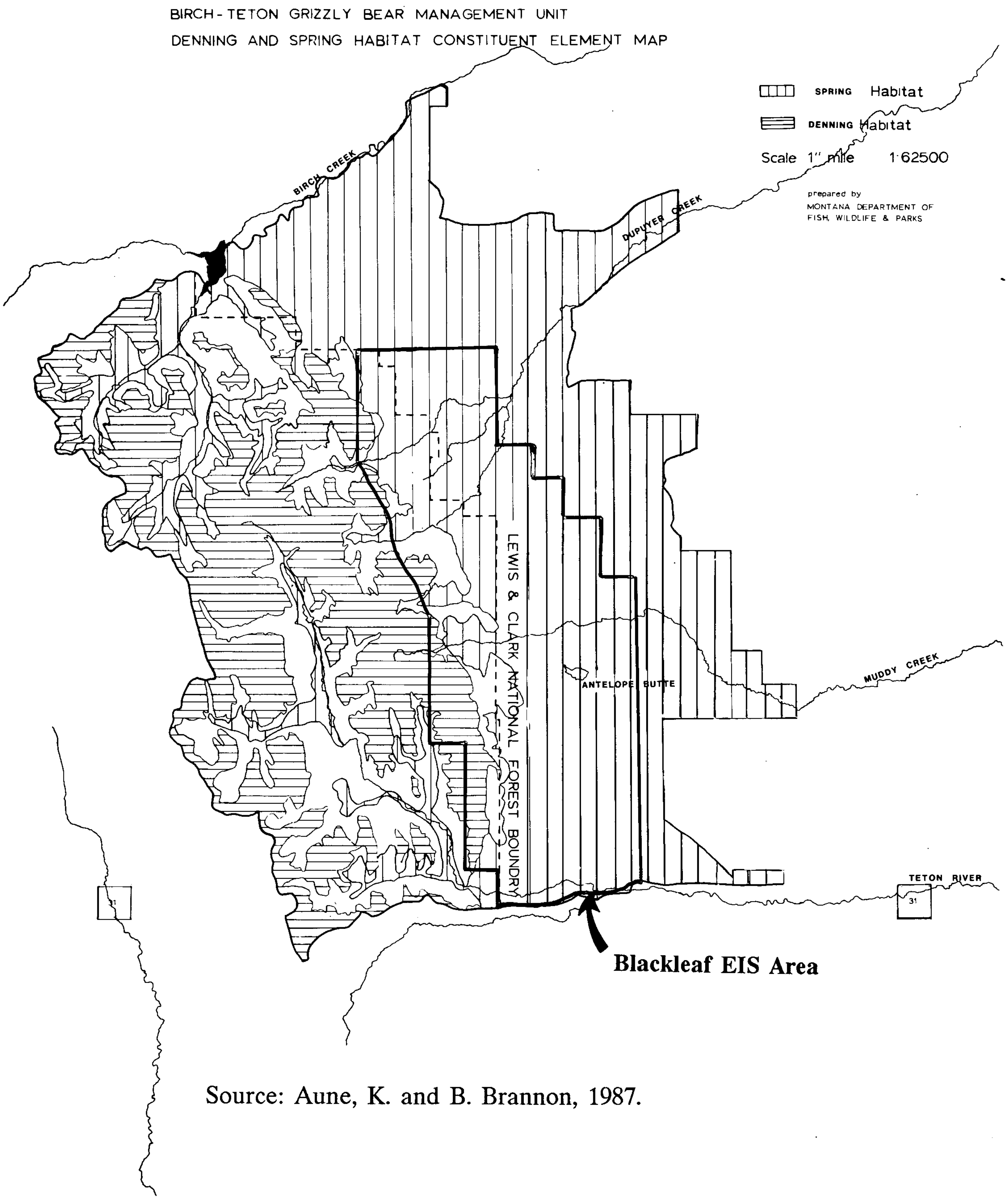
The western, higher elevation portions of the BMU are denning habitat but very little of this would be influenced by any alternative of the EIS as shown in Tables 4.17 through 4.20 in Chapter 4 of the PDEIS. The median date for den entry as reported by Aune, 1987 was November 8.

Maintaining habitat and security for breeding age females is recognized as the key to continued grizzly bear survival in a given BMU. During Aune's studies, home range data was secured in the Birch-Teton BMU for three breeding-age females. The areas used by these females were closely aligned to Antelope Butte Swamp and Volcano Reef which are areas of principal interest for gas field development (Figures L-5, L-6, and L-7).

Female grizzly bears are **"tied to a piece of real estate"** (Personal Communication, Keith Aune, January 1989); or in other words, display a high degree of fidelity to a particular area which would be represented by home range boundaries. Also, grizzly bear young are highly likely to follow in mother's footsteps and show the same fidelity to almost the same area. Thus, the Antelope Butte Swamp and Volcano Reef areas which were documented as being so important to the three females listed above are likely to be of similar importance to future breeding age females in the BMU.

Roads are an integral part of the development of a gas field. Less bear use of habitats within 100 meters of roads in Canada has been documented (McLellan, B.N., and Shackleton, D.M., 1988). Some loss of special habitat will, therefore, occur as the field develops, but of more immediate importance, any increase in access, especially uncontrolled, increases the likelihood of man, firearms, and grizzly bears coming together at the same time and place. As indicated by study findings, **"Most female mortality has been within 1 Km. of a road in the RMF study area"**, (Keith Aune, Personnel Communication, January, 1989). The first study mentioned in this paragraph also indicated increased vulnerability of grizzlies to both legal and illegal killing because of access. **"All known and suspected adult and sub-adult grizzly deaths (n=29) since 1979, have been due to legal or illegal**

Figure L-1 Birch Teton Grizzly Bear Management Unit.



Source: Aune, K. and B. Brannon, 1987.

Figure L-2 Distribution of Spring Grizzly Bear Observations.

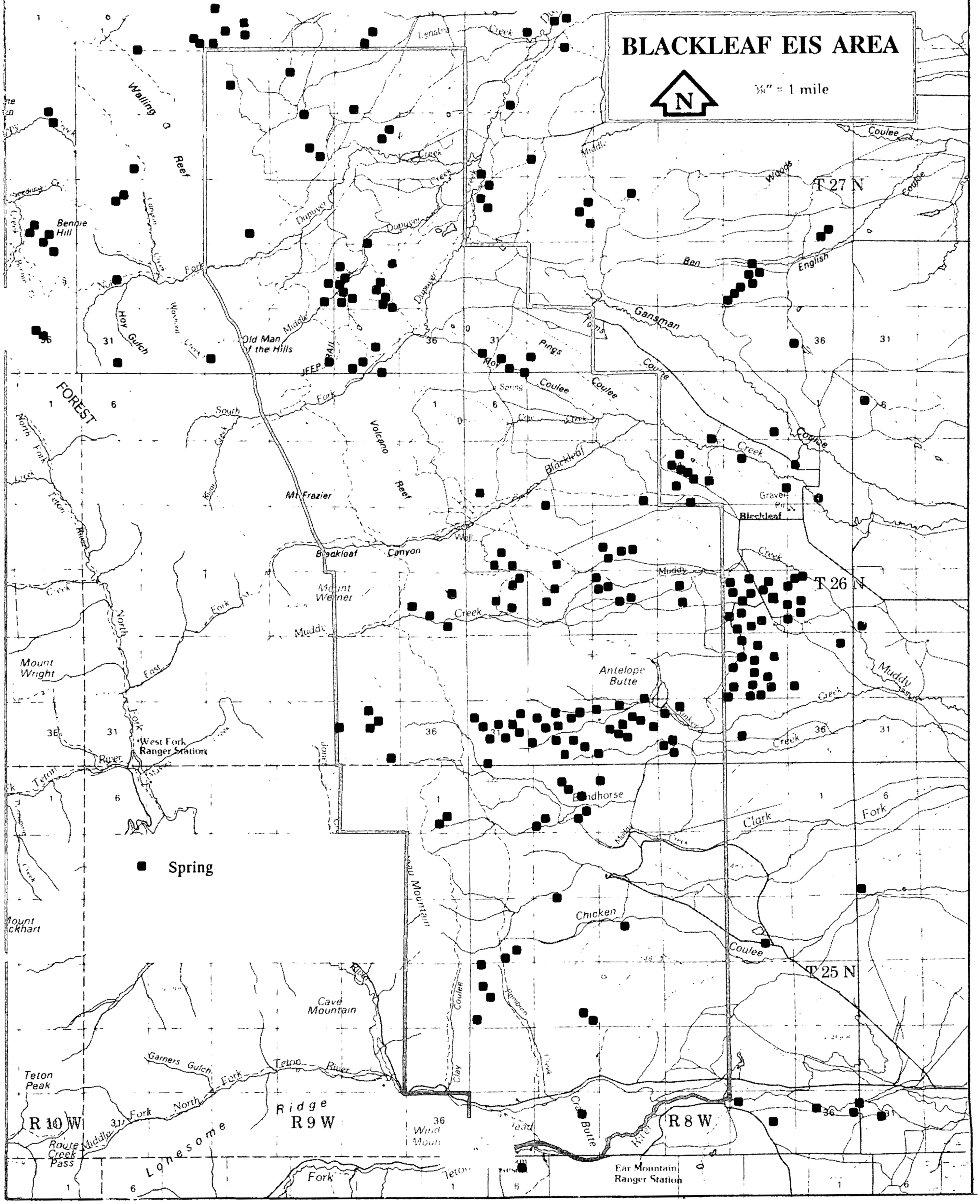


Figure L-3 Distribution of Summer Grizzly Bear Observations.

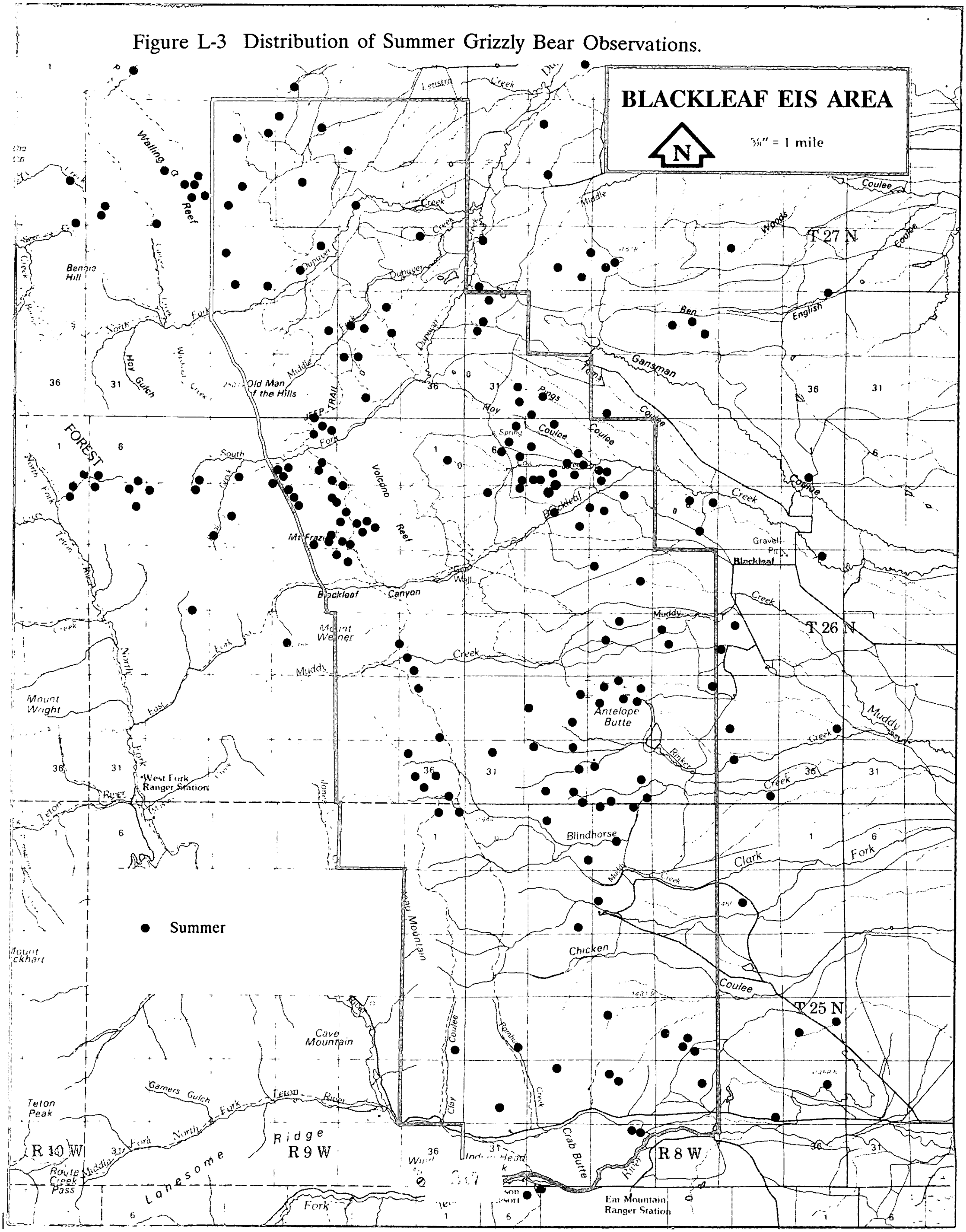


Figure L-4 Distribution of Fall Grizzly Bear Observations.

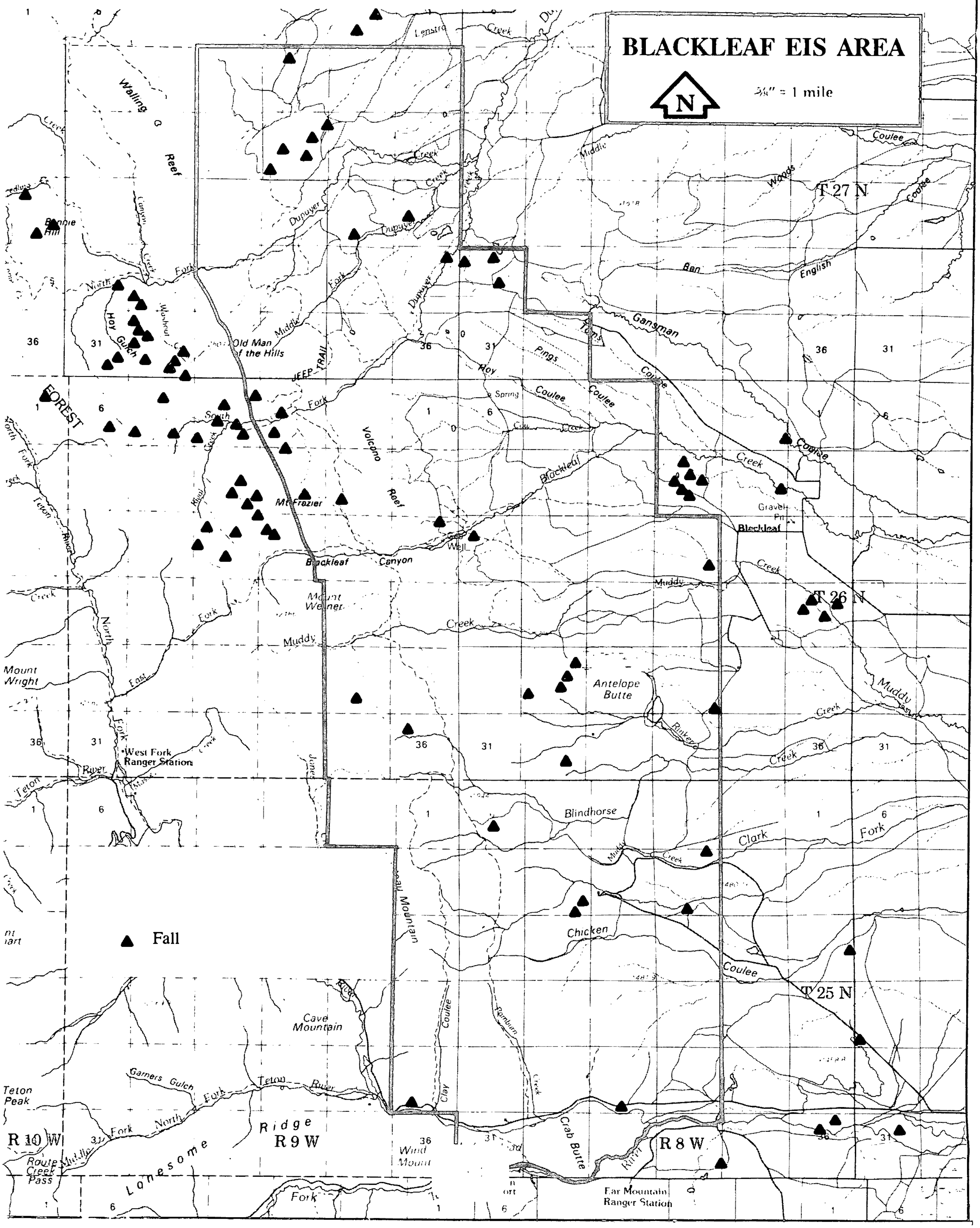
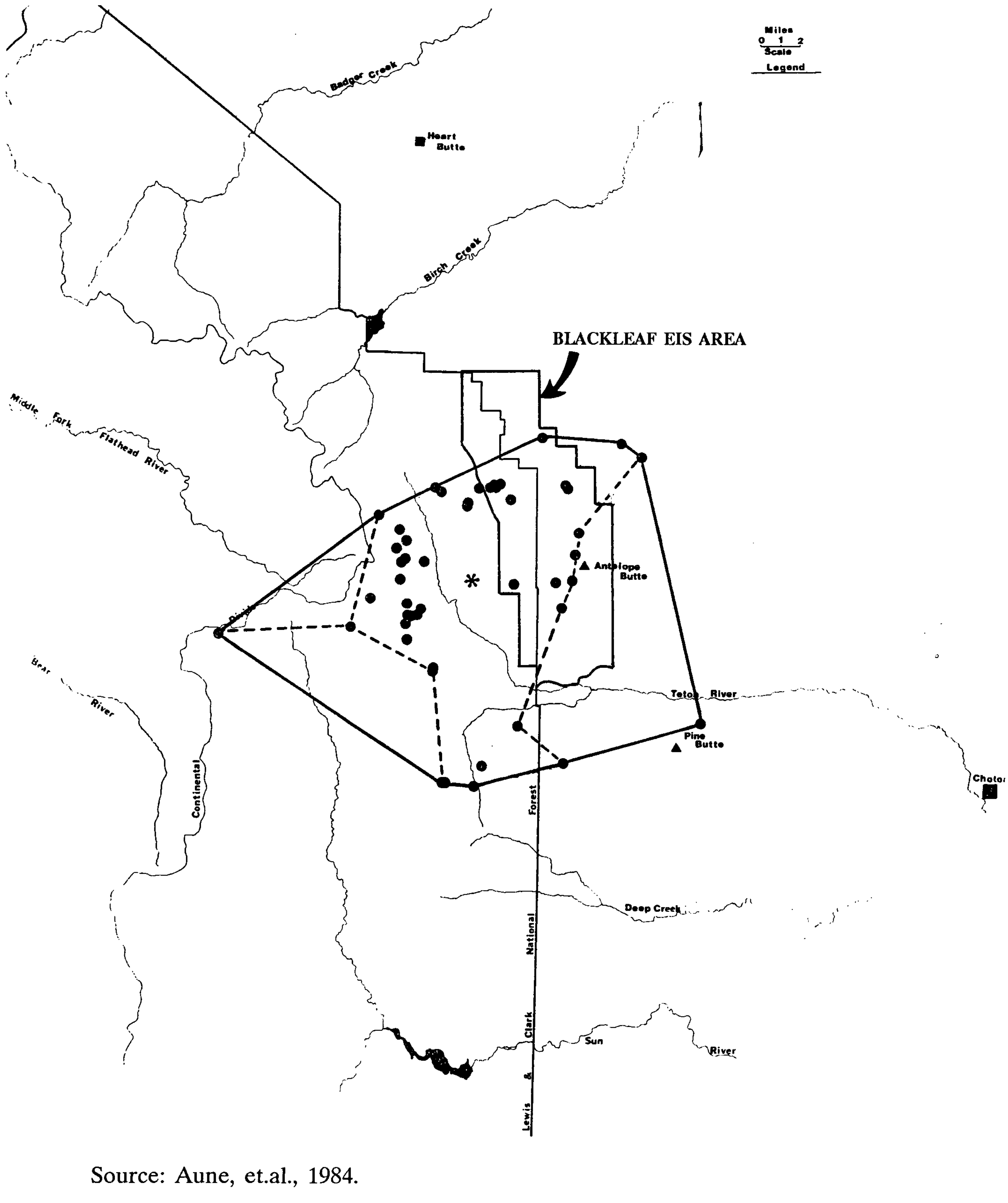
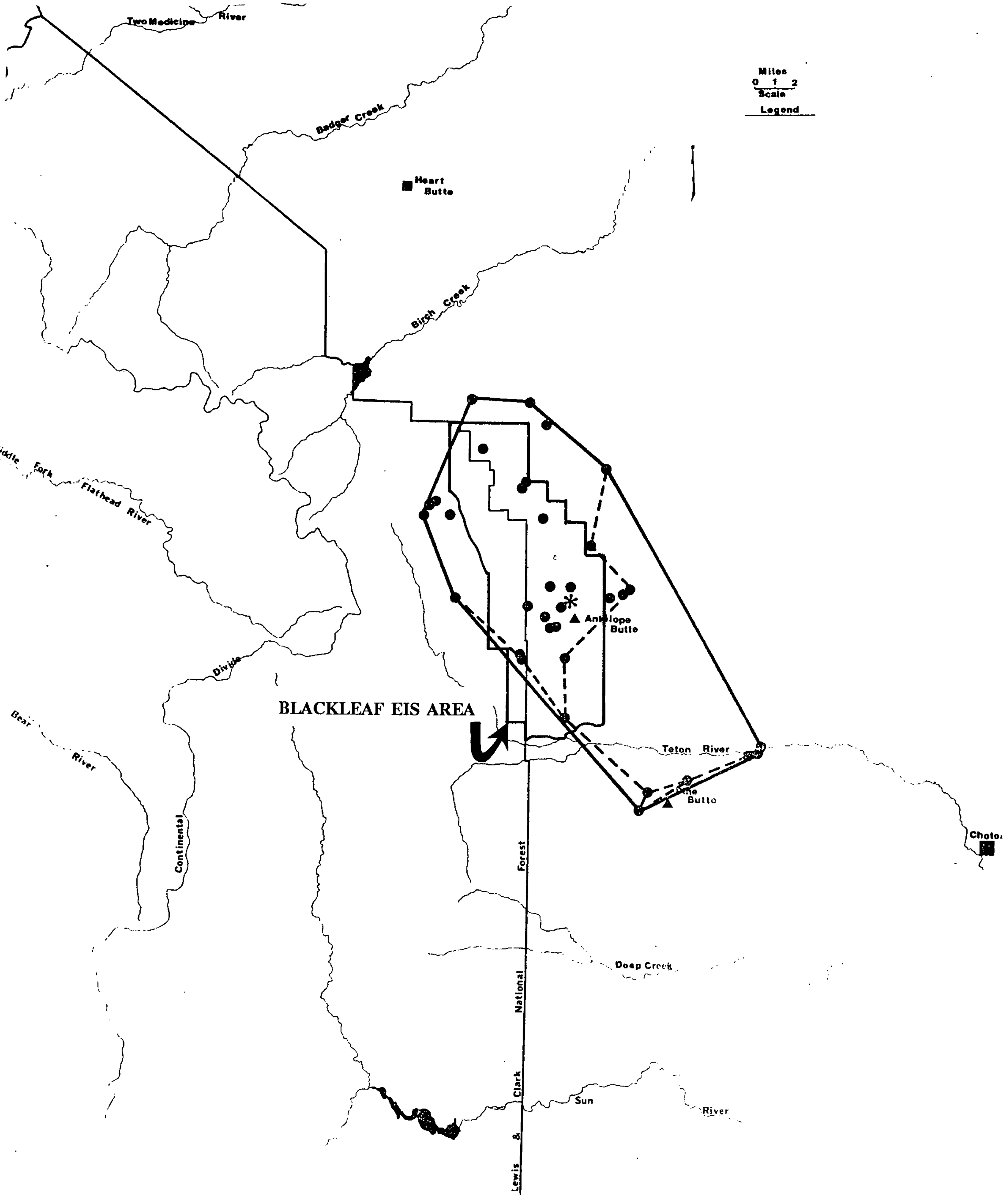


Figure L-5 Minimum and Modified Minimum Home Range of Grizzly 220, 1983.



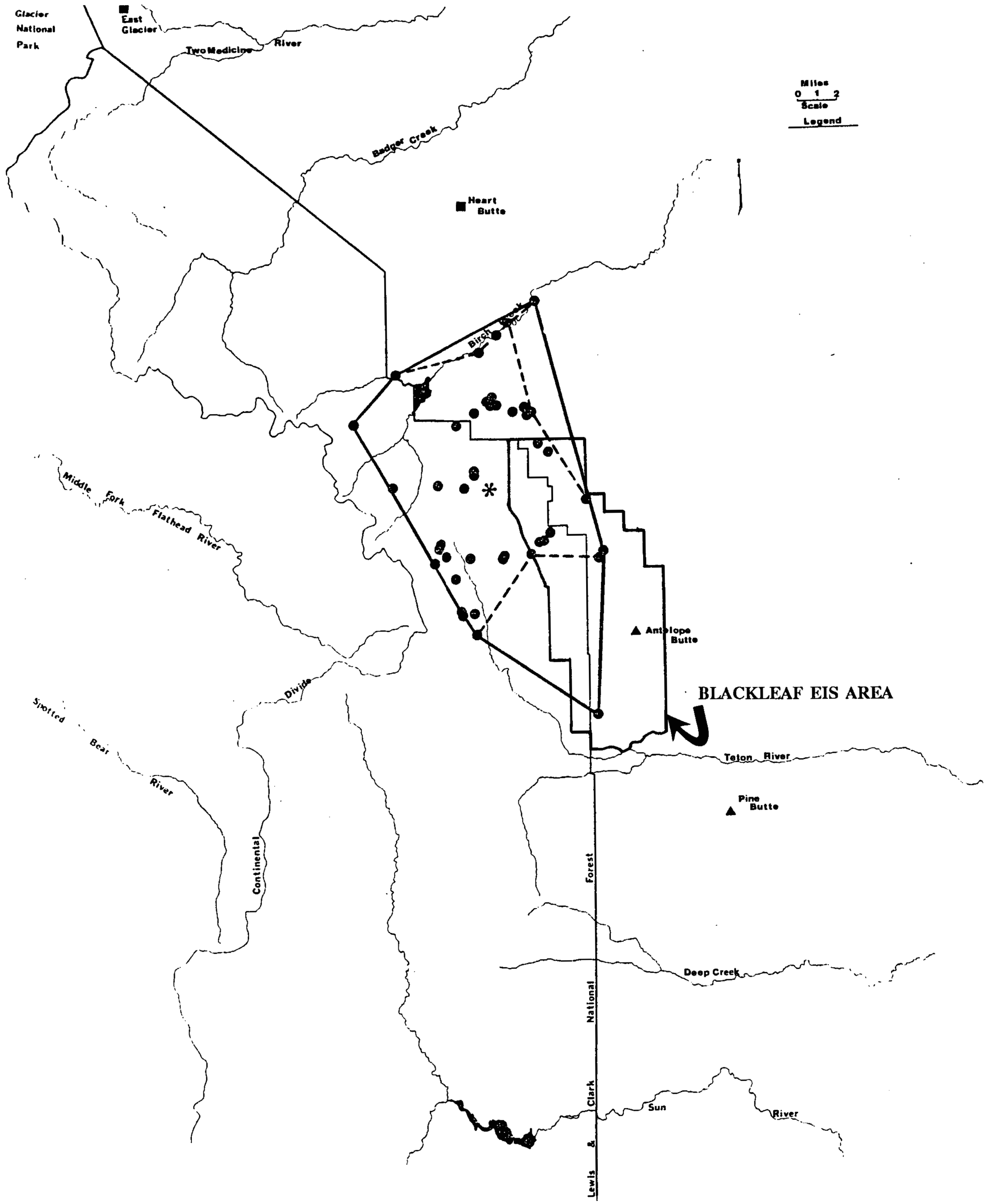
Source: Aune, et.al., 1984.

Figure L-6 Minimum and Modified Minimum Home Range of Grizzly 257, 1983.



Source: Aune, et.al., 1984.

Figure L-7 Minimum and Modified Minimum Home Range of Grizzly 335, 1983.



Source: Aune, et.al., 1984.

hunting; most bears were shot from roads." Most other research shows similar conclusions concerning correlation between grizzly bear mortality and roads (National Wildlife Federation, 1987, and Dood et al., 1986).

CUMULATIVE EFFECTS MODEL (CEM)

Because the analysis of full field development in such important wildlife habitat was so complex and controversial, and because the principal tool to display effects on grizzly bear involved a new process, cumulative effects computer modeling (CEM), early involvement and discussions were initiated with not only the U. S. Fish and Wildlife Service but also with the Montana Department of Fish, Wildlife, and Parks. Advice and professional opinion from biologists from these agencies as well as the U.S. Forest Service aided in development and selection of the preferred alternative, and their opinions were supported by CEM outputs.

The reviewer is referred to the USFS publication "Cumulative Effects Analysis Process for the RMF Northern Continental Divide Grizzly Bear Ecosystem" (U.S. Forest Service et al., 1987) for descriptions of the complicated modeling processes and formulas used in the computer assisted analysis. The basic geographic unit of the CEM is the vegetation polygon (individually delineated units of vegetation). The model calculates values based on the inherent habitat values of polygons as affected by various human activities. The CEM is composed of two phases, the data base construction phase and the analysis phase. Within the data base construction phase, there are two submodels that develop the data base; habitat and activity. The habitat submodel uses data variables (food, cover, edge value etc.) to arrive at seasonal habitat values for the subunit. The activity submodel creates zones of influence for each activity based on nature and type of activity, disturbance coefficients (DC), cover-noncover relationships and determines the habitat values for the vegetative units within the zone-of-influence. The analysis phase uses results from the data base construction phase as data for formulas that calculate the model results; habitat effectiveness (HE) and mortality risk index, (MRI).

During analysis, each wellsite and associated road and pipeline system was separately run through the CEM, and outputs for changes from the existing situation in HE and MRI were obtained for each season (Tables L-2, L-3, and L-4). These data were correlated with information available from Keith Aune's study, and the interagency group decided on the relative importance to grizzly bear and acceptability of each wellsite and road system in formulating of the preferred alternative. Other factors were discussed including relative impacts to all wildlife species and the significance of the site to recovering of gas reserves. However, the judgement as to how the grizzly bear would be affected from development of that site was the decisive factor as to whether or not a wellsite, road, or pipeline location should be included, modified, or dropped.

As a result of these Interagency discussions, review of Aune's study data, and CEM analysis, the following changes were made to the sites proposed in Alternative 2 to formulate the preferred alternative:

1. Two wells, S-6 and S-7, located at the head of Cow Creek and underneath Volcano Reef were dropped in the preferred

Table L-2. Comparison of Cumulative Effects Model Outputs for each well site as if activities occured during SPRING.

WELL SITE	HABITAL VALUE(HV)	REDUCTION IN HV	ACRES IN THE ZONE OF INFLUENCE (ZI)	SEASONAL HABITAT VALUE (SHV) IN ZI	% REDUCTION IN HABITAT EFFECTIVENESS (HE)	MORTALITY RISK INDEX (MRI)
B-1	5,667	4,210	10,445	0.543	3.78	.00614
S-1	4,272	3,284	7,870	0.543	2.91	.00420
S-2	3,877	2,890	9,390	0.413	2.60	.00412
S-2.4	7,221	3,195	11,595	0.372	2.87	.00472
ACCESS TO S-2 FOR ALT. 4	5,381	4,021	11,495	0.468	3.61	.007
S2.5-150 HIGH ROAD	4,556	3,455	9,980	0.457	3.10	.006
S2.5-151 LOWER ROAD	5,633	4,179	10,460	0.538	3.75	.00614
S-3	6,249	4,620	11,440	0.546	4.15	.00692
S-4	5,953	4,412	10,930	0.545	3.96	.00651
S-4.4	6,257	4,629	11,455	0.546	4.16	.009
S4.5 FINAL PLACEMENT & ROUTING FOR S-4 for ALT. 4	4,582	3,449	9,375	0.489	3.10	.00464
S-5	5,057	3,782	10,675	0.474	3.40	.00530
S 5.4 ACCESS TO S-5 FOR	5,279	3,937	10,385	0.508	3.54	.00560
ALT. 4	4,294	3,247	9,600	0.447	2.92	.0006
S-6						
S-6.4 ACCESS FOR	5,599	4,153	11,140	0.503	3.73	.00609
ALT.4						
S-7 SOUTHERN ACCESS						
S-7	5,814	4,305	12,645	0.460	3.87	.00639
NORTHERN ACCESS	4,216	2,952	9,855	0.428	2.65	.00565
S-8	4,191	2,583	10,395	0.403	2.32	.005
S8.4 TO AVOID COW CREEK						
E-1	2,172	1,697	6,060	0.404	1.52	.00178
E-2	4,506	3,399	10,055	0.483	3.05	.00452
E-3	3,435	2,619	8,565	0.401	2.35	.00326
E-4	3,793	3,049	7,650	0.496	2.74	.00388
E-5	5,582	3,500	10,665	0.523	3.14	.00601
E-6	5,310	4,111	10,750	0.494	3.69	.00597

Table L-3. Comparison of Cumulative Effects Model Outputs for each well site as if activities occured during SUMMER.

WELL SITE	HABITAL VALUE(HV)	REDUCTION IN HV	ACRES IN THE ZONE OF INFLUENCE (ZI)	SEASONAL HABITAT VALUE (SHV) IN ZI	% REDUCTION IN HABITAT EFFECTIVENESS (HE)	MORTALITY RISK INDEX (MRI)
B-1	5,667	4,210	10,445	0.543	3.78	.00614
S-1	4,272	3,284	7,870	0.543	2.91	.00420
S-2	3,877	2,890	9,390	0.413	2.60	.00412
S-2.4 ACCESS TO S-2 FOR ALT. 4	7,221	3,195	11,595	0.372	2.87	.00472
S2.5-150 HIGH ROAD	5,381	4,021	11,495	0.468	3.61	.007
S2.5-151 LOWER ROAD	4,556	3,455	9,980	0.457	3.10	.006
S-3	5,633	4,179	10,460	0.538	3.75	.00614
S-4	6,249	4,620	11,440	0.546	4.15	.00692
S-4.4	5,953	4,412	10,930	0.545	3.96	.00651
S4.5 FINAL. PLACEMENT & ROUTING FOR S-4 for ALT. 4	6,257	4,629	11,455	0.546	4.16	.009
S-5	4,582	3,449	9,375	0.489	3.10	.00464
S 5.4 ACCESS TO S-5 FOR ALT. 4	5,057	3,782	10,675	0.474	3.40	.00530
S-6	5,279	3,937	10,385	0.508	3.54	.00560
S-6.4 ACCESS FOR ALT.4	4,294	3,247	9,600	0.447	2.92	.0006
S-7 SOUTHERN ACCESS	5,599	4,153	11,140	0.503	3.73	.00609
S-7 NORTHERN ACCESS	5,814	4,305	12,645	0.460	3.87	.00639
S-8	4,216	2,952	9,855	0.428	2.65	.00565
S8.4 TO AVOID COW CREEK	4,191	2,583	10,395	0.403	2.32	.005
E-1	2,172	1,697	6,060	0.404	1.52	.00178
E-2	4,506	3,399	10,055	0.483	3.05	.00452
E-3	3,435	2,619	8,565	0.401	2.35	.00326
E-4	3,793	3,049	7,650	0.496	2.74	.00388
E-5	5,582	3,500	10,665	0.523	3.14	.00601
E-6	5,310	4,111	10,750	0.494	3.69	.00597

Table L-4. Comparison of Cumulative Effects Model Outputs for each well site as if activities occured during FALL.

WELL SITE	HABITAL VALUE(HV)	REDUCTION IN HV	ACRES IN THE ZONE OF INFLUENCE (ZI)	SEASONAL HABITAT VALUE (SHV) IN ZI	% REDUCTION IN HABITAT EFFECTIVENESS (HE)	MORTALITY RISK INDEX (MRI)
B-1	6,623	4,958	10,445	0.634	4.06	.00692
S-1	4,707	3,592	7,870	0.598	2.94	.00444
S-2	4,319	3,226	9,390	0.460	2.64	.00456
S-2.4 ACCESS TO S-2 FOR ALT. 4	4,883	3,620	11,595	0.421	2.97	.00533
S2.5-150 HIGH ROAD	5,813	4,340	11,495	0.506	3.56	.008
S2.5-151 LOWER ROAD	4,949	3,749	9,980	0.496	3.07	.007
S-3	6,630	4,962	10,460	0.634	4.07	.00692
S-4	7,125	5,254	11,440	0.623	4.31	.00798
S-4.4	6,574	4,868	10,930	0.601	3.99	.00722
S4.5 FINAL PLACEMENT & ROUTING FOR FOR S-4 FOR ALT. 4	7,515	5,591	11,455	0.656	4.58	.010
S-5	5,216	3,944	9,375	0.556	3.23	.00518
S 5.4 ACCESS TO S-5 FOR ALT. 4	5,710	4,290	10,675	0.535	3.52	.00586
S-6	6,045	4,524	10,385	0.582	3.71	.00632
S-6.4 ACCESS FOR ALT.4	4,799	3,652	9,600	0.500	2.99	.007
S-7 SOUTHERN ACCESS	6,275	4,656	11,140	0.563	3.82	.00684
S-7 NORTHERN ACCESS	6,251	4,639	12,645	0.494	3.80	.00680
S-8	4,477	3,135	9,855	0.454	2.57	.006
S8.4 TO AVOID COW CREEK	4,339	2,690	10,395	0.417	2.20	.005
E-1	2,451	1,918	6,060	0.404	1.57	.00199
E-2	4,855	3,664	10,055	0.483	3.00	.00485
E-3	3,747	2,844	8,565	0.438	2.33	.00364
E-4	5,061	4,046	7,650	0.662	3.32	.00519
E-5	7,158	4,564	10,665	0.671	3.74	.00795
E-6	6,977	5,387	10,750	0.649	4.42	.00783

alternative. This particular area was considered crucial to grizzly bear and has been central to activities of breeding-age sows, (Figures L-5, L-6, and L-7). The area also has a multitude of other important wildlife values. Accessing these two sites while holding impacts to an acceptable level was not considered very probable.

2. A new road design to access S-8 by skirting around the Cow Creek area was made. This was done in order to keep man's influence on grizzly bear habitat in the Cow Creek/Volcano Reef area to a minimum.

3. The S-4 site and associated road and pipeline on the south side of Muddy Creek were relocated to lessen impacts. The pipeline was totally redesigned and will now follow the new roadway, rather than opening a new path through important grizzly bear bedding cover and riparians to the east of the wellsite.

4. The S-2 site was extremely difficult to design to a minimal and acceptable level of negative influence on grizzly bear. It is located within a highly used grizzly bear complex just upslope (1/4 to 1/2 mile) of the Blind Horse and Rinkers Creek riparian areas. The wellsite is in an extremely dense limber pine-juniper habitat component which is principally used for bedding after bears have been feeding in the riparian areas.

   Originally, the road to S-2 was designed to come from the county road almost due east and climb up through the Blind Horse/Rinkers Creek riparian areas. Upon initial analysis, it was agreed that such a road and wellsite location would be extremely detrimental to grizzly bears in the Blackleaf/Teton BMU; and that if a road could be designed to come off of an existing road to the south (which had been upgraded for a drilling project in 1985), and that S-2 could be moved westward to get further away from the riparian areas the level of negativity would be significantly reduced.

   Thus two road routes were so designed, one high thru the Blind Horse Outstanding Natural Area and one lower which switchbacks through the upper portion of Blind Horse Creek. Each leads to a separate S-2 wellsite, and both sites are west of the original S-2 in Alternative 2. The group felt that without a doubt the lower route was less impacting than the upper, but was still located in a critical area. Concern was expressed about the pipeline route should the well be a discovery. It was felt that a pipeline lane through such heavy cover would be detrimental as it would entice people to use it as a travel lane. Consequently, the pipeline was designed to travel down the access road until it gets close to grassland prairie near Rinkers Creek and then cut through cover for only about a 1/4 mile onto the grassland.

In the future, as the CEM is refined and validity and sensitivity tests are performed on it, its utility as a tool of analysis and aid in helping make management decisions will become more meaningful. At this point in time, it is most useful as a comparative tool; comparing one road route to another, one wellsite to another, combinations of activities compared to other combinations, or one complete alternative to another. It is in this context that the following analysis is structured.

INDIVIDUAL WELL ANALYSIS

Tables L-2, L-3, and L-4 list the outputs for the exploration of each proposed well including associated roads for each season, as if no time and space requirements were applied to the site and no activities other than that particular wellsite were to be added to the activities already existing in the BMU. Some wells have more than one analysis because they were calculated with different road routes, mostly due to alternative formulation (Tables L-2, L-3 and L-4), as previously explained. These tables show which wells would influence the most important grizzly bear habitats and how much the HE would be lowered and the MRI raised.

Two factors provide a relative index of the effects of a particular wellsite on grizzly bear habitat; one related to quantity and one related to quality. The acres of habitat within the zone of influence (ZI) of a particular project indicate the amount of habitat affected, and the seasonal habitat value (SHV) of these acres is an index to the habitat's quality.

The acres of spring habitat within the zone expected to be negatively influenced by activities necessary to explore each well ranged from 6,060 acres for E-1 to 12,645 acres for S-7 (with a northerly access route) (Table L-2). Most wells influence about 9-10,000 acres of habitat.
Aune, 1987, mapped spring habitat in the Teton-Birch Creek BMU (Figure L-1) and determined that over 80% of this element lay outside of the National Forest. Slightly less than 60% of the BMU was classified as spring habitat, yet influence zones for all sites are almost totally spring range (Tables 4.17 through 4.20 and Figures 4.1 through 4.4 of the DEIS).

According to Aune, 1987, the BMU contains 512.1km^2 (126,080 acres) of spring habitat. As previously mentioned, the typical well in this gas field would influence about 9-10,000 acres of spring habitat. Comparing Aune's spring range map to computer outputs would indicate that exploration and production activities associated with field development for the average wellsite, if not mitigated by timing windows or other measures, would negatively affect 7 to 8% of the grizzlies spring range.

If the activity associated with each well was to be permitted during the spring, the change in HE for the acres influenced would decrease in a range from 1.96% at E-1 to 6.18% at E-6. Generally, however, adding a wellsite to the BMU reduces the HE in ZI by about 4%. If exploration activity were to be undertaken during the summer or fall periods, the reduction in habitat effectiveness levels would range from 1.52 to 4.15 and 1.57 to 4.42, respectively. These numbers are not as large as the reductions in spring, but the HE levels for the existing situation are significantly less than those for the spring period (Table L-2), and the area qualifying as summer and fall range is more expansive.

Seasonal Habitat Values (SHVs) for the acres in the ZI in spring ranged from 0.5888 at E-3 to 1.095 at E-4. Most step-out wells exhibited SHVs of around 0.8.

It is apparent that as a general rule grizzly bear habitat affected by proposed sites at the southern end of the EIS area were not as high value as that in the middle and northern end.

This individual well analysis was most important in comparing the level of impact from one well to another by season and for alternative formulation, but at this stage of model use and development the interpretation of the magnitude of the number changes are difficult to relate to. Since roads and possibly pipelines are to be shared in full field development, operations are staggered over long periods of time; and mitigation including time and space restrictions and remote monitoring are to be applied, the magnitude of the numbers expressed in this individual well analysis are exaggerated.

COMPARISON OF ALTERNATIVES

Cumulative Effects Modeling outputs for the existing situation plus each alternative at full production are presented in Table L-5. Significant amounts of roading have already occurred in the BMU and much of this is in the EIS area. This roading has contributed to the reduced HE in the BMU. Fortunately, most of the heavy use of these roads is only during the fall hunting season. Habitat effectiveness has already been reduced 19.31, 29.78, and 45% in the spring, summer, and fall, respectively.

Outputs were calculated for each alternative at full production to see what the increases in negative influence on grizzly bears and their habitat would be. Again, the relative meaning of the magnitude of the number changes is difficult to interpret with such a new model. But, as expected, the greatest negative effects occur when the most sites are developed with the most on site activity (Alternative 2). Increases from the existing situation in per cent reduction in HE and MRI are given in Tables L-6 and L-7. As shown the greatest increase in reduction in HE and increases in MRI occur in Alternative 2 in the spring as 2.73 and 0.103%, respectively. Effects lessen as the number of sites are reduced and less production activity occurs on site (Alternatives 4, 3, and 1).

As previously discussed, the face of the Rocky Mountain Front and riparian areas of the adjoining prairie are critically important to grizzly bear during the spring. Care should be taken (and has been in siting past proposals) to separate oil and gas activities from important high value spring habitats by avoiding them in both time and space. Time mitigation is generally easy to apply, especially during exploration, by adhering to a fall drilling window. Special mitigation may be harder to apply and exploration of some adjacent sites may be staggered over years.

SIMULTANEOUS EXPLORATION AND PRODUCTION

Until all sites have been explored and the final production scenario has actually been defined, all scheduling of exploration wells will be conjecture. BLM cannot dictate to a lessee or unit manager when to file an Application for Permit to Drill (APD), but BLM could delay approval of an APD for a drilling season if too many activities were scheduled and the existence of an endangered species was in question. Each year as the field develops new levels of impact would be exerted on grizzly bears and the new impacts would be additive to those still existing

Table L-5

Results of Cumulative Effects Modeling for the Existing Situation in the Birch-Teton Bear Management Unit and for four Production Scenarios given as Alternatives in the Blackleaf EIS.

	BASE EXISTING SITUATION			ALTERNATIVE 1			ALTERNATIVE 3			ALTERNATIVE 4			ALTERNATIVE 2		
	SPRING	SUMMER	FALL	SPRING	SUMMER	FALL	SPRING	SUMMER	FALL	SPRING	SUMMER	FALL	SPRING	SUMMER	FALL
HV	.642	.511	.560	.642	.511	.560	.642	.511	.560	.642	.511	.560	.642	.511	.560
HB	.518	.359	.308	.513	.358	.308	.511	.357	.306	.507	.356	.306	.501	.352	.300
% Reduction	19.31	29.78	45.00	20.11	29.82	45.04	20.49	30.11	45.33	21.03	30.20	45.39	22.04	31.04	46.43
Habitat Units Reduced	27,035	33,142	54,907	28,148	33,190	54,952	28,684	33,509	55,313	29,439	33,611	55,378	30,852	34,555	56,650
MRI	.087	.115	.324	.092	.115	.325	.094	.116	.326	.098	.117	.327	.103	.121	.332

Alternative 1: Provides for production of I-13, I-19, I-5, I-8 wellsites with a central gas plant. Only difference between this and existing situation is year long operation at the sweetening plant and access roads to wellsites.

Alternative 2: Provides for production of all wellsites except exploratory wells. Includes production facilities at each wellsite, therefore, there is a zone-of-influence around each wellsite plus access roads.

Alternative 4: Provides for production of all wells except S-6 and S-7 and the exploratory wellsites. Includes 24 hour operation of sweetening plant, utilizes remote monitoring of wellheads, year long use either for high or low use. One Basic Assumption used: gas use will not raise any use of the road above what it is classified in the existing situation because of remote monitoring.

Alternative 3: Same situation as Alternative 4 except fewer wellsites are programmed.

Table L-6

Per Cent Reduction in Habitat Effectiveness (HE) by season for the existing situation (base) and each Alternative and increase in (HE) when at full production.

	SPRING		SUMMER		FALL	
ALTERNATIVE	HE	INCREASE FROM BASE	HE	INCREASE FROM BASE	HE	INCREASE FROM BASE
EXISTING SITUATION (BASE)	19.31		29.78		45.00	
1	20.11	0.8	29.82	0.04	45.04	0.04
3	20.49	1.18	30.11	0.33	45.33	0.33
4	21.03	1.72	30.20	0.42	45.39	0.39
2	22.04	2.73	31.04	1.26	46.43	1.43

Table L-7

Mortality Risk Index (MRI) by season for the existing situation (base) and each Alternative and increase in MRI when at full production.

	SPRING		SUMMER		FALL	
ALTERNATIVE	MRI	INCREASE FROM BASE	MRI	INCREASE FROM BASE	MRI	INCREASE FROM BASE
EXISTING SITUATION (BASE)	0.087		0.115		0.324	
1	0.092	0.005	0.115	same	0.325	0.001
3	0.094	0.007	0.116	0.001	0.326	0.002
4	0.098	0.011	0.117	0.002	0.327	0.003
2	0.103	0.016	0.121	0.006	0.332	0.008

including effects of producing wells. As exploration ceases and production activities are defined the additive (cumulative) effects will lessen.

In the scenario described in the preferred alternative the years of the greatest negative effects on grizzly bears would be when more than one well in the EIS area is in the exploration phase. This is apparent when Tables L-2, L-3, L-4 showing HE and MRI for individual wells are studied. Relative effects of combinations of explorations occurring in the same year can be envisioned. It would appear that during 1993-94, when S-4 and S-5 are both in the exploration phase the highest impacts would probably occur (see Table L-8).

Thus as one can see on Table L-9 the increase in HE is over three times greater during the years when these more difficult wells, S-4 and S-5, are being explored than when full production is reached in the preferred alternative. It would appear that during these years the maximum negative effect on bears would occur. In other words, the maximum reduction in HE anticipated would be 26.46% if S-4 and S-5 were explored during the spring periods of 1993 and 1994 (Table L-8), and this reduction is 7.15% greater than the reduction existing for the BMU at the present time (Table L-9). Should the field develop at a slower rate and less overlap in drilling of exploration sites occurs, less maximum reduction in HE for any given year would result. The sequence of events proposed are very ambitious and less activity than proposed would likely be the real situation for any given year.

Table L-8

Years of maximum effect on grizzly bears, 1993-94, when two of the more difficult wells are being explored (S-4 and S-5).

	SPRING	SUMMER	FALL
HV	.642	.511	.560
HE	.472	.339	.291
% Reduction	26.46	33.66	48.00
Habitat Units Reduced	37,045	37,468	58,571
MRI	.103	.121	.330

Table L-9

Increase in the percentage of reduction in Habitat Effectiveness in the BMU as compared to Existing Situation for all alternatives and during the years of maximums negative effect, 1993-94[1/]

ALTERNATIVE	1	3	4	2	S-4 & S-5 during 1993 & 1994
Spring	0.8	1.18	1.72	2.73	7.15
Summer	0.04	0.33	0.42	1.26	3.88
Fall	0.04	0.33	0.39	1.43	3.00

1) These modeling outputs assume that exploration of these two wells is occurring thru all seasons.

DETERMINATION OF EFFECT FOR GRIZZLY BEAR

The Interagency Rocky Mountain Front guidelines will be adhered to except for minor variations as identified in the EIS., i.e. timing window in Alternative 4. Guidelines applicable to grizzly bear include the general management guidelines on pages 3 and 4 and the grizzly bear specific guidelines on page 10 (BLM et. al. 1987).

Application and adherence to these guidelines will significantly lessen the adversity of these activities, especially exploration which can be programmed in an appropriate late summer or fall drilling window. Effects from production are harder to mitigate. Employment of remote monitoring (Alternatives 1, 3, and 4) and proper road management (all alternatives) will lessen, BUT NOT ELIMINATE these adverse effects, therefore, we must determine that grizzly bear may be affected by any of these alternatives and we request a Fish and Wildlife Service opinion on each.

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Table G-5

Results of Cumulative Effects Modeling for the Existing Situation in the Birch-Teton Bear Management Unit and for four Production Scenarios given as Alternatives in the Blackleaf EIS.

	BASE EXISTING SITUATION			ALTERNATIVE 1			ALTERNATIVE 3			ALTERNATIVE 4			ALTERNATIVE 2		
	SPRING	SUMMER	FALL	SPRING	SUMMER	FALL	SPRING	SUMMER	FALL	SPRING	SUMMER	FALL	SPRING	SUMMER	FALL
HV	.642	.511	.560	.642	.511	.560	.642	.511	.560	.642	.511	.560	.642	.511	.560
HB	.518	.359	.308	.513	.358	.308	.511	.357	.306	.507	.356	.306	.501	.352	.300
% Reduction	19.31	29.78	45.00	20.11	29.82	45.04	20.49	30.11	45.33	21.03	30.20	45.39	22.04	31.04	46.43
Habitat Units Reduced	27,035	33,142	54,907	28,148	33,190	54,952	28,684	33,509	55,313	29,439	33,611	55,378	30,852	34,555	56,650
MRI	.087	.115	.324	.092	.115	.325	.094	.116	.326	.098	.117	.327	.103	.121	.332

Alternative 1:
Provides for production of I-13, I-19, I-5, I-8 wellsites with a central gas plant. Only difference between this and existing situation is year long operation at the sweetening plant and access roads to wellsites.

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Provides for production of all wellsites except exploratory wells. Includes production facilities at each wellsite, therefore, there is a zone-of-influence around each wellsite plus access roads.

Alternative 4:
Provides for production of all wells except S-6 and S-7 and the exploratory wellsites. Includes 24 hour operation of sweetening plant, utilizes remote monitoring of wellheads, year long use either for high or low use. One Basic Assumption used: gas use will not raise any use of the road above what it is classified in the existing situation because of remote monitoring.

Alternative 3:
Same situation as Alternative 4 except fewer wellsites are programmed.

Table G-6

Per Cent Reduction in Habitat Effectiveness (HE) by season for the existing situation (base) and each Alternative and increase in (HE) when at full production.

	SPRING		SUMMER		FALL	
ALTERNATIVE	HE	INCREASE FROM BASE	HE	INCREASE FROM BASE	HE	INCREASE FROM BASE
EXISTING SITUATION (BASE)		19.31			29.78	45.00
1 45.04		20.11 0.04		0.8	29.82	0.04
3 45.33		20.49 0.33		1.18	30.11	0.33
4 45.39		21.03 0.39		1.72	30.20	0.42
2 46.43		22.04 1.43		2.73	31.04	1.26

Table G-7

Mortality Risk Index (MRI) by season for the existing situation (base) and each Alternative and increase in MRI when at full production.

	SPRING		SUMMER		FALL	
ALTERNATIVE	MRI	INCREASE FROM BASE	MRI	INCREASE FROM BASE	MRI	INCREASE FROM BASE
EXISTING SITUATION (BASE)		0.087			0.115	0.324
1 0.325		0.092 0.001		0.005	0.115	same
3 0.326		0.094 0.002		0.007	0.116	0.001
4 0.327		0.098 0.003		0.011	0.117	0.002
2 0.332		0.103 0.008		0.016	0.121	0.006

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Fish and Wildlife Enhancement
Federal Bldg., U.S. Courthouse
301 South Park
P.O. Box 10023
Helena, Montana 59626

IN REPLY REFER TO:
M.02 Blackleaf Oil/Gas
Field Development

December 20, 1989

MEMORANDUM

To: District Manager, Lewistown District Office, Bureau of Land Management, Lewistown, MT

From: Field Supervisor, Montana/Wyoming Field Office, Fish and Wildlife Enhancement, U.S. Fish and Wildlife Service, Helena, MT

Subject: Section 7 Consultation - Blackleaf Oil and Gas Field Development

This is the U.S. Fish and Wildlife Service's (Service) biological opinion prepared in response to your September 19, 1989 request for formal consultation under Section 7 of the Endangered Species Act on the Blackleaf Oil and Gas Field Development Environmental Impact Statement.

This biological opinion considers the effects of field development in the Blackleaf area (Figure 1.1, Appendix A) as outlined in the preferred alternative (Alternative 4) of the Preliminary Draft Environmental Impact Statement (PDEIS). This opinion, however, is restricted in scope to the existing wells and the step-out wells identified in Alternative 4 and does not cover the six exploratory wells identified as part of all alternatives analyzed in the PDEIS. The PDEIS and biological assessment for endangered and threatened species do not analyze the consequences of all stages of oil/gas activities associated with the six exploratory wells. Based on Conner v. Burford, 836 F 2d 1521, the Endangered Species Act requires the Service to consider all stages of the agency action (i.e, exploration through production and abandonment) in its biological opinion using the best scientific and commercial data available. According to Conner v. Burford, staged consultations on oil/gas activities does not meet the intent of the Endangered Species Act. Therefore, before an application for permit to drill (APD) for any of the six exploratory wells can be approved, the Bureau of Land Management (BLM) must assess the consequences of all stages of its actions and submit this information along with a request for formal consultation to the Service. Upon receiving a request for formal consultation, the Service will issue a comprehensive biological opinion considering all stages of the activity.

Based upon our review of the biological assessment and the September 1989 PDEIS, the Service concurs with the conclusions reached in the biological assessment that there will be no adverse effects upon the bald eagle and peregrine falcon. This biological opinion considers the potential effects of exploration, development and production from the two existing wells (1-5 and 1-8) that are producers, the two existing shut-in wells (1-13 and 1-19), six step-out wells (S-1, S-2, S-3, S-4, S-5, and S-8) and one injection well on the grizzly bear and gray wolf (Figure 2.9, Appendix B). The overall environmental acceptability of the proposed actions are not considered. The Service has examined the proposed actions in accordance with the procedural regulations governing interagency cooperation under Section 7 of the Endangered Species Act of 1973, as amended (50 CFR 402 and USC 1531 et seq.).

BIOLOGICAL OPINION

It is the Service's biological opinion that field development in the Blackleaf EIS analysis area as outlined in Alternative 4 of the PDEIS and biological assessment is not likely to jeopardize the continued existence of the grizzly bear and gray wolf. The scope of this opinion does not include the exploratory wells identified in Alternative 4.

This opinion is contingent upon:

1. the project being designed and implemented as described in the preferred alternative identified in the PDEIS and biological assessment and as summarized in the project description of this opinion;

2. the mitigation and coordination measures outlined in the PDEIS, biological assessment, and in this opinion (reference PROJECT DESCRIPTION) are implemented and followed;

3. technology is available to remote monitor the well heads; and

4. no more than two step out wells may be drilled concurrently.

PROJECT DESCRIPTION

The Blackleaf EIS identifies alternatives for field development of the two known gas structures (known as the Blackleaf Production Unit) and establishes the sideboards that govern the extent and manner in which field development will occur. Full field development includes all development activities including exploration of step out wells, production facility development, placement of transportation networks and abandonment.

The Blackleaf Production Unit currently has two producing wells (wells 1-5 and 1-8) and two shut-in wells (1-13 and 1-19) capable of production. The preferred alternative for field development consists of the following:

Existing Wells	2
Shut-in Wells brought on line	2
Injection Wells	1
Step Out Wells	6
Total Wells	11

Gas Processing Facility	1
Total Road Miles in Use	63.45*
Total New Road Construction	6.5
New Pipeline Outside of Road ROWs	23.9 miles
New Pipeline Inside of Road ROWs	12.65 miles
Existing Pipeline	3.25 miles
Total Pipeline Miles	39.8**
Time Frames	
Active Drilling Program	1991-2003
Well Field Maintenance	1983-2026
Abandonment and Rehabilitation	2024-2026 (last 2 years of field life)

* The total road miles figure reflects counting some segments of the total road system multiple times since some segments would be used to access multiple wells. This was done to give the reader the total length of road to be used for each well site.

** The reason for high number of pipeline miles is that each well is metered at the gas plant requiring a separate line for each well. Many of these pipelines will be laid in the same right-of-way.

A central gas processing facility would be located on private surface over Federal minerals (T26N, R8W, Section 8), thus eliminating the need for production facilities at each wellhead. The only facilities located at each wellsite would be the wellhead, some corrosion inhibitors (to be injected into the gas stream prior to putting it into the pipeline) contained inside a small building on-site and separation and dehydration facilities for separation of water, gas and gas condensate. Each wellsite would be remotely monitored from the central gas processing facility via computer capabilities. Initially, each well would be visited a maximum of once per day unless there were problems. This level of visitation would occur during the first year or at least through the first winter until all problems are worked out.

The gas bearing geologic structures being tapped by the wells will cease production in about 25 years at which time the wellheads, gas processing facility, pads and roads would be removed and rehabilitated to as near natural conditions as possible.

Wellsite access roads in the EIS area will be closed to motorized use by the public. Existing arterial and collector routes in the EIS area will remain open to public use to maintain existing access to public lands (Figure 4.4, Appendix C). Seasonal closures for wildlife purposes and resource protection will remain as currently managed. Roads which access non-producing wells will be closed and reclaimed.

All wellsite construction, maintenance and other proposals and activities would be required to meet the following requirements:

1. use a July 15 to December 15 timing window for any activity located in the areas cross-hatched on the Alternative 4 map (Appendix B) to minimize disruption to wildlife species. Within this time period the authorizing agencies would select the appropriate 105 day (3-1/2 month) operating period which would have the least adverse impact on wildlife;

2. site construction would be allowed the first year of operation and drilling allowed the following year if it appears both cannot be completed within the prescribed time window;

3. all productive wells will be remotely monitored to minimize maintenance visits;

4. proposals for concurrent activities (to be active during the same period) must be separated by at least a major drainage in critical areas or a minimum one mile distance at the agencies discretion based upon site specific location, resources and topography;

5. areas not cross-hatched on the Alternative 4 map (Appendix B) are areas with the least restrictions due to wildlife habitat and could sustain year-round oil and gas activity;

6. APDs must be filed 120 days in advance of any proposed activity so that the required evaluations may be completed;

7. the Management Guidelines for Selected Species, Rocky Mountain Front (RMF) Studies (RMF Guidelines), will be applied to all oil and gas activities; and

8. a no firearms policy as required by the RMF Guidelines for company employees while on duty will be enforced.

Current Status of the Grizzly Bear

There is an estimated current population of 549-813 grizzly bears for the Northern Continental Divide grizzly bear ecosystem (Montana Department of Fish, Wildlife and Parks, Grizzly Bear EIS, 1986). Using data from Aune et al. (In Prep.), the Service estimated for purposes of this consultation a population of 34.3 to 45.7 grizzly bears in the Birch-Teton Bear Management Unit (BMU). Counts in the Birch-Teton core study area of marked and unmarked grizzly bears (unduplicated bears) minus the recorded mortality averaged 27.4 bears. Using a counting efficiency of 60-80%, we calculated 34.3 to 45.7 grizzly bears in the BMU (27.4/.80 = 34.3; 27.4/.60 = 45.7). Trend data examined for grizzly bears on the East Rocky Mountain Front indicated a stable or perhaps slightly increasing population during the period 1977-1987 (Aune et al., In Prep.).

The recovery goals for the grizzly bear population in the Northern Continental Divide Ecosystem (Ecosystem) were established in the 1982 Grizzly Bear Recovery Plan as:

- a population of 440-680 with a mean goal of 560 bears; and

- attainment of a set of biological parameters.

Parameters for assessing population status have been identified for inclusion in the revision of the 1982 Grizzly Bear Recovery Plan. These parameters include; (1) the unduplicated sightings of females with cubs of the year, (2) distribution of females with young in the Ecosystem; (3) mortality, and (4) a conservation strategy. Targets for parameters 1, 2 and 3 are presently being established. The Conservation Strategy is in preparation by an Interagency Working Group. Table 1 presents population parameters from the 1982 Grizzly Bear Recovery Plan, the draft recovery parameters and their targets being considered for the revised Recovery Plan, and current parameter estimates.

Table 1. Grizzly Bear Population Status in the Northern Continental Divide Ecosystem

PARAMETERS	1982 RECOVERY PLAN*	CURRENT ESTIMATE**
POPULATION GOAL:	560	549 - 813
MEAN CUB LITTER SIZE	1.78	1.7 - 2.66
MEAN LITTER FREQUENCY (YEARS) (REPRODUCTIVE CYCLE)	3.0	2.1 - 3.3
MEAN PRODUCTION RATE (REPRODUCTIVE CYCLE)	0.593	0.515 - 1.267
ANNUAL NUMBER OF FEMALES WITH CUBS	56.0	68
AVERAGE ANNUAL KNOWN MAN-CAUSED MORTALITY	25.0	18.2
AVERAGE ANNUAL TOTAL MORTALITY AS % OF TOTAL POPULATION	17.1 - 18.7	(7.1 MAN-CAUSED)

*STATISTICS OR THEIR BIOLOGICAL EQUIVALENTS COMPUTED AS A RUNNING SIX-YEAR AVERAGE (PAGE 60)

**MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS LETTER DATED NOVEMBER 28, 1988

PARAMETERS	DRAFT REVISED RECOVERY PLAN	CURRENT ESTIMATE
PRODUCTION - UNDUPLICATED COUNT OF FEMALES WITH CUBS OF THE YEAR	22*	29.0 (1987-27; 1988-25; 1989-35)
OCCUPANCY - COUNT FEMALES WITH OFFSPRING	AT LEAST 1 FAMILY UNIT IN 20 OF 24 BMU**	21 (1987-89)
MORTALITY - INVENTORY ALL	NTE 14 TOTAL PER YEAR KNOWN HUMAN-INDUCED OR (6) FEMALES OUTSIDE GNP	12(6) - 1986 9(6) - 1987 8(6) - 1988 12(5) - 1989
HABITAT - MAINTAIN EFFECTIVENESS CONSERVATION STRATEGY PLAN	AS DEVELOPED, UTILIZE CUMULATIVE EFFECTS MODEL (CEM)	ON-GOING; UTILIZE BEST DATA AVAILABLE

*COMPUTED AS A RUNNING THREE YEAR AVERAGE. GNP = Glacier National Park
**COMPUTED AFTER THREE-YEARS OF CUMULATIVE REPORTS NTE = not to exceed

Current Status of the Gray Wolf

Natural recolonization is presently occurring in northwestern Montana as a result of dispersal of animals from wolf populations in Alberta and British Columbia and subsequent reproduction near the international border. Reproduction was first discovered in 1982 in the North Fork Flathead River drainage three miles north of Glacier National Park (GNP) with subsequent denning in GNP in 1986. Of four packs (Wigwam, Sage Creek, Headwaters, and Camas) that occurred in the North Fork Flathead River drainage during 1987, two packs now exist (Headwaters and Camas). Since 1986, wolf numbers have ranged between 15 and 26 animals. The population goal for down-listing wolves in the northwest Montana recovery area is 10 packs.

There have been 115 wolf occurrence reports recorded on the East Rocky Mountain Front during the period 1978 to 1989 (U.S. Fish and Wildlife Service files). Sixty-nine percent of these occurred within the last five years (1985-89). While available data do not indicate sustained pack activity on the East Front, the potential for pack formation and recolonization through natural recruitment appears eminent.

BASIS OF OPINION

Grizzly Bear: The pattern of grizzly use along the Rocky Mountain Front is largely determined by availability and phenology of plants that serve as food sources determined by food habit analysis, :io locations of radio-collared bears, and analysis of habitat use by montr -une et al., In Prep.). During the spring, summer and early fall, Antelope Butte and Pine Butte Swamps and the riparian corridors along creek drainages provide the grasses, sedges and forbs sought by bears. During the spring 80.3% of all radio locations were below 6,560 feet in elevation. Receding snowline and plant phenology influences the elevational distribution of bears during the spring. The elevational distribution during the summer is broad, encompassing all elevational zones. During the fall there is a bimodal distribution of elevations used by grizzly bears. Fruits of buffaloberry, serviceberry, chokecherry and grouse whortleberry at the lower elevations become increasingly important in the diet of bears in August and September. In September, for bears south of Birch Creek the food habits shift to whitebark pine nuts (93% of radio locations) at elevations above 6,200 feet. Very few cases of bears feeding on limber pine nuts were recorded (Aune et al., In Prep.).

For all grizzly bears, den entrance ranged between October 10 and December 5 with a median date of November 6. Movement to dens occurred from October 6 to approximately December 1. Den sites ranged in elevation from 5,100 feet to 8,167 feet with a mean of 7,055 feet. Ninety-five percent of the dens were above 6,232 feet. Emergence dates ranged between March 10 and May 13 with a median date of April 7.

Aune et al. (In Prep.) observed various patterns of elevational migration in grizzly bears on the Rocky Mountain Front. Two common patterns included lowland bears who migrated from denning habitat to low elevations and remained until a predenning-denning period and an upland pattern (backcountry bears) which included a spring season migration to lowlands, then a return to higher elevation during the summer and fall. Occasionally the upland bears would return to lower elevations during the berry season in late summer and fall.

The East Front grizzly bear studies (Aune et al., In Prep.) provides extensive data on habitat selection and use, population status and response of bears to human activities. These data and the guidelines developed from the East Front Studies (RMF Guidelines) provide a solid basis for designing and coordinating gas development in the Blackleaf area and assessing its impact.

Potential impacts to grizzly bears from hydrocarbon exploration and development are discussed and summarized in the Grizzly Bear Compendium (National Wildlife Federation, 1987). Potential impacts may be categorized as follows:

1. loss of habitat due to activities that adversely modify or destroy important habitat components;
2. loss of habitat due to displacement;
3. increased mortality risk; and
4. cumulative impacts of all past and present Federal, State and private actions.

Loss of Habitat due to Activities that Adversely Modify or Destroy Important Habitat Components

Construction of the access roads and drill pads is the activity most likely to adversely modify or destroy important habitat components for the grizzly bear. Access to the well sites requires an improved gravel road 12 to 16 feet wide and the drill pads are 2 to 5 acres in size. Thus, the six step out wells, four existing wells, and sweetening plant will directly impact approximately 43 acres. Their access roads will impact approximately 24 acres.

The Rocky Mountain Front Guidelines (Part A, Guideline #10 and Part B, Guideline #2) require that roads and drill sites be located to avoid important wildlife habitat components. Specific locations for each step-out well and access road will be determined at the time an APD is received and a site review made so that the drill site and roads are located to avoid important foraging components. Habitat components that contain important bear foods such as riparian shrub types, Populus stands, marshes, fens, etc. will be avoided, thereby minimizing any direct loss or modification of important components. Through informal consultation the general location of each step out well was reviewed with biologists from the BLM, Forest Service, Montana Department of Fish, Wildlife and Parks and the Service for its impact on grizzly bears. Based on recommendations from this group of Interagency biologists, step-out wells 6 and 7 were removed from Alternative 4 and changes in wellsite locations and access roads made for several step-out wells (BLM, Biological Assessment for Endangered and Threatened Species). The gas processing plant located in T26N, R8W, Section 8 is far enough removed from important grizzly bear habitat components that its construction, operation and remote monitoring of the wellheads from this location will be compatible with grizzly bear use of the East Front.

The Service therefore believes that the magnitude of direct habitat loss through physical alteration/destruction of habitat is not at a level that is expected to reduce the reproduction, numbers, or distribution of the grizzly bear.

Loss of Habitat Due to Displacement of Animals

The loss of bear use of important habitat components on the East Rocky Mountain Front due to long-term displacement as a result of oil/gas activities is a much greater concern to the Service than is direct habitat loss due to the roads and drill sites. If oil/gas operations are at levels that cause displacement of bears for extended periods of time, historical bear use of the area may be lost, particularly to females. Aune et al. (In Prep.) and McLellan (Pers. Comm. 1989) showed that female cubs generally establish their home range within or have a significant overlap with their mother's home range, while males generally disperse from their mother's home range. Long-term displacement of a female from a portion of her home range may result in that area being lost to female bears since her offspring have no chance to learn the foraging opportunities in areas no longer used.

Aune et al. (1982, 1983, 1984) studied the effects of drilling operations on the movements, home range, and habitat use of grizzly bears on the East Rocky Mountain Front. They compared the geometric activity centers of bears in consecutive pre- and post-disturbance years and found that grizzly bears were not displaced from their seasonal ranges by drilling operations (Aune et al. 1983, 1984). Although seasonal geometric activity centers did shift from one year to the next, these shifts were attributed to food availability, reproductive status and age/sex class. Grizzly bears did appear to be temporarily displaced from areas immediately around active drill sites. For most bears, a minimum impact zone of about 0.5 miles existed around active wells. This distance varied depending on the degree of habituation of individual bears and the cover and topography of the area. Grizzly bears began to reuse the area around the drill site once human activity at the site tapered off (Aune et al. 1984). Increased road construction was considered the most serious impact of oil and gas development in the area (Aune and Stivers 1983, Aune et al. 1984). Other research studies have also confirmed the temporary displacement of bears along road corridors (National Wildlife Federation, 1987). McLellan and Shackelton (1988) showed that most grizzly bears used areas near open roads significantly less than expected. This was equivalent to a habitat loss of 58% in the 0-100 meter distance from road category and 7% in the 101-250 meter distance from road category. For the whole Flathead study area it represents a loss of 8.7% of the area available to grizzly bears.

Harding and Nagy (1980) in studying grizzly bear responses to hydrocarbon exploration on Richards Island, Northwest Territories, Canada, concluded that although grizzly bears did not avoid the general area of industrial activity, they did avoid the area within 0.6 miles of drill sites, camps, etc. Of 13 to 24 grizzly bears in the area only 6 ever entered the immediate area of industrial activity. They concluded that the grizzly bear population had apparently adapted to existing facilities. However, as new industrial activities were introduced to the Island, the population might be jeopardized. Of greatest concern was the construction of new all weather roads, disturbance of denning bears, marginal habitat loss and relocation of problem bears from construction camps.

Our no jeopardy conclusion is based in part on the following:

1. Adherence to a July 15 to December 15 timing window within which a 3-1/2 month operating period would be selected for road construction, drilling, and heavy maintenance activities.

   Due to the seasonal restrictions placed on field development, displacement and hence reductions in habitat effectiveness during the critical spring period would not occur during the construction and development phase of the step-out wells. In areas where berry production is an important fall food source, an operating period of September 1 to December 15 would allow bears to utilize berry crops before they are desiccated. While some bears may remain in the lowlands near riparian areas and Antelope Butte Swamp, many move up in elevation in September in search of pine nuts and to select and prepare their winter dens. Thus the overlap of road construction and drilling with fall bear use will be minimized. Displacement of bears during the summer and early fall is less critical than in the spring because foraging opportunities are spread over the entire landscape rather than being restricted to low elevations below the snowline.

2. Restricting exploration of step-out wells to no more than two wells drilled concurrently.

   It is recognized that some overlap of grizzly bear use and field development activities will occur. It is extremely important that adequate available space containing the biological components required by grizzly bears be available when bears are displaced by field development activities. Information on displacement of grizzly bears from the literature was incorporated into the cumulative effects model (CEM) developed for the East Rocky Mountain Front (Forest Service et al., 1987) and the model run to evaluate the loss of habitat effectiveness on a seasonal basis for exploration of each well and the habitat effectiveness when all the wells are brought into production. Habitat units (habitat quality and quantity) calculated by the CEM provides a means of quantifying the loss or gain in habitat due to human activities and are used in calculating habitat effectiveness. The habitat unit is an expression of available seasonal habitat in units that can be measured, duplicated in other areas that have been habitat component mapped and then used for comparison purposes. Thus, habitat units may be used to quantify habitat quality in a BMU or within a zone of influence associated, for example, with a drillsite or access road.

Habitat units were calculated (Table 2) by season for the:

(1) Birch-Teton BMU in the absence of all human activities (optimum habitat),

(2) existing situation (environmental baseline),

(3) the environmental baseline with two and three wells being drilled concurrently, and

(4) the environmental baseline with all wells brought into production.

Table 2. **Seasonal Habitat Units for the Birch-Teton BMU with No Human Activity (Optimum Habitat), Environmental Baseline (Existing Situation), Production (Alternative 4), and Exploration for 2 and 3 Wells Drilled Concurrently**

	OH	E	ALT. 4 - P	EXPL. S-4 & S-5	EXPL. S-2 & S-8	EXPL. S-2, S-4 & S-8
Spring						
Habitat Units (HU)	140,078	113,043	110,639	103,033	103,537	96,515
HU Reduced		27,035	29,439	37,045	36,541	43,563
%HU Reduced		19.3	21.0	26.5	26.1	31.1
%HU Remaining (HE)		80.7	79.0	73.5	73.9	68.9
Summer						
Habitat Units	111,215	78,073	77,604	73,747	72,035	67,406
HU Reduced		33,142	33,611	37,468	39,180	43,809
%HU Reduced		29.8	30.2	33.7	35.2	39.4
%HU Remaining (HE)		70.2	69.8	66.3	64.8	60.6
Fall						
Habitat Units	122,015	67,108	66,637	63,444	60,669	55,078
HU Reduced		54,378	55,378	58,571	61,346	66,937
%HU Reduced		45.0	45.4	48.0	50.3	54.9
%HU Remaining (HE)		55.0	54.6	52.0	49.7	45.1

OH = Optimum Habitat (absence of all human activities) HE = Habitat Effectiveness
E = Environmental Baseline (Existing Situation)

The number of habitat units in the absence of all human activity represents the resource cushion that grizzly bears have available to meet their biological requirements. As human activities are superimposed over bear habitat, habitat units are either permanently or temporarily made unavailable to bear use, thus reducing the resource cushion. The CEM calculates the loss or gain of habitat units as human activities are added to or removed from bear habitat. Theoretically, the resource cushion could be reduced to a point where the grizzly bear population could no longer meet its biological requirements, thereby jeopardizing its existence.

To date, no process for establishing thresholds has been completed on grizzly bear cumulative effects models to define and validate threshold levels required to meet recovery targets. The cumulative effects analysis process developed on the Kootenai National Forest (Christensen and Madel 1982) has operated under a philosophy of maintaining a minimum of 70% freely available space (habitat effectiveness) throughout BMUs on the Forest. Managers commonly use threshold habitat effectiveness levels between 70-80% for non-listed species such as elk.

The CEM indicates that, on average, the habitat effectiveness in the Birch-Teton BMU is reduce by 3.5% for each well drilled during the summer and fall seasons (Table 2). Thus, two wells drilled concurrently reduces the habitat effectiveness in the BMU by 7% and three wells drilled concurrently would reduce habitat effectiveness by approximately 10.5%. Table 2 shows that for the summer season the existing habitat effectiveness is 70.2% and would be reduced to 66% if two wells were drilled concurrently and further reduced to 60% if three wells were drilled concurrently. Similarly, in the fall the existing habitat effectiveness is 55%, but would be reduced to 52% if two wells were drilled, and down to 45% if three wells were drilled concurrently. The low fall habitat effectiveness ratings for the existing situation is largely attributed to open roads and to the high hunting pressure that the East Front receives during the hunting season. A computer run of the CEM indicated that in the absence of hunting, exiting fall habitat effectiveness would be 65.4% (Don Godtel, Pers. Comm., 1989). While thresholds for habitat effectiveness have not been established, habitat effectiveness levels drop well below 70% when three wells are drilled concurrently. The Service believes that drilling three wells concurrently would excessively remove from bear use habitat needed for their long-term survival and recovery and should be prohibited.

Figure 1 (Appendix D) shows the number of wells drilled on the East Rocky Mountain Front between 1979 and 1987. Of these wells, 10 were drilled in the Birch-Teton BMU, an average of two wells per year (Day, Pers. Comm., 1989). Grizzly bears that were impacted by exploration of the Blackleaf natural gas field during 1980-84 were monitored as part of the East Front Grizzly Studies. Aune et al. (In Prep.) concluded that oil and gas activities at the level experienced by these bears did not cause them to be displaced from their annual home ranges and that the population remained stable or is slightly increasing. Thus, if mortality is managed and regulated as discussed below in this opinion, the Service believes that two wells can be drilled concurrently without significantly reducing the reproduction, numbers, or distribution of the grizzly bear.

3. One central gas processing plant allowing for remote monitoring of wellheads and closing access roads to wells to motorized use by the public.

   Production facilities will be off-site as outlined in the project description and the wellheads remotely monitored from one central gas processing plant. This technology greatly reduces the need for daily/weekly visits to the well site, thereby minimizing disturbance to bears and other wildlife during the production phase of each well. With public road closures and remote monitoring in place, habitat effectiveness is reduced 1.7%, 0.4%, and 0.4% for the spring, summer and fall seasons, respectively, from the existing situation when all wells are brought into production. The remaining habitat effectiveness levels would be 79.0%, 69.8%, and 54.6% for the spring, summer and fall seasons, respectively (Table 2). The small reduction in habitat effectiveness from the existing situation for the production phase is attributed to:

   (1) seasonal restrictions on when construction and heavy maintenance of wells may occur,

   (2) prohibiting public traffic on the access roads to well sites, and

   (3) low levels of employee visitation to the wellsites due to off-site location of production facilities and remote monitoring of well heads.

4. The location of field development in relation to potential denning habitat that prevents denning activities by bears from being impacted.

   Ninety-five percent of all grizzly bear dens located on the East Rocky Mountain Front were above 6,232 feet in elevation. Den sites ranged in elevation from 5,100 feet to 8,167 feet, with a mean of 7,055 feet (Aune et al., In Prep.). As a result, potential denning habitat is not effected by the field development (Figure 2, Appendix E).

   Therefore, if seasonal operating periods and road restrictions are adhered to, remote monitoring required and enforced, and no more than two wells drilled concurrently, impacts to grizzly bears from displacement during exploration and production is not expected to affect the numbers, reproduction or distribution of the grizzly bear at a level that would jeopardize the continued existence of the species.

Increased Mortality Risks

The scientific literature indicates that the greatest impact to grizzly bears from oil and gas activities results from increased human access into bear habitat, thereby increasing mortality risk to bears. Our no jeopardy conclusion is dependent, in part, on the following factors:

1. new access roads to wellsites will be obliterated and revegetated in the case of dry wells, and in the case of producible wells the access routes will be closed to motorized use by the public;

2. a no firearms policy for industry employees while on duty;

3. the requirement to incinerate garbage daily or store in bear proof containers and to remove to local land fill dumps on a daily basis; and

4. no work camps at the drill site. Work camps would introduce attractants (cooking odors, foods, garbage accumulation, etc.), increasing the possibility of human/bear conflicts.

During the period 1985 through 1989, six grizzly bears in the Birch-Teton BMU have been documented as lost to the population from all causes, an average annual loss of 1.2 bears/year (Mike Madel, Pers. Comm. 1989). The Montana Department of Fish, Wildlife and Parks, in developing its proposed levels of hunting, reviewed data from several studies and determined that an average annual human-induced mortality of 6% of the total population could be sustained and still experience a general increase in numbers (Montana Department of Fish, Wildlife and Parks 1986). Applying this 6% figure to the population estimate of 34.3 to 45.7 bears in the BMU yields 2.06 to 2.74 bears that theoretically could be taken per year without experiencing a population decline. Unknown, unreported illegal mortality for the Northern Continental Divide Ecosystem (NCDE) population is estimated at 2% (Revision of Special Regulations for the Grizzly Bear, Final Rule; 51 FR 33753). Adjusting the theoretical acceptable mortality level to account for unknown illegal mortality yields 1.37 to 1.83 bears that could be taken per year (known mortality) without experiencing a population decline (34.3 X .02 = .69; 45.7 X .02 = .91; 2.06 - .69 = 1.37 and 2.74 - .91 = 1.83).

The present mortality level (1.2 bears/year) within the BMU falls below the acceptable theoretical mortality limits (1.37 - 1.83 bears/year) for the estimated grizzly bear population within the BMU. Based on the assumptions that: (1) access roads to wellheads will be closed to motorized use by the public, (2) road restrictions are legal and will be enforced, and (3) a no firearms policy for company employees will be in effect, mortality risks theoretically can be held to levels that exist at the present time (Table G-7, Appendix F). Any known mortality that occurs will be counted against the quota of 14 bears or 6 females (whichever occurs first) established to regulate hunting seasons for the grizzly bear in the NCDE (50 CFR Part 17). We thus conclude that the mortality level is, and with the incorporation of the above factors 1-4, will continue to be sufficiently managed to preclude jeopardy to the species.

Impacts of Past and Present Federal, State and Private Actions

The CEM was used to evaluate the impacts of all past and present Federal, State and private actions in the analysis area (Birch-Teton BMU). The environmental baseline included all human activities such as roads, trails, recreational activities (dispersed and concentrated), campgrounds, administrative sites, home sites, livestock grazing, etc. Human activities were mapped and digitized according to procedures outlined in the cumulative effects analysis process (Forest Service et al., 1987). The CEM was then run to establish the level of habitat effectiveness for the existing situation (environmental baseline) and then runs were made to evaluate exploration of individual wells and production from all wells measuring them against the existing situation (reference Bureau of Land Management Biological Assessment).

Table 2 shows the resource cushion (habitat units) as it has been reduced by; (1) the environmental baseline (existing situation), (2) exploration when two wells are drilled concurrently, (3) exploration when three wells are drilled concurrently, and (4) production when all wells are brought into production. For the production scenario, the data indicate that the resource cushion remains at 79, 69.8 and 54.6% of its optimum for the spring, summer and fall seasons, respectively. The exploration of two wells drilled concurrently would represent a worst case scenario under Alternative 4 with respect to cumulative impacts. Should such a situation develop the resource cushion would remain at approximately 74, 66, and 52% of its optimum for the spring, summer and fall seasons, respectively. As discussed earlier, approximately 10% of the reduction in the resource cushion during the fall is attributed to hunting pressures on the East Front. The Grizzly Bear Studies on the East Front (Aune et al., In Prep.) indicate that the grizzly bear population has remained stable or perhaps has slightly increased despite this level of hunter disturbance and under even higher levels of exploratory drilling for oil/gas than will occur under field development for the Blackleaf Unit. The analysis presented in the previous section of this opinion on mortality risks demonstrates that the level of mortality occurring from all causes under the on-going level and kinds of human activities falls within theoretical acceptable limits for the grizzly bear population in the analysis area. Thus, the Service concludes that the additive impacts of field development of the Blackleaf production units, along with other past and on-going activities, are not likely to affect the numbers, reproduction or distribution of grizzly bears at a level that is likely to jeopardize the species.

Gray Wolf: The Rocky Mountain Front is considered excellent wolf habitat due to: (1) its abundant and diverse prey base, (2) its wilderness status or otherwise remote areas, and (3) its relatively low human use and access. At present, available data do not indicate sustained pack activity or a viable wolf population in the area. However, sporadic wolf observations indicate possible use, at least by transient individuals. There have been 115 wolf occurrence reports recorded on the Rocky Mountain Front (Glacier National Park/East of the Continental Divide, Blackfeet Indian Reservation, Bureau of Land Management/Great Falls Resource Area, and Lewis and Clark National Forest) during the period 1978-1989 (U.S. Fish and Wildlife Service Files), 69% of these have occurred within the last five years (1985-1989). The potential for a breeding pair to establish residence and pack formation to develop through natural recruitment appears imminent. Two key factors for successful wolf recovery in the area are: (1) maintenance or improvement of a healthy prey base and (2) preventing illegal mortalities.

Maintenance or Improvement of a Healthy Prey Base

Elk and mule deer are the two major prey species for wolves on the East Rocky Mountain Front (Peek and Vales, 1989). Oil and gas activities that result in population declines of these species would have negative effects on wolf recovery and management on the East Rocky Mountain Front. Approximately

180 elk winter in and adjacent to the Blackleaf EIS study area (BLM, PDEIS). Winter counts of mule deer in 1986 on the Blackleaf-Teton and Dupuyer Creek winter ranges were 450 and 250 animals, respectively (BLM, PDEIS). Figures 3.9 and 3.10 (Appendix G) show the mule deer and elk winter ranges in the EIS analysis area.

Elk begin their migration from summer ranges about mid-November and concentrate in the Middle and South Forks of Dupuyer Creek, Ping's Coulee, and Cow Creek areas. In early December the herd splits, some moving north toward Birch Creek and some south into the Antelope Butte area, arriving about January 1. The elk begin their spring migration back to summer ranges in mid-May, some elk calving occurs west of Antelope Butte in late May (Figure 3.10, Appendix G). Thus, the critical period for elk in the project area is January through May. Mule Deer begin their migration to the area about November 1.

Geist (1971) discusses disturbance factors as they relate to wild ungulates and states "if the disturbance is common and localized in time and space, the animal soon learns to avoid it. What is known of the effects of disturbance is disquieting. Excitation is costly because it elevates metabolism (Graham, in Baxter, 1962), and raises the energy cost of living, thus competing directly with energy otherwise available for reproduction and growth. Another serious consequence of persistent disturbance is voluntary withdrawal from available habitat and the confinement of the population to a smaller and less favorable area. Habitat left unused is wasted. Moreover, once suitable habitat has been lost by the animals withdrawal, it may be quite difficult for certain species to return, i.e., bighorn sheep (Geist 1967), elk (McCullough 1969), or pronghorn antelope (Binarsen 1948)."

Our no jeopardy conclusion for the wolf is based in part on the following:

1. Adherence to a July 15 to December 15 timing window within which a 3-1/2 month operating period would be selected for road constructions, drilling and heavy maintenance activities.

   An operating period between July 15 and December 15 for field development greatly minimizes displacement of deer and elk from their winter ranges and avoids disturbance during the calving and fawning periods.

2. One central gas processing plant allowing for remote monitoring of well heads and closing access roads to wells to motorized use by the public.

   As discussed under the grizzly bear section of this opinion, remote well head monitoring, once wells are brought into production, will greatly reduce the need for daily/weekly visits to each wellsite, thereby minimizing disturbance to the prey species of the wolf. This is particularly important during the winter and spring calving/fawning periods.

   As shown in Table 2 for the grizzly bear, reductions in habitat effectiveness during the production phase are minimal due to the central gas plant, remote monitoring and road closures. Therefore if seasonal operating periods and road restrictions are adhered to, remote monitoring required and enforced, and no more than two wells drilled concurrently, impacts to the wolves' prey base from displacement during exploration and production is not expected, in turn, to affect the numbers, reproduction or distribution of the wolf at a level that would jeopardize the continued existence of the species.

Preventing Illegal Mortality

In reviewing the literature on population dynamics of wolves, Keith (1982) compared reported exploitation rates with resulting numerical trends from 13 different wolf populations. He reported that wolf reproduction and/or pup survival can apparently offset rates of exploitation up to 30%. However, if human-caused mortality rates are greater than 30%, wolf numbers may decline.

There is little evidence that human activity other than direct killing has caused wolf mortality. While wolves appear most sensitive to human disturbance near den sites, there is little evidence to suggest such disturbance will cause reproductive failure. In view of this information, the Service believes that displacement/disturbance of wolves created by field development activities, accept for those that may impact whelping dens and initial rendezvous sites, will have little or no demographic effects.

The Service believes the single most important factor to successful wolf recovery is to prevent illegal human-caused mortality. This can best be provided by promoting public acceptance of the animal and providing adequate security. Our no jeopardy conclusion is based in part on the following:

1. access roads to wellsites will be obliterated and revegetated in the case of dry wells, and in the case of producible wells, the access roads will be closed to motorized use by the public;

2. a no firearms policy for industry employees while on duty; and

3. presently there are no known packs in the Blackleaf EIS analysis area, and hence no known den sites or rendezvous sites.

INCIDENTAL TAKE

Section 9 of the Endangered Species Act, as amended, prohibits any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species without a special exemption. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered taking within the bounds of the Act provided that such taking is in compliance with the incidental take statement.

The Service does not anticipate that field development on the Blackleaf Production Area will result in any incidental take of grizzly bears and gray wolves. Accordingly, no incidental take is authorized. Should any take occur, the Forest Service must reinitiate formal consultation with the Service and provide the circumstances surrounding the take.

Our conclusion that no incidental take is expected is based on the following:

As defined by the Act, the term "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct" 10 U.S.C. 1532(19). Further, "harm" is defined to include "an act....[that] may include significant habitat modification or degradation where it actually kills or injuries wildlife by significantly impairing essential behavior patterns including breeding, feeding, or sheltering" (50 CFR 17.3).

"Taking" therefore is not expected to result from the proposed actions due to:

1. a spring seasonal restriction on construction and drilling during the critical spring period (grizzly bear spring foraging and elk/deer calving and fawning) and an operation window that minimizes overlap of construction and drilling during the fall bear use period and elk/deer use of winter ranges;

2. no direct or indirect impacts to denning bears or wolves;

3. firearms are prohibited;

4. adequate habitat that bears can displace to that is absent of other motorized activities is available;

5. no construction camps will be permitted on site; and

6. roads to wellsites will be closed to public traffic.

The illegal killing of grizzly bears and gray wolves, be it through poaching or "mistaken identity", is a violation of both State and Federal law and will be prosecuted. All other taking of grizzly bears must be done in compliance with the 50 CFR S17.40(b) and applicable State laws.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Endangered Species Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The term conservation recommendations has been defined as suggestions of the Service regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.14(j)).

The Service provides the following conservation recommendations that would further minimize the adverse impacts of field development and help enhance the survival and recovery of the species:

1. Once a well has been brought into production, daily or weekly visitation to the wellsite should be restricted to a six month period or less after which remote monitoring should be the primary means of monitoring the wellhead.

2. To increase habitat effectiveness, particularly in the fall, the BLM should pursue opportunities to close additional roads or trails to motorized use.

3. Should wolf packs establish themselves on the East Front, the BLM when processing APDs should insure that field development activities do not adversely affect dens and initial rendezvous sites. Informal consultation should be initiated with the Service to ensure that current information is being considered.

CONCLUSION

This concludes formal consultation on this action. Reinitiation of formal consultation is required if the amount or extent of incidental take is exceeded, if new information reveals effects of the action that may impact listed species or critical habitat in a manner or to an extent not considered in this opinion, if the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion, or if a new species is listed or critical habitat designated that may be affected by the action.

Your cooperation and assistance in meeting our joint responsibilities under the Endangered Species Act are appreciated.

cc: ARD, FWE-60120, FWS, RO, Denver, CO
OES, FWS, Washington, DC
Area Manager, BLM, Great Falls, MT
Forest Supervisor, Lewis & Clark NF, Great Falls, MT
Director, Montana Dept. of Fish, Wildlife & Parks, Helena, MT
Grizzly Bear Recovery Coordinator, FWS, Missoula, MT

DRHARMS/clh

"Take Pride in America"

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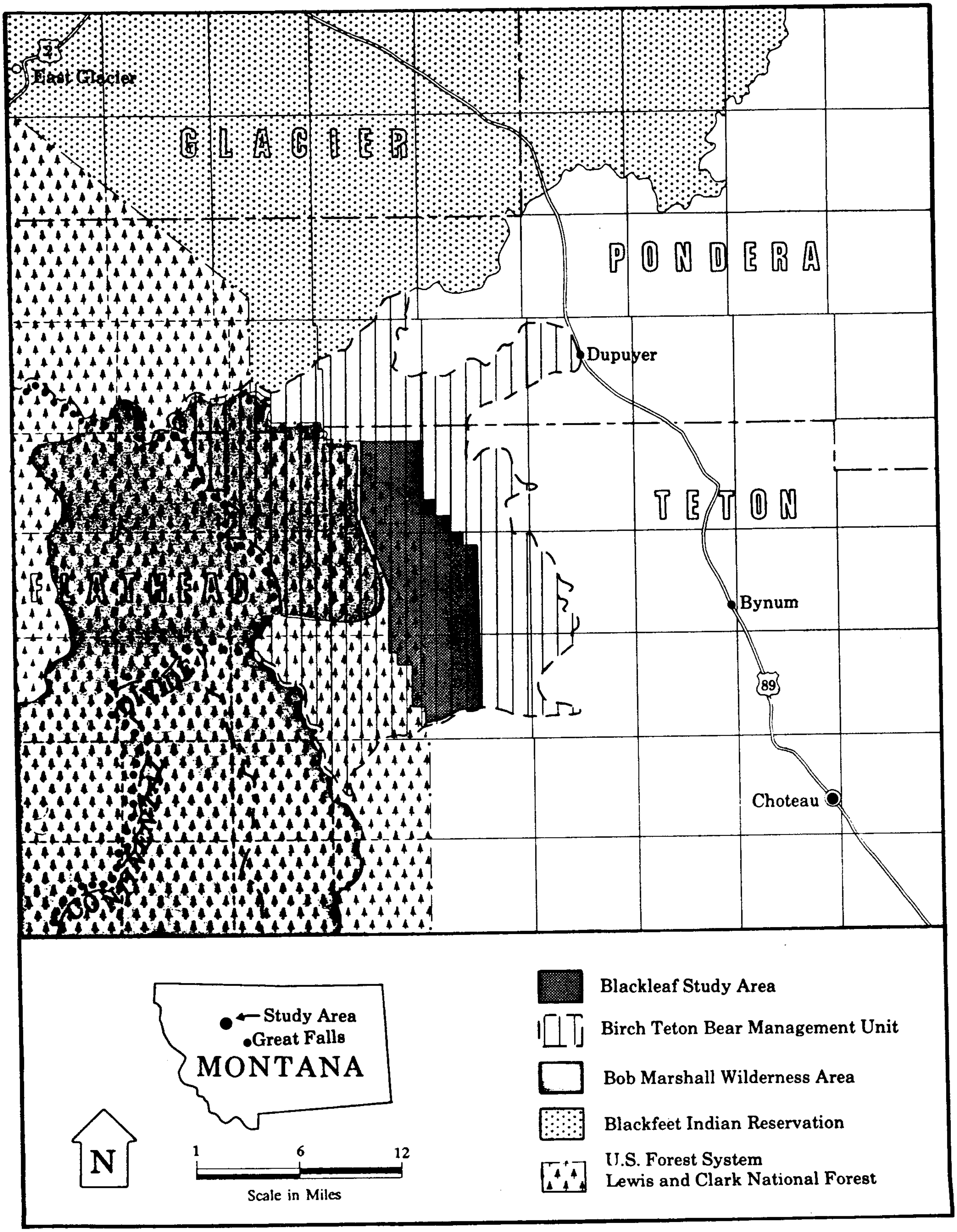
APPENDIX A

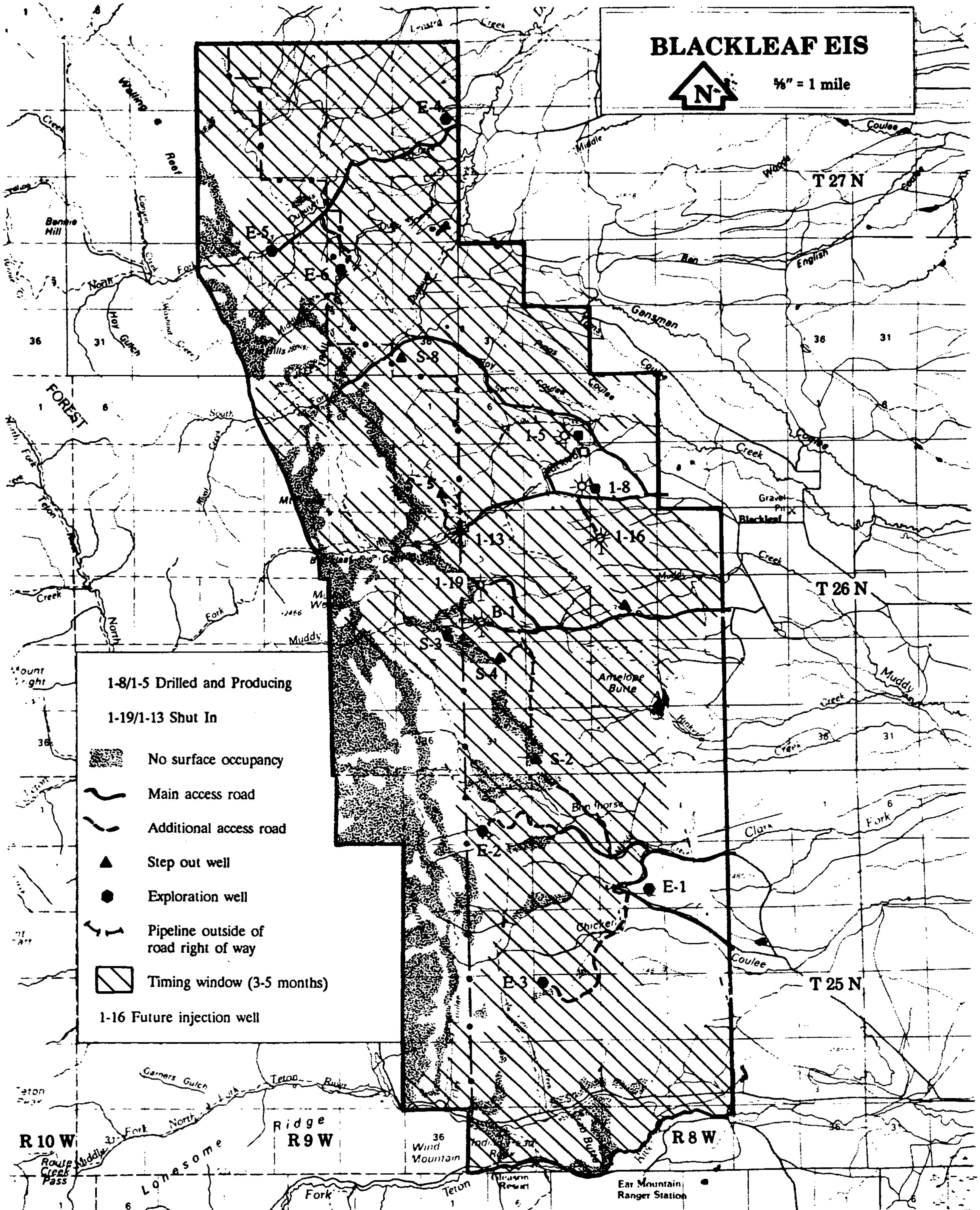
Figure 1.1 Location Map of Blackleaf EIS Study Area and Birch Teton Bear Management Unit



Source: BLM, 1989. Draft Blackleaf Environmental Impact Statement.

APPENDIX B

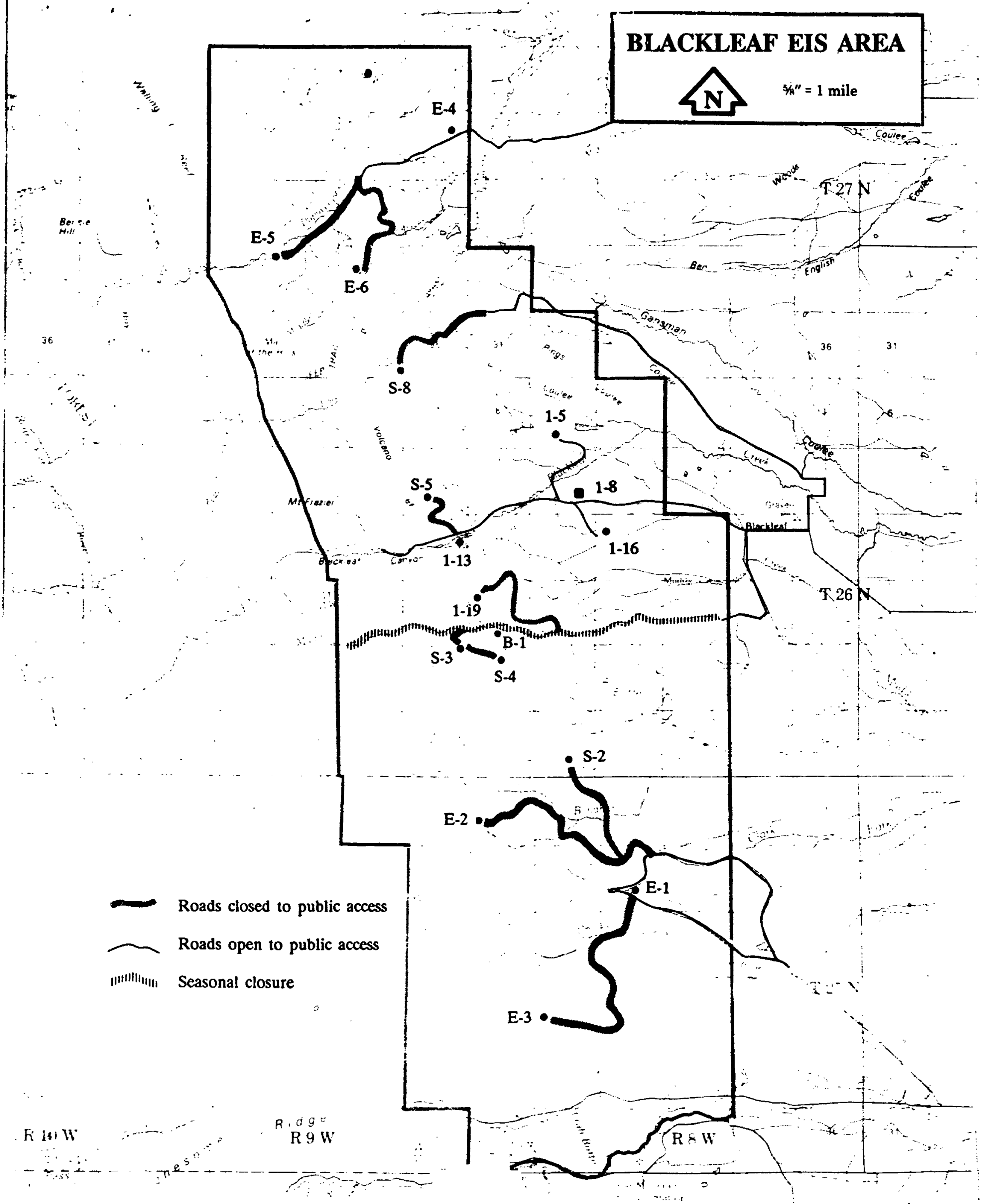
Figure 2.9 Alternative Four.



Source: BLM, 1989. Draft Blackleaf Environmental Impact Statement.

APPENDIX C

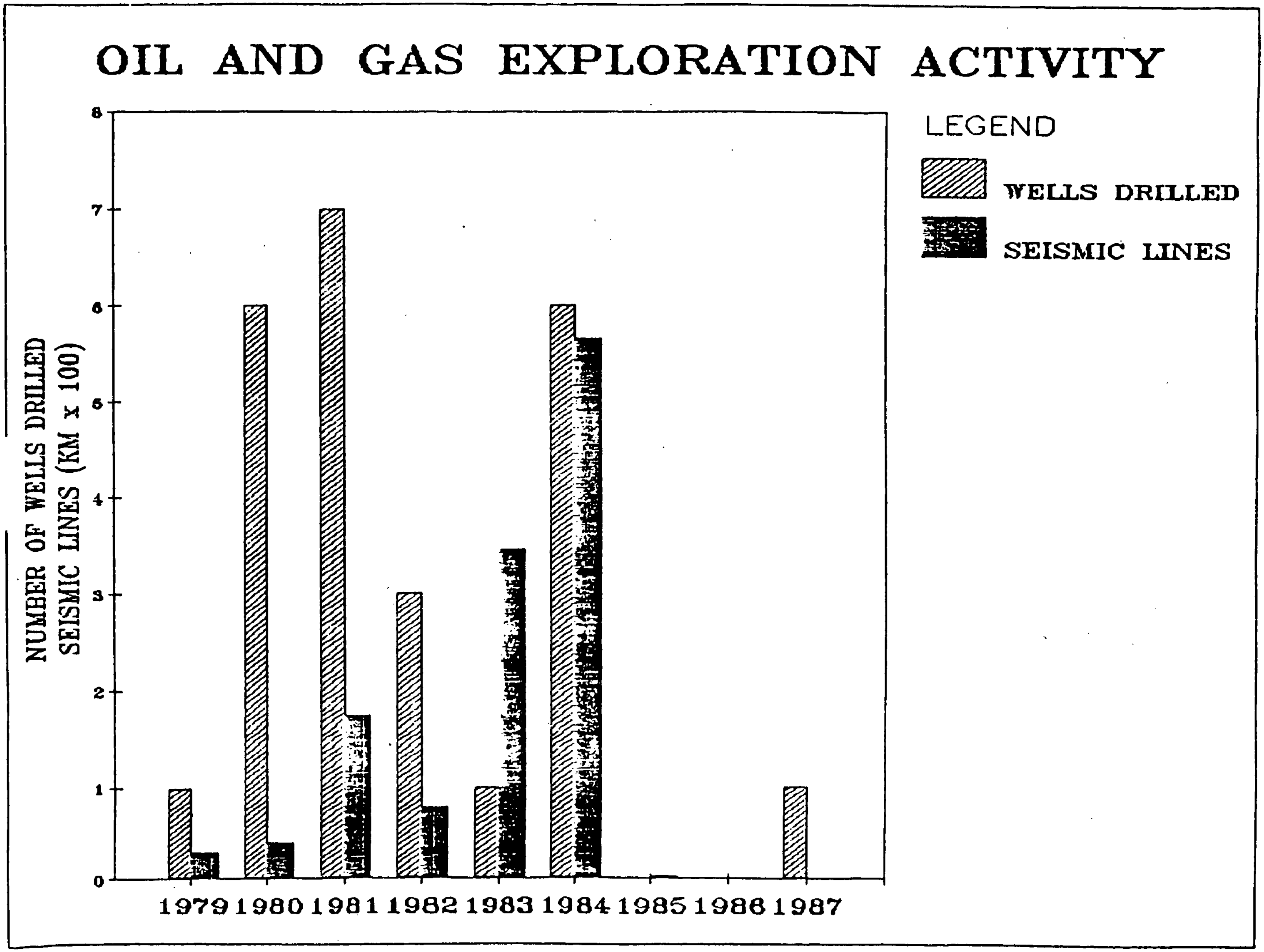
Figure 4.4 Access Routes in the Blackleaf EIS Area.



Source: BLM, 1989. Draft Blackleaf Environmental Impact Statement

APPENDIX D

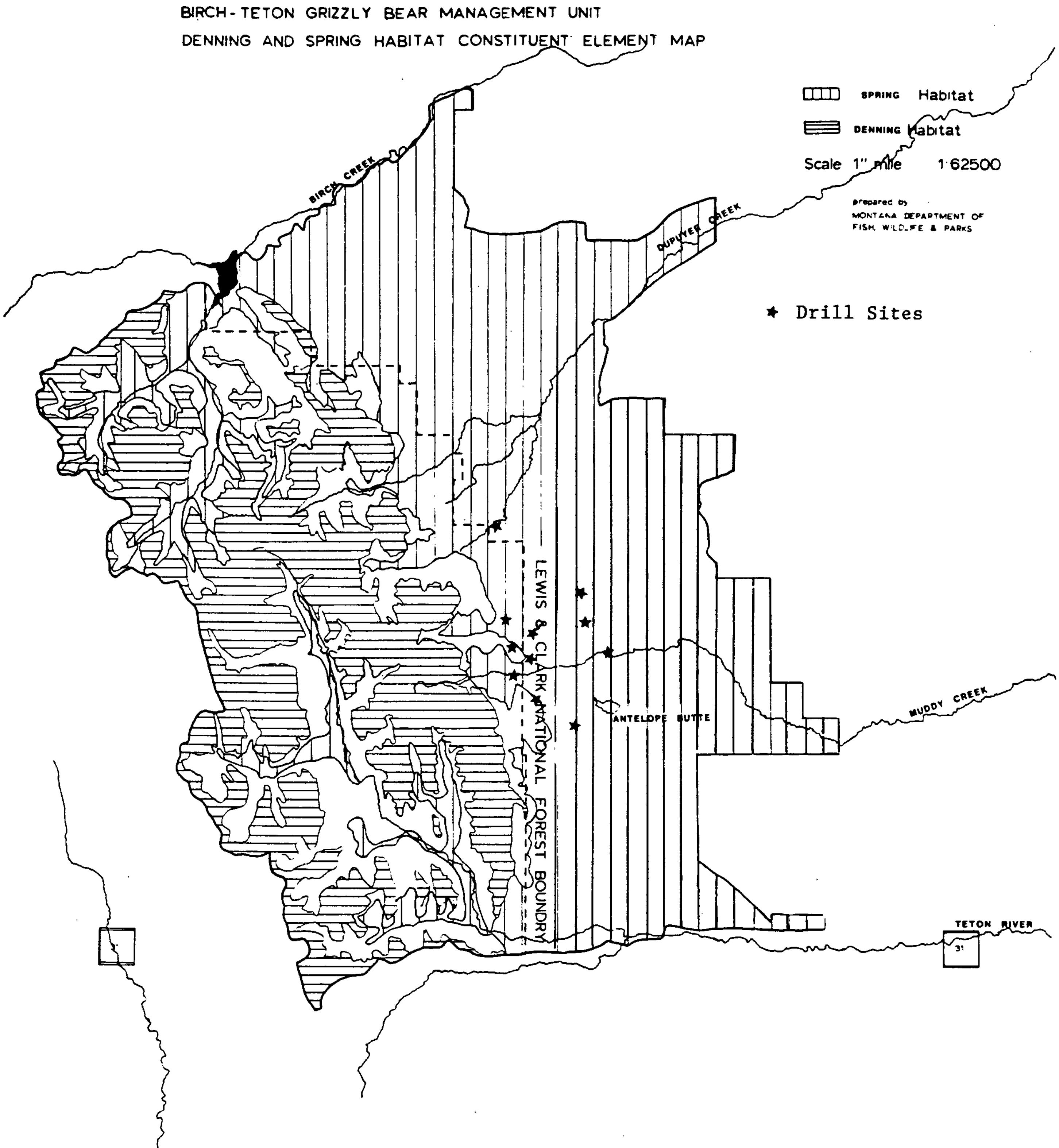
Figure 1.



Source: Aune, K. 1989. Preliminary draft Final Report, East Front Grizzly Studies. Mont. Dept. Fish, Wildl. and Parks, Helena, Montana (In Preparation).

APPENDIX E

FIGURE 2. CONSTITUENT ELEMENT MAP, 1986



Source: Management Guidelines for Selected Species - Rocky Mountain Front Studies.

APPENDIX F

Table G-7

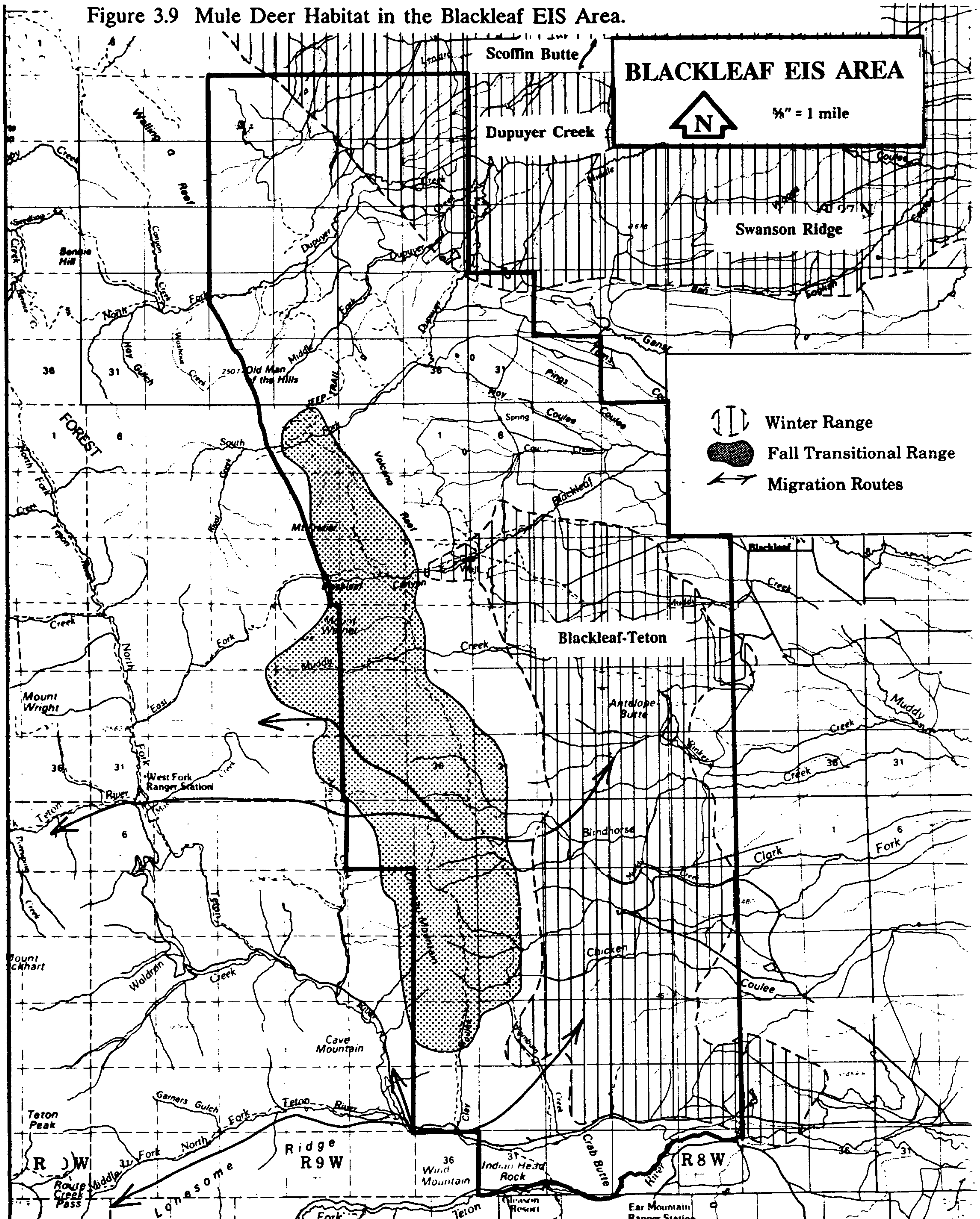
Mortality Risk Index (MRI) by season for the existing situation (base) and each Alternative and increase in MRI when at full production.

	SPRING		SUMMER		FALL	
ALTERNATIVE	MRI	INCREASE FROM BASE	MRI	INCREASE FROM BASE	MRI	INCREASE FROM BASE
EXISTING SITUATION (BASE)	0.087		0.115		0.324	
1	0.092	0.005	0.115	same	0.325	0.001
3	0.094	0.007	0.116	0.001	0.326	0.002
4	0.098	0.011	0.117	0.002	0.327	0.003
2	0.103	0.016	0.121	0.006	0.332	0.008

Source: BLM Biological Assessment for Endangered and Threatened Species. Preliminary Draft Environmental Impact Statement.

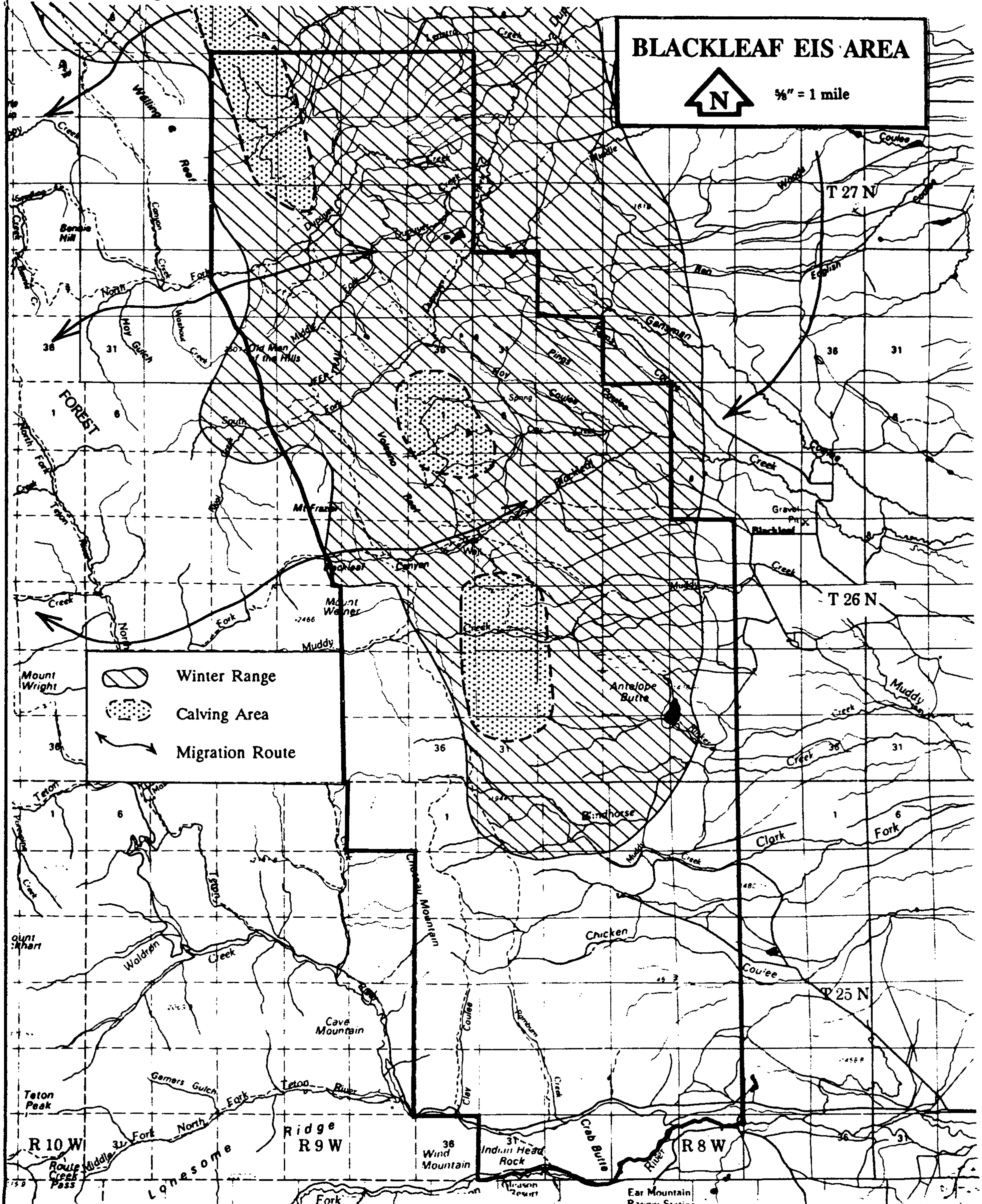
APPENDIX G

Figure 3.9 Mule Deer Habitat in the Blackleaf EIS Area.



Source: BLM, 1989. Draft Blackleaf Environmental Impact Statement

Figure 3.10 Elk Habitat in the Blackleaf EIS Area.



Source: BLM, 1989. Draft Blackleaf Environmental Impact Statement.