Table 4-32
Continued

Species At -Risk (1)	National Grasslands Occurrence	Miles of Alternative in Potential Habitat in National Grasslands	Evidence for Occurrence in Project Area by Habitat	Potential for Impact by Alternative (2)
Swainson's hawk	TBNG	herbaceous rangeland - 31.8 mi	Documented nesting on TBNG and BGNG in trees in grasslands and shrublands	Probably
	BGNG	herbaceous rangeland - 5.2 mi		
Short-eared owl	TBNG	herbaceous rangeland - 31.8 mi	Known occurrence on TBNG and BGNG in moderately tall mixed-grass/ tall-grass prairie	Possibly
	BGNG	herbaceous rangeland - 5.2 mi		
Burrowing Owl	TBNG	prairie dog colonies - 1.7 mi herbaceous rangeland - 31.8 mi	Prairie dog colonies, grasslands, basin-prairie shrublands, agricultural areas documented on BGNG and TBNG	Possibly
	BGNG	herbaceous rangeland - 5.2 mi		
Loggerhead shrike	TBNG	None	Known occurrence on TBNG and BGNG in woody shrub/tree overstory riparian vegetation	Possibly
	BGNG	None		
Baird's sparrow	TBNG	herbaceous rangeland - 31.8 mi	Known occurrence on TBNG in moderately tall mixed-grass/tall-grass prairie	Possibly
Fox sparrow	TBNG	None	Known occurrence on TBNG and BGNG in woody shrub/tree overstory riparian vegetation	Possibly
Trumpeter swan	BGNG	None	Known to occur in emergent wetland vegetation on BGNG	Possibly
Black tern	TBNG	None	Known to occur in emergent wetland vegetation on TBNG and BGNG	Possibly
	BGNG	None		
Lewis' Woodpecker	TBNG	evergreen forest 0.3 mi	Ponderosa pine savannah and cottonwood-riparian floodplains	Possibly
Fringe-tailed myotis	TBNG	None	Known to occur near emergent wetland vegetation & woody shrub/tree overstory riparian vegetation on TBNG and BGNG	Possibly
	BGNG	None		
Black-tailed prairie dog	TBNG	prairie dog colonies - 1.7 mi	Prairie dog colonies	Yes
	BGNG	None		

Notes:
1 = Species at-risk were included if they were identified on BGNG and TBNG and analyzed by the Forest Service in the Draft Biological Assessment and Evaluation for Proposed Land and Resource Management Plans, Dakota Prairie Grasslands, Nebraska National Forest and Associated Units, Thunder Basin National Grassland.
2 = Potential for impact by Alternative C with the W G Flat Route Variation was judged as:
No: the at-risk species is not likely to occur on TBNG and/or BGNG.
Unknown: although the at-risk species may occur on TBNG and/or BGNG, there is no documented occurrence of the species within specified habitats or the presence of those habitats have not been documented in areas crossed by Alternative C with the W G Flat Route Variation.
Possibly: the at-risk species is known to occur in specified habitats on TBNG and/or BGNG that would be crossed by Alternative C with the W G Flat Route Variation but the species has not been documented proximate to the alternative.
Probably: Alternative C with the W G Flat Route Variation crosses specified habitat on TBNG and/or BGNG with documented use by the at-risk species.
Yes: Alternative C with the W G Flat Route Variation crosses the specified habitat on TBNG and/or BGNG and would directly impact the at-risk species.

Table 4-33
Miles of Alternative D Within 0.5 and 1 mile of the Cheyenne River, Black Thunder Creek, Little Thunder Creek and Antelope Creek That are Potential Bald Eagle Wintering Habitats

County, State (ordered west to east)	Miles Within 0.5 Mile of Potential Habitat	Miles Within 1 Mile of Potential Habitat
Campbell, WY	4.4	7.1
Converse, WY	6.4	8.6
Weston, WY	0	0
Niobrara, WY	0	0
Fall River, SD	11.2	20.0
Custer, SD	0	0
Pennington, SD	7.9	9.4
Alternative D Total	29.9	45.1

Table 4-34
Number of Miles Where Alternative D Intersects Suitable Soils and Habitats Potentially Inhabited by American Burying Beetles in South Dakota

South Dakota County (ordered west to east)	Suitable Soil Type	Distance (miles) Crossed in Potential Habitats per Suitable Soil Type				
		Cropland, Pasture	Herbaceous Rangeland	Forested Wetland	Deciduous Forest	County Total
Fall River	Sandy, Erosive	0.8	5.1	0.1	0	6.0
	Prime Farmland	7.9	14.0	0.7	0	22.6
Custer	Sandy, Erosive	0	0	0	0	0
	Prime Farmland	2.0	4.8	0	0	6.8
Pennington	Sandy, Erosive	0.1	0	0	0	0.1
	Prime Farmland	3.1	0.8	0	0	3.9
Alternative D Total		13.9	24.7	0.8	0	39.4

Table 4-35
Number of Sites and Total Distance (miles) Where Alternative D is Within 500 Feet of the Cheyenne River or Tributary Streams

County, State	Cheyenne River		Tributary Streams	
	Number of Sites	Total Distance	Number of Sites	Total Distance
Campbell, WY	0	0	18	1.8
Converse, WY	0	0	0	0
Niobrara, WY	0	0	0	0
Weston, WY	0	0	0	0
Custer, SD	0	0	0	0
Fall River, SD	3	0.7	22	5.70
Pennington, SD	3	2.0	30	3.3
Alternative D Total	6	2.7	70	10.8

the 85 miles of Alternative B and 58 miles of Alternative C that are estimated to be within 0.5-mile of potential winter habitats. If short-term construction related disturbances affected wintering bald eagles 1 mile away, 45 miles of Alternative D would be within that distance from potential habitats identified in Table 4-33, less than the 129 miles of Alternative B and 93 miles of Alternative C within the 1-mile zone. Specifically in South Dakota, Alternative D would affect less potential habitats along the Cheyenne River than either Alternative C routes with the Phiney Flat or W G Flat route variations.

Disturbances to wintering bald eagles could occur along 30 to 45 miles of Alternative D during the short-term and long-term if eagles are affected by noise associated with train traffic 0.5-mile to 1 mile away. Potential bald eagle nesting habitats are within the same areas where there are cottonwood riparian woodlands.

Though no bald eagles are currently nesting in the project area, they may in the future as nesting populations expand their range. However, the degree to which Alternative D limits future nesting by this species can not be determined.

Construction of Alternative D during spring and early summer along the Cheyenne River, primarily in Pennington County, could displace interior least terns if they select sand bars or islands within the river to nest. However, Alternative D would cross the Cheyenne River once, between the confluence of Spring Creek and Wasta, and be within 0.5 mile of the river for only 8 miles in Pennington County, approximately half the distance of any other alternative.

American burying beetles could occur in suitable soils along Alternative D in South Dakota. The amount of disturbances by Alternative D in these soils, potential substrates for the species, and where these soils coincide with potentially suitable habitats are provided in Table 4-34. Surface disturbances to these soils during construction would probably contribute short- and long-term impacts to burying beetles, if they actually occur.

There are approximately 39 miles in South Dakota where Alternative D would pass through suitable soils in potential habitats that might be used by American burying beetles, 7 miles more than Alternative B and between 2 and 5 miles more than Alternative C including either of the route variations. Over 33 miles of Alternative D passes through soils with characteristics to be prime farmlands, but whether all or some are irrigated and/or cultivated is unknown. If those prime farmland soils are taken out of production by Alternative D, they would probably be more suitable for use by burying beetles, if they occur and if appropriate sized carrion is available.

Short-term impacts to listed (pallid sturgeon), candidate (sturgeon chub) and sensitive (plains topminnow, flathead chub, finescale dace, longnose sucker) fish species could occur during construction with increased sedimentation due to runoff from construction sites near waterways. During operation, short-term impacts could occur downstream if there were derailments and accidental release of diesel fuels and other petroleum products into the Cheyenne River or its tributaries. Both types of impacts would be most likely if potential discharge sites are within 500 feet of surface waters. In addition, bald eagles and least terns could be impacted by widespread fish-kills that would adversely affect food sources and piping plovers nesting down-stream could be affected if aquatic and burrowing invertebrate were killed. Table 4-35 indicates the number of sites and/or distances at which Alternative D would be within 500 feet of the Cheyenne River or tributary streams with perennial flows.

There are 76 sites on the Cheyenne River and perennial tributary streams, combined, where Alternative D is within 500 feet of the drainages, fewer than the 177 sites and 206 sites intersected by Alternative B and Alternative C, respectively. Less than 14 miles of Alternative D is within 500 feet of the Cheyenne River and tributaries, 8 miles less than Alternative B and nearly 7 miles less than Alternative C. These sites are believed to be those most likely where sediments and/or accidental releases of toxic compounds could be discharged.

As a result of past surveys, there is 1 site along Alternative D that has been evaluated as potential habitat for Ute ladies'-tresses. That site is in South Dakota where Alternative D and Alternative C coincide and cross Dry Creek. One other site in South Dakota (Plum Creek) and 3 in Wyoming (East Fork Coal Creek, Belle Fourche River, and Caballo Creek) could not be evaluated because access to the site was denied. In South Dakota, Alternative D would cross a total of 0.29 mile of wet meadows, palustrine emergent wetland temporarily and seasonally flooded, that could be potential habitat for the orchid (see Table 3-78). The route in Wyoming would cross 0.8 mile of that wetland type, more than affected by Alternative B and Alternative C. In both states, almost all wet meadows impacted by the alternative are on private lands (see Table 3-78). Occurrence of other sensitive plant species along Alternative D is unknown but individuals of any sensitive plant species, including Ute ladies'-tresses, that inhabit construction sites would be eliminated, at least for the short-term.

Long-term impacts due to the presence, operation and maintenance of Alternative D to Federally-listed threatened or endangered species, species proposed for listing, candidate species, species petitioned for listing, and species with special status are similar to short-term impacts described above and are expected to be fewer than those described under Alternatives B and C. They include direct mortality by trains and maintenance vehicles, avoidance of habitats that are near the track, and potential long-term deterioration of habitats, especially aquatic habitats at sites where sediment discharge and accidental release of toxic substances occur.

Alternative D would not affect BGNG. Wildlife MIS identified on TBNG were listed under Alternative B, above. Alternative D would not cross land designated for reintroduction of black-footed ferrets and so would not be inconsistent with the Forest Plan. While Alternative D would not affect peregrine falcons, it would possibly affect wintering bald eagle habitats along the Cheyenne River, Black Thunder Creek, Little Thunder Creek and Antelope Creek.

Medicine Bow Forest Plan management area prescriptions that would be affected by Alternative C are provided in Table 1-2 and discussed in detail in Table 6 through Table 12 in Appendix A. Estimates of where and how much of Alternative D would impact known or potential habitats utilized by recovery and ecological indicator species are provided in Table 4-36. Effects of Alternative D on the remaining MIS will be discussed and evaluated in Section 4.18.

Grassland management area prescriptions under the proposed grassland plan for TBNG that would be affected by Alternative D are provided in Table 1-2 and discussed in detail in Table 13 through Table 23 in Appendix A. Animal and plant species that are likely to inhabit TBNG and which have been identified as at-risk of range-wide imperilment (extinction or extirpation) or at-risk of local or region imperilment were assessed by the Forest Service (1999c) in the Draft Biological Assessment and Evaluation. Estimates of where and how much of Alternative D would impact known or potential habitats utilized by those imperilled plant and animal species are provided in Table 4-37.

4.17.9 Proposed Mine Loop Options. The North Antelope West Mine Loop would pass through prairie dog colonies for 0.6 miles. Surface disturbances to prairie dog colonies will affect some individual prairie dogs and can potentially impact nesting mountain plovers and swift fox over the short- and long-term if either species inhabits the area. All 4 proposed mine loops would be within 1 mile of Antelope Creek and Little Thunder Creek for a total of 7.3 miles. Consequently, construction and operation of the loops could displace bald eagles wintering along those riparian zones over the long-term.

4.17.10 Proposed Yard Sites. The proposed yard near Wall would be within croplands and intersect the I-90 corridor. Soils at the site are shallow and would probably not be suitable for American burying beetles. No other Federally-listed threatened and endangered species, candidate wildlife species, and special status species is likely to be affected by the Wall Yard.

The proposed Edgemont Interchange Yard would be within grassland vegetation. That yard would cross 1 intermittent stream, a tributary to the Cheyenne River, and be within 0.5 mile of the river. Because the site is adjacent to the existing BNSF railroad, construction and operation of the yard are unlikely to affect wintering bald eagles if they occur along the Cheyenne River east of Edgemont. No eagles were observed there during recent winter surveys. However, since the yard crosses an intermittent stream, potential exists for accidental discharge of toxic materials and sediments into the Cheyenne River that could affect Federally-listed threatened and endangered species, candidate wildlife species, and special status species downstream.

The proposed Western Yard in Wyoming would cross mostly grasslands but also 21 intermittent streams which are tributary to Little Thunder Creek. No wetlands would be affected. For most of its length, the yard would be within 0.5 mile of Little Thunder Creek. Consequently, const-ruction and operation of the Western Yard are likely to displace bald eagles wintering along Little Thunder Creek and make that riparian zone unsuitable for wintering eagles over the long-term. The yard site also coincides with numerous black-tailed prairie dog colonies. Surface disturbances to prairie dog colonies will affect some individual prairie dogs and can potentially impact nesting mountain plovers and swift fox over the short- and long-term if either species inhabits the area. With the proximity of the yard to Little Thunder Creek and numerous intermittent streams crossed, the potential exists for accidental discharge of toxic materials and sediments into the Cheyenne River system that could affect Federally-listed threatened and endangered species, candidate wildlife species, and special status species downstream.

4.18 Wildlife and Aquatic Resources

Game and non-game wildlife and fisheries habitat issues and species-specific issues were raised by USFWS, SDGFP, and WGFD in written and oral comments and are summarized, below:

- If the project leads to decreased quality and quantity of big game habitat, the potential exists for big game populations to also decrease making management at population objective levels difficult and potentially reducing hunter opportunities and enjoyment.
- Construction activities and disturbances and persistent human activity and noise for the life of the project can lead to direct and indirect loss of big game habitats including foraging areas, fawning and parturition areas, hiding and thermal cover, winter/yearlong range and yearlong ranges.
- Existence of the rail line and right-of-way fences can lead to potential loss of big game seasonal migration and daily movement routes. Specifically, migration patterns of pronghorn can be altered by fences and fencing, using Federal guidelines to facilitate passage of big game, mule deer and pronghorn, must be addressed.
- Possible big game mortality caused by train/animal collisions and work force influences such as illegal harvest.
- Displacement of big game away from suitable habitats due to human and construction activity as

Table 4-36
Forest Service Management Indicator Species on TBNG That Could be Impacted by Alternative D in Potential Habitats

Forest Management Indicator Species	Species Designation	Miles of Alternative in Potential Habitat on TBNG	Evidence for Occurrence in Project Area by Habitat	Potential for Impact by Alternative (1)
Recovery Species				
Black-footed Ferret	Federally Listed Endangered	prairie dog colonies - 0.3 mi	Habitat suitable for reintroduction	Yes
Peregrine Falcon	Delisted as Endangered	None	None	No
Bald Eagle	Federally Listed Threatened	evergreen forest - 1.1 mi	Documented wintering and potential nesting habitat in ponderosa pine woodlands and riparian cottonwood woodland	Probably
Ecological Indicator Species				
Mountain Plover	Federal Proposed for Listing as Threatened Forest Service Sensitive	prairie dog colonies - 0.3 mi herbaceous range - 20.0 mi mixed rangeland - 5.5 mi	Documented nesting habitats in short-grass prairie and black-tailed prairie dog colonies	Possibly
Black-tailed Prairie Dog	Federal Candidate	prairie dog colonies - 0.3 mi	Documented colonies in project area	Yes
Upland Sandpiper	USFWS Species of Concern; Forest Service Sensitive	herbaceous range - 20.0 mi mixed rangeland - 5.5 mi	Possible occurrence during breeding on short-grass prairie	Possibly
Long-billed Curlew	USFWS Species of Concern; Forest Service Sensitive	herbaceous range - 20.0 mi mixed rangeland - 5.5 mi	Documented presence - possibly nesting - in sagebrush steppe, meadow, grasslands, native hay meadow	Possibly
Ferruginous Hawk	USFWS Species of Concern; Forest Service Sensitive	herbaceous range - 20.0 mi mixed rangeland - 5.5 mi evergreen forest - 1.1 mi	Documented nesting habitat in short-grass prairie and sagebrush steppe	Probably
Red-headed Woodpecker	USFWS Species of Concern	None	Possible occurrence during breeding, probably in riparian cottonwood woodland	Unknown
Brewer's Sparrow	USFWS Species of Concern	mixed rangeland - 5.5 mi	Documented occurrence during breeding in sagebrush steppe	Possibly

1 = Potential for impact by Alternative D was judged as:
No: the species is not likely to occur on TBNG.
Unknown: although the management indicator species may occur on TBNG, there is no documented occurrence of the species within specified habitats or the presence of those habitats have not been documented in areas crossed by Alternative D.
Possibly: the management indicator species is known to occur in specified habitats on TBNG that would be crossed by Alternative D but the species has not been documented proximate to the alternative.
Probably: Alternative D crosses specified habitat on TBNG with documented use by the management indicator species.
Yes: Alternative D crosses the specified habitat on TBNG and would directly impact the management indicator species.

Table 4-37
Animal and Plant Species Identified as At Risk by The Forest Service in the Northern Great Plains That Potentially Occur on TBNG and Could be Impacted by Alternative D in Potential Habitats

Species At-Risk (1)	Miles of Alternative in Potential Habitat in National Grasslands	Evidence for Occurrence in Project Area by Habitat	Potential for Impact by Alternative (2)
Species Protected Under the ESA and at Risk of Rangewide Imperilment:			
Ute ladies'-tresses	wet meadow - 0.10 mi	No known occurrence or recent observations although potential habitat is possible on TBNG and BGNG	Unknown
Bald eagle	evergreen forest land - 1.1 mi	Documented wintering and potential nesting habitat in ponderosa pine woodlands and riparian cottonwood woodland	Probably
Peregrine falcon (before delisting)	None	Known occurrences but only incidentally during migrations.	No
Black-footed ferret	prairie dog colonies - 0.3 mi	Introduced in black-tailed prairie dog complex in Conata Basin, potential habitat for reintroduction	Possibly
Mountain plover	prairie dog colonies - 0.3 mi herbaceous rangeland - 20.0 mi mixed rangeland - 5.5 mi	Documented nesting habitats in short-grass prairie and black-tailed prairie dog colonies on TBNG, unknown occurrence on BGNG but potential habitat exists	Probably
Species That may be at Risk of Rangewide Imperilment but are not Protected Under the ESA:			
Barr orphacea	Unknown	Known occurrence on clay hills in ne WY and present in Custer, Shannon Cos., SD	Unknown
Swift Fox	prairie dog colonies - 0.3 mi herbaceous rangeland - 20.0 mi mixed rangeland - 5.5 mi	Documented denning habitats in short-grass prairie on TBNG and BGNG	Possibly
Species That may be at Risk of Regional or More Local Imperilment:			
Nodding buckwheat	Unknown	Suspected to occur in suitable habitats on buttes in TBNG and BGNG	Unknown
Lanceleaf cottonwood	None	Suspected to occur in suitable habitats in wetlands and riparian zones on TBNG and BGNG	Unknown
Torrey's crypthantha	Unknown	Suspected to occur in suitable habitats on buttes in TBNG	Unknown
Sand lily	Unknown	Suspected occurrence on TBNG and BGNG on sandy areas on mixed grass prairie, on hillsides, open coniferous woods	Unknown
Blue lips	None	Suspected to occur in suitable habitats in wetlands and riparian zones on TBNG and BGNG	Unknown
Alyssum-leaf phlox	Unknown	Suspected to occur in suitable habitats on buttes in TBNG and BGNG	Unknown
Alkali sacaton	Unknown	Suspected to occur in suitable habitats in wetlands and riparian zones on TBNG	Unknown
Tawny Crescent Butterfly	None	Suspected occurrence on TBNG in ponderosa pine savannah with riparian habitats	Unknown
Flathead Chub	None	Documented occurrence in Cheyenne River, BGNG and Antelope Creek, TBNG	Possibly
Plains topminnow	None	Documented occurrence in tributaries to Cheyenne River on BGNG and TBNG	Possibly
Northern leopard frog	None	Known to occur in emergent wetland vegetation on TBNG and BGNG	Possibly

Table 4-37
Concluded

Species At-Risk (1)	Miles of Alternative in Potential Habitat in National Grasslands	Evidence for Occurrence in Project Area by Habitat	Potential for Impact by Alternative (2)
Yellow-billed cuckoo	None	Known occurrence on TBNG and BGNG in woody shrub/tree overstory riparian vegetation	Possibly
Long-billed curlew	herbaceous rangeland - 20.0 mi mixed rangeland - 5.5 mi	Known occurrence on TBNG and BGNG in short-grass and low mixed -grass prairie	Possibly
Disckcissel	herbaceous rangeland - 20.0 mi mixed rangeland - 5.5 mi	Known occurrence on TBNG in moderately tall mixed-grass/ tall -grass prairie	Possibly
Northern Goshawk	evergreen forest 0.3 mi	Possible nesting on TBNG in ponderosa pine, may be on BGNG during migrations	Possibly
Sage Grouse	None	Documented occurrence in sagebrush steppe on TBNG and BGNG with leks present	Yes
Ferruginous hawk	herbaceous rangeland - 20.0 mi mixed rangeland -5.5 mi	Documented nesting on TBNG and BGNG in trees, on ground and rocks in grasslands and shrublands	Probably
Swainson's hawk	herbaceous rangeland - 20.0 mi mixed rangeland - 5.5 mi	Documented nesting on TBNG and BGNG in trees in grasslands and shrublands	Probably
Short-eared owl	herbaceous rangeland - 20.0 mi mixed rangeland - 5.5 mi	Known occurrence on TBNG and BGNG in moderately tall mixed-grass/ tall -grass prairie	Possibly
Burrowing Owl	prairie dog colonies - 0.3 mi herbaceous rangeland - 20.0 mi mixed rangeland - 5.5 mi	Prairie dog colonies, grasslands, basin-prairie shrublands, agricultural areas documented on BGNG and TBNG	Possibly
Loggerhead shrike	None	Known occurrence on TBNG and BGNG in woody shrub/tree overstory riparian vegetation	Possibly
Baird's sparrow	herbaceous rangeland - 20.0 mi mixed rangeland - 5.5 mi	Known occurrence on TBNG in moderately tall mixed-grass/ tall -grass prairie	Possibly
Fox sparrow	None	Known occurrence on TBNG and BGNG in woody shrub/tree overstory riparian vegetation	Possibly
Black tern	None	Known to occur in emergent wetland vegetation on TBNG and BGNG	Possibly
Lewis' Woodpecker	evergreen forest 0.3 mi	Ponderosa pine savannah and cottonwood-riparian floodplains	Possibly
Fringe-tailed myotis	None	Known to occur near emergent wetland vegetation & woody shrub/tree overstory riparian vegetation on TBNG and BGNG	Possibly
Black-tailed prairie dog	prairie dog colonies - 0.3 mi	Prairie dog colonies	Yes

1 = Species at-risk were included if they were identified on TBNG and analyzed by the Forest Service in the Draft Biological Assessment and Evaluation for Proposed Land and Resource Management Plan, Thunder Basin National Grassland.

2 = Potential for impact by Alternative D was judged as:

No: the at-risk species is not likely to occur on TBNG.

Unknown: although the at-risk species may occur on TBNG, there is no documented occurrence of the species within specified habitats or the presence of those habitats have not been documented in areas crossed by Alternative D.

Possibly: the at-risk species is known to occur in specified habitats on TBNG would be crossed by Alternative D but the species has not been documented proximate to the alternative.

Probably: Alternative D crosses specified habitat on TBNG with documented use by the at-risk species.

Yes: Alternative D crosses the specified habitat on TBNG and would directly impact the at-risk species.

well as persistent noise disturbance for the life of the project.

- Potential decrease in hunter harvest and opportunity due to reduced hunter access and displacement of animals caused by habitat losses, fragmentation of private property and continued noise and human disturbance for the life of the project.
- Construction and disturbance impacts could reduce forage possibly leading to increased forage competition between big game and livestock.
- Disruption or fragmentation of established territories and routines of secretive species such as the mountain lion, a South Dakota State-threatened species, and bobcat.
- Potential direct loss and indirect loss of sage grouse leks due to the loss of suitable habitat types from construction disturbances and human activity.
- Potential direct loss of sage grouse nesting sites due to the loss of suitable habitat cover from construction and human activity.
- Potential reduction in sage grouse numbers caused by habitat losses, human disturbances and possible work force influences such as illegal harvest.
- Possible declines in hunter harvest and opportunity due to reduced hunter access and displacement of sage grouse.
- Direct and indirect loss of non-game wildlife habitats including nesting and young rearing areas, foraging and watering sites, escape, thermal and hiding cover, and resting or loafing areas due to project construction and continual human disturbance.
- Displacement of wildlife away from suitable or preferred habitats due to construction and human disturbance.
- Adverse effects to nesting birds, including raptors, by disturbance and disruption due to train traffic.
- Many species of birds, including raptors and eagles, are protected under the Migratory Bird Treaty Act and Bald Eagle and Golden Eagle Protection Act. Activities that may adversely affect a migratory bird or eagle, their young, eggs or nests) should be coordinated with USFWS before any actions are taken. Removal or destruction of nests, or causing abandonment of a nest could constitute violation of these statutes. USFWS recommended surveys for raptor nests and roost sites in the project area.
- Several non-game species of special concern in Wyoming (burrowing owls, mountain plovers, prairie falcons, golden eagles, bald eagles) have been documented along the proposed project route and could be negatively impacted by direct and indirect loss of habitats used for different life history functions, direct mortality, and illegal harvest by the work force.
- Decline in animal numbers due to lost habitat, fragmented habitat, train/animal collisions, and/or work force influences such as illegal harvest.
- Direct and indirect loss of hunter numbers (issued licenses), reduced hunter success and hunting opportunities due to loss of game wildlife species caused by construction, train/animal collisions, habitat loss, human activity and noise levels.
- Decreased hunter access due to rail line existence, fragmentation of property, and right-of-way fences.
- Increased train traffic across Game Production Areas owned by South Dakota Game, Fish and Parks located 2 miles south of Oral, South Dakota will disrupt wildlife and recreation uses - hunting, wildlife watching - on this tract of public lands. Evaluation of applicability of existing easements will have to be completed.
- Decreased quality of hunting experiences and enjoyment with continual noise disturbances that would include disruption of aesthetics and serenity of a tranquil and virtually undisturbed river valley from Wasta, South Dakota south for 66 miles.
- Loss of habitats and desirable vegetation could potentially reduce the biological diversity of the area.
- Fragmentation of habitat types may potentially affect wildlife use and movement patterns within the area.
- Effects to fish and wildlife of environmental contaminants in coal dust, whether by contaminant uptake by vegetation, consumption of vegetation by wildlife, or incidental direct consumption of coal dust or soils by wildlife.
- Increased traffic and new rail lines may increase the potential for derailments and diesel fuel spills. Additionally, railroad ties treated with certain chemical may pose a contamination hazard. Identify the chemicals used in treatment of the ties as well as any environmental impacts that could be associated with the chemicals.
- Potential loss of native vegetation communities and soil disturbance will lead to increased encroachment or invasion of noxious weeds and undesirable plant species.
- Impacts to riparian forest and woody draw habitats, including direct removal and fragmentation of these habitats, must be addressed as well as impacts to riparian oxbow wetlands along the Cheyenne River in South Dakota.
- Disturbance to existing vegetation cover may lead to increased soil erosion and stream sedimentation.
- Require revegetating disturbed sites with desirable native species and avoid planting species such as sweet clover or alfalfa on grade slopes and borrow areas that would attract grazing wildlife.
- Potential exists to impact numerous plains streams in eastern Wyoming. The project should be

designed to traverse an upland route and avoid riparian corridors wherever possible.

- Changes to the capacity of the Cheyenne River floodplain due to construction of the rail grade within and across the flood plain can potentially alter natural erosion patterns and increase bank erosion due to diminished flood plain capacity.
- Instream construction restrictions may be required at certain stream crossings and fish passage should be allowed at all crossings, at all times during and after project construction. Potential effects to fish migration in tributary streams due to construction of crossings that may increase flow velocities or, in the long-term, cause changes in the channel bed elevations or cause physical obstructions to migrating fish.
- Decreased water quality from sediments and other pollutants can be avoided by implementing best management practices, servicing and fueling construction and maintenance machinery away from streams and riparian areas, locating equipment staging areas as far away as possible from riparian areas, and promptly revegetating disturbed areas that contribute sediment to surface waters.
- Both TBNG and BGNG have been identified as important grassland habitat areas for neotropical migratory birds by the National Partners-In-Flight Program. Conservation measures have been recommended that the Forest Service has accepted as best management practices.

4.18.1 Significance Criteria. The Wyoming Game and Fish Commission (1998) established a mitigation policy in which they recommend objectives for managing unavoidable adverse impacts to different categories of wildlife and wildlife habitats (see Table 4-9). Wildlife habitats are evaluated by their function (the arrangement of habitat features that sustain species, populations and wildlife diversity over time), and their value (the relative importance of habitat types and conditions in sustaining wildlife populations). Based on the commission's mitigation policy, impacts to wildlife and fisheries would be considered significant if any of the following occurred (refer to Table 4-9):

- Increased mortality and/or decreased survival of native wildlife species considered as Vital, High, or Moderate under the Mitigation Policy.
- Loss of habitat function and/or habitat value for habitats classified as Vital or High under the Mitigation Policy.
- Net loss of habitat value with alterations in habitat function for habitats classified as Moderate under the Mitigation Policy.

Similarly, the South Dakota Game, Fish and Parks Department has a policy of no net loss of Resource Category 1 Habitats that include woody draws, native grasslands, sagebrush-grasslands, riparian woodlands, and wetlands. Impacts to wildlife would be considered significant if there was a net loss of any Resource Category 1 Habitat.

4.18.2 Summary of Issues and Impacts Common to All Alternatives (Except the No Action Alternative). Direct or primary impacts to wildlife are explicitly related to the action and include mortality of individuals, loss of habitat quantity and functional quantity and ultimately, diminished population-sustaining functions: individuals' survival and reproductive capacity are adversely affected. With respect to the proposed alternatives (except the No Action - Alternative A), direct impacts include:

- Mortality from wildlife-vehicle collisions on or off project sites.
- Mortality during railroad construction and other surface-disturbing actions.
- Mortality due to consumption of or exposure to toxic compounds.
- Fragmentation of connected habitats.
- Removal of vegetation and other features such as rock-outcrops that provide habitat.
- Degradation of terrestrial habitats from erosion and introduction of non-native vegetation.
- Degradation of aquatic habitats due to altering stream banks, siltation and decreased water quality.
- Loss of forage for herbivores.
- Diminished animal use of habitats due to effects of noise, dust, emissions and human presence.
- Interruption or interference with life history functions including courtship, nesting and parturition, migration, and winter survival.

For some species, these direct impacts are expected to be interrelated such as the effects of habitat fragmentation on interference with life history functions. In addition, there will probably be indirect or secondary impacts that ensue with increased human population and/or increased human use (access) of an area. These evolve during and after a project but are functionally related: secondary impacts would not have occurred without the project. Once initiated though, secondary impacts may continue well beyond the time-frame and develop independently of the project (Comer, 1982). While the effects on wildlife of secondary impacts may be the same as primary, direct impacts, the sources of those impacts vary and include (Comer, 1982 page 18):

- Increased recreation, especially off-road vehicles.
- Increased habitat conversion, especially urban/suburban sprawl.

- Habitat degradation by human encroachment.
- Increased noise, air and water pollution.
- Increased game poaching.
- Increased wildlife road kill.
- Increased harassment of wildlife by uncontrolled pets, especially dogs.

Summarized in Table 4-9 are the Wyoming Game and Fish Commission's mitigation categories related to the relative importance of habitats to fish and wildlife species. These mitigation categories and associated mitigation objectives provide the basis for judging levels of impact significance.

Applications of the policy to Federally-listed threatened and endangered species and their critical habitats were discussed above. State rare wildlife species, Federal candidate species, State native species with status 1 and 2, species' crucial habitats, wetlands, and stream class 1 waterways (premium trout waters with fisheries of national importance) are identified as "vital": habitats may be modified but no loss of habitat function is recommended since these habitats directly limits communities and populations and it may not be possible to restore or replace the habitat once impacted.

State priority 2 species, raptors, migratory birds of high Federal interest, trophy game animals (mountain lions, black bears), big game and trophy game winter-yearlong ranges, parturition areas, raptor nesting habitats, riparian habitats, and other important or limited habitats have been identified as "high" importance: if impacts occur the commission's Mitigation Policy would recommend replacement of affected habitats or enhancement of similar habitats to achieve no net loss of habitat function of the community impacted by a project. Similarly, high values to fishery management include native game fish, stream class 2 waterways, and fisheries management programs emphasizing trophy species and wild native game fish.

Wildlife and fish habitats identified in the "moderate" category may be common or of intermediate importance but the Wyoming Game and Fish Commission's Mitigation Policy recommends no loss of habitat values (the relative importance necessary to sustain socially or ecologically significant wildlife populations) and minimal loss of habitat function (capability of the habitat to sustain species, populations, wildlife diversity over time). Habitats in the "low" importance category are abundant or not essential to sustain wildlife populations or communities.

While the list of impacts identified by the public and agencies (most of them direct or primary) seems to grow with every project, analysis must base impact evaluations on assumption, conjecture and inference derived from studies of similar types of actions but in diverse locations and on different but similar species. Documented or implied impacts that are applicable to the alternatives are summarized in Table 4-10. These do not include effects of railroad developments on species' populations; none have been studied or documented and hence the emphasis of impact analyses is on projected effects to wildlife habitat.

Big Game. In Wyoming, WGFD biologists have mapped seasonal ranges used by big game species. Similarly, SDGFP biologists provided information about big game use along portions of each alternative. The only measurable direct impact to big game is the amount of surface disturbance in each delineated seasonal range that would be produced by the proposed alternatives. In Wyoming, pronghorn, mule deer, white-tailed deer and elk populations and their respective seasonal ranges would be affected by each of the alternatives. Likewise, habitats used by pronghorn and deer (white-tailed deer and mule deer) would be affected in South Dakota.

Of particular concern to biologists in Wyoming are potential impacts to elk during parturition, when elk calves are born. During the parturition period, elk cows are especially sensitive to disturbance and will move to 0.75 mile away or farther from preferred calving sites if subjected to construction workers and equipment (Brekke, 1988). In that study conducted in Colorado, the function of that elk parturition range had been diminished, impacted by oil and gas development but graveled roads and highways also cause significant avoidance with decreased habitat use by elk during parturition (Bian and West, 1997).

Functions of other seasonal big game ranges may be impaired by construction and operation of the proposed project through other means. Winter ranges (crucial WIN, WYL and SWR) provide habitat components that sustain animals through periods of maximum thermal and energy-intake stress. Disturbances during winter stress periods can lead to increased energy expense and increased mortality (Hobbs, 1989). For example, data related to over-winter mortality of mule deer fawns and adults has been collected in western Wyoming (McWhirter, 1998). Using techniques developed by White *et al.* (1996), these empirical data provide estimates of fawn and adult mortality which show a strong relationship to winter precipitation (Reeve and Smith, 1999): as total winter precipitation (November through March) increases, so do mule deer fawn and adult mortality rates. Winter precipitation explains 62 percent of the observed variation in fawn mortality rates. Not surprisingly, fawn mortality increases at a greater rate than adult mortality with increasing winter precipitation.

In part, overwinter mortality of mule deer is due to snow depth since deep snow covers forage and increases

energy expense for movements. Parker *et al.* (1984) clearly demonstrated that energy costs associated with deer moving through snow increased exponentially as snow depth increased relative to the height of a deer or relative sinking depth of an animal in snow. Therefore, fawns expend more energy than adults moving through snow with similar depth and consistency (as dense vs. powdered snow). Increased energy expense or metabolic rate during winter is also promoted by operative temperatures (including combined effects of ambient temperature, wind, and solar radiation) that are below mule deer thermal neutral zones, below -2.2°F. The combined effects of precipitation and temperature on deer winter survival have been discussed by numerous investigators (Roper and Lipscomb, 1973; Bartmann, 1984; Leckenby and Adams, 1986; Hobbs, 1989) and these are undoubtedly related to the differential observed winter mortality of fawn and adult deer. Human-related factors or events on winter ranges that cause mule deer (or other big game) to expend energy during winter, in addition to "natural" environmental factors (severe weather causing migration, competition with conspecifics and/or other ungulates, predators) will increase their over-winter mortality (Hobbs, 1989) and consequently diminish the function of those winter ranges.

In addition to potential project impacts to big game habitats, big game are likely to be killed by train traffic once the project is operational. Most studies of big game-vehicle mortality have been conducted on highways where the number of animals killed increases as traffic volume and vehicle speeds increase (see Table 4-10). New highways constructed through deer movement corridors can lead to substantial mortality (Romin and Bissonette, 1996). One study of mule deer mortality due to highway traffic and trains in western Wyoming showed that more deer were killed on the highway than on the railroad (Reeve, 1990). There, the railroad closely followed the highway. When a deer-proof fence was constructed along 8 miles on each side of the highway, the number of deer collisions decreased on the highway but deer mortality increased significantly on the railroad where the tracks coincided with the deer-proof fence (Reeve, 1990).

From this study and others conducted on big game-vehicle mortalities, it is apparent that a new railroad passing through big game habitats in Wyoming and South Dakota will lead to mortalities. More mortalities are expected during winter when animals are concentrated in large groups than summer when they are dispersed, more with higher train traffic volume than with fewer trains, more during night when animals may be more mobile than during daytime, and more mortalities are expected with higher train speeds (as with empty west-bound trains) than slower trains loaded with coal.

Also, big game are most likely to be killed in areas where they have little or no escape away from tracks. Such situations could include areas between cut slopes and tracks and where right-of-way fences are constructed close to tracks. While fences may inhibit some animals from moving on to the tracks, they also inhibit animals from reaching areas on the other side, thereby isolating and fragmenting habitats. Fences could especially limit big game use of habitats along the Cheyenne River where animals are expected to be highly motivated to move to water from feeding areas or shelter/cover in upland habitats. Pronghorns, in particular, are impeded by certain types of fences (see Table 4-10). Fences can lead to under-utilization of habitat, leading to loss of habitat function. Such impact would be especially acute if animals were prevented from reaching winter or severe winter relief ranges during critical winter periods. Functional loss of important seasonal habitats would also occur in animals are displaced from those areas. Elk in particular could be displaced from wintering habitat in the vicinity of Sunny Draw on TBNG.

Waterfowl, Upland Game Birds, Furbearers, Small Game. Potential impacts to waterfowl due to construction and operation would be most likely during the nesting period where the proposed route is near the Cheyenne River in Wyoming and South Dakota. A study of impacts to nesting waterfowl by oil well drilling indicated some species (43 percent) moved away from or avoided the concentrated activity site while others (52 percent) were unaffected and 5 percent of the species increased abundance near the activity (Barry and Spencer, 1976). Effects of disturbance were observed as far away 1.5 mile from the drilling rig. Increased predation of nests from which adults were disturbed was also reported (Barry and Spencer, 1976).

Accidental release of oils and other petroleum products into the Cheyenne River or tributaries also would adversely affect waterfowl. Toxicity of petroleum products discharged to aquatic habitats was discussed, above under pallid sturgeon (also Table 4-10). Waterfowl could also be affected if feathers became oiled since that would increase thermal conductivity of the feathers and birds would become susceptible to hypothermia (McEwan and Koelink, 1973).

The decline of sage grouse throughout the west has been of increasing concern (Heath *et al.*, 1996; Heath *et al.*, 1997; Braun, 1998). Such a decline in northeastern Wyoming is evident from recent harvest data (see Table 3-99). Reasons for their decline have been attributed to conversion of sagebrush-grasslands to agriculture, herbicide and mechanical treatments to convert sagebrush to pastureland for livestock, livestock grazing that removes concealing vegetation at nest sites thus exposing them to predation, mining and energy

developments, creation of reservoirs that eliminate riparian zones utilized by sage grouse broods, expansion of human settlements into sage grouse habitats, and fragmentation of habitats by fence lines, highways, and powerlines (Heath *et al.*, 1996; Braun, 1998).

The degree to which any or all of these potential factors have affected sage grouse has yet to be determined. Nevertheless, construction and operation of the railroad through South Dakota and Wyoming will contribute to existing habitat fragmentation. Also, noise from vehicles on highways has been suggested as having an adverse impact on sage grouse lek attendance (Braun, 1998).

Mating displays by male sage grouse as well as male sharp-tailed grouse involve acoustic signals coupled with visual displays (Eng *et al.*, 1979; Vehrencamp and Bradbury, 1989; Gibson and Bradbury, 1985; Gibson, 1989, 1992, 1996; Gratson, 1993) so that constant noise could interfere with females' attraction to males' displays. Existing background noise in the project area in both states is expected to be similar to EPA's "farm in valley" noise category which is about 39 dBA in daytime and 32 dBA at night.

Noise levels associated with construction work and effects on sage grouse and other wildlife are unknown but can be inferred from limited available data. Reports indicate that mammals and birds will consistently escape from noises between 75 and 85 dBA (Golden *et al.*, 1980). Heavy machinery, such as scrapers and dozers, typically emit noise levels within the 75 to 85 dBA range at distances beyond 200 feet (Golden *et al.*, 1980). Noises associated with construction will be temporary impacts but those associated with train traffic will be long-term for the life of the project. Estimates of distances at which noise attenuation from train whistles and from locomotives pulling cars diminishes to background daytime noise levels ranges from 39,000 feet - 7.4 miles (whistles) to 23,000 feet - 4.4 miles (locomotives with cars). Attenuation distances are much greater for noise to diminish to nighttime background levels: 49,000 feet - 9.3 miles for whistles and 32,000 feet - 6.1 miles for locomotives pulling cars.

Noise levels of 60 dBA are comparable to EPA's "noisy urban residential" category and noise from locomotives pulling cars would reach that level at 5,700 feet - 1.1 mile from the tracks while whistle sound would attenuate to 60 dBA 3 miles away (16,000 feet). There are numerous sage grouse leks but fewer known sharp-tailed grouse leks within those distances of the proposed routes in both states. In addition, there are wild turkey roosts along the Cheyenne River in South Dakota and mourning doves that are likely to nest anywhere along the alternative routes. Wild turkey strutting and courtship areas during the toms' "gobbling" season exist throughout woody draws (for example, juniper woodlands on Wall Hill), the Cheyenne River corridor and riparian zones of tributaries in South Dakota including Battle Creek, Spring Creek, Rapid Creek and Box Elder Creek. Responses by these upland game bird species to the levels of noise associated with the proposed project can not be predicted but abandonment of areas within some distance of the railroad is likely.

Game birds can also be subject to direct mortality during construction and operation of the alternatives. Sage grouse, pheasants, wild turkeys, mourning doves and sharp-tailed grouse nest on the ground in situations varying in degrees of vegetation cover. Birds incubating eggs and broods of chicks would be killed if projected-related vehicles drove over nests. Birds could also be struck by trains as they are by vehicles on highways (Bennett, 1991).

Desert cottontails are most likely to be impacted during construction. Since they are relatively small and nocturnal, they are susceptible to being killed by vehicles. Once constructed, the railroad grade could be a barrier to cottontail movements, particularly with high train volumes. Since terrestrial furbearers are carnivores, they are likely to be attracted to carrion of big game and other wildlife killed by trains. Animals attracted to or feeding on the railroad are likely to likewise become casualties. As aquatic animals, river otter, beaver and muskrat could be adversely affected by accidental release of petroleum products; their abilities to thermoregulate are severely hampered if fur becomes coated with oil (McEwan *et al.*, 1974).

Nongame Wildlife

Raptors. Construction and operation activities could affect the productivity of nesting raptors in the project area. In their study of responses by nesting ferruginous hawks to human disturbances, White and Thurow (1985) concluded that 90 percent of all nesting adults would not flush from nests if the disturbance was more than 250 meters (820 feet) away. The researchers cautioned, though, that distances of effect would expand when prey are scarce, when ferruginous hawks must spend more time searching for prey and appear to be less tolerant of disturbances (White and Thurow, 1985).

Impacts to nesting golden eagles, prairie falcons, red-tailed hawks, northern harriers and American kestrels would be similar to those discussed for ferruginous hawks. However, all of these raptor species are somewhat adaptable to human disturbance: red-tailed hawks and golden eagles remained in home ranges when exposed to military training activities (Andersen *et al.*, 1990) and blasting did not adversely affect prairie falcon

productivity (Holthuijzen *et al.*, 1990). Parent birds can desert eggs or young but the potential for nest desertion varies between raptor species and is more likely early in the nesting season than after young have hatched (Suter and Jones, 1981). Other potential effects of disturbance include damage to eggs and young by frightened adults, cooling, overheating and loss of moisture from eggs or young if adult birds remain away from nests for too long, missed feedings of chicks, premature fledging of older nestlings, and increased exposure to predators if adults leave nests unattended (Fyfe and Olendorff, 1976; Grier and Fyfe, 1987).

Project activities are not expected to displace wintering golden eagles and rough-legged hawks from available hunting grounds. However, these species show greater flushing response to humans walking than to approaching vehicles and wintering rough-legged hawks when perched are most sensitive to vehicles within 550 feet while wintering golden eagles tended to not respond to vehicles (Holmes *et al.*, 1993). Impacts to wintering raptors are expected to be minor since prey is expected to remain available throughout the area. However, if they focused on carrion along the railroad, winter raptors could be killed such as described for bald eagles.

No impacts to peregrine falcons are anticipated since there is no documentation of their occurrence within the project area except infrequently during migrations. Peregrines could be migrants in the area but their occurrence near any project component under any alternative would indicate their tolerance for the activity. Peregrines occasionally consume waterfowl carrion (Buchanan, 1991) and there is an extremely remote possibility that a peregrine falcon could be killed while feeding on bird carcasses if they occur along the railroad where it parallels the Cheyenne River in South Dakota.

Other Nongame Wildlife. The only certain impact to other terrestrial wildlife by construction and operation of the alternatives is loss of vegetation and habitats. Effects would be especially acute for those species restricted to very limited habitats, including cottonwood-riparian, shrub-dominated woody draws, and coniferous woodlands in the project area. Passerine birds that are obligate shrub-steppe nesting species would be most affected by loss of shrubs and fragmentation of shrub-dominated habitats would be short- and long-term impacts to these birds and possibly to some small mammal species as well. In addition to lost habitat due to physical removal, noise associated with project construction and operation is expected to displace nongame species from physically undisturbed habitats adjacent to the railroad. The extent to which displacement occurs is unknown for any of the species likely to be present.

The degree to which anticipated noise levels displace game and non-game birds from habitats adjacent to the railroad is unknown and undoubtedly varies by species and local conditions. Abandonment of occupied habitats within some distance of the railroad is likely, particularly by nesting birds. For example, densities of nesting birds inhabiting woodlands begins to decline when noise levels form highways reach 42 dBA and densities of grassland species declines when noise levels reach 48 dBA (Forman and Alexander, 1998). For noise of locomotives pulling cars, attenuation to 48 dBA may not occur for over 2.5 miles while attenuation to 42 dBA may be over 4 miles (see data in Table 2-6). Sound attenuation though, is likely to be greater in woods than grasslands and the distance of noise effects on breeding birds will probably be greater in grasslands than in woodlands.

Aquatic Resources. There are no important trout fisheries where the proposed project and any of the alternatives cross or parallel the Cheyenne River and its tributaries in Wyoming and South Dakota. Warm water game fish species are mostly present in South Dakota and include black bullhead, channel catfish, sauger, bluegill, green sunfish, and freshwater drum as well as those preferring cooler water (white bass, smallmouth bass, northern pike and sauger-walleye hybrid or saugeye). Many of these species are tolerant of relatively high turbidity that periodically occurs in the Cheyenne River and also tolerant of low or no flows in the river during summers of drought years. Because of frequent limited flows below Angostura Reservoir, channel catfish are the principal recreational fishery there (USFWS, 1993a). In the region, Angostura Reservoir is the most important fishery with a variety of introduced game fish (largemouth and smallmouth bass, walleye, black crappie, northern pike, channel catfish, yellow perch, rock bass and green sunfish). Degradation to water quality by erosion and/or discharge of toxic compounds would be a significant impact to the Angostura Reservoir fishery.

4.18.3 Alternative A (No Action). Implementation of the No Action Alternative would eliminate project-related impacts to wildlife that have been described, above. However, impacts described as secondary or indirect in Table 4-10 would be expected to continue with any additional population growth in the region.

4.18.4 Alternative B (Proposed Action)

4.18.4.1 Short-Term Impacts

Big Game. Estimates of linear distances associated with Alternative B within Wyoming big game seasonal ranges are provided in Table 3-88. Pronghorn yearlong ranges (YRL) in 3 herd units (Highlight, Thunder Basin and Lance Creek) are most affected by Alternative B with 109.3 miles of the herd units crossed. Although there are

no pronghorn crucial winter ranges that would be affected by Alternative B, the alternative would cross 39.6 miles of ranges used during winter and throughout the year (WYL) and 2.3 miles of severe winter relief range (SWR) in the Lance Creek Herd Unit. SWR ranges are used by that pronghorn population during extremely severe winter conditions.

Alternative B would also affect 123.5 miles of YRL range and 11.0 miles of WYL range used by mule deer in the Thunder Basin Herd Unit but only 3.7 miles would coincide with white-tailed deer YRL ranges. A total of 31.9 miles of Alternative B would affect elk ranges in the Rochelle Hills Herd Unit. While no elk calving or parturition areas would be directly affected by construction of Alternative B, 0.4 miles would pass through elk crucial winter range, 9.7 miles through winter-yearlong range, and 21.8 miles through ranges used throughout the year (YRL).

During the calving (parturition) period, elk cows are especially sensitive to disturbance and will move to 0.75 mile away or farther from preferred calving sites if subjected to construction workers and equipment (Brekke, 1988). Approximately 9.9 miles of Alternative B would pass within 0.75 mile of known elk parturition ranges.

In Wyoming, big game WYL and parturition ranges are classified as "high", no net loss of habitat function is recommended although loss of function may be mitigated through habitat improvements elsewhere. Crucial ranges, however, are "vital": No loss of habitat function is acceptable so that species (here, elk) supported by the habitat are unchanged (see Table 4-9). Passage of Alternative B through crucial elk winter range, pronghorn and mule deer WYL range, and proximity to elk parturition ranges would be expected to impose significant impacts to those habitats over the short-term. Poaching (illegal harvest) would be an additional short-term impact to big game that could be committed by individuals in the temporary work force.

Collisions of big game with construction vehicles are possible short- and long-term impacts. Although locations of big game migration corridors are unknown in Wyoming and South Dakota, mortalities would be most likely where concentrations of animals coincide with construction activities and where animals move across the construction right-of-way as they travel between seasonally used ranges. In Wyoming, most big game mortalities are expected to occur within the portion of Alternative B that crosses 10.1 miles of elk crucial WIN and WYL ranges, 11.0 miles of mule deer WYL range and 39.6 miles of pronghorn WYL range, and within 2.3 miles of pronghorn SWR range during particularly severe winter weather. Similarly, 12 miles of construction in Custer County, South Dakota would occur within pronghorn winter ranges and pronghorn mortalities would be most likely occur there. Because mule deer and white-tailed deer ranges are used yearlong, mortalities due to collisions with vehicles would probably occur throughout, albeit not in concentrations that are expected to occur in deer WYL ranges in Wyoming.

Big game ranges affected by Alternative B in South Dakota are provided in Table 3-92. Available information indicates that 12.2 miles of this alternative would pass through pronghorn winter ranges and 10.4 miles would affect pronghorn yearlong ranges in Custer County. Approximately 2.4 miles of Alternative B would affect pronghorn winter ranges in Pennington County. Undoubtedly, Alternative B would also affect pronghorn seasonal ranges in Fall River County but apparently not those that are used by significant numbers of animals. Mule deer and white-tailed deer ranges used throughout the year would also be affected by Alternative B in each of the South Dakota counties (see Table 3-92) with 135 miles of the alternative passing through winter and/or yearlong ranges used by one or both deer species.

Waterfowl, Upland Game Birds, Furbearers, Small Game. The portion (in miles) of Alternative B that is within 0.5 mile and 1 mile of the Cheyenne River and tributaries (see Table 4-11) and number of sites and total distance where Alternative B would be within 500 feet of the Cheyenne River and its tributaries (see Table 4-13) in Wyoming and South Dakota provide some indication of the level of impact construction could have to waterfowl inhabiting these drainages. Approximately 129 miles of Alternative B would be within 1 mile of a perennial stream or river, 85 miles would be within 0.5 mile, and 22 miles would be within 500 feet of these. There is no information about the levels of actual waterfowl use of these drainages but observations indicate they are used by various species during migrations and for nesting.

There are 2 known sage grouse lek within 0.25 mile and 26 within 2.0 miles of Alternative B in Wyoming (see Table 4-38). Likewise there are 2 sage grouse or sharp-tailed grouse leks within 0.25 mile and 30 leks within 2.0 miles of this alternative in South Dakota (see Table 4-38). Short-term construction surface disturbances and associated noise occurring when sage grouse and sharp-tailed grouse are attending leks could inhibit courtship and reproduction, especially on leks that are 0.25 mile away or less but noise could possibly affect birds on leks as far away as 2 miles or farther. Also, grouse nesting habitats within 2.0 miles of leks could be adversely affected by construction noise.

In South Dakota, wild turkeys utilize the riparian zones along the Cheyenne River and its tributaries during courtship: 8 "gobbling" toms with harems were observed within 0.5 to 1 mile of Alternative B during 1999 aerial

Table 4-38
Number of Known Sage Grouse and Sharp-tailed Grouse Leks Within Various Distances of Alternative B in Wyoming and South Dakota

State and Managed Area	Grouse Species	Number of Leks			
		0.25 mile	2.0 miles	4.4 miles	6.1 miles
Wyoming - Upland and Small Game Management Areas					
USGMA 36 Niobrara	Sage Grouse	1	6	12	14
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	0	0	0
	Total	1	6	12	14
USGMA 39 Belle Fourche	Sage Grouse	1	20	32	35
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	0	0	0
	Total	1	20	32	35
South Dakota - Counties:					
Fall River	Sage Grouse	0	12	12	13
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	0	0	1
	Total	0	12	12	14
Custer	Sage Grouse	0	0	0	0
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	6	12	13
	Total	0	6	12	13
Pennington	Sage Grouse	0	0	0	0
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	2	12	14	14
	Total	2	12	14	14
Alternative B Total		4	56	82	90

surveys for raptors. More than those gobbling sites probably occur along the route, however. There are approximately 76 miles of Alternative B within 1 mile of the Cheyenne River and tributaries, while 51 miles are within 0.5 mile and 21 miles are within 500 feet of these drainages. The response of wild turkeys during courtship and nesting to construction activities and noises are unknown but impacts, if they occur, will most likely be at sites proximate to or through riparian zones and ponderosa pine-juniper woodlands. Nesting wild turkeys, sage grouse, pheasants, mourning doves and sharp-tailed grouse could be impacted by construction within the various undisturbed habitats that occur along the alternative.

Short-term impacts to furbearers and small game include habitat loss and direct mortality from construction machinery. Poaching (illegal harvest) would be an additional short-term impact to waterfowl, upland game birds, furbearers and small game species that could be committed by individuals in the temporary work force.

Raptors. Available data indicates there are 71 raptor nests within 0.5 mile of Alternative B in Wyoming and 12 nests within that distance of Alternative B in South Dakota (see Table 3-108). Most of the definable potential nesting habitats for golden eagles, red-tailed hawks, Swainson's hawks, and great horned owls are in trees associated with the Cheyenne River and tributaries. Nearly 85 miles of Alternative B would pass within 0.5 mile of potential nesting habitats in those riparian zones in both states (see Tables 4-11 and 4-39).

Raptors nesting within 0.25 mile of the alternative are most likely to be adversely affected by short-term construction impacts during the nesting season. In South Dakota, there are 5 red-tailed hawk nests within 0.25 mile of Alternative B but in Wyoming, there are 7 red-tailed hawk nests, 5 golden eagle nests, 1 great horned owl nest, and 17 ferruginous hawk nests within that distance (see Table 4-39). Of those species, ferruginous hawks are most likely to abandon nests if disturbed during the nesting period since they are more sensitive to disturb-

Table 4-39
Number of Known Raptor Nests Within Varying Distances from Alternative B in Wyoming and South Dakota

State	Distance (miles)	Number of Nests for Each Species within Distance (1)								
		GE	FH	RT	SW	PF	KE	GHO	BO	Other
Wyoming	0.25	5	17	7	1	0	0	1	0	2
	0.50	10	34	13	2	0	0	8	0	4
	1.0	17	46	20	2	1	0	14	0	4
South Dakota	0.25	0	0	5	0	0	0	0	0	1
	0.50	0	0	9	0	0	0	0	0	3
	1.0	0	0	13	0	0	0	0	0	4

1 = Species coeds are: GE, golden eagle; FH, ferruginous hawk; RT, red-tailed hawk; SW, Swainson's hawk; PF, prairie falcon; KE, American kestrel; GHO, great horned owl; BO, burrowing owl; Other includes northern harrier, long-eared owl, short-eared owl, and unknown species.

ance than other species. However, many ferruginous hawk nests and nests of other species that are within 0.25 mile of the alternative have not been active recently. As evident in Table 4-39, there are many more raptor nests within distances of 0.5 and 1 mile from the proposed route and it is possible that some of those more distant nest could be affected either during construction or during the long-term project operation. Nests closest to the alternative could be most at-risk if individuals in the temporary work force were involved in illegal shooting, an additional potential short-term impact to raptors.

Other Nongame Wildlife. Short-term disturbances to nongame birds, mammals, amphibians and reptiles would occur during construction as vegetation and other habitat features are destroyed at construction sites. Data collected from NBS breeding bird surveys indicate that riparian zones associated with the Cheyenne River and its tributaries tend to support a large number of nongame bird species (see Table 3-98). Approximately 7 miles of Alternative B would pass through forested (3.4 miles) and non-forested (3.5 miles) wetlands that are associated with riparian habitats, but all are within South Dakota. Coniferous woodlands also support a relatively high diversity of nongame bird species. Nearly 2.4 miles of Alternative B would affect evergreen forested lands, again all in South Dakota.

In addition to short-term impacts due to disturbances within occupied habitats, terrestrial nongame species are also likely to be killed by construction vehicles within work zones and possibly off-site by personnel vehicles en route to construction sites.

Aquatic Resources There are 177 total sites where Alternative B is within 500 feet of the Cheyenne River and perennial tributary streams in Wyoming and South Dakota (see Table 4-13). Alternative B would pass within 500 feet of these drainages for a total of 21.9 miles. These sites are believed to be those most likely where sediments and/or accidentally released toxic compounds could be discharged into the Cheyenne River system, both in the short- and long-term.

4.18.4.2 Long-Term Impacts. Long-term impacts due to the presence, operation and maintenance of Alternative B to game and nongame wildlife are expected to be similar to short-term impacts, described above. They include direct mortality by trains and maintenance vehicles, species' avoidance of habitats that are near the tracks, and potential long-term deterioration of habitats, especially aquatic habitats at sites subject to sediment discharge and accidental release of toxic substances and aquatic habitats downstream.

For the life of the project, there is the potential for direct mortalities to terrestrial vertebrates by trains. Big game are likely to be killed by trains, especially where the tracks cross wintering areas and migration corridors, sites where pronghorn, mule deer, white-tailed deer and elk are concentrated and/or would be more likely to cross the tracks. Although specific big game migration pathways are not known, Alternative B would cross through 41.9 miles of pronghorn WYL and SWR ranges, 11.0 miles of mule deer WYL ranges, and 10.1 miles of elk crucial WIN and WYL ranges in Wyoming. In South Dakota, 14.6 miles of Alternative B would cross through pronghorn winter ranges in Custer and Pennington counties and also for some distance in Fall River County. In addition to being areas where big game mortalities are expected, impacts from Alternative B to these seasonal ranges include physical loss of habitats and habitat fragmentation over the long-term. Such long-term impacts are expected to reduce the functions of those habitats so that they may not provide as much food and shelter to wintering big game as they do currently. Loss of function in these habitats from Alternative B would be a significant impact to big game.

In addition to lost habitats, big game in both states will be impacted over the long-term by fencing on one or both sides of the railroad. Depending on design, fencing will impede if not prohibit pronghorn movements. Mule deer, white-tailed deer, and occasionally elk and pronghorns will jump over typical range fences but sometimes individuals of each species become entangled in fences and inevitably die. Fenced right-of-way increases habitat fragmentation by limiting animals' movements, whether daily or seasonally, from one habitat to another or to access a limited resource. On a daily time scale, fencing will limit big game from accessing water - a limited resource - from the Cheyenne River and tributaries where Alternative B parallels these drainages in both states. On a seasonal scale, fencing will limit big game migrations from summer to winter ranges thereby rendering parts or all of winter range inaccessible. Alternatively, if fences retain big game on winter ranges too long, they may over-utilize vegetation there and reduce the amount of forage needed by wintering animals. In either case, the habitat function of winter ranges will be diminished.

Noise due to train traffic is expected to be a long-term impact to some species. Background noise on the project area in both states is similar to EPA's "farm in valley" noise category which is about 39 dBA in daytime and 32 dBA at night. Estimates of distances at which noise attenuation from train whistles and from locomotives pulling cars diminishes to background daytime noise levels ranges from 7.4 miles for whistles to 4.4 miles for locomotives pulling cars. Attenuation distances are much greater for noise to diminish to nighttime background levels: 9.3 miles for whistles and 6.1 miles for locomotives pulling cars. Locations of where whistles would be sounded in relation to wildlife habitats are unknown so estimates of noise disturbances associated with trains moving on tracks are the only component analyzed for long-term effects.

If sage grouse and sharp-tailed grouse are sensitive to noise above background levels during courtship on leks, grouse on leks may be affected from 4.4 miles up to 6.1 miles away from the railroad. These are computed distances at which noise from locomotives pulling cars would attenuate to expected background levels during the day and night, respectively. There are 44 known leks within 4.4 miles and 49 known leks within 6.1 miles of Alternative B in Wyoming and 38 to 41 grouse leks within those distances in South Dakota (see Table 4-38) and which could be impacted by noise during train operations.

The degree to which these anticipated noise levels displace species is unknown and undoubtedly varies by species and local conditions. Abandonment of occupied habitats within some distance of the railroad is likely, particularly by nesting birds. For example, densities of nesting birds inhabiting woodlands begins to decline when noise levels form highways reaches 42 dBA and densities of grassland species declines when noise levels reach 48 dBA (Forman and Alexander, 1998). For noise of train locomotives pulling cars, attenuation to 48 dBA may not occur for over 2.5 miles while attenuation to 42 dBA may be over 4 miles (see data in Table 2-6). Sound attenuation though, is likely to be greater in woods than grasslands and the distance of noise effects on breeding birds will probably be greater in grasslands than in woodlands. Whether noise from relatively infrequent train traffic causes decreased densities of birds comparable to the effects of noise on high traffic volume highways is unknown; traffic volume on highways influences bird densities as well as noise (Forman and Alexander, 1998). In Wyoming, Alternative B would pass through 128 miles of grasslands (herbaceous rangeland) and 14.6 miles of sagebrush steppe (shrub and brush rangeland, mixed rangeland) as well as 113 of grasslands in South Dakota. If noise from operating trains causes lower densities of grassland bird species within some distance from the railroad, nearly 250 miles of grasslands and sagebrush steppe could be affected.

Foxes, raptors, and other carnivores and scavengers that are game (weasels, badgers, mountain lions in Wyoming) and nongame (coyotes, magpies) species are those most likely to feed on carrion of other animals that are killed by trains. These scavengers could be drawn near to the tracks, thereby increasing their risk of being killed. Locations and numbers of mortalities are impossible to estimate except where tracks would intersect suitable habitats that are known to be used or may potentially be used. Those high risk areas include where tracks intersect prairie dog colonies and big game wintering ranges or other ranges where big game animals congregate and cross tracks. Potential indirect long-term impacts to ground nesting birds (waterfowl, upland game birds, numerous passerine birds) could also occur if predators are drawn to a nesting area because of nearby carrion concentrations along tracks.

Long-term impacts to habitats used by terrestrial and aquatic species due to surface disturbances are expected to be similar to those described under short-term impacts, above. However, once construction machinery is with-drawn from the construction sites and revegetation is successful, the total amount of some habitats affected by surface disturbance is expected to be less over the long-term. Some species of birds that nest in grasslands may utilize revegetated portions of the right-of-way. However, if that vegetation is mowed or sprayed with herbicides during maintenance or if fires were ignited by sparks from train operations, nesting bird species and others inhabiting the right-of-way would be impacted throughout the life of the project.

Long-term runoff of sediments and toxic compounds could impact aquatic organisms downstream in much the same way as described under short-term impacts. Those same sites that were evaluated in Table 4-13 are likely to be those where chronic discharges occur with risk to game and nongame fish as well as amphibians and other aquatic animals. Over 22 miles of Alternative B would be within 500 feet of rivers and perennial streams in both states, combined.

Surface disturbance associated with the completed rail bed and rail sidings through habitats utilized by game and nongame wildlife species would be irretrievably lost to those species' uses. Direct mortality of any of these species would constitute an irreversible loss of a resource. For species' habitats not directly affected by mortality or habitat loss by surface disturbance, effects of human activities associated with construction and operational actions and noise associated with trains could cause long-term avoidance of habitats adjacent to Alternative B. Those habitats, however, would probably be eventually utilized once the project is abandoned, assuming that species would reoccupy those areas in the future.

4.18.4.3 Forest Plan Consistency Review

Existing Nebraska Forest Plan. Wildlife MIS identified on BGNG include pronghorn antelope, mule deer, sharp-tailed grouse, black-footed ferrets and wild turkey. Effects of Alternative B on black-footed ferrets were discussed previously. Nebraska Forest Plan management area prescriptions that would be affected by Alternative B are provided in Table 1-2 and discussed in detail in Table 1 through Table 5 in Appendix A. Estimates of where and how much of Alternative B would impact known or potential habitats utilized by MIS species are provided in Table 4-40.

Alternative B would cross approximately 7 miles of pronghorn ranges and 31.5 miles of mule deer and white-tailed deer ranges within BGNG in Custer and Pennington counties. No sharp-tailed grouse leks are known to be within distances up to 1 mile from Alternative B on BGNG. However, leks possibly do occur proximate to the 15.3 miles of herbaceous rangeland in BGNG that would be affected by Alternative B. And wild turkey gobbling sites and roosts may be present in BGNG particularly near the 0.8 mile of forested riparian vegetation that would be affected.

Existing Medicine Bow Forest Plan. Wildlife MIS identified on TBNG include featured species (pronghorn antelope, mule deer, elk), recovery species (bald eagle, black-footed ferret, and peregrine falcon), and ecological indicator species (prairie vole, black-tailed prairie dog, yellow-breasted chat, sage grouse, golden eagle, Brewer's sparrow, willow flycatcher, mountain plover, upland sandpiper, ferruginous hawk, red crossbill, house wren, long-billed curlew, red-headed woodpecker, and Woodhouse's toad). Management requirements on the Medicine Bow National Forest and TBNG related to recovery species and many of the ecological indicator species that are identified as sensitive were discussed above.

It is likely that Alternative B would not comply with the Forest Plans' standards and guidelines restrictions pertaining to ferruginous hawks since 6 nests within TBNG would be within 0.25 mile of Alternative B. Similarly, Alternative B would pass within 1 mile of 3 sage grouse leks on TBNG As discussed in Chapter 2, at peak operation nearly 40 coal trains would pass along the track daily. Train traffic would occur 24 hours a day. Consequently, sage grouse nesting habitats could be adversely affected by noise, train movements, and removal of shrub-dominated vegetation that is a key habitat component for nesting sage grouse. Alternative B could affect habitat capabilities for several MIS that potentially inhabit riparian zones along Little Thunder Creek, particularly nesting raptors.

Alternative B is not expected to decrease habitat capability for big game species on TBNG to below levels needed to support the State of Wyoming population goals for each species. Pronghorn, mule deer, white-tailed deer and elk are the only MIS with state population goals. Alternative B would, however, affect seasonal ranges used by different big game species on TBNG (see Table 3-88). The following pronghorn seasonal ranges on TBNG would be affected: 17 miles of WYL, 17 miles of YRL and 2 miles of SWR. For mule deer 5 miles of WYL and 28 miles of YRL would be affected on TBNG while 1 mile of white-tailed deer YRL would be crossed. Elk ranges affected by Alternative B on TBNG include 0.3 mile of crucial WIN, 3 miles of WYL and 13 miles of YRL ranges.

Medicine Bow Forest Plan management area prescriptions that would be affected by Alternative B are provided in Table 1-2 and discussed in detail in Table 6 through Table 12 in Appendix A. Estimates of where and how much of Alternative B would impact known or potential habitats utilized by management indicator species are provided in Table 4-41.

Northern Great Plains Management Plans Revision. Recently proposed grassland management area prescriptions under the proposed grassland plans for TBNG and BGNG that would be affected by Alternative B are provided in Table 1-2 and discussed in detail in Table 13 through Table 23 in Appendix A.

Table 4-40
Miles of Alternative B That Affect Land Use Cover Types (Potential Wildlife Habitats) That May Be Inhabited by the Forest Service Management Indicator Species on BGNG in South Dakota

Land Use Cover Types Potential Wildlife Habitats	Miles	Forest Service Management Indicator Species Possibly Occurring in Land Use Cover Types on BGNG	Potential for Impacts to Species by Alternative B (1)
Cropland, Pasture	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Other Agricultural Land	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Herbaceous Rangeland	15.3	Antelope, Sharp-tailed Grouse	Yes
Shrub and Brush Rangeland	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Mixed Rangeland	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Deciduous Forest Land	None	Mule Deer, Wild Turkey	No
Evergreen Forest Land	None	Mule Deer, Wild Turkey	No
Forested Wetlands	0.8	Mule Deer, Wild Turkey	Limited
Nonforested Wetlands	0.2	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	Limited
Bare Exposed Rock	None	None	No

1 = Potential for impacts by Alternative B were judged as:
No: the Land Use Cover Type is not affected by the alternative
Limited: the alternative passes through the Land Use Cover Type for less than one mile, impact potential to management indicator species is possible but unlikely.
Yes: the alternative will pass through the Land Use Cover Type for more than one mile and the management indicator species are known to occur on BGNG in that cover type.

The proposed grassland management plan specifies standards and guidelines that would be applicable to species at-risk as well as game and nongame wildlife species and fisheries. The applicability of those standards and guidelines to implementation of the new railroad alternatives is discussed in Table 13 in Appendix A. Conflicts between Alternative B and wildlife management on TBNG and BGNG have been analyzed in that table.

4.18.5 Alternative C (Modified Proposed Action)

4.18.5.1 Short-Term Impacts

Big Game. Estimates of linear distances affected by Alternative C during construction in Wyoming big game seasonal ranges are provided in Table 3-89. Nearly 88 miles of pronghorn yearlong ranges (YRL) in 2 herd units (Highlight and Lance Creek) would be crossed by the alternative. Although there are no pronghorn crucial winter ranges crossed by this alternative, 41 miles of ranges used during winter and throughout the year (WYL) and 2.4 miles of SWR range in the Lance Creek Herd Unit would be crossed. For the most part, Alternative C would affect pronghorn ranges in Wyoming similarly or slightly less than Alternative B, but only 2 herd units would be affected compared to 3 affected by Alternative B.

Alternative C would also cross 103.4 miles of YRL range and 9.0 miles of WYL range used by mule deer in the Thunder Basin Herd Unit but only 1.4 miles would coincide with white-tailed deer YRL range. Alternative C is expected to have slightly less impact to mule deer and white-tailed deer in the Thunder Basin Herd Unit than Alternative B.

A total of 28.6 miles of Alternative C would cross elk ranges in the Rochelle Hills Herd Unit. While no elk calving or parturition areas would be crossed by Alternative C, 2.5 miles would pass through elk crucial WIN range. However, that portion of Alternative C would be within an existing railroad corridor and, except for the increased volume of trains, would not represent a new impact to elk crucial WIN. However, elk may disperse from the range because of increased traffic. Nearly 5 miles of Alternative C would go through elk WYL range, and 21 miles would pass through YRL ranges. Alternative C would impact less elk crucial WIN range than Alternative B because surface disturbances would be contained within already disturbed land. Alternative C would affect nearly the same amount of elk YRL ranges as Alternative B but less WYL range.

During the calving (parturition) period, elk cows are especially sensitive to disturbance and will move to 0.75

Table 4-41
Miles of Alternative B That Affect Land Use Cover Types (Potential Wildlife Habitats) That May Be Inhabited by Forest Service Management Indicator Species (Featured Species and Some Ecological Indicator Species) on TBNG in Wyoming

Land Use Cover Types Potential Wildlife Habitats	Miles	Forest Service Management Indicator Species Possibly Occurring in Land Use Cover Types on TBNG	Potential for Impacts to Species by Alternative B (1)
Cropland, Pasture	0.7	Antelope, Mule Deer, Prairie Vole, Black-tailed Prairie Dog, Golden Eagle, Upland Sandpiper, Mountain Plover, Longbilled Curlew	Limited
Other Agricultural Land	None	Prairie Vole, Upland Sandpiper, Mountain Plover, Longbilled Curlew	No
Herbaceous Rangeland	34.5	Antelope, Mule Deer, Elk, Prairie Vole, , Black-tailed Prairie Dog, Golden Eagle, Ferruginous Hawk, Upland Sandpiper, Mountain Plover, Longbilled Curlew	Yes
Shrub and Brush Rangeland	0.1	Antelope, Mule Deer, Elk, Prairie Vole, Black-tailed Prairie Dog, Sage Grouse, Golden Eagle, Brewer's Sparrow, Ferruginous Hawk	Limited
Mixed Rangeland	0.2	Antelope, Mule Deer, Elk, Prairie Vole, Black-tailed Prairie Dog, Sage Grouse, Golden Eagle, Brewer's Sparrow, Ferruginous Hawk, Mountain Plover	Limited
Deciduous Forest Land	None	Mule Deer, Elk, Golden Eagle, House Wren, Red-headed Woodpecker	No
Evergreen Forest Land	None	Mule Deer, Elk, Golden Eagle, Red Crossbill, Red-headed Woodpecker	No
Forested Wetlands	None	Mule Deer, Elk. Golden Eagle, Willow Flycatcher, House Wren, Red-headed Woodpecker, Woodhouse's Toad	No
Nonforested Wetlands	None	Mule Deer, Elk, Yellow Breasted Chat, Willow Flycatcher, Woodhouse's Toad	No
Bare Exposed Rock	None	Golden Eagle, Ferruginous Hawk	No

1 = Potential for impacts by Alternative B were judged as:
No: the Land Use Cover Type is not affected by the alternative
Limited: the alternative passes through the Land Use Cover Type for less than one mile, impact potential to management indicator species is possible but unlikely.
Yes: the alternative will pass through the Land Use Cover Type for more than one mile and the management indicator species are known to occur on TBNG in that cover type.

mile away or farther from preferred calving sites if subjected to construction workers and equipment (Brekke, 1988). Alternative C would not pass within 0.75 mile of any known elk parturition ranges. However, construction of Alternative C through crucial elk WIN range and pronghorn and mule deer WYL range would be expected to result in significant impacts to those habitats over the short-term. Poaching (illegal harvest) would be an additional short-term impact to big game that could be committed by individuals in the temporary work force.

Collisions of big game with construction vehicles are possible short-term and long-term impacts. In Wyoming, most big game mortalities are expected to occur within the portion of Alternative C that crosses 7 miles of elk crucial WIN and WYL ranges, 9 miles of mule deer WYL range and 41 miles of pronghorn WYL range, and within 2.4 miles of pronghorn SWR range during particularly severe winter weather. Except for potential effects to pronghorn on WYL ranges, these estimates of extent for potential big game mortalities are less than estimates made for Alternative B.

Pronghorn winter ranges would be affected by 14 miles of construction in Custer and Pennington counties, South Dakota and pronghorn mortalities would be most likely to occur there. That is nearly the same as the estimated effects of Alternative B on pronghorn winter ranges. Alternative C would also cross 33 miles of winter ranges used by mule deer and white-tailed deer in all South Dakota counties. Additional areas in South Dakota that are used by mule deer and white-tailed deer yearlong would be crossed for 70 miles (see Table 3-94), less than the possible effects by Alternative B.

Waterfowl, Upland Game Birds, Furbearers, Small Game. The distance (in miles) that Alternative C is within 0.5 mile and 1 mile of the Cheyenne River and tributaries (see Table 4-17) and number of sites and total distance where Alternative C would be within 500 feet of the Cheyenne River and its tributaries (see Table 4-19) in Wyoming and South Dakota provide some indication of the level of impact construction could have to waterfowl using those drainages during nesting and/or migration. Approximately 93 miles of Alternative C would be within

1.0 mile of a perennial stream or river, 58 miles would be within 0.5 mile, and 21 miles would be within 500 feet of these. Each of these zones of potential effects to waterfowl is less than estimates made for Alternative B.

There are 2 known sage grouse leks within 0.25 mile and 19 within 2 miles of Alternative C in Wyoming (see Table 4-42). Likewise, there are 4 sage grouse or sharp-tailed grouse leks within 0.25 mile and 34 leks within 2 miles of this alternative in South Dakota (see Table 4-42). Short-term construction surface disturbances and associated noise occurring when sage grouse and sharp-tailed grouse are attending leks could inhibit courtship and reproduction, especially on leks that are 0.25 mile away or less but noise could possibly affect birds on leks as far away as 2 miles or farther. Also, grouse nesting habitats within 2.0 miles of leks could be adversely affected by construction noise.

In South Dakota, wild turkeys utilize the riparian zones along the Cheyenne River and its tributaries during courtship: 6 "gobbling" toms with harems were observed within 0.5 to 1 mile of Alternative C during 1999 aerial surveys for raptors. More than those surely occur along the alternative, however. There are approximately 46 miles of Alternative C within 1 mile of the Cheyenne River and tributaries, while 25 miles are within 0.5 mile and 19 miles are within 500 feet of these drainages, areas with potential habitat for use by wild turkeys during courtship and nesting in South Dakota. Intersection of Alternative C with each of these zones of potential effects to turkeys is less than estimates made for Alternative B.

Short-term impacts to furbearers and small game are the same as discussed for Alternative B. No quantitative, comparative evaluations of potential impacts to furbearers and small game can be made among alternatives.

Raptors. Available data indicates there are 67 raptor nests within 0.5 mile of Alternative C in Wyoming and 12 nests within that distance of Alternative C in South Dakota (see Table 4-43). Most of the definable potential nesting habitats for golden eagles, red-tailed hawks, Swainson's hawks, and great horned owls are in trees associated with the Cheyenne River and tributaries. Over 58 miles of Alternative C would pass within 0.5 mile of potential nesting habitats in those riparian zones in both states (see Table 4-17) compared to 85 miles similarly affected by Alternative B (see Table 4-11).

Other Nongame Wildlife. Short-term disturbances to nongame birds, mammals, amphibians and reptiles would occur during construction as vegetation and other habitat features are destroyed within construction sites. Data collected from NBS breeding bird surveys indicate that riparian zones associated with the Cheyenne River and its tributaries tend to support a large number of nongame bird species (see Table 3-98). Approximately 6 miles of Alternative C would pass through forested (1.8 miles) and non-forested (4.3 miles) wetlands that are associated with riparian habitats, but all are within South Dakota. Coniferous woodlands also support a relatively high diversity of nongame bird species. Three miles of Alternative C would affect evergreen forested lands in South Dakota and 0.3 mile would pass through evergreen forest in Wyoming. Fewer miles of Alternative C would affect wetlands than Alternative B but Alternative C would affect slightly more evergreen forests in South Dakota and Wyoming.

Generally, there have been more nongame bird species observed in grasslands than in shrublands (see Table 3-98) in both states. In Wyoming, over 110 miles of Alternative C would pass through grasslands (18 fewer miles than Alternative B passing through herbaceous rangeland) while 11 miles would affect shrublands (3 fewer miles than Alternative B passing through shrub/brush rangelands and mixed rangelands). Alternative C would pass through 110 miles of grasslands in South Dakota (3 miles less than Alternative B) but would not coincide with any shrublands there. Although the differences are not great, construction of Alternative C is expected to have slightly less impact to breeding birds than Alternative B simply because there would be less disturbance in grasslands and less noise effects to those grassland species.

Aquatic Resources. There are 206 total sites (29 more than Alternative B) where Alternative C is within 500 feet of the Cheyenne River and perennial tributary streams in Wyoming and South Dakota (see Table 4-19). Alternative C would pass within 500 feet of these drainages for a total of 20.8 miles. These sites are believed to be those most likely where sediments and/or accidentally released toxic compounds could be discharged into the Cheyenne River system, both in the short-term and long-term.

4.18.5.2 Long-Term Impacts. Long-term impacts due to the presence, operation and maintenance of Alternative C to game and nongame wildlife are expected to be similar to short-term impacts described for Alternative B.

Raptors nesting within 0.25 mile of the alternative are most likely to be adversely affected by short-term construction impacts during the nesting season. In South Dakota, there are 6 red-tailed hawk nests, 2 golden eagle nests, and 1 great horned owl nest all within 0.25 mile of Alternative C. But in Wyoming, there are 7 red-tailed hawk nests, 6 golden eagle nests, 2 great horned owl nests, 1 Swainson's hawk nest and 22 ferruginous hawk nests within that distance (see Table 4-43). Alternative

Table 4-42
Number of Known Sage Grouse and Sharp-tailed Grouse Leks Within Various Distances of Alternative C in Wyoming and South Dakota

State and Managed Area	Grouse Species	Number of Leks within Distance			
		0.25 mile	2.0 miles	4.4 miles	6.1 miles
Wyoming - Upland and Small Game Management Areas					
USGMA 36 Niobrara	Sage Grouse	0	6	9	14
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	0	0	0
	Total	0	6	9	14
USGMA 39 Belle Fourche	Sage Grouse	2	13	26	31
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	0	0	0
	Total	2	13	26	31
South Dakota - Counties:					
Fall River	Sage Grouse	1	11	12	13
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	1	1	2
	Total	1	12	13	15
Custer	Sage Grouse	0	0	0	0
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	1	10	12	13
	Total	1	10	12	13
Pennington	Sage Grouse	0	0	0	0
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	2	12	14	14
	Total	2	12	14	14
Alternative C Total		6	53	74	87

Table 4-43
Number of Known Raptor Nests Within Varying Distances from Alternative C in Wyoming and South Dakota

State	Distance From (miles)	Number of Nests for Each Species within Distance (1)								
		GE	FH	RT	SW	PF	KE	GHO	BO	Other
Wyoming	0.25	6	22	7	1	0	0	2	0	2
	0.50	11	34	10	2	0	0	6	1	3
	1.0	21	56	20	2	1	0	12	2	4
South Dakota	0.25	2	0	6	0	0	0	1	0	0
	0.50	2	0	7	0	0	0	2	0	1
	1.0	2	0	11	0	0	0	2	0	2

1 = Species coeds are: GE, golden eagle; FH, ferruginous hawk; RT, red-tailed hawk; SW, Swainson's hawk; PF, prairie falcon; KE, American kestrel; GHO, great horned owl; BO, burrowing owl; Other includes northern harrier, long-eared owl, short-eared owl, and unknown species.

C would affect more known raptor nests than Alternative B within 0.25 miles of the alternatives.

There are many more raptor nests within distances of 0.5 and 1 mile from the alternative and it is possible that some of those more distant nest could be affected either during construction or during the long-term project operation. Nests closest to the alternative could be most at-risk if individuals in the temporary work force were involved in illegal shooting, an additional potential short-term impact to raptors.

Big game are likely to be killed by trains, especially where the tracks cross wintering areas and migration corridors. Although specific big game migration pathways are not known, Alternative C would pass for 43 miles through pronghorn WYL and SWR ranges (1 mile more than Alternative B), 9.1 miles of mule deer WYL ranges (2 miles less than Alternative B), and 7.2 miles of elk crucial WIN and WYL ranges (2.9 miles less than Alternative B) in Wyoming. In South Dakota, 14.2 miles of Alternative C would pass through pronghorn winter ranges in Custer and Pennington counties (0.4 mile less than Alternative B). Over 33 miles of Alternative C would affect mule deer and white-tailed deer wintering areas in South Dakota compared to nearly 40 miles affected by Alternative B. In addition to being areas where big game mortalities are expected, impacts by Alternative C to these seasonal ranges include physical loss of habitats and habitat fragmentation over the long-term. Such long-term impacts with loss of function in these habitats due to Alternative C would be a significant impact to big game.

Fenced right-of-way along Alternative C would increase fragmentation of habitats use by big game, further reducing habitat functions over the long-term in ways similar to those described for Alternative B. Too, fences are expected to contribute to big game mortalities if animals become entangled.

Noise due to train traffic under Alternative C is expected to be a long-term impact to some species in the same way that was described for Alternative B. Courtship and reproduction by sage grouse and sharp-tailed grouse may be affected by noise, probably more from locomotives pulling cars than whistles because those sources will be more widespread than localized whistle points. Since sage grouse and sharp-tailed grouse courtship on leks includes early morning before sunrise, they may be affected by noise from trains up to 6.1 miles away.

If sage grouse and sharp-tailed grouse are sensitive to noise above background levels during courtship on leks, grouse on leks may be affected from 4.4 miles up to 6.1 miles away from the railroad. These are computed distances at which noise from engines pulling cars would attenuate to expected background levels during the day and night, respectively. There are 35 known leks within 4.4 miles and 45 known leks within 6.1 miles of Alternative C in Wyoming (see Table 4-42) with 39 and 42 grouse leks within those distances in South Dakota (see Table 4-42) and which could be impacted by noise during train operations.

The degree to which these anticipated noise levels displace species is unknown and undoubtedly varies by species and local conditions. Abandonment of occupied habitats within some distance of the railroad is likely, particularly by nesting birds. Densities of nesting birds inhabiting woodlands begins to decline when noise levels form highways reaches 42 dBA and densities of grassland species declines when noise levels reach 48 dBA. For noise of train engines pulling cars, attenuation to 48 dBA may not occur for over 2.5 miles while attenuation to 42 dBA may be over 4 miles (see Table 2-6). In Wyoming, Alternative C would pass through 110 miles of grasslands (herbaceous rangeland) and 11 miles of sagebrush steppe (shrub and brush rangeland, mixed rangeland) as well as 110 of grasslands in South Dakota. If noise from operating trains causes lower densities of grassland bird species within some distance from the railroad, 231 miles of grasslands and sagebrush steppe could be affected, 25 miles less than Alternative B.

Impacts by Alternative C to foxes, raptors, and other carnivores and scavengers that are game (weasels, badgers, mountain lions in Wyoming) and nongame (coyotes, magpies) species are those most likely to feed on carrion of other animals and if they are drawn near to the tracks, their risk of being killed would increase. As described for Alternative B, high risk areas for wildlife mortalities due to trains include locations where tracks intersect prairie dog colonies and big game wintering ranges or other ranges where big game animals congregate and cross tracks. Potential indirect long-term impacts to ground nesting birds (waterfowl, upland game birds, numerous passerine birds) could also occur if predators are drawn to a nesting area because of carrion concentrations along tracks.

Long-term impacts to habitats used by terrestrial and aquatic species due to surface disturbances are expected to be similar to those described under short-term impacts, above. However, once construction machinery is withdrawn from the construction site and revegetation is successful, the total amount of some habitats affected by surface disturbance is expected to be less over the long-term. Some species of birds that nest in grasslands may utilize revegetated portions of the right-of-way. However, if that vegetation is mowed or sprayed with herbicides during maintenance operations or if localized fires were ignited by sparks from train operations, nesting bird

species and others inhabiting the right-of-way would be impacted throughout the life of the project.

Long-term runoff of sediments and toxic compounds could impact aquatic organisms downstream in much the same way as described under short-term impacts. Those same sites along Alternative C that were evaluated in Table 4-19 are likely to be those where chronic discharges occur with risk to game and non-game fish as well as amphibians and other aquatic animals. Over 20 miles of Alternative C would be within 500 feet of rivers and perennial streams in both states, combined.

4.18.5.3 Forest Plan Consistency Review

Existing Nebraska Forest Plan. MIS identified on BGNG include pronghorn antelope, mule deer, sharp-tailed grouse, black-footed ferrets and wild turkey. Effects of Alternative C on black-footed ferrets were discussed above. Nebraska Forest Plan management area prescriptions that would be affected by Alternative C are provided in Table 1-2 and discussed in detail in Table 1 through Table 5 in Appendix A. Estimates of where and how much of Alternative C would impact known or potential habitats utilized by MIS species are provided in Table 4-44.

Alternative C would cross approximately 5 miles of pronghorn ranges and over 8 miles of mule deer and white-tailed deer ranges within BGNG in Custer and Pennington counties. No sharp-tailed grouse leks are known to be within distances up to 1 mile from Alternative C on BGNG. However, leks possibly do occur proximate to the 5 miles of herbaceous rangeland in BGNG that would be affected by Alternative C. And wild turkey gobbling sites and roosts may be present in BGNG but Alternative C would not directly affect any forested riparian vegetation potentially inhabited by turkeys.

Existing Medicine Bow Forest Plan. MIS identified on TBNG include featured species (pronghorn antelope, mule deer, elk), recovery species (bald eagle, black-footed ferret, and peregrine falcon), and ecological indicator species (prairie vole, black-tailed prairie dog, yellow-breasted chat, sage grouse, golden eagle, Brewer's sparrow, willow flycatcher, mountain plover, upland sandpiper, ferruginous hawk, red crossbill, house wren, long-billed curlew, red-headed woodpecker, and Woodhouse's toad). Management requirements on the Medicine Bow National Forest and TBNG related to recovery species and many of the ecological indicator species that are identified as sensitive were discussed above.

It is likely that Alternative C would not comply with the Forest Plans' standards and guidelines restrictions pertaining to raptors since 1 golden eagle nest, 1 Swainson's hawk nest and 8 ferruginous hawk nests within TBNG would be within 0.25 mile of Alternative C. Similarly, Alternative C would pass within 1 mile of 2 sage grouse leks on TBNG As discussed in Chapter 2, at peak operation nearly 40 coal trains would pass along the track daily. Train traffic would occur 24 hours a day. Consequently, sage grouse nesting habitats could be adversely affected by noise, train movements, and removal of shrub-dominated vegetation that is a key habitat component for nesting sage grouse. Alternative C could affect habitat capabilities for several MIS that potentially inhabit riparian zones along Little Thunder Creek, particularly nesting raptors.

Alternative C is not expected to decrease habitat capability for big game species on TBNG to below levels needed to support the State of Wyoming population goals for each species Alternative C would, however, affect seasonal ranges used by different big game species on TBNG (see Table 3-89). The following pronghorn seasonal ranges on TBNG would be affected: 12.5 miles of WYL, 18.2 miles of YRL and 2.1 miles of SWR. For mule deer, 2.5 miles of WYL and 26.3 miles of YRL would be affected on TBNG while only 0.2 mile of white-tailed deer YRL would be crossed. Elk ranges affected by Alternative C on TBNG include 2.3 mile of crucial WIN, 3.7 miles of WYL and 12 miles of YRL ranges.

The Medicine Bow Forest Plan management area prescriptions that would be affected by Alternative C are provided in Table 1-2 and discussed in detail in Table 6 through Table 12 in Appendix A. Estimates of where and how much of Alternative C would impact known or potential habitats utilized by management indicator species are provided in Table 4-45.

Northern Great Plains Management Plans Revision. Management area prescriptions recently proposed under the proposed land and resource management plans for TBNG and BGNG that would be affected by Alternative C are provided in Table 1-2 and discussed in detail in Table 13 through Table 23 in Appendix A.

The grassland plans specify standards and guidelines that would be applicable to species at-risk as well as game and nongame wildlife species and fisheries. The applicability of those standards and guidelines to implementation of the new railroad alternatives is discussed in Table 13, Appendix A. Conflicts between Alternative C and wildlife management on TBNG and BGNG have been analyzed in that table.

Table 4-44
Miles of Alternative C That Affect Land Use Cover Types (Potential Wildlife Habitats) That May Be Inhabited by the Forest Service Management Indicator Species on BGNG in South Dakota

Land Use Cover Types Potential Wildlife Habitats	Miles	Forest Service Management Indicator Species Possibly Occurring in Land Use Cover Types on BGNG	Potential for Impacts to Species by Alternative C (1)
Cropland, Pasture	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Other Agricultural Land	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Herbaceous Rangeland	5.2	Antelope, Sharp-tailed Grouse	Yes
Shrub and Brush Rangeland	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Mixed Rangeland	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Deciduous Forest Land	None	Mule Deer, Wild Turkey	No
Evergreen Forest Land	None	Mule Deer, Wild Turkey	No
Forested Wetlands	None	Mule Deer, Wild Turkey	No
Nonforested Wetlands	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Bare Exposed Rock	0.9	None	No

Notes: /1 Potential for impacts by Alternative C were judged as:
No: the Land Use Cover Type is not affected by the alternative
Limited: the alternative passes through the Land Use Cover Type for less than one mile, impact potential to management indicator species is possible but unlikely.
Yes: the alternative will pass through the Land Use Cover Type for more than one mile and the management indicator species are known to occur on BGNG in that cover type.

4.18.6 Alternative C With the Phiney Flat Route Variation

4.18.6.1Short-Term Impacts

Big Game. Estimates of Alternative C with the Phiney Flat Route Variation within Wyoming big game seasonal ranges are the same as described above. Pronghorn winter ranges would be affected by 6 miles in Custer and Pennington counties, South Dakota and pronghorn mortalities would be most likely occur there. That is less than effects by either Alternative B or Alternative C on pronghorn winter ranges. Alternative C with the Phiney Flat Route Variation would also cross 27 miles of winter ranges used by mule deer and white-tailed deer in South Dakota counties. Additional areas in South Dakota that are used by mule deer and white-tailed deer yearlong would be crossed for 70 miles (see Table 3-95), less than the possible effects by Alternative B but the same as affected by Alternative C.

Waterfowl, Upland Game Birds, Furbearers, Small Game. The distance (in miles) of Alternative C with the Phiney Flat Route Variation that is within 0.5 mile and 1.0 mile of the Cheyenne River and tributaries in South Dakota (see Table 4-23) and number of sites and total distance where the route variation would be within 500 feet of the Cheyenne River and its tributaries (see Table 4-25) in South Dakota provide some indication of the level of impact construction could have to waterfowl using those drainages during nesting and/or migration. Approximately 50 miles of Alternative C with the Phiney Flat Route Variation would be within 1.0 mile of a perennial stream or river, 26 miles would be within 0.5 mile, and 14 miles would be within 500 feet of these. Each of these zones of potential effects to waterfowl is less than estimates made for Alternative B in South Dakota.

Discussions of sage grouse leks in Wyoming that would be affected by Alternative C also apply to the Wyoming portion of this route variation. In South Dakota there are 5 known grouse leks within 0.25 mile and 32 leks within 2.0 miles of the Phiney Flat Route Variation (see Table 4-46). Short-term construction surface disturbances and associated noise occurring when sage grouse and sharp-tailed grouse are attending leks could inhibit courtship and reproduction, especially on leks that are 0.25 mile away or less but noise could possibly affect birds on leks as far away as 2 miles or farther. Also, grouse nesting habitats within 2.0 miles of leks could be

Table 4-45
Miles of Alternative C That Affect Land Use Cover Types (Potential Wildlife Habitats) That May Be Inhabited by the Forest Service Management Indicator Species (Featured Species and Some Ecological Indicator Species) on TBNG in Wyoming

Land Use Cover Types Potential Wildlife Habitats	Miles	Forest Service Management Indicator Species Possibly Occurring in Land Use Cover Types on TBNG	Potential for Impacts to Species by Alternative C (1)
Cropland, Pasture	0.7	Antelope, Mule Deer, Prairie Vole, Black-tailed Prairie Dog, Golden Eagle, Upland Sandpiper, Mountain Plover, Longbilled Curlew	Limited
Other Agricultural Land	None	Prairie Vole, Upland Sandpiper, Mountain Plover, Longbilled Curlew	No
Herbaceous Rangeland	31.8	Antelope, Mule Deer, Elk, Prairie Vole, , Black-tailed Prairie Dog, Golden Eagle, Ferruginous Hawk, Upland Sandpiper, Mountain Plover, Longbilled Curlew	Yes
Shrub and Brush Rangeland	None	Antelope, Mule Deer, Elk, Prairie Vole, Black-tailed Prairie Dog, Sage Grouse, Golden Eagle, Brewer's Sparrow, Ferruginous Hawk	No
Mixed Rangeland	None	Antelope, Mule Deer, Elk, Prairie Vole, Black-tailed Prairie Dog, Sage Grouse, Golden Eagle, Brewer's Sparrow, Ferruginous Hawk, Mountain Plover	No
Deciduous Forest Land	None	Mule Deer, Elk, Golden Eagle, House Wren, Red-headed Woodpecker	No
Evergreen Forest Land	0.3	Mule Deer, Elk, Golden Eagle, Red Crossbill, Red-headed Woodpecker	Limited
Forested Wetlands	None	Mule Deer, Elk. Golden Eagle, Willow Flycatcher, House Wren, Red-headed Woodpecker, Woodhouse's Toad	No
Nonforested Wetlands	None	Mule Deer, Elk, Yellow Breasted Chat, Willow Flycatcher, Woodhouse's Toad	No
Bare Exposed Rock	None	Golden Eagle, Ferruginous Hawk	No

1 = Potential for impacts by Alternative C were judged as:
No: the Land Use Cover Type is not affected by the alternative
Limited: the alternative passes through the Land Use Cover Type for less than one mile, impact potential to management indicator species is possible but unlikely.
Yes: the alternative will pass through the Land Use Cover Type for more than one mile and the management indicator species are known to occur on TBNG in that cover type.

adversely affected by construction noise could inhibit courtship and reproduction, especially on leks that are 0.25 mile away or less but noise could possibly affect birds on leks as far away as 2 miles or farther. Also, grouse nesting habitats within 2.0 miles of leks could be adversely affected by construction noise.

In South Dakota, wild turkeys utilize the riparian zones along the Cheyenne River and its tributaries during courtship. There are approximately 50 miles of this alternative within 1 mile of the Cheyenne River and tributaries, while 26 miles are within 0.5 mile and 14 miles are within 500 feet of these drainages, areas with potential habitat for use by wild turkeys during courtship and nesting in South Dakota. Intersection of Alternative C with the Phiney Flat Route Variation with each of these zones of potential effects to wild turkeys is less than estimates made for Alternative B but not Alternative C.

Short-term impacts to furbearers and small game are the same as discussed above for Alternative B. No quantitative, comparative evaluations of potential impacts to furbearers and small game can be made among alternatives.

Raptors. Discussions of raptor nests in Wyoming that would be affected by Alternative C also apply to the Wyoming portion of Alternative C with the Phiney Flat Route Alternative. Available data indicates there are 11 raptor nests within 0.5 mile of the alternative in South Dakota (see Table 4-44). Most of the definable potential nesting habitats for golden eagles, red-tailed hawks, Swainson's hawks, and great horned owls are in trees associated with the Cheyenne River and tributaries. Nearly 26 miles of Alternative C with the Phiney Flat Route Variation would pass within 0.5 mile of potential nesting habitats in those riparian zones in South Dakota (see Table 4-23) compared to 51 miles similarly affected by Alternative B (see Table 4-11) and 25 miles of Alternative C (see Table 4-17) in South Dakota, only.

Raptors nesting within 0.25 mile of the alternative are most likely to be adversely affected by short-term construction impacts during the nesting season. In South

Table 4-46
Number of Known Sage Grouse and Sharp-tailed Grouse Leks Within Various Distances of Alternative C with the Phiney Flat Route Variation in South Dakota

South Dakota County	Grouse Species	Number of Leks within Distance			
		0.25 mile	2.0 miles	4.4 miles	6.1 miles
Fall River	Sage Grouse	1	11	12	13
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	1	1	2
	Total	1	12	13	15
Custer	Sage Grouse	0	0	0	0
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	2	9	12	13
	Total	2	9	12	13
Pennington	Sage Grouse	0	0	0	0
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	2	11	14	14
	Total	2	11	14	14
Alternative C with the Phiney Flat Route Variation in South Dakota Total		5	32	39	42

Table 4-47
Number of Known Raptor Nests Within Varying Distances from Alternative C with the Phiney Flat and W G Flat Route Variations South Dakota

Alternative C Route Variation	Distance From (miles)	Number of Nests for Each Species within Distance (1)								
		GE	FH	RT	SW	PF	KE	GHO	BO	Other
Phiney Flat	0.25	2	0	5	0	0	0	1	0	0
	0.50	0	0	9	0	0	0	0	0	2
	1.0	0	0	13	0	0	0	0	0	4
W G Flat	0.25	2	0	6	0	0	0	0	0	0
	0.50	2	0	7	0	0	0	1	0	1
	1.0	2	0	11	0	0	0	1	0	2

1 = Species coeds are: GE, golden eagle; FH, ferruginous hawk; RT, red-tailed hawk; SW, Swainson's hawk; PF, prairie falcon; KE, American kestrel; GHO, great horned owl; BO, burrowing owl; Other includes northern harrier, long-eared owl, short-eared owl, and unknown species.

Dakota, there are 5 red-tailed hawk nests, 2 golden eagle nests, and 1 great horned owl nest all within 0.25 mile of Alternative C with the Phiney Flat Route Variation (see Table 4-47). As evident in Table 4-47, there are more raptor nests within distances of 0.5 and 1 mile from the alternative and it is possible that some of those more distant nest could be affected either during construction or during the long-term project operation.

Other Nongame Wildlife. Short-term disturbances to nongame birds, mammals, amphibians and reptiles would occur during construction as vegetation and other habitat features are destroyed at construction sites. Data collected from NBS breeding bird surveys indicate that riparian zones associated with the Cheyenne River and its tributaries tend to support a large number of nongame bird species (see Table 3-98). Approximately 6 miles of Alternative C with the Phiney Flat Route Variation would pass through forested (1.6 miles) and non-forested (4.3 miles) wetlands that are associated with riparian habitats within South Dakota. Coniferous woodlands also support a relatively high diversity of nongame bird species. Three miles of the route variation would affect evergreen forested lands in South Dakota.

Generally, there have been more nongame bird species observed in grasslands than in shrublands (see Table 3-98) in both states. Alternative C with the Phiney

Flat Route Variation would pass through 106 miles of grasslands in South Dakota (is 4 miles less than Alternative C and 7 miles less than Alternative B) but would not coincide with any shrublands there. Although the differences are not great, construction of Alternative C with the Phiney Flat Route is expected to have slightly less impact to breeding birds than Alternative B simply because there would be less disturbance in grasslands and less noise effects to those grassland species.

Aquatic Resources There are 164 total sites in South Dakota (3 more than Alternative B and 24 fewer than Alternative C) where Alternative C with the Phiney Flat Route Variation is within 500 feet of the Cheyenne River and perennial tributary streams. (see Table 4-25). The route would pass within 500 feet of these drainages for a total of 14.4 miles in South Dakota. These sites are believed to be those most likely where sediments and/or accidentally released toxic compounds could be discharged into the Cheyenne River system, both in the short-term and long-term.

4.18.6.2 Long-Term Impacts. Long-term impacts due to the presence, operation and maintenance of Alternative C with the Phiney Flat Variation to game and nongame wildlife are expected to be similar to short-term impacts, described above for Alternatives B and C. Discussions of long-term impacts to wildlife in Wyoming that would be affected by Alternative C also apply to the Wyoming portion of this alternative.

Big game are likely to be killed by trains, especially where the tracks cross wintering areas and migration corridors. Although specific big game migration pathways are not known, Alternative C with the Phiney Flat Route would cross through 42 miles of pronghorn ranges, 6 miles in winter range and 36 miles in yearlong range. Over 27 miles would affect mule deer and white-tailed deer wintering areas in South Dakota compared to nearly 40 miles affected by Alternative B. Seventy miles would pass through deer yearlong ranges. In addition to being areas where big game mortalities are expected, impacts by Alternative C with the Phiney Flat Route Variation to these seasonal ranges include physical loss of habitats and habitat fragmentation over the long-term. Such long-term impacts with loss of function in these habitats would be a significant impact to big game.

Fenced right-of-way along the alternative would increase fragmentation of habitats use by big game, further reducing habitat functions over the long-term in ways similar to those described above for Alternative B. Too, fences are expected to contribute to big game mortalities if animals become entangled.

Noise due to train traffic is expected to be a long-term impact to some species in the same way that was described for Alternative B. Courtship and reproduction by sage grouse and sharp-tailed grouse may be affected by noise, probably more from locomotives pulling cars than whistles because those sources will be more widespread than localized whistle points. Since sage grouse and sharp-tailed grouse courtship on leks includes early morning before sunrise, they may be affected by noise from trains up to 6.1 miles away. There are 39 known leks within 4.4 miles and 42 known leks within 6.1 miles of Alternative C with the Phiney Flat Route Variation in South Dakota (see Table 4-46) that could be impacted by noise during train operations.

Impacts from this alternative to foxes, raptors, and other carnivores and scavengers that are game (weasels, badgers, mountain lions in Wyoming) and nongame (coyotes, magpies) species are those most likely to feed on carrion of other animals and if they are drawn near to the tracks, their risk of being killed would increase. As described for Alternative B, high risk areas for wildlife mortalities due to trains include locations where tracks intersect prairie dog colonies and big game wintering ranges or other ranges where big game animals congregate and cross tracks. Potential indirect long-term impacts to ground nesting birds (waterfowl, upland game birds, numerous passerine birds) could also occur if predators are drawn to a nesting area because of carrion concentrations along tracks.

Long-term impacts to habitats used by terrestrial and aquatic species due to surface disturbances are expected to be similar to those described under short-term impacts, above. However, once construction machinery is withdrawn from construction sites and revegetation is successful, the total amount of some habitats affected by surface disturbance is expected to be less over the long-term. Some species of birds that nest in grasslands may utilize revegetated portions of the right-of-way. However, if that vegetation is mowed or sprayed with herbicides during maintenance or if fires were ignited by sparks from train operations, nesting bird species and others inhabiting the right-of-way would be impacted throughout the life of the project.

Long-term runoff of sediments and toxic compounds could impact aquatic organisms downstream in much the same way as described under short-term impacts. Those same sites along Alternative C with the Phiney Flat Route Variation that were evaluated in Table 4-25 are likely to be those where chronic discharges occur with risk to game and non-game fish as well as amphibians and other aquatic animals. Over 14 miles of the alternative would be within 500 feet of rivers and perennial streams in South Dakota.

4.18.6.3 Forest Plan Consistency Review

Existing Nebraska Forest Plan. MIS identified on BGNG include pronghorn antelope, mule deer, sharp-tailed grouse, black-footed ferrets and wild turkey. Effects of Alternative C on black-footed ferrets were previously discussed. Nebraska Forest Plan management area prescriptions that would be affected by the Alternative C with the Phiney Flat Route Variation are provided in Table 1-2 and discussed in detail in Table 1 through Table 5 in Appendix A. Estimates of where and how much of Alternative C with the Phiney Flat Route Variation would impact potential habitats utilized by MIS species are provided in Table 4-48.

Alternative C with the Phiney Flat Route Variation would cross approximately 5 miles of pronghorn ranges and nearly 7 miles of mule deer and white-tailed deer ranges within BGNG in Custer and Pennington counties. No sharp-tailed grouse leks are known to be within distances up to 1 mile from the route variation on BGNG. However, leks possibly do occur proximate to the 5 miles of herbaceous rangeland in BGNG that would be affected by Alternative C with the Phiney Flat Route Variation. And wild turkey gobbling sites and roosts may be present in BGNG but the Phiney Flat Route Variation would not directly affect any forested riparian vegetation potentially inhabited by turkeys.

Existing Medicine Bow Forest Plan. Alternative C With the Phiney Flat Route Variation would not affect TBNG differently than Alternative C discussed above.

Northern Great Plains Management Plans Revision. Management area prescriptions under the recently proposed land and resource management plans for TBNG and BGNG that would be affected by Alternative C with the Phiney Flat Route Variation are provided in Table 1-2 and discussed in detail in Table 13 through Table 23 in Appendix A.

The proposed grassland plans specify standards and guidelines that would be applicable to species at-risk as well as game and nongame wildlife species and fisheries. The applicability of those standards and guidelines to implementation of the new railroad alternatives is discussed in Table 13, Appendix A. Conflicts between Alternative C with the Phiney Flat Route Variation and wildlife management on TBNG and BGNG have been analyzed in that table.

4.18.7 Alternative C With the W G Flat Route Variation

4.18.7.1 Short-Term Impacts

Big Game. Estimates of linear distances affected by Alternative C with the W G Flat Route Variation within Wyoming big game seasonal ranges are the same as described for Alternative C. Pronghorn winter ranges would be affected by 15 miles of construction in Custer and Pennington counties, South Dakota and pronghorn mortalities would be most likely occur there. That is about the same as effects by Alternative B and Alternative C on pronghorn winter ranges. Alternative C with the W G Flat Route Variation would also cross 33 miles of winter ranges used by mule deer and white-tailed deer in South Dakota, less than Alternative B but more than Alternative C. Additional areas in South Dakota that are used by mule deer and white-tailed deer yearlong would be crossed for 77 miles (see Table 3-93), less than the possible effects by Alternative B but more than affected by Alternative C.

Waterfowl, Upland Game Birds, Furbearers, Small Game. Approximately 48 miles of the W G Flat Route Variation would be within 1.0 mile of a perennial stream or river, 26 miles would be within 0.5 mile, and 19 miles would be within 500 feet of these. Each of these zones of potential effects to waterfowl is less than estimates made for Alternative B in South Dakota but not Alternative C.

Discussions of sage grouse leks in Wyoming that would be affected by Alternative C also apply to the Wyoming portion of Alternative C with the W G Flat Route Variation. In South Dakota there are 3 known grouse leks within 0.25 mile and 32 within 2.0 miles of the W G Flat Route Variation (see Table 4-49). Short-term construction surface disturbances and associated noise occurring when sage grouse and sharp-tailed grouse are attending leks could inhibit courtship and reproduction, especially on leks that are 0.25 mile away or less but noise could possibly affect birds on leks as far away as 2 miles or farther.

Also, grouse nesting habitats within 2.0 miles of leks could be adversely affected by construction noise could inhibit courtship and reproduction, especially on leks that are 0.25 mile away or less but noise could possibly affect birds on leks as far away as 2 miles or farther. Also, grouse nesting habitats within 2.0 miles of leks could be adversely affected by construction noise.

Table 4-48
Miles of Alternative C with the Phiney Flat Route Variation That Affect Land Use Cover Types (Potential Wildlife Habitats) That May Be Inhabited by Forest Service Management Indicator Species on BGNG in South Dakota

Land Use Cover Types Potential Wildlife Habitats	Miles	Forest Service Management Indicator Species Possibly Occurring in Land Use Cover Types on BGNG	Potential for Impacts to Species by the Phiney Flat Route (1)
Cropland, Pasture	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Other Agricultural Land	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Herbaceous Rangeland	4.4	Antelope, Sharp-tailed Grouse	Yes
Shrub and Brush Rangeland	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Mixed Rangeland	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Deciduous Forest Land	None	Mule Deer, Wild Turkey	No
Evergreen Forest Land	None	Mule Deer, Wild Turkey	No
Forested Wetlands	None	Mule Deer, Wild Turkey	No
Nonforested Wetlands	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Bare Exposed Rock	0.9	None	No

1 = Potential for impacts by the Phiney Flat Route Variation were judged as:
No: the Land Use Cover Type is not affected by the alternative
Limited: the alternative passes through the Land Use Cover Type for less than one mile, impact potential to management indicator species is possible but unlikely.
Yes: the alternative will pass through the Land Use Cover Type for more than one mile and the management indicator species are known to occur on BGNG in that cover type.

Table 4-49
Number of Known Sage Grouse and Sharp-tailed Grouse Leks Within Various Distances of Alternative C with the W G Flat Route Variation in South Dakota

South Dakota County	Grouse Species	Number of Leks within Distance			
		0.25 mile	2.0 miles	4.4 miles	6.1 miles
Fall River	Sage Grouse	0	10	13	13
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	0	0	2
	Total	0	10	13	15
Custer	Sage Grouse	0	0	0	0
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	1	10	12	13
	Total	1	10	12	13
Pennington	Sage Grouse	0	0	0	0
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	2	12	14	14
	Total	2	12	14	14
Alternative C with W G Flat Route Variation in South Dakota Total		3	32	39	42

There are approximately 48 miles of Alternative C with the W G Flat Route Variation within 1 mile of the Cheyenne River and tributaries, while 26 miles are within 0.5 mile and 19 miles are within 500 feet of these drainages, areas with potential habitat for use by wild turkeys during courtship and nesting in South Dakota. Intersection of Alternative C with the W G Flat Route Variation with each of these zones of potential effects to wild turkeys is less than estimates made for Alternative B but not Alternative C.

Raptors. Discussions of raptor nests in Wyoming that would be affected by Alternative C also apply to the Wyoming portion of Alternative C with the W G Flat Route

Variation. Available data indicates there are 11 raptor nests within 0.5 mile of Alternative C with the W G Flat Route Variation in South Dakota (see Table 4-47). Over 26 miles of Alternative C with the W G Flat Route Variation would pass within 0.5 mile of potential nesting habitats in riparian zones in South Dakota (see Table 4-28) compared to 51 miles similarly affected by Alternative B (see Table 4-11) and 25 miles of Alternative C (see Table 4-17) in South Dakota, only. In South Dakota, there are 6 red-tailed hawk nests and 2 golden eagle nests within 0.25 mile of Alternative C with the W G Flat Route Variation (see Table 4-47).

Other Nongame Wildlife. Alternative C with the W G Flat Route Variation would pass through 107 miles of grasslands in South Dakota (less than Alternative B and Alternative C) but would not coincide with any shrublands there. Although the differences are not great, construction of Alternative C with the W G Flat Route Variation is expected to have slightly less impact to breeding birds than Alternative B and Alternative C simply because there would be less disturbance in grasslands and less noise effects to those grassland species.

Aquatic Resources There are 192 total sites in South Dakota (15 more than Alternative B and 14 less than Alternative C) where Alternative C with the W G Flat Route Variation is within 500 feet of the Cheyenne River and perennial tributary streams. (see Table 4-30). The route would pass within 500 feet of these drainages for a total of 19 miles in South Dakota. These sites are believed to be those most likely where sediments and/or accidentally released toxic compounds could be discharged into the Cheyenne River system, both in the short-term and long-term.

4.18.7.2 Long-Term Impacts. Long-term impacts due to the presence, operation and maintenance of the W G Flat Variation to game and nongame wildlife are expected to be similar to short-term impacts, described above for Alternatives B and C. Discussions of long-term impacts to wildlife in Wyoming that would be affected by Alternative C also apply to the Wyoming portion of the W G Flat Route Alternative.

Although specific big game migration pathways are not known, Alternative C with the W G Flat Route Variation would cross 43 miles of pronghorn ranges, 15 miles of winter range and 28 miles of yearlong range. Over 33 miles would affect mule deer and white-tailed deer wintering areas in South Dakota compared to nearly 40 miles affected by Alternative B. Seventy-seven miles would pass through deer yearlong ranges. In addition to being areas where big game mortalities are expected, impacts by the route variation to these seasonal ranges include physical loss of habitats and habitat fragmentation over the long-term. Such long-term impacts with loss of function in these habitats due to the W G Flat Route Variation would be a significant impact to big game.

Fenced right-of-way along the route would increase fragmentation of habitats use by big game, further reducing habitat functions over the long-term in ways similar to those described for Alternative B. Too, fences are expected to contribute to big game mortalities if animals become entangled.

If sage grouse and sharp-tailed grouse are sensitive to noise above background levels during courtship on leks, grouse on leks may be affected from 4.4 miles up to 6.1 miles away from the railroad. These are computed distances at which noise from locomotives pulling cars would attenuate to expected background levels during the day and night, respectively. There are 39 known leks within 4.4 miles and 42 known leks within 6.1 miles of the Alternative C with the W G Flat Route Variation in South Dakota (see Table 4-49) that could be impacted by noise during train operations. If noise from operating trains causes lower densities of grassland bird species within some distance from the railroad, Alternative C with the W G Flat Route Variation could affect 107 miles of grasslands (herbaceous rangeland) in South Dakota.

4.18.7.3 Forest Plan Consistency Review

Existing Nebraska Forest Plan. MIS identified on BGNG include pronghorn antelope, mule deer, sharp-tailed grouse, black-footed ferrets and wild turkey. Effects of Alternative C on black-footed ferrets were previously discussed. Nebraska Forest Plan management area prescriptions that would be affected by Alternative C with W G Flat Route Variation are provided in Table 1-2 and discussed in detail in Table 1 through Table 5 in Appendix A. Estimates of where and how much of the route variation would impact potential habitats utilized by MIS species are provided in Table 4-50.

Alternative C with W G Flat Route Variation would cross approximately 5 miles of pronghorn ranges and over 8 miles of mule deer and white-tailed deer ranges within BGNG in Custer and Pennington counties. No sharp-tailed grouse leks are known to be within distances up to 1 mile from Alternative C with W G Flat Route Variation on BGNG. However, leks possibly do occur proximate to the 5 miles of herbaceous rangeland in BGNG that would be crossed by the alternative. And wild turkey gobbling sites and roosts may be present in BGNG but Alternative C with W G Flat Route Variation would not directly affect any forested riparian vegetation potentially inhabited by turkeys.

Existing Medicine Bow Forest Plan. Alternative C with the W G Flat Variation would not affect TBNG differently than Alternative C.

Table 4-50
Miles of Alternative C with the W G Flat Route Variation That Affect Land Use Cover Types (Potential Wildlife Habitats) That May Be Inhabited by the Forest Service Management Indicator Species on BGNG in South Dakota

Land Use Cover Types Potential Wildlife Habitats	Miles	Forest Service Management Indicator Species Possibly Occurring in Land Use Cover Types on BGNG	Potential for Impacts to Species by the W G Flat Route (1)
Cropland, Pasture	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Other Agricultural Land	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Herbaceous Rangeland	5.2	Antelope, Sharp-tailed Grouse	Yes
Shrub and Brush Rangeland	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Mixed Rangeland	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Deciduous Forest Land	None	Mule Deer, Wild Turkey	No
Evergreen Forest Land	None	Mule Deer, Wild Turkey	No
Forested Wetlands	None	Mule Deer, Wild Turkey	No
Nonforested Wetlands	None	Antelope, Mule Deer, Sharp-tailed Grouse, Wild Turkey	No
Bare Exposed Rock	0.9	None	No

1 = Potential for impacts by the W G Flat Route Variation were judged as:
No: the Land Use Cover Type is not affected by the alternative
Limited: the alternative passes through the Land Use Cover Type for less than one mile, impact potential to management indicator species is possible but unlikely.
Yes: the alternative will pass through the Land Use Cover Type for more than one mile and the management indicator species are known to occur on BGNG in that cover type.

Northern Great Plains Management Plans Revision. Recently proposed grassland plans management area prescriptions for TBNG and BGNG that would be affected by Alternative C with the W G Flat Route Variation are provided in Table 1-2 and discussed in detail in Table 13 through Table 23 in Appendix A. Standards and guidelines that would be applicable to species at-risk as well as game and nongame wildlife species and fisheries are in Table 13, Appendix A. Conflicts between Alternative C with the W G Flat Route Variation and wildlife management on TBNG and BGNG have been analyzed in that table.

4.18.8 Alternative D (Existing Corridors Alternative)

4.18.8.1 Short-Term Impacts

Big Game. Estimates of linear distances affected by Alternative D during construction within existing right-of-way that, although within Wyoming big game seasonal ranges, would not create new impacts to pronghorns and their seasonal ranges. Those distances of seasonal ranges adjacent to existing railroad rights-of-way are provided in Table 3-90. Pronghorn yearlong ranges (YRL) in 4 herd units (Highlight, Thunder Basin, South Black Hills and Lance Creek) are those that most coincide with existing right-of-way for 84 miles. WYL ranges in 4 pronghorn herd units (North Black Hills, Highlight, Thunder Basin, and Lance Creek) coincide with Alternative D and existing right-of-way for 74 miles. In addition, 5.2 miles of existing tracks coincide with WIN range used by pronghorn in the South Black Hills Herd Unit and 2.5 miles coincide with SWR in the Lance Creek Herd Unit. Although nearly 166 miles of Alternative D would coincide with pronghorn seasonal ranges in Wyoming (compared to 151 miles for Alternative B and 131 miles for Alternative C), surface disturbances would occur on land already disturbed and seldom used, if at all, by pronghorns in these herd units.

Alternative D would pass through 108.3 miles of YRL range used by mule deer in the Thunder Basin and Powder River herd units and pass though 36.8 miles WYL range used by mule deer in the Thunder Basin and Black Hills herd units. Although nearly 145 miles of Alternative D would coincide with mule deer seasonal ranges in Wyoming (compared to 135 miles for Alternative B and 112 miles for Alternative C), surface disturbances would occur on land already disturbed and seldom used, if at all, by mule deer in these herd units. Likewise, existing right-of-way within which Alternative D would occur coincides with 27.7 miles of WYL range used by white-tailed deer in the Black Hills and Thunder Basin herd units. Ten miles also pass through YRL range used by white-tailed deer in the Thunder Basin Herd Unit. In all, Alternative D would coincide with 37 miles of white-tailed deer seasonal ranges in Wyoming but because all surface disturbances would occur on land already disturbed, the impact to white-tailed deer is expected to be less than Alternative B (would affect 3.7 miles of YRL range) and Alternative C (would affect 1.4 miles of YRL range).

A total of 23.7 miles of Alternative D would coincide with elk ranges in the Rochelle Hills Herd Unit. While no elk calving or parturition areas would be directly adjacent to Alternative D, 2.5 miles of existing track pass through elk crucial WIN range (the same right-of-way proposed for Alternative C), 4.7 miles of track pass through WYL range, and 16.5 mile of existing right-of-way would pass through YRL ranges. Alternative D would not disturb new areas that are within elk crucial WIN, WYL and YRL ranges whereas 31.9 miles of Alternative B would affect new areas in elk habitat and 26.1 miles of Alternative C would do the same (2.5 miles of Alternative C through crucial WIN ranges would be on existing right-of-way). Alternative D would not pass within 0.75 mile of any known elk parturition ranges. Although the route would be within existing right-of-way currently used by trains, the potential for additional train traffic and concomitant noise could affect elk during during winter. But unlike the discussion of short-term impacts for Alternative B, passage of Alternative D through crucial elk WIN range, pronghorn and mule deer WYL range is not expected to impose significant new impacts to those habitats, at least in terms of lost habitat and decreased habitat function. Poaching, though could still be a short-term impact to big game under Alternative D.

Collisions of big game with construction vehicles are possible short-term and long-term impacts with Alternative D even though construction would occur adjacent to existing rail lines. In Wyoming, most big game mortalities are expected to occur within the portion of Alternative D that passes through 7.2 miles of elk crucial WIN and WYL ranges, 36.8 miles of mule deer and 27.7 miles of white-tailed deer WYL ranges, and 82 miles through pronghorn WYL, WIN and SWR ranges.

Alternative D would not affect any designated pronghorn winter ranges in South Dakota (see Table 3-96) but 25.0 miles would pass through pronghorn yearlong range in Custer County, all within the existing railroad right-of-way. Alternative D would not coincide with any deer winter range but would cross 61.5 miles of yearlong ranges used by mule deer and white-tailed deer in Fall River and Pennington counties. Some of that yearlong range used by white-tailed deer would be within existing right-of-way, mostly in Pennington County where the existing tracks parallel Box Elder Creek. Alternative D would disturb new areas of deer habitat in Fall River County where it would coincide with the proposed route for Alternative C. Although much of Alternative D would be within existing right-of-way in South Dakota where no new big game habitat would be destroyed, the level of impact to big game caused by increased train traffic traveling at higher speeds and more frequent noise under Alternative D will probably be above existing levels.

Waterfowl, Upland Game Birds, Furbearers, Small Game. Approximately 45 miles of Alternative D would be within 1.0 mile of a perennial stream or river, 30 miles would be within 0.5 mile, and 13 miles would be within 500 feet of these. Each of these zones of potential effects to waterfowl is less than estimates made for Alternative B and Alternative C.

There are 2 known sage grouse lek within 0.25 mile and 20 within 2.0 miles of Alternative D in Wyoming (see Table 4-51). But there are no known sage grouse or sharp-tailed grouse leks within 0.25 mile and only 11 leks within 2.0 miles of this Alternative in South Dakota (see Table 4-51).

There are approximately 29 miles of Alternative D within 1 mile of the Cheyenne River and tributaries, while 19 miles are within 0.5 mile and 12 miles are within 500 feet of these drainages, all of which would be within Pennington County, mostly along Box Elder Creek, and Fall River County where Alternative D follows the same route as Alternative C. Intersection of Alternative D with each of these zones of potential effects to wild turkeys is less than estimates made for Alternative B and Alternative C.

Raptors. Available data indicates there are 66 raptor nests within 0.5 mile of Alternative D in Wyoming and 7 nests within that distance of Alternative D in South Dakota (see Table 3-108). Only 30 miles of Alternative D would pass within 0.5 mile of potential nesting habitats in riparian zones in both states (see Table 4-33) compared to 85 miles similarly affected by Alternative B (see Table 4-11) and 58 miles affected by Alternative C (see Table 4-17). In South Dakota, there are only 3 red-tailed hawk nests within 0.25 mile of Alternative D. But in Wyoming, there are 6 red-tailed hawk nests, 3 golden eagle nests, 2 great horned owl nests, 1 Swainson's hawk nest and 25 ferruginous hawk nests within that distance (see Table 4-52).

Other Nongame Wildlife. In Wyoming, over 67 miles of Alternative D would pass through grasslands - less than Alternatives B (121 miles) and C (109 miles) - and 81 miles would coincide with shrub/brush rangelands and mixed rangelands - more than the other two alternatives - but all within existing railroad right-of-way. Alternative D would pass through 119 miles of grasslands in South Dakota - nearly the same as the other two alternatives - but would not coincide with any shrublands there. Although the differences are not great, Alternative D is expected to have slightly less impact to breeding birds than Alternative B and C simply because there would be less disturbance in grasslands and less noise effects to those grassland species.

Table 4-51
Number of Known Sage Grouse and Sharp-tailed Grouse Leks Within Various Distances of Alternative D in Wyoming and South Dakota

State and Managed Area	Grouse Species	Number of Leks within Distance			
		0.25 mile	2.0 miles	4.4 miles	6.1 miles
Wyoming - Upland and Small Game Management Areas					
USGMA 36 Niobrara	Sage Grouse	0	3	6	8
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	0	0	0
	Total	0	3	6	8
USGMA 39 Belle Fourche	Sage Grouse	2	17	31	35
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	0	0	0
	Total	2	17	31	35
South Dakota - Counties:					
Fall River	Sage Grouse	0	11	12	13
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	0	0	1
	Total	0	11	12	14
Custer	Sage Grouse	0	0	0	0
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	0	0	1
	Total	0	0	0	1
Pennington	Sage Grouse	0	0	0	0
	Sharp-tailed Grouse	0	0	0	0
	Not Identified	0	0	0	0
	Total	0	0	0	0
Alternative D Total		2	31	49	58

Table 4-52
Number of Known Raptor Nests Within Varying Distances from Alternative D in Wyoming and South Dakota

State	Distance From (miles)	Number of Nests for Each Species within Distance (1)								
		GE	FH	RT	SW	PF	KE	GHO	BO	Other
Wyoming	0.25	3	25	6	1	0	0	2	0	0
	0.50	7	39	8	3	0	0	6	2	1
	1.0	12	57	16	3	1	0	12	2	1
South Dakota	0.25	0	0	3	0	0	0	0	0	0
	0.50	0	0	5	0	0	0	0	0	2
	1.0	0	0	8	0	0	0	0	0	2

1 = Species coeds are: GE, golden eagle; FH, ferruginous hawk; RT, red-tailed hawk; SW, Swainson's hawk; PF, prairie falcon; KE, American kestrel; GHO, great horned owl; BO, burrowing owl; Other includes northern harrier, long-eared owl, short-eared owl, and unknown species.

Aquatic Resources There are 76 total sites (101 fewer than Alternative B and 130 fewer than Alternative C) where Alternative D is within 500 feet of the Cheyenne River and perennial tributary streams in Wyoming and South Dakota (see Table 4-35). Alternative D would pass within 500 feet of these drainages for a total of 13.5 miles, less than the other alternatives. These sites are believed to be those most likely where sediments and/or accidentally released toxic compounds could be discharged into the Cheyenne River system, both in the short-term and long-term.

4.18.8.2 Long-Term Impacts. Long-term impacts due to the presence, operation and maintenance of Alternative D to game and nongame wildlife are expected to be similar to short-term impacts described for Alternative B. Alternative D would cross 82 miles of pronghorn WYL, WIN and SWR ranges (39.6 miles more than Alternative B and 38.6 miles more than Alternative C), 36.8 miles of mule deer WYL ranges (25.8 miles more than Alternative B and 27.8 miles more than Alternative C), and 7.2 miles of elk crucial WIN and WYL ranges (2.9 miles less than Alternative B and the same as Alternative C) in Wyoming. In South Dakota, none of Alternative D would pass through pronghorn winter ranges (14.6 miles for Alternative B and 14.2 miles for Alternative C). Likewise, none of Alternative D would pass through deer winter ranges while over 33 miles of Alternative C and nearly 40 miles of Alternative B would affect mule deer and white-tailed deer wintering areas in South Dakota.

Long-term impacts by Alternative D to big game are expected to be primarily increased mortality on the new and existing rail lines since train traffic volume will increase as well as train speeds. Assuming that most if not all of the existing railroad rights-of-way are fenced, Alternative D is not expected to contribute additional habitat fragmentation nor to further loss of habitat functions over the long-term as Alternative B and Alternative C would.

In Wyoming, there are 37 sage grouse known to be within 4.4 miles of Alternative D and 43 leks with 6.1 (see Table 4-518) and which may be affected by noise for the life of the project. Fewer known leks have been identified within those distances in South Dakota: 12 would be within 4.4 miles and 15 would be within 6.1 miles.

If noise from operating trains causes lower densities of grassland bird species within some distance from the railroad, Alternative D could affect 119 miles of grasslands (herbaceous rangeland) in South Dakota and 69 miles of grassland in Wyoming as well as 81 miles of sagebrush steppe.

4.18.8.3 Forest Plan Consistency Review

Existing Nebraska Forest Plan. Alternative D would not pass through or otherwise affect BGNG.

Existing Medicine Bow Forest Plan. It is likely that Alternative D would not comply with the Forest Plans' standards and guidelines restrictions pertaining to raptors since 1 Swainson's hawk nest and 8 ferruginous hawk nests within TBNG would be within 0.25 mile of Alternative D. No known sage grouse leks on TBNG would be within 1 mile of Alternative D but sage grouse nesting habitats could be adversely affected by noise, train movements, and removal of shrub-dominated vegetation that is a key habitat component for nesting sage grouse.

Alternative D is not expected to decrease habitat capability for big game species on TBNG to below levels needed to support the State of Wyoming population goals for each species Alternative D would, however, affect seasonal ranges used by different big game species on TBNG (see Table 3-90). The following pronghorn seasonal ranges on TBNG would be affected: 11 miles of WYL, 13 miles of YRL and 2 miles of SWR. For mule deer, 6 miles of WYL and 16 miles of YRL would be affected on TBNG while 4 miles of white-tailed deer WYL range and 0.2 mile of YRL would be crossed. Elk ranges affected by Alternative D on TBNG include 2.3 mile of crucial WIN, 4 miles of WYL and 10 miles of YRL ranges.

Medicine Bow Forest Plan management area prescriptions that would be affected by Alternative D are provided in Table 1-2 and discussed in detail in Table 6 through Table 12 in Appendix A. Estimates of where and how much of Alternative D would impact known or potential habitats utilized by management indicator species are provided in Table 4-53.

Northern Great Plains Management Plans Revision. The recently released proposed TBNG plan specifies standards and guidelines that would be applicable to species at-risk as well as game and nongame wildlife species and fisheries. The applicability of those Standards and Guidelines to implementation of the new railroad alternatives is discussed in Table 13, Appendix A. Conflicts between Alternative D and wildlife management on TBNG and BGNG have been analyzed in that table.

4.18.9 Proposed Mine Loop Options. Mine loops to the Black Thunder North, Black Thunder South, North Antelope East and North Antelope West mines would be within the Highlight and Lance Creek pronghorn herd

Table 4-53
Miles of Alternative D That Affect Land Use Cover Types (Potential Wildlife Habitats) That May Be Inhabited by Forest Service Management Indicator Species (Featured Species and Some Ecological Indicator Species) on TBNG in Wyoming

Land Use Cover Types Potential Wildlife Habitats	Miles	Forest Service Management Indicator Species Possibly Occurring in Land Use Cover Types on TBNG	Potential for Impacts to Species by Alternative D (1)
Cropland, Pasture	None	Antelope, Mule Deer, Prairie Vole, Black-tailed Prairie Dog, Golden Eagle, Upland Sandpiper, Mountain Plover, Longbilled Curlew	No
Other Agricultural Land	None	Prairie Vole, Upland Sandpiper, Mountain Plover, Longbilled Curlew	No
Herbaceous Rangeland	20.0	Antelope, Mule Deer, Elk, Prairie Vole, , Black-tailed Prairie Dog, Golden Eagle, Ferruginous Hawk, Upland Sandpiper, Mountain Plover, Longbilled Curlew	Yes
Shrub and Brush Rangeland	5.5	Antelope, Mule Deer, Elk, Prairie Vole, Black-tailed Prairie Dog, Sage Grouse, Golden Eagle, Brewer's Sparrow, Ferruginous Hawk	Yes
Mixed Rangeland	None	Antelope, Mule Deer, Elk, Prairie Vole, Black-tailed Prairie Dog, Sage Grouse, Golden Eagle, Brewer's Sparrow, Ferruginous Hawk, Mountain Plover	No
Deciduous Forest Land	None	Mule Deer, Elk, Golden Eagle, House Wren, Red-headed Woodpecker	No
Evergreen Forest Land	1.1	Mule Deer, Elk, Golden Eagle, Red Crossbill, Red-headed Woodpecker	Yes
Forested Wetlands	None	Mule Deer, Elk. Golden Eagle, Willow Flycatcher, House Wren, Red-headed Woodpecker, Woodhouse's Toad	No
Nonforested Wetlands	None	Mule Deer, Elk, Yellow Breasted Chat, Willow Flycatcher, Woodhouse's Toad	No
Bare Exposed Rock	None	Golden Eagle, Ferruginous Hawk	No

1 = Potential for impacts by Alternative D were judged as:
No: the Land Use Cover Type is not affected by the alternative
Limited: the alternative passes through the Land Use Cover Type for less than one mile, impact potential to management indicator species is possible but unlikely.
Yes: the alternative will pass through the Land Use Cover Type for more than one mile and the management indicator species are known to occur on TBNG in that cover type.

units. The loops would pass through WYL ranges for 11.6 miles (5.1 miles through the Highlight Herd Unit and 6.5 miles through the Lance Creek Herd Unit) and through YRL range in the Lance Creek Herd Unit for 3.9 miles. The mine loop options would pass through WYL range in the Thunder Basin Mule Deer Herd Unit for 2.1 miles and through YRL range for 8.0 miles and through YRL range in the Thunder Basin White-tailed Deer Herd Unit for 1.5 miles. Elk ranges in the Rochelle Hills Elk Herd Unit that would be affected by mine loops include WYL range for 0.1 mile and YRL range for 3.6 miles.

There are no sage grouse leks within 2 miles of any of the 4 mine loops evaluated in this report. However, there are 5 leks within 4.4 miles and 12 leks within 6.1 miles. Sage grouse attending those leks could be affected by noise associated with train operations and/or whistles over the life of the project. Raptor surveys on coal mines indicate there are 6 ferruginous hawk nests, 2 red-tail hawk nests, 1 golden eagle nest and 1 great horned owl nest within 0.25 mile of the proposed mine loops. Although current activity of each nest is not known, those nest structures are likely to be impacted by construction and operation of the mine loops and may not be suitable for nesting during the long-term. Twelve additional ferruginous hawk nests, 1 red-tailed hawk nest, and 1 golden eagle nest are within 0.5 mile of the rail loops. Depending on local topography, obscuring vegetation, and existing levels of human activities construction and operation of the loops could affect nesting birds using those nests, as well.

Because only 0.6 mile of the North Antelope West Mine Loop would cross black-tailed prairie dog colonies, impacts to wildlife species that utilize or inhabit those colonies are not expected to be significant although some individuals of some species could be affected. Likewise, loops to the 4 mines would pass within 0.5 mile of Antelope Creek for 2.3 miles and Little Thunder Creek for 0.9 mile and some individuals of some species might vacate otherwise suitable habitat in those riparian zones.

4.18.10 Proposed Yard Sites. The proposed yard near Wall, South Dakota would be within croplands and intersect the I-90 corridor. The site intersects 3 wetlands. Construction and operation of the Wall Yard is not expected to adversely affect wildlife species other than displacing passerine birds that might nest in fallow fields and the affected wetlands. Such impact would occur for the life of the project.

The proposed Edgemont Interchange Yard, also in South Dakota, would be within grassland vegetation, on soils designated as prime farmlands. That yard would cross 1 intermittent stream, a tributary to the Cheyenne River, and be within 0.5 mile of the river. Because the site is adjacent to the existing BNSF railroad, construction and operation of the yard are unlikely to affect mule deer and white-tailed deer if they occur along the Cheyenne River east of Edgemont. The proposed yard site is farther than 2 miles from the nearest known raptor nest and would not affect any known sage grouse or sharp-tailed grouse leks. The Interchange Yard is likely to displace passerine birds that might nest in grasslands and remove grassland vegetation. Such impact would occur for the life of the project. However, since the yard crosses an intermittent stream and is proximate to the Cheyenne River, the potential exists for accidental discharge of toxic materials and sediments into the river that could affect fish and other aquatic species downstream.

The proposed Western Yard in Wyoming, would cross mostly grasslands but also 21 intermittent streams, tributaries to Little Thunder Creek. No jurisdictional wetlands would be affected. Short- and long-term surface disturbance of at least 250 acres of grasslands and noise levels that would probably be consistently higher than along the operating railroad would adversely affect nesting habitats for a variety of nongame birds.

For most of its length, the yard would be within 0.5 mile of Little Thunder Creek and within 500 feet of at least 4 sites. One golden eagle nest and one red-tailed hawk nest in cottonwood trees along the creek would be within 0.5 mile of the yard. Three additional red-tailed hawk nests are within 1 mile of the site. Noise and activities associated with construction and operation of the yard would likely make nesting habitats along the creek unsuitable for raptors. No sage grouse or sharp-tailed grouse leks are known to be within 2 miles of the yard site.

The site also coincides with yearlong ranges used by pronghorn in the Lance Creek Herd Unit, by mule deer in the Thunder Basin Herd Unit, and by elk in the Rochelle Hills Herd Unit. For the short- and long-term, the yard would be fenced and present a barrier to big game movements, particularly to animals south of the yard seeking water in Little Thunder Creek to the north. If big game, as well as other species, became trapped within the yard right-of-way, their risk of mortality from moving trains would be high.

Since the yard site would affect numerous black-tailed prairie dog colonies, surface disturbances to prairie dog colonies will affect some individuals of species that may inhabit colonies or prey on prairie dogs. Such impact would last during the short- and long-term. With the proximity of the yard to Little Thunder Creek and numerous intermittent streams crossed, the potential exists for accidental discharge of toxic materials and sediments into the Cheyenne River system that could affect fish and aquatic species downstream.

4.19 Angostura Irrigation District

The Angostura Irrigation District is located in Custer and Fall River Counties along the Cheyenne River. The Angostura Dam and Reservoir is located about 9 miles southeast of Hot Springs and the irrigation district extends approximately 24 miles downstream of the dam. The irrigation district consists of approximately 12,000 acres and is located on benchlands along both sides of the Cheyenne River below Angostura Dam with 78 percent of the irrigated lands located on the south side of the river and the remaining 22 percent on the north side.

Most farm units within the irrigation district include both irrigated and nonirrigated lands. This intergrated irrigation-dryland type farming operation includes dryland cattle grazing areas adjoining the irrigation district. Alfalfa and corn are the major irrigated crops grown in the district. Other irrigated crops include barley, oats, wheat, pasture, hay and sorghum.

Table 4-54 provides the farm units that Alternative B, Alternative C and the W G Flat Route Variation would impact in the irrigation district. Alternative C would disturb the fewest acres and number of farm units (i.e., 134.8 acres in 8 farm units). Alternative B would disturb approximately 229.3 acres in 13 farm units in the district. Although the W G Flat Route Variation would disturb the most acres and farm units in the district (i.e., 232.5 acres and 14 farm units), it would disturb only one additional farm unit and 3.2 more acres than Alternative B. However, it is anticipated that the majority of the impacts associated with Alternative B would be confined to DM&E's existing right-of-way through the irrigation district so actual impacts to farm units and acreages may be considerably less. Further design would be necessary to quantify the actual disturbance outside of DM&E's existing right-fo-way.

Table 4-54 provides the percent of each farm unit that would be affected by the alternatives. Alternative B would disturb greater than 10 percent of the entire farm unit in 6

farm units. The disturbance from Alternative C would impact 5 farm units by 10 percent or more which is the fewest of the alternatives. The W G Flat Route Variation would disturb 9 farm units by 10 percent or more. The W G Flat Route Variation would have the highest impact to the Angostura Irrigation District of all of the alternatives considered to date.

Table 4-54
Angostura Irrigation District Farm Unit Impacts by Alternative

		Alternative B			W G Flat Route Variation			Alternative C (Hay Canyon)		
Farm Unit	Farm Unit Size (acres)	Alternative Right-of-Way (acres)	Remaining Unit Size (acres)	Percent of Farm Unit	Alternative Right-of-Way (acres)	Remaining Unit Size (acres)	Percent of Farm Unit	Alternative Right-of-Way (acres)	Remaining Unit Size (acres)	Percent of Farm Unit
Farm Unit 100	39.4	0.2	39.2	0.5	0.2	39.2	0.5	0.2	39.2	0.5
Farm Unit 100	306.4	36.6	109.4 160.4	11.9	36.7	108.6 161.1	12.0	36.5	110.6 159.3	11.9
Farm Unit 101	26.0	3.8	22.2	14.6	3.8	22.2	14.6	3.8	22.2	14.6
Farm Unit 101	53.0	8.0	45.0	15.1	8.0	45.0	15.1	8.0	45.0	15.1
Farm Unit 69	253.4	13.7	124.5 115.2	5.4	14.0	122.0 117.4	5.5	12.2	133.5 107.7	4.8
Farm Unit 68b	64.7	18.7	18.2 27.8	28.9	17.4	16.6 30.7	26.9	9.5	55.0 0.2	14.7
Farm Unit 68a	158.4	41.1	64.1 53.2	25.9	30.7	81.4 46.3	19.4	N/A	N/A	N/A
Farm Unit 23	234.0	3.5	230.5	1.5	N/A	N/A	N/A	N/A	N/A	N/A
Farm Unit 25	243.7	16.6	227.1	6.8	N/A	N/A	N/A	N/A	N/A	N/A
Farm Unit 29	181.5	2.9	178.6	1.6	N/A	N/A	N/A	N/A	N/A	N/A
Farm Unit 84	79.0	14.2	9.1 55.7	18.0	N/A	N/A	N/A	N/A	N/A	N/A
Farm Unit 26	363.3	13.8	349.5	3.8	N/A	N/A	N/A	N/A	N/A	N/A
Farm Unit 27	666.6	56.2	288.7 321.7	8.4	N/A	N/A	N/A	N/A	N/A	N/A
Farm Unit 93	592.4	N/A	N/A	N/A	2.9	589.5	0.5	N/A	N/A	N/A
Farm Unit 93a	53.0	N/A	N/A	N/A	20.0	1.9 31.1	37.7	N/A	N/A	N/A
Farm Unit 56	199.7	N/A	N/A	N/A	19.9	175.0 4.8	10.0	N/A	N/A	N/A
Farm Unit 48	238.5	N/A	N/A	N/A	0.9	237.6	0.4	N/A	N/A	N/A
Farm Unit 52	295.8	N/A	N/A	N/A	48.8	102.0 145.0	16.5	N/A	N/A	N/A
Farm Unit 91	157.3	N/A	N/A	N/A	16.7	17.4 123.2	10.6	N/A	N/A	N/A
Farm Unit 53	264.1	N/A	N/A	N/A	12.5	245.4 6.2	4.7	N/A	N/A	N/A
Farm Unit 70	201.0	N/A	N/A	N/A	N/A	N/A	N/A	18.4	181.0 1.6	9.2
Farm Unit 99	331.5	NA	NA	NA	NA	NA	NA	46.2	11.8 273.5	13.9
Total		229.3			232.5			134.8		

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Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
Diversity on National Forests and National Grasslands	01 Manage the Forest to provide for the maintenance or improvement of habitat diversity as described in the diversity appraisal procedure.	a. The following interspersion indices will be maintained as a minimum: Bessey Area and Samuel R. McKelvie National Forest - Interspersion Index = 19; Pine Ridge Area and Oglala National Grassland - Interspersion Index = 324; Western Half of the Buffalo Gap National Grassland - Interspersion Index = 101; Eastern Half of the Buffalo Gap National Grassland and Fort Pierre National Grassland - Interspersion Index = 296. b. Leave a minimum of three snags per acre on forested land receiving silvicultural treatment. Two replacement snags may be retained in addition to the three above. Retain occupied den trees and raptor nest trees.	a. The alternatives would not change the interspersion indice on BGNG. See Appendix A of the Nebraska National Forest Land and Resource Management Plan (Forest Service, 1984). b. The snag density described is not applicable to the alternatives (it applies to silvicultural treatment). Raptor nest surveys have been completed and will continue annually throughout the construction period (see Chapters 3 and 4). No raptor nests have been identified within the construction right-of-way on BGNG. DM&E is consulting with the U.S. Fish and Wildlife Service (USFWS) and South Dakota Department of Game, Fish and Parks (SDGFP) to determine adequate mitigation to offset indirect impacts to raptor nests and den trees pursuant to the requirements of the Migratory Bird Treaty Act and Bald Eagle Protection Act.
	02 Management of coniferous stands will be directed toward: providing a healthy, vigorous forest environment; reducing potential for catastrophic losses due to fires, insects, and disease; providing quality wildlife habitat; and providing recreation opportunities. Ensure retention of tree cover where it currently exists.		Not applicable to the alternatives.
	03 Manage forest cover types to provide variety in stand sizes, shape, crown closure, edge contrast, age structure and interspersion.	a. See individual prescriptions for standards and guidelines.	Not applicable to the alternatives.
National Grassland Management	01 Manage National Grasslands for the use(s) that best demonstrate programs of sound land conservation and utilization (grassland agriculture). Demonstrations should include, but not be limited to: a. Improved range utilization techniques; b. Wildlife habitat protection and improvement; c. Surface resource protection, management, and rehabilitation during and after mineral operations; d. Soil conservation and watershed protection; and e. Development of recreational potential.		The alternatives would be consistent with the general direction described. a. The alternatives would not limit the ability of the Forest Service to initiate improved range utilization techniques. b. Wildlife habitat will be adversely affected on BGNG. Although in places the impacts may be severe on BGNG, the impacts are anticipated to be localized. A wildlife mitigation plan, prepared in consultation with SDGFP and the USFWS, will address replacement of important wildlife habitats affected by construction and operation. c. Not applicable to the alternatives. d. Best management practices (BMPs) are being developed that address conservation of soil, sedimentation and the protection of water quality and watersheds. These BMPs will be incorporated into Storm Water Pollution Prevention Plans (SWPPPs) being prepared in compliance with South Dakota Department of Environment and Natural Resources (SDENR) regulations. Site-specific criteria for application of BMPs will be included in the SWPPPs. e. Operation of the railroad may preclude opportunities to develop recreation on parts of BGNG. However, no developed recreation sites are currently planned in the vicinity of the alternatives on BGNG.
	02 Accommodate appropriate objectives of all U.S. Department of Agriculture (USDA), State, and other Federal agencies and institutions pertinent to grassland agriculture in National Grassland management objectives.		Not applicable to the alternatives.
	03 Manage sites with unique or exceptional recreational, esthetics, or wildlife habitat, and areas with Research Natural Area (RNA) or special interest site values for their inherent values as part of the National Grassland demonstration.		Alternative B would cross RARE II and roadless areas on BGNG and would not be consistent with the general direction described. The inherent value of these RARE II and roadless areas (i.e., wilderness quality) would be adversely affected in close proximity to the operating railroad. Alternative C (including both route variations) would be consistent with the general direction. Alternative D would not affect NFS lands on BGNG. [Note: After the 1884 Nebraska National Forest Plan was developed, a special interest area (paleontological resources) was identified near Indian Creek. The Phiney Flat Route Variation would cross through a portion of this area - see Table 15 in this appendix.
Cultural Resource Management	01 Protect, find an adaptive use for, or interpret all cultural resources on National Forest System (NFS) lands which are listed on the National Register of Historic Places, the National Register of Historic Landmarks, or have been determined to be eligible for the National Register.	a. Follow direction in FSM 2360.	This general direction is addressed in the Cultural Resources Programmatic Agreement (see Appendix F of this report). The alternatives would be consistent with this general direction.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	02 Nominate or recommend cultural resource sites to the National Register of Historic Places by 1990 in the following priority: a. Sites representing multiple themes; b. Sites representing themes which are not currently on the National Register within the State; or c. Sites representing themes which are currently represented by single sites.	a. Nominate or recommend sites in accordance with Section 110 (a) (2) of the National Historic Preservation Act of 1966.	Not applicable to the alternatives.
	03 Protect and foster public use and enjoyment of cultural resources: a. Complete cultural resource surveys prior to any ground-disturbing project; b. Avoid disturbance of known cultural resources until evaluated and determined not significant; c. Collect and record information from sites where there is no other way to protect the properties; d. Issue antiquities permits to qualifying academic institutions or other organizations for the study and research of sites.		The alternatives would be consistent with this general direction. a. Surveys will be completed for all NFS lands which would be disturbed during construction of the selected alternative. b. Disturbance of sites on NFS lands will not be allowed until adequate mitigation plans have been developed, approved and implemented. c. Site data collection will be incorporated into mitigation planning, where appropriate. d. Appropriate permits have been issued to cultural contractors working for the STB. Refer to the Cultural Resource Programmatic Agreement in Appendix F of this report for additional information.
Visual Resource Management	01 Apply the Visual Management System to all National Forest System (NFS) lands. Travel routes, use areas and water bodies determined to be of primary importance are sensitivity level 1 and appropriate visual quality objectives are established according to the Visual Management System.		This general direction required Forest Service action following approval of the forest plan in 1984. The purpose of this consistency review is to evaluate the alternatives based on visual quality objectives established for individual management prescriptions.
	02 Rehabilitate all existing projects and areas which do not meet the adopted visual quality objective(s) (VQO) specified for each management area. Set priorities for rehabilitation, considering the following: a. Relative importance of the area and the amount of deviation from the adopted VQO. Foreground areas have highest priority; b. Length of time it will take natural processes to reduce the visual impacts so that they meet the adopted VQO; c. Length of time it will take rehabilitation measures to meet the adopted VQO; and d. Benefits to other resource management objectives to accomplish rehabilitation.	a. Follow direction provided in FSM 2380 and FSH 2309.16 through FSH 2309.25.	This general direction required Forest Service action following approval of the forest plan in 1984. The general direction is not applicable to the alternatives.
	03 Achieve enhancement of landscapes through addition, subtraction or alteration of elements of the landscape such as vegetation, rockform, water features or structures. Examples of these include: a. Addition of vegetation species to introduce unique form, color or texture to existing vegetation. b. Vegetation manipulation to open up vistas or screen out undesirable views.		Not applicable to the alternatives.
	04 Plan, design and locate vegetation manipulation in a scale which retains the color and texture of the characteristic landscape, borrowing directional emphasis of form and line from natural features.	a. Meet the Visual Quality Objectives of retention and partial retention one full growing season after completion of a project. Meet modification and maximum modification objectives three full growing seasons after completion of a project. b. Determine sensitivity levels in accordance with FSH 2309.16, Agriculture Handbook No. 462, Vol. 2, Chapter 1; Sensitivity Levels.	Not applicable to the alternatives.
	05 Choose facility and structure design, color of materials, location and orientation to meet the adopted visual quality objective(s) for the management area.		The visual quality objective (VQO) for the majority of the NFS lands on BGNG which would be crossed by the alternatives is designated by the Nebraska Forest Plan (Forest Service, 1984) as "modification". The modification classification recognizes that management activities may dominate the landscape. All the alternatives would comply with the level of contrast allowed by the modification VQO. However, all fixed facilities and structures on NFS lands would be painted to blend with the natural environment as required by the general direction. A small portion of Alternatives B and C(including both route variations) would cross areas designated as Management Prescription 9A in the Nebraska

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
			Forest Plan. Management Prescription 9A applies to the aquatic ecosystem, the riparian ecosystem, and adjacent ecosystems that remain within approximately 100 feet from both edges of all perennial streams and from shores of lakes and other still water bodies. Management Prescription 9A has a VQO of "partial retention". Management activities may be evident but should be subordinate to the natural landscape. Activities may introduce forms, lines and colors not found in the natural landscape but they should not dominate the views. Other natural features should attract the viewer's attention. Where the alternatives would cross or run parallel to Management Prescription 9A, the operating railroad is expected to dominate the natural landscape and the views. Other natural features would likely be subordinate to the railroad, especially when coal trains are passing. Therefore, Alternatives B and C (including both route variations) are not consistent with this general direction on BGNG. Alternative D would not cross NFS lands on BGNG.
Recreation Site Construction and Rehabilitation	01 Provide appropriate development facilities where the private sector is not meeting the demand.		Not applicable to the alternatives.
	02 Maintain cost-effective developed recreation facilities which complement non-Forest Service developments.		Not applicable to the alternatives.
	03 Provide facilities which are accessible to handicapped persons.		Not applicable to the alternatives.
	04 Facilities proposed for construction or reconstruction which lie within identified 100-year floodplains will be evaluated as to the specific flood hazards and values involved with the site. Viable alternatives will be thoroughly evaluated.	a. Follow procedures and guidelines in FSM 2527.04c.	Not applicable to the alternatives.
Management of Developed Recreation Sites	01 Construct, reconstruct and maintain developed sites in accordance with the established Recreation Opportunity Spectrum (ROS) classification for the management area.	a. Standards and Guidelines --- ROS Class* — Site Development Scale** --- P — Not to exceed 1 SPNM — Not to exceed 2 SPM — Not to exceed 2 RN — Class 3 or 4 R — Class 3 or 4 U — Class 5 --- * P = Primitive SPNM = Semi-primitive non-motorized SPM = Semi-primitive motorized RN = Roaded Natural R = Rural U = Urban ** FSM 2331.47	Not applicable to the alternatives.
	02 Provide appropriate development facilities where the private sector is not meeting the demand		Not applicable to the alternatives.
	03 Prohibit summer home development.		Not applicable to the alternatives.
	04 Fully developed recreation facilities only permitted in Management Areas 1A and 10C.		Not applicable to the alternatives.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	05 Manage development scale 3 and 4 sites for full service when at least one of the following are met: a. A campground is designated as a fee site; b. A group campground or picnic ground has a reservation system and/or user fee; or c. The site is a swimming site, a boating site with a constructed ramp, or a staffed visitor information center.		Not applicable to the alternatives.
Dispersed Recreation Management	01 Provide a broad spectrum of dispersed recreation opportunities in accordance with the established Recreation Opportunity Spectrum (ROS) classification for the management area.		Not applicable to the alternatives.
	02 Close or rehabilitate dispersed sites where unacceptable environmental damage is occurring.	a. Close sites that cannot be maintained in Frissell Condition Class 1, 2, or 3 (Campsite Condition, Frissell, S.S.; Journal of Forestry August 1978). b. Rehabilitate sites that are in Frissell condition class 4.	Not applicable to the alternatives.
	03 Allow gathering of dead or down material for fuelwood for camping or picnicking use.		Not applicable to the alternatives.
	04 Manage resource activities and facilities in accordance with the Regional Acceptable Work Standards.	a. FSM 1310 R2 ID No. 1 7/22/82.	Not applicable to the alternatives.
	05 Demonstrate resource management which will encourage broadening the land base available for dispersed recreation.		Not applicable to the alternatives.
Wildlife and Fish Resource Management	01 Maintain or enhance habitat for threatened and endangered wildlife and plant species.		At this time, the alternatives are consistent with this general direction. Surveys conducted to date suggest that the alternatives will not adversely affect currently-listed federally-threatened or -endangered species on BGNG. However, surveys have not been conducted for nesting mountain plovers. The USFWS proposed to list the mountain plover as threatened in February, 1999. Prairie dog colonies which will be crossed by the alternatives may provide nesting habitat for this species. A proposal to list the sturgeon chub is advancing - this species may be present in streams tributary to the Cheyenne River on BGNG. Finally, the USFWS is currently evaluating whether listing the black-tailed prairie dog as threatened is warranted. Listing action on all these species is expected in the foreseeable future (i.e., during the period when construction of the railroad would occur). Environmental groups are currently working on petitions to list other species that may occur on BGNG - most notably the sage grouse. The alternatives have the potential to adversely affect all of these species. Future consistency with this general direction will depend upon listing decisions made by the USFWS.
	02 Conduct on-going surveys for threatened, endangered and sensitive species.	a. Conduct black-footed ferret surveys on prairie dog colonies where planned management activities may affect ferrets. U.S. Fish and Wildlife Service will be consulted on current ferret survey procedures.	Appropriate surveys for threatened and endangered species have been completed or will occur in the future. Annual follow-up surveys will be required for some species through the construction period (see Chapter 4). Surveys for black-footed ferrets, if required, will be conducted in the year prior to construction.
	03 Implement Black-footed Ferret Contingency Plan upon any confirmed sighting on or near NFS lands or for future ferret recovery efforts as identified in the Black-foot Ferret Recovery Plan (U.S. Fish and Wildlife Service document.)		Not applicable to the alternatives.
	04 Continue to manage black-tailed prairie dog as described in a 1978 Final Environmental Statement (Management of Prairie Dogs on Lands Administered by the Supervisor of the Nebraska National Forest) and a 1981 Decision Notice and Environmental Assessment.	a. Use registered rodenticides and grazing methods to reduce prairie dog populations. b. Reduce prairie dog population in the Conata Basin area of the Buffalo Gap National Grassland. The population reduction will be limited to retaining a specified number of active prairie dog colonies and acreage in a scattered distribution. Conata Basin is divided into four units and, as a minimum, eight colonies will be retained in each unit. Six of these colonies must be at least 30 acres in size and two must be at least 100 acres in size.	Not applicable to the alternatives.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland

Management Activities	General Direction	Standards & Guidelines	Railroad Alternative Consistency
		c. Manage the prairie dog population on administered lands outside of Conata Basin in a manner that is consistent with other uses. The wildlife values of prairie dog colonies will be recognized, but to prevent serious conflicts with forage and watershed resources, the acreage of active prairie dog colonies will not be allowed to exceed two percent of the area suitable for grazing in an allotment. As a minimum, approximately 1600 acres of active prairie dog colonies will be retained on the administered lands outside Conata Basin.	
	05 Maintain habitat for viable populations of all existing vertebrate wildlife species.		The alternatives would not degrade habitat on BGNG to such an extent that viable populations of wildlife would no longer be supported.
	06 Provide habitat for management indicator species at a level no lower than 40% of potential.		The alternatives would not reduce habitat for any management indicator species to below 40% of potential (see Chapter 4).
Wildlife Habitat Improvement and Maintenance	01 Manage water capable of supporting fish populations to provide for those populations.	a. Construct a minimum of 10 percent of new reservoirs to a minimum depth of 12 feet over at least 25 percent of the surface acreage of normal water level. b. Do not allow manipulation of riparian vegetation on trout streams that would reduce shade cover by more than 50 percent.	The alternatives would not result in construction of new reservoirs on BGNG. No trout streams would be affected on BGNG.
	02 Construct fences to allow for pronghorn passage, where pronghorns exist.	a. Assure that the bottom wire, new construction and reconstruction on all cattle and horse allotment fences is a minimum of 16 inches above the ground. For sheep allotments, make the bottom wire a minimum of 10 inches above the ground.	The alternatives would be consistent with these standards and guidelines. Fencing on NFS lands would comply with Forest Service requirements.
	03 Manage wildlife and fish resources as outlined in the appropriate State Comprehensive Wildlife Management Plan.		Not applicable to the alternatives.
	04 Install bird escape ladders on all water tanks.		Not applicable to the alternatives.
	05 Maintain edge contrast of at least medium or high between tree stands created by even-aged management.	a. Contrast by Age Class is: Contrast** Age Class* / OG / M / P / SSS / GF / Shr / Gra OG: - / L / M / H / H / M / H M: L / - / M / M / H / M / H P: M / M / - / M / H / M / H SSS: H / M / M / - / L / L / L GF: H / H / H / L / - / M / L Shr: M / M / M / L / M / - / M Gra: H / H / H / L / L / M / - * OG = Old Growth; SSS = Shrub-seedling-sapling; M = Mature; GF = Grass-forb; P = Poles; SHR = Shrubland; GRA = grass ** H = High contrast; Medium contrast; L = Low contrast	Not applicable to the alternatives.
	06 Implement Black-footed Ferret Contingency Plan upon any confirmed sighting on or near NFS lands or for future ferret recovery efforts as identified in the Black-footed Ferret Recovery Plan (U.S. Fish and Wildlife Service document).		Not applicable to the alternatives.

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Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
Wildlife and Fish Cooperation With Other Agencies	01 Manage animal damage in cooperation with the State Wildlife Agencies, Fish and Wildlife Service, other appropriate agencies, and cooperators to prevent or reduce damage to other resources and direct control toward preventing damage or removing only the offending animal.		Not applicable to the alternatives.
Range Resource Management	01 Invest in cost-effective allotment management and associated range improvements.	a. Base economic analysis on Project Effectiveness Analysis Handbook (FSH 2209.11).	Not applicable to the alternatives.
	02 Provide forage to sustain local dependent livestock industry as well as wildlife populations agreed to in Statewide Comprehensive Wildlife Management Plans for National Forest System lands.		Not applicable to the alternatives.
	03 In cooperation with State wildlife agencies, develop residual cover guidelines for prairie grouse by close of FY 1988.		Not applicable to the alternatives.
	04 Require Allotment Management Plans to be based on rangeland analysis and capabilities; specify objectives, management systems, improvements, and utilization standards; develop Plan with permittees and include it as a condition of the grazing permit.		Not applicable to the alternatives.
	05 Implement only range practices and improvements identified in Allotment Management Plans.		Not applicable to the alternatives.
Range Improvement and Maintenance	01 Structural range improvement should be designed to benefit wildlife and livestock.		Not applicable to the alternatives.
	02 Give first priority for improvements to rangeland in less than fair condition (don't allow higher condition to degenerate to lower condition in meantime).	a. Base range condition on the standards in Range Analysis Handbook (FSH 2209.21) or SCS methods.	Not applicable to the alternatives.
Silvicultural Prescriptions	01 Provide for wildlife habitat improvement and enhancement of other renewable resources in Sale Area Improvement Plans.		Not applicable to the alternatives.
	02 Make Christmas trees available in areas where other resource objectives can be accomplished through commercial or personal use Christmas tree sales.		Not applicable to the alternatives.
	03 Use trees of the best genetic quality available which are adapted to the planting site when supplemental planting. (Reference FSM 2475)		Not applicable to the alternatives.
	04 Apply a variety of silvicultural systems and harvest methods which best meet resource management objectives.	a. The appropriate harvest methods by forest cover type are: --- Appropriate Harvest Methods* Forest Cover Type — Even-aged — Uneven aged --- Ponderosa Pine — SW, CC, & S — GS & ST Eastern Red Cedar — CC — - --- *The following abbreviations are used for harvest methods: SW = Shelterwood; CC = Clearcut; GS = Group selection; ST = Single tree selection; S = Seed tree b. Utilization standards for live and dead material are: --- Species — Min. DBH — Min. Top Dia. — Length (feet) — % Net of Gross ---	Not applicable to the alternatives.

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Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
		Live Trees - All Periods Sawtimber P. Pine 8.0 6.0 8 33-1/3 J. Pine 8.0 4.0 7 33-1/3 E.R. Cedar 4.0 3.0 7 50 c. Silvicultural Standards by Harvest Method: (These standards do not apply on areas managed for old growth) 1. Clearcut: --- Forest Cover Type Rotation Age Growing Stock Thinning Cycle Level --- P. Pine 100-160 80-120 20-30yr J. Pine 70-90 80-120 20-30yr E.R. Cedar 60-80 175-180 20-30yr 2. Two-step shelterwood: --- Forest Cover Type Rotation Age Growing Stock Thinning Cycle Level --- P. Pine 100-160 80-120 20-30yr J. Pine 70-90 80-120 20-30yr E.R. Cedar 60-80 175-400 20-30yr --- First Cut (seed cut): Remove 40-70 percent of the basal area or cut to basal area 25-60 for P. Pine; BA 20-40 for J. Pine; 50-60 trees/ac. E. Red Cedar --- Second Cut (removal cut): Remove all overstory when regenerated stand meets minimum stocking standards. --- 3. Three step-shelterwood: Rotation age, growing stock level, and thinning cycle is the same as two-step shelterwood. --- First Cut (preparatory cut): Remove 10-40 percent of the basal area or cut to BA 60-80 for P. Pine; BA 60-80 for J. Pine; 90-120 Trees/ac E.R. Cedar --- Second Cut (seed cut): Remove 40-50 percent of the remaining basal area or cut to BA 25-50, 10 to 20 years after preparatory cut for P. Pine and J. Pine 40-60 Trees/ac., 10 to 20 years after preparatory cut for E. R. Cedar. ---	

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Management Activities	General Direction	Standards & Guidelines	Railroad Alternative Consistency
		4. Selection Forest Cover Type / Residual BA / Cutting Cycle P. Pine: 80-120 / 20-30yr J. Pine: 80-120 / 20-30yr	
	05 Assure that all even-aged stands scheduled to be harvested during the planning period will generally have reached the culmination of mean annual increment of growth.		Not applicable to the alternatives.
	06 The maximum size of openings created by the application of even-aged silviculture will be 40 acres regardless of forest cover type. Exceptions are: a. Proposals for larger openings are subject to a 60-day public review and are approved by the Regional Forester; b. Larger openings are the result of natural catastrophic conditions of fire, insect or disease attack, windstorm; or c. The area does not meet the definition of created openings.	a. Size of openings : Patch clearcuts: 1-10 acres Clearcuts : 10-40 acres	Not applicable to the alternatives.
	07 Acceptable management intensity activities to determine harvest levels are: Ponderosa Pine / Jack Pine / E.R.Cedar Tree Improvement Site: X / X / N Preparation: X / X / N Reforestation Planting: X / X / X Seeding: X / N / O Natural: X / X / N Regeneration Protection: X / X / X Stocking Control thinning): Pre-commercial: X / X / X Commercial: X / X / X Salvage of Dead Material: X / X / X Cutting Methods: Clearcut: X / X / X Shelterwood: X / N / N Selection: X / N / N *Various combinations of these activities provide the acceptable range of management intensity for timber production (36 CFR 291.2 (b)(2)). X = Appropriate practice; O = Not an appropriate practice; N = Appropriate, but not a standard practice. May be acceptable where justified.		Not applicable to the alternatives.
	08 Establish a satisfactory stand on cut over areas, emphasizing natural regeneration within 5 years after final harvest except when provided for otherwise in specific management prescriptions, and permanent openings that serve specific management objectives.	a. Minimum stocking standards by productivity and forest cover type: Forest Cover Type / Site Prod (Cu. Ft./A/yr) / Planting Densities (Trees/A) P. Pine: 85+ / 360-680 50-84 / 360-550 20-49 / 300-360	Not applicable to the alternatives.

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Management Activities	General Direction	Standards & Guidelines	Railroad Alternative Consistency

J. Pine	85+	360-680
	50-84	360-540
	20-49	300
E. R. Cedar	55+	400-680
	35-54	300-400
	25-34	100-300

Forest Cover Type	Seedling Stocking Per Acre 1/	
	Min. 2/	Desir. 3/
P. Pine	205	310
	205	255
	190	240
J. Pine	245	340
	200	280
	150	250
E. R. Cedar	140	175
	80	120
	40	100

Forest Cover Type	Percent of Plots or transects that are stocked	
	Minimum	Desired
P. Pine	70	100
	70	100
	70	100
J. Pine	75	100
	75	100
	75	100
E. R. Cedar	80	100
	80	100
	80	100

Forest Cover Type	Seedling Height (inches)	
	Minimum	Desired
P. Pine	3	18
J. Pine	3	18
E. R. Cedar	3	18

1/ Lower densities are recommended to meet minimum stocking standards. Higher densities are recommended to meet desired stocking standards, with ample stock for selecting genetically superior trees.
2/ Minimum stocking standards are to be used where no precommercial cutting will be done, and only one harvest will be made to regenerate the stand.
3/ Desired stocking standards are to be used where at least one precommercial cut will be done followed by two sawlog harvests before the final cut is done.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
Wild and Scenic River Management	01 Protect river segments that have been determined eligible for potential addition to the National Wild and Scenic Rivers system from activities which could diminish or change the free-flowing character, water quality, or the scenic, recreational, fish and wildlife, and other values which make the river eligible for designation. a. Request that Federal lands which constitute the bed or bank, or which are within one-quarter mile of either bank, be temporarily withdrawn from appropriation and entry under the mining laws. Withdrawal should continue until the river segment is: a) found to be ineligible; b) not recommended for inclusion in the National system; or c) added to the system by Act of Congress. b. Safeguard the values of the river area by appropriate conditions and stipulations in leases, permits, and licenses, including prospecting, issued under terms of the mineral leasing laws. c. Extraction of salable, common-variety minerals from the river or the study area shall not be authorized until the study is complete and recommended actions are enacted. d. Prohibit construction of roads within the river study area if it would have direct and adverse effects on the values which make the river eligible for potential inclusion into the system. e. Maintain current motorized access character and avoid any changes to the potential wild and scenic river classification. f. Maintain free-flowing characteristics and water quality during the study and Congressional review period. g. Manage tree stands within the study area to maintain or enhance potential wild and scenic river values. Protect scenic values by sizing and shaping timber harvest units to achieve a natural appearance and to harmonize with the surrounding landscape. h. Prohibit special uses or permitted land uses which degrade or have directly adverse effects on values which make the river segment eligible. i. None of this direction shall abrogate any existing privileges or contracts affecting National Forest System lands held by any private party without consent of said party. Activities affecting the applicability of U.S. mining and mineral leasing laws are subject to valid existing rights.		No streams or rivers that have determined to be eligible for potential addition to the National Wild and Scenic River System would be affected on NFS lands on BGNG. The Forest Service has completed an eligibility inventory of wild and scenic rivers on BGNG. Both the Cheyenne River and Rapid Creek were evaluated. The draft grassland plan did not recommend either for management as wild and scenic (Forest Service, 1999a).
Riparian Area Management	01 Manage hardwood draws and riparian areas to provide for regeneration to sustain their inherent biological, physical, and visual values.	a. Maintain all riparian ecosystems in at least an upper mid-seral successional stage based upon the R2 Riparian Ecosystem Rating System.	Alternatives B and C would be inconsistent with this general direction. Alternative B would have the largest impact on riparian areas on NFS lands on BGNG. Alternative B would impact riparian areas on NFS lands along Cottonwood Creek, Spring Creek and at several locations adjacent to the Cheyenne River. Riparian impacts on NFS lands along Cottonwood Creek and the Cheyenne River would be eliminated by Alternative C but the impacts to Spring Creek would remain. The Phiney Flat Route Variation of Alternative C would eliminate riparian impacts on NFS lands along Spring Creek. The biological, physical, and visual values of riparian areas which would be crossed by the operating railroad on NFS lands on BGNG would not be sustained by Alternatives B and C. However, the impacts would be substantially reduced by implementing the Phiney Flat Route Variation for Alternative C.
	02 Prescribe silvicultural and livestock grazing systems to achieve riparian area objectives.		Not applicable to the alternatives.
	03 Locate and construct arterial and collector roads to maintain the basic natural condition and character of riparian areas.		It is anticipated that access to the construction right-of-way on BGNG will rely primarily on existing roads. However, should it become necessary to construct an access road on NFS lands, this general direction would be applied to the road location and construction techniques.
Water Uses Management	01 Protest water right applications of others when such uses will lower streamflows below levels acceptable for National Forest uses and purposes.		Not applicable to the alternatives. DM&E's need for water would be limited to construction activities.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	02 Determine and obtain rights to instream flow volumes to protect and maintain stream channel stability and capacity and to accomplish any proposed increase in use or resource activity.		Not applicable to the alternatives.
	03 Identify at the project level, upland areas that are immediately adjacent to Riparian (Prescription 9A) Management Areas. Adjacent upland areas are those portions of a management area which, when subjected to management activities, have a potential for directly affecting the condition of the adjacent Riparian Management Area. The magnitude of effects is dependent upon slope steepness, and the kind, amount, and location of surface and vegetation disturbance within the adjacent upland unit.	a. The following is a guide to identify the approximate extent of adjacent upland areas: Slope Gradient of Upland Areas Adjacent to Riparian Management Area (% Slope Range) / Upslope Distance From Boundary of Riparian Management Area (Feet) 0-20 / 100 20-30 / 180 30-40 / 280 40-50 / 400 50-60 / 520 60-70 / 640 70-80 / 760 80-90 / 880 90-100 / 1000 100-150 / 1000-1300 b. Reduce, through designed management practices and appropriate erosion mitigation and vegetation/restoration measures, the project caused on-site erosion rates (calculated with appropriate Universal Soil Loss Equation methodology) by 75% within the first year after disturbance. Reduce project caused on-site erosion by 95% within five years after initial disturbance (USDA Tech. Pub. SA-TP 11, 1980: USDA SCS Tech. Note No. 10, 1977). c. Design continuing mitigation/restoration practices and follow-up maintenance activities to insure that 80% original ground cover (vegetation) recovery occurs within five years after disturbance.	b. BMPs are being designed to address sedimentation from these sites. These BMPs will be implemented through site-specific SWPPPs prepared in compliance with SDENR regulations. On NFS lands the BMPs will be designed to achieve the stabilization goals referenced in this section. The Forest Service will be provided with copies of the SWPPPs and BMPs for review and comment. It is anticipated that the final BMPs will be incorporated as conditions of approval to Forest Service approvals to construct and operate the railroad on NFS lands. c. Monitoring and maintenance will be addressed in the SWPPPs. Reclamation success objectives in the SWPPPs will consistent with the forest plan's 5 year - 80 percent goal.
Water Resource Improvement and Maintenance	01 Maintain instream flows and protect public property and resources.		Temporary dewatering of streams may be required in the vicinity of construction activities during installation of instream structures. However, downstream flow would be maintained at all times, where necessary, to protect aquatic resources.
	02 Improve or maintain water quality to meet State water quality standards. However, where the natural background water pollutants cause degradation, it is not necessary to implement improvement actions. Short-term or temporary failure to meet some parameters of the State standard, such as increased sediment from road crossing construction or water resource development may be permitted in special cases.		The alternatives are designed to maintain water quality in compliance with federal and state regulations. Before construction can begin, the SDENR must certify to the COE that water quality standards will be maintained during construction of the alternatives. That certification will apply to all lands affected by construction activities. To a certain extent, SDENR will rely upon BMPs developed by DM&E to determine the project's ability to comply with state water quality standards. SDENR will review the BMPs prior to issuing a 401 water quality certification. If the BMPs are found deficient, additional measures to protect water quality may be imposed by SDENR. In addition to the 401 water quality certification, DM&E will be required to prepare and implement SWPPPs in compliance with SDENR regulations. The purpose of the SWPPP is to prevent storm water from becoming "polluted" prior to leaving the construction site. Of primary concern is sedimentation. The SWPPP must specify storm water controls, such as hay bales, sedimentation (silt) fences, settling ponds, etc., that will be installed to prevent transport of sediment from construction sites to adjacent water bodies and wetlands. The SWPPP must also contain an inspection and maintenance schedule for storm water controls.
	03 Rehabilitate disturbed areas that are contributing sediment directly to perennial streams as a result of management activities to maintain water quality and reestablish vegetation cover.	a. Reduce to natural rate of erosion due to management activity in the season of disturbance and sediment yields within one year of the activity through necessary mitigation measures such as waterbarring and revegetation.	This general direction will be addressed in the SWPPPs developed for storm water permits required by the SDENR.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	04 Limit use of herbicides, insecticides, rodenticides, or other chemical agents as part of management activities to times and places where possible transport to or by surface water has a low probability of occurrence. Follow all label requirements concerning water quality protection.		DM&E would comply with federal and state regulations pertaining to the application of boicides. Only licensed applicators would be employed. Use of biocides on NFS lands would require prior approval from the Forest Service.
Minerals Management General	01 Administer areas with producing sites and known reserves with consideration of ongoing and potential mineral activities.		Not applicable to the alternatives.
	02 In areas of high to moderate potential for valuable mineral deposits, perform site-specific mineral evaluations prior to making substantial capital investments, such as recreational developments.		Not applicable to the alternatives.
Mining Law Compliance and Administration	01 Prevent or control adverse impacts on surface resources in accordance with 36 CFR 228. a. Unclassified lands: Provide for reclamation of disturbed lands to achieve the planned uses specified in the Forest Plan, when those lands are no longer needed for mining operations. b. Designated Wilderness, Congressionally designated Wilderness Study Areas, and areas recommended for wilderness designation by RARE II on which Congressional action has not been completed: Provide for reasonable access of the type necessary to the purpose of proposed operations and for restoration of disturbed lands as near as practical to their natural condition when they are longer needed for operations. c. Other classified lands not withdrawn from operations under the General Mining Laws: Such lands may include Research Natural Areas, National Recreation Areas, "RARE II" Further Planning Areas, Special Interest Areas such as scenic and geologic, National Historic Sites, or some other type of specific classification. The status of classified lands with respect to withdrawal must be checked before an operating plan can be approved. Provide for reasonable protection of the purposes for which the lands were classified and for reclamation of disturbed lands to a condition suitable for the purposes for which the lands were classified.		Not applicable to the alternatives.
	02 Withdrawals must be for the purpose of protecting specific existing or proposed uses. Initiate actions for withdrawal from entry under the General Mining Laws when 36 CFR 228 and other applicable laws and regulations will not provide the opportunity for protection of surface resources and uses.		Not applicable to the alternatives.
Minerals Management-Oil, Gas and Geothermal	01 Review cases of suspected abuse of the mining laws such as occupancy of the land for purposes other than prospecting, mining and related operations. Initiate appropriate actions to resolve. First action should be administrative. Failure of such action requires examination of claims for validity, followed by appropriate contest proceedings or legal action.		Not applicable to the alternatives.
	02 Withdrawals of lands from operations of the mineral leasing acts will be requested only in exceptional situations because Federal decisions on mineral disposals under these acts are discretionary on a case-by-case basis.		Not applicable to the alternatives.
	03 Recommendations for or consent to issuance of leases or permits: 1. Unclassified Lands: a. Forest Service authorization of geophysical prospecting will include terms and conditions controlling operating methods and times to prevent or control adverse impacts on surface resources and uses. b. Recommendations for and consent to BLM issuance of leases and permits will include all current standard stipulations and the Regionally-approved special stipulations that may be necessary for additional protection of specific surface resources and uses. Reclamation requirements will have the objective of returning disturbed lands to the planned uses. These standard and current Regionally-approved special stipulations are in Appendix H to the Forest Plan.		Not applicable to the alternatives.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	(1) Standard stipulations, in addition to those in the basic lease or permit document, are BLM Form 3109-3, "Stipulation for Lands Under Jurisdiction of the Department of Agriculture" and Forest Service (R-2) Supplement D to BLM Form 3109-3, "Surface Disturbance Stipulation."		
	(2) Special Region 2 Forest Service stipulations will be used as appropriate to the surface resource situation on the lands involved in a lease or permit. These stipulations are titled as supplements to Form 3109-3 and are listed below: (a) Forest Service (R-2) Supplement C to Form 3109-3, "Limited Surface Use Stipulation". This stipulation notifies a lessee or permittee that certain described conditions exist upon the lands involved that require special operating plan provisions for their protection. (b) Forest Service (R-2) Supplement F to Form 3109-3, "Surface Use Stipulation". This stipulation notifies a prospective lessee or permittee that surface use or occupancy that would cause significant surface disturbance is not authorized upon tracts within the proposed lease or permit area. This stipulation is also used to protect wilderness values in areas being considered or studied as potential additions to the wilderness preservation system. Recision and replacement of this stipulation is provided if Congress removes the area from further consideration as wilderness.		Not applicable to the alternatives.
	(c) Forest Service (R-2) Supplement H to Form 3109-3, "Conditional No Surface Disturbance Stipulation". This stipulation notifies a prospective lessee or permittee that certain described conditions exist upon tracts within the proposed lease or permit area that will prevent any surface disturbance affecting those tracts unless an operating plan can be devised that will convince the Forest Service that surface use, occupancy and reclamation can take place without causing irretrievable environmental damage. (d) Forest Service (R-2) Supplement G to Form 3109-3, "Activity Coordination Stipulation". This stipulation notifies the lessee that surface values exist that are sensitive to high levels of activity. In such circumstances, the Forest Service may require that activities on the lease lands, when multiple leaseholds are involved, be conducted by a single operator, similar to the conduct of operations under a unitization agreement approved by the Bureau of Land Management. An alternative approach would be joint Forest Service/Bureau of Land Management approval of a coordinated plan of operations involving multiple operators. (e) Forest Service (R-2) Supplement A to Form 3109-3, "Further Planning Area Stipulation". This stipulation applies to lands identified for further planning in RARE II decision documents. It specifies the nature and extent of operations allowed and the conditions to be met for their approval.		Not applicable to the alternatives.
	c. Recommend against or deny consent to BLM for issuance of leases where operational damages on surface resources, including the impacts of surface-based access, product transportation and ancillary facilities necessary to production and related operations, would be irreversible and irretrievable, with no potential for reclamation and attachment of the no surface occupancy stipulation (Forest Service R-2: Supplement F to Form 3109-3) would prevent the effective recovery of the Federal mineral resource, as determined by the BLM. Negative recommendations or consent denials will be based on site-specific consideration of the following criteria: (1) Slopes steeper than 60 percent. (2) High erosion hazard rating. (3) High geologic hazard rating. (4) Low visual absorption capacity that prevents reclamation to established visual quality objective (VQO).		Not applicable to the alternatives.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	(5) A conclusion by the Forest Service (FS) and/or the United States Fish and Wildlife Service (USFWS) that the action will jeopardize the survival or recovery of federally listed threatened and endangered (T&E) wildlife or plant species. (6) Intrusions upon the identified critical (USFWS) or essential (FS) habitat of a federally listed (T&E) wildlife or plant species or upon the plant or animal itself. (7) Intrusion upon the habitat of individual plant or animal species listed by a state as threatened or endangered. (8) Intrusion upon the habitat of individual plant or animal species identified by the Regional Forester as needing special management to prevent its need for listing as a threatened or endangered species.		
	2. Designated Wilderness, Congressionally-designated Wilderness Study Areas, and areas recommended for Wilderness in RARE II on which Congress has not taken final action: a. Geophysical prospecting, when authorized, will be subject to terms and conditions insuring that operations will be done by methods and at such times that there will be no significant adverse impacts on surface resources. b. Wilderness is withdrawn from all leasing, subject to valid existing rights. c. Recommendations for consent to lease in Wilderness Study Areas and RARE II areas on which Congress has not taken final action will include Stipulation F, which withholds authorization of surface occupancy. Stipulation F may become inoperative if Congressional action releases the area from further consideration for addition to the Wilderness Preservation System. d. Recommendations for consent to lease in Further Planning Areas will include Forest Service Supplement A to Form 3109-3. 3. Classified lands other than Wilderness and related Study and Roadless areas, as described in "2" foregoing, which are not by law or otherwise withdrawn from operations under the mineral leasing acts. Examples of such lands include Wild and Scenic River System, RARE II Further Planning Areas, National Recreation Areas, National Historic Sites, Natural Areas, Special Areas--such as geological, scenic and zoological, and some other specific classifications. a. Forest Service authorize geophysical and similar prospecting only when terms and conditions can be applied that will protect the purposes for which the lands were classified.		Not applicable to the alternatives.
	b. Recommendations for and consent to BLM for issuance of leases and permits will include all current standard stipulations and the current Regionally-approved special stipulations necessary to protect the purposes for which the lands were classified. Standard and special stipulations are in Appendix H to the Forest Plan. See 1.b(1) under this Management Activity heading, foregoing, for the standard stipulations. Special stipulations to be applied as appropriate are: (1) Forest Service (R-2) Supplement B to Form 3109-3, "Classified Area Stipulation". This stipulation applies to lands classified under 36 CFR 251.23 and 294.1 for specific management purposes. Because of the regulatory provisions, no use or occupancy inconsistent with the classification is permitted. This does not necessarily mean recommendation against or denial of consent to BLM for issuance of leases. The reason is that classified areas may be only small portions of large leaseholds. (2) Forest Service (R-2) Supplement C to Form 3109-3, "Limited Surface Use Stipulations". This stipulation notifies a lessee or permittee that certain described conditions exist upon the lands involved that require special operating plan provisions for their protection.		Not applicable to the alternatives.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	(3) Forest Service (R-2) Supplement E to Form 3109-3, "Wild and Scenic Rivers Sys. Stipulations". This stipulation establishes operating conditions for lands under study by Congress for inclusion in the National Wild and Scenic Rivers systems. It also provides for establishing appropriate operational controls should the lands be included in that system or should the lands not be added to the system. (4) Forest Service (R-2) Supplement F to Form 3100-3, "Surface Use Stipulation". This stipulation notifies prospective lessees or permittees that surface use or occupancy that would cause significant surface disturbance is not authorized for described lands. This stipulation may be applied in a wide variety of conditions in lieu of recommending against or denying consent to BLM for issuance of a lease. (5) Forest Service (R-2) Supplement H to Form 3109-11, "Conditional No Surface Disturbance Stipulation". This stipulation notifies a prospective lessee that certain described conditions exist upon tracts within the proposed lease or permit area that will prevent any surface disturbance affecting those tracts unless an operating plan can be devised that will convince the Forest Service that surface use, occupancy and reclamation can take place without causing irretrievable environmental damage. (6) Forest Service (R-2) Supplement G to Form 3109-3, "Activity Coordination Stipulation". This stipulation notifies the lessee that surface values exist that are sensitive to high levels of activity. In such circumstance, the Forest Service may require that activities on the lease lands, when multiple leaseholds are involved, be conducted by a single operator, similar to the conduct of operations under a unitization agreement approved by the BLM. An alternative approach would be joint Forest Service/BLM approval of a plan of operations involving multiple operators. c. Recommend against or deny consent to BLM for issuance of leases where operation damages to surface resources, including the impacts of surface-based access, product transportation and ancillary facilities necessary to production and related operations, would be irreversible and irretrievable, with no potential for reclamation and attachment of the no surface occupancy stipulation (Forest Service R-2: Supplement F to Form 3109-3) would prevent the effective recovery of the Federal mineral resource, as determined by the BLM. Negative recommendations or consent denials will be based on site-specific consideration of the following criteria: (1) Operations destroy or irretrievably damage the characteristics or purposes for which the lands were classified. (2) Slopes steeper than 40 percent. (3) High erosion hazard rating. (4) High geologic hazard rating. (5) Low visual absorption capacity that prevents reclamation to established visual quality objective (VQO). (6) A conclusion by the Forest Service (FS) and/or the United States Fish and Wildlife Service (USFWS) that the action will jeopardize the survival or recovery of federally listed threatened or endangered (T&E) wildlife or plant species. (7) Intrusions upon the identified critical (USFWS) or essential (FS) habitat of a federally listed (T&E) wildlife or plant species or upon the plant or animal itself. (8) Intrusion upon the habitat of individual plant or animal species listed by a State as threatened or endangered. (9) Intrusion upon the habitat of individual plant or animal species identified by the Regional Forester as needing special management to prevent its need for listing as a threatened or endangered species.		Not applicable to the alternatives.
Minerals Management-Coal, Leasable	01 Withdrawals of lands from operations of the mineral leasing acts will be requested only in exceptional situations because Federal decisions on mineral disposals under these acts are discretionary on a case-by-case basis.		Not applicable to the alternatives.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
Uranium and Non-Energy Common Minerals Materials			
	02 Withdrawals from disposal of common variety mineral materials are unnecessary. The Forest Service has total discretionary authority for such disposals.		Not applicable to the alternatives.
	03 General direction for unclassified lands, designated Wilderness, and classified lands other than Wilderness are: 1. Unclassified Lands. a. Forest Service authorize common variety exploration and disposal under terms and conditions to prevent or control adverse impacts on surface resources and uses. The objective of reclamation requirements will be to return disturbed lands to the planned uses. b. Recommendations for and consent to BLM for issuance of leases, permits, and coal exploration licenses will include all current standard stipulations and the Regionally-approved special stipulations that may be necessary for additional protection of specific surface resources. The objective of reclamation requirements will be to return disturbed lands to the planned uses. The standard and current Regionally-approved special stipulations are in Appendix H to the Forest Plan. (1) Standard Stipulations, in addition to those in the basic lease, permit or license document, are BLM Form 3109-3, "Stipulation for Lands Under Jurisdiction of the Department of Agriculture", and Forest Service (R-2) stipulation, Supplement D to BLM Form 3109-3, "Surface Disturbance Stipulation".		Not applicable to the alternatives.
	(2) Special Forest Service, Region 2, stipulations will be used as appropriate to the surface resource situation involved in a lease, permit or license. These stipulations are titled as supplements to BLM Form 3109-3 and are listed below: (a) Forest Service (R-2) Supplement C to Form 3109-3, "Limited Surface Use Stipulations". This stipulation notifies a lessee, permitted or licensee that certain described conditions exist upon the lands involved that require special operating plan provisions for their protection. (b) Forest Service (R-2) Supplement H to Form 3109-3, "Conditional No Surface Disturbance Stipulation". The usual application of this stipulation for minable minerals will be in exploration permits and licenses. The stipulation notifies a prospective lessee, permitted or licensee that certain described conditions exist upon tracts within the proposed lease or permit area that will prevent any surface disturbance affecting those tracts unless an operating plan can be devised that will convince the Forest Service that surface use, occupancy and reclamation can take place without causing irretrievable environmental damage.		Not applicable to the alternatives.
	c. Recommend against or deny consent to BLM for issuance of leases, permits or coal exploration license where operational damages on surface resources, including the impacts of surface-based access, product transportation and ancillary facilities necessary to production and related operations, would be irreversible and irretrievable, with no potential for reclamation. If warranted after an analysis of the proposed activity area has been made, negative recommendations or consent denials will be based on site-specific consideration of the following criteria: (1) Terrain as it affects waste dumps and tailings disposal–related to dump and tailing stability, adequate room for placement. (2) Whether or not negative impacts on water quality are preventable. (3) For surface-based access, product transportation and ancillary facilities necessary to operations. Slopes steeper than 60 percent; high erosion hazard; high geologic hazard.		Not applicable to the alternatives.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	(4) Low visual absorption capacity that prevents reclamation to established visual quality objective (VQO). (5) A conclusion by the Forest Service (FS) and/or the United States Fish and Wildlife Service (USFWS) that the action will jeopardize the survival recovery of federally listed threatened or endangered (T&E) wildlife or plant species. (6) Intrusions upon the identified critical (USFWS) or essential (FS) habitat of a federally listed (T&E) wildlife or plant species or upon the plant or animal itself. (7) Intrusion upon the habitat of individual plant or animal species listed by a State as threatened or endangered. (8) Intrusion upon the habitat of individual plant or animal species identified by the Regional Forester as needing special management to prevent its need for listing as a threatened or endangered species.		
	2. Designated Wilderness, Congressionally-designated Wilderness study areas, Further Planning Areas and RARE II areas on which Congress has not taken final action. a. Prospecting for and disposal of common varieties of mineral materials will not be authorized. b. Coal mining in the National Wilderness Preservation System is prohibited by the Coal Leasing Amendments Act of 1975. Therefore, coal leasing and coal exploration licenses will not be authorized for any of the foregoing described lands. c. Designated Wildernesses were withdrawn from exploration and leasing on December 31, 1983, subject to prior valid existing rights. d. No exploration permits or leasing is recommended in Wilderness Study Areas or areas recommended for Wilderness designation by the Forest Service until such time as Congress acts on the disposition of those areas, designates them Wilderness, or releases them from Wilderness consideration. A non-wilderness determination will result in the mineral resources being managed the same as other nonclassified National Forest System lands. 3. Classified lands other than Wilderness and areas as described in "2" foregoing, which are not by law or otherwise withdrawn from operations under the mineral leasing acts. Examples of such lands include Wild and Scenic Rivers, Natural Areas, Special Areas--such as geological, scenic and zoological, and some other specific classifications. a. The Forest Service authorizes common variety exploration and disposals under terms and conditions to protect the purposes for which the lands were classified. The objective of reclamation requirements will be to return disturbed lands to a condition suitable for the purposes for which they were classified. For Special Areas classified under 36 CFR 294 and 251.23 for specific management purposes, the regulatory provisions permit no use or occupancy inconsistent with the classification. b. Coal mining is prohibited by the Coal Leasing Amendment Act of 1975, within the National System of Trails and the Wild and Scenic Rivers System, including Study rivers designated by that Act. This prohibition also applies to the National Park System and the National Wildlife Refuge System, which lands are not under Forest Service jurisdiction. c. Recommend or consent to BLM for issuance of leases, permits or licenses only when terms and conditions can be applied that will protect the purposes for which the lands were classified.		Not applicable to the alternatives.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	d. Recommendations and consent to BLM for issuance of leases, permits or licenses will include all current standard stipulations and the current Regionally-approved special stipulations necessary to protect the purposes for which the lands were classified. Standard and special stipulations are in Appendix H to the Forest Plan. See 1.b.(1) under this management heading for the standard stipulations. Special stipulations to be applied as appropriate are: (1) Forest Service (R-2) Supplement A to Form 3109-3, "Further Planning Area Stipulation". This stipulation applies to lands identified for further planning in the RARE II decision documents. It specifies the nature and extent of operations allowed and the conditions to be met for their approval. (2) Forest Service (R-2) Supplement B to Form 3109-3, "Classified Area Stipulation". This stipulation applies to lands classified under 36 CFR 294 and 251.23 for specific management purposes. Because of the regulatory provisions, no use or occupancy inconsistent with the classification is permitted. This does not necessarily mean recommendation against or denial of consent to issuance of leases, permits or licenses is necessary. The reason is that classified areas may be only small portions of the lands involved. (3) Forest Service (R-2) Supplement C to Form 3109-3, "Limited Surface Use Stipulation". This stipulation notifies a lessee, permitted or licensee that certain described conditions exist upon the lands involved that require special operating plan provisions for their protection. (4) Forest Service (R-2) Supplement F Form 3109-3 "Surface Use Stipulation". This stipulation notifies prospective lessees or permittees that surface use or occupancy that would cause significant surface disturbance is not authorized for described lands. This "no surface occupancy" stipulation may be applied in a wide variety of conditions in lieu of recommending against or denying consent to BLM for issuance of a lease. (5) Forest Service (R-2) Supplement H to Form 3109-3, "Conditional No Surface Disturbance Stipulation". This stipulation notifies the prospective lessee, permitted or licensee that certain described conditions exist upon tracts within the proposed lease or permit area that will prevent any surface disturbance affecting those tracts unless a operating plan can be devised that will convince the Forest Service that surface use, occupancy and reclamation can take place without causing irretrievable environmental damage.		
	e. Recommend against or deny consent to issuance of leases, permits or licenses or use Forest Service (R-2) Supplement F to Form 3109-3 where operational damage on surface resources, including the impacts of surface-based access, product transportation and ancillary facilities necessary to production and related operations, would be irreversible and irretrievable, with no potential for reclamation. Negative recommendations or consent denials will be based on the consideration of the following criteria: (1) Operations would destroy or irretrievably damage the characteristics or purposes for which the lands are classified. (2) Terrain as it affects waste dumps and tailings disposal--related to dump and tailing stability, adequate room for placement, and whether or not waste and tailings can be handled or treated in a manner that results in no detrimental effects on the purposes for which the lands were classified. (3) Whether or not negative impacts on water quality are preventable. (4) For surface-based access, product transportation and ancillary facilities necessary to operations: slopes steeper than 40 percent; high erosion hazard; high geologic hazard. (5) Low visual absorption capacity that prevents reclamation to established visual quality objective (VQO).		Not applicable to the alternatives.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	(6) A conclusion by the Forest Service (FS) and/or the United States Fish and Wildlife Service (USFWS) that the action will jeopardize the survival or recovery of federally listed threatened or endangered (T&E) wildlife or plant species. (7) Intrusions upon the identified critical (USFWS) or essential (FS) habitat of a federally listed (T&E) wildlife or plant species or upon the plant or animal itself. (8) Intrusion upon the habitat or individual plant or animal of a species listed by a state as threatened or endangered (9) Intrusion upon the habitat of individual plant or animal of a species identified by the Regional Forester as needing special management to prevent its need for listing as a threatened or endangered species.		
Special Use Management (Non-Recreation)	01 Act on special use applications according to the following priorities: a. Land and land use activity requests relating to public safety, health and welfare, e.g., highways, powerlines and public service improvements. b. Land and land use activities contributing to increased economic activity associated with National Forest resources, e.g., oil and gas, and energy minerals. c. Land and land use activities that benefit only private users, e.g., road permits, rights-of-way for powerlines, telephones, waterlines, etc.		This general direction establishes Forest Service permit processing priorities.
	02 Do not approve any special use applications that can be reasonably met on private or other Federal lands unless it is clearly in the public interest.		According to DM&E, it would not be possible to construct and operate an economically-viable heavy haul railroad between the SPRB mines and DM&E's existing main line without crossing NFS lands. In addition, the STB has made an initial determination that DM&E's proposed project satisfies the transportation-related requirements of 49 U.S.C. 10901 and is therefore at least not inconsistent with the public necessity and convenience. STB regulations state that *"the Board shall issue a certificate...unless the Board finds that such activities are inconsistent with the public convenience and necessity..."* While the statute does not define "*public convenience and necessity*", a 3-part test has been developed to aid in this determination. The test requires a determination of whether: 1) the applicant is financially fit to undertake the construction and provide service; 2) there is a public demand or need for the proposed service; and 3) the construction project is in the public interest and will not unduly harm existing services. In its December 9, 1998 decision STB determined that DM&E's proposal meets the 3-part test. However, STB's initial determination does not grant approval to construct the project. No final decision by STB permitting construction to begin would be issued until such time as all statutory requirements - under both environmental and transportation law - have been satisfied. In fact, it is possible that in their final analysis STB could determine that, due to possible adverse environmental impacts, the public interest dictates that the application be denied even though the criteria of 49 U.S.C. 10901 have otherwise been met.
	03 Bury electrical utility lines of 33 KV or less and telephone lines except when: a. Visual quality objectives of the area can be met using an overhead line. b. Burial is not feasible due to geologic hazard or unfavorable geologic conditions. c. It is not economical as determined by a cost analysis. d. Greater long-term site disturbance would result. e. It is not technically feasible.		Any powerlines installed on NFS lands on BGNG would comply with this general direction.
	04 Do not approve special use applications for areas adjacent to developed sites unless the proposed use is compatible with the purpose and use of the developed site.		There are no developed sites adjacent to the alternatives on BGNG.
	05 Permit disposal of toxic waste, including nuclear waste, only after all suitable lands in a given area, both public and private, have been evaluated through the NEPA process and the best alternative determined.		Not applicable to the alternatives.

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Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
Rights-of-way and Land Adjustments	01 Improve National Forest System landownership patterns to further resource management objectives in coordination with needs of adjoining landowners.		Not applicable to the alternatives.
	02 Acquire rights-of-way on existing Forest System roads and trails that cross private land.		Not applicable to the alternatives.
	03 Insure floodplain and wetland values are approximately equal on both offered and selected tracts in proposed land exchanges or that values are in favor of the United States.		Not applicable to the alternatives.
	04 Classify lands or interest in lands for acquisition where lands are valuable for NFS purposes according to the following priorities: a. In designated wilderness areas and other Congressionally classified areas. b. Where lands or rights-of-way are needed to meet resource management goals and objectives. c. Lands which provide habitat for threatened and endangered species of animals and plants. d. Lands which include floodplain or wetlands. e. On lands of the National Grasslands that provide opportunities for demonstration of multiple uses in grassland agriculture. f. On lands having historical or cultural resources, outstanding scenic values or critical ecosystems, when these resources are threatened by change of use or when management may be enhanced by public ownership.	a. Consider the following factors when making National Forest land adjustments: Efficiencies of property boundary maintenance, consolidation of ownership, relationship to adjoining ownership, suitability for other public use, size of tract, presence of special values such as wetlands, historic sites, endangered species habitat, and consolidation of Federal agency management and uses. b. Consider the following factors when making National Grasslands land adjustments: Adjustments should be aimed at merging federal ownership into groupings of 3,000 to 30,000 acres. Individual private holdings large enough to provide adequate ranch headquarters are desirable.	Not applicable to the alternatives.
	05 Classify lands for disposal according to the following priorities: a. To States, counties, cities, or other Federal agencies when disposal will serve a greater public interest. b. In small parcels intermingled with mineral or homesteads patents. c. When suitable for development by the private sector, if development (residential, agricultural, industrial, recreational, etc.) is in the public interest. d. When critical or unique resource (wetlands, floodplains, essential big game winter range, threatened or endangered species habitat, historical or cultural resources, critical ecosystems, etc.) effects are mitigated by reserving interests to protect the resource, or by exchange where other critical resources to be acquired are considered to be of equal or greater value. e. In National Grasslands, when they offer no opportunity to meet National Grassland demonstration objectives.		Not applicable to the alternatives.
	06 Effect jurisdictional transfers which achieve the following objectives: a. Reduce duplication of efforts by users and agencies in terms of time, cost, and coordination. b. Improve or maintain user access to the administering agency. c. Decrease travel and enhance management. d. Improve public understanding of applicable laws, regulations, policies, and procedures. e. Develop more effective and efficient work units. f. Reduce administrative cost.		Not applicable to the alternatives.
	07 Identify areas where designation as transportation and utility corridors in the future are compatible with management area goals. Follow the process and definitions established in FSM 1922.51.	a. Avoid the following management areas unless studies indicate that impacts of the corridor can be mitigated: 1. Developed recreation areas 2. Roadless and undeveloped areas (RARE II) 3. Research Natural Areas 4. Riparian areas 5. Proposed wild and scenic river segments 6. Bessey Nursery	Alternative B would not be consistent with these standards and guidelines because the alternative would cross RARE II and inventoried roadless areas (see Chapter 3). The impacts associated with an operating railroad in an area recognized for its wilderness values could not be adequately mitigated. The wilderness characteristic of the RARE II and roadless areas would be lost. Alternatives C (including both route variations) and D would not cross RARE II or inventoried roadless areas on BGNG.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
			Alternatives B and C would also be inconsistent with the standard and guideline to avoid riparian areas. Alternative B would have the largest impact on riparian areas on NFS lands on BGNG. Alternative B would impact riparian areas along Cottonwood Creek, Spring Creek and at several locations adjacent to the Cheyenne River. Riparian impacts on NFS lands along Cottonwood Creek and the Cheyenne River would be eliminated by Alternative C but the impact to Spring Creek would remain. The Phiney Flat Route Variation of Alternative C would eliminate riparian impacts on NFS lands along Spring Creek.
Property Boundary Location	01 Locate, mark, and post landlines according to the following priorities: a. Lines needed to meet planned activities; b. Lines needed to protect NFS lands from encroachment, and c. All other lines.		Not applicable to the alternatives.
Soil Resource Management	01 Maintain soil productivity, minimize man-caused soil erosion, and maintain the integrity of associated ecosystems. a. Use site preparation methods which are designed to keep fertile, friable topsoil essentially intact. b. Give roads and trails special design considerations to prevent resource damage on capability areas containing soils with high shrink-swell capacity. c. Provide adequate road and trail cross drainage to reduce sediment transport energy. d. Revegetate all areas, capable of supporting vegetation, disturbed during road construction and/or reconstruction to stabilize the area and reduce soil erosion. Use less palatable plant species on cuts, fills, and other areas subject to trampling damage by domestic livestock and big game to discourage grazing by herbivores. e. Prevent livestock and wildlife grazing which reduces the percent of plant cover to less than the amount needed for watershed protection and plant health. f. Place tractor-built firelines on the contour, where possible, and avoid use of tractors on highly erodible sites. g. Provide permanent drainage and establish protective vegetative cover on all new temporary roads or equipment ways, and all existing roads which are being removed from the transportation system. h. Minimize soil compaction by reducing vehicle passes, skidding on snow, frozen or dry soil conditions, or by off-ground logging systems. i. Restore soil disturbance caused by human use to soil loss tolerance levels commensurate with the natural ecological processes for the treatment areas.	a. Use the following Standards and Guidelines unless more site specific requirements are developed during project design. 1. Limit intensive ground disturbing activities on unstable slopes and highly erodible sites. 2. Apply Packer's guides in the design for cross drain spacing and buffers. 3. Chisel or rip, on the contour, compacted soils. Soils are considered compacted if there is a 15 percent increase in bulk density or a 50 percent decrease in macro pore space. b. Follow procedures specified in Agricultural Handbook 537 for Utilizing the Universal Soil Loss Equation. (Cautions contained in WO 2550 letter dated 5/28/82 should be noted.) The guidance for K and T factors are in the National Soils Handbook 407.1 (a) (3) (xvii). c. Restore blowouts caused by management activities that are larger than one acre by seeding, planting, or through livestock management practices.	The standards and guidelines will be incorporated into the site-specific SWPPPs which are designed to implement BMPs to control sedimentation from construction sites. Reclamation techniques will be incorporated into the SWPPPs.
	02 Identify at the project level, upland areas that are immediately adjacent to Riparian (Prescription 9A) Management Areas. Adjacent upland areas are those portions of a management area which, when subjected to management activities, have a potential for directly affecting the condition of the adjacent Riparian Management Area. The magnitude of effects is dependent upon slope steepness, and the kind, amount, and location of surface and vegetation disturbance within the adjacent upland unit.	a. The following is a guide to identify the approximate extent of adjacent upland areas: Slope Gradient of Upland Areas Adjacent to Riparian Management Area / Upslope Distance From Boundary of Riparian Management Area % Slope Range — Feet 0-20 — 100 20-30 — 180 30-40 — 280 40-50 — 400 50-60 — 520 60-70 — 640 70-80 — 760 80-90 — 880 90-100 — 1000 100-150 — 1000-1300	b. BMPs are being designed to control sedimentation to these sites. These BMPs will be implemented through site-specific SWPPPs prepared in compliance with SDENR regulations. The objectives of reclamation on NFS lands will be to reduce erosion rates to the levels specified in the standard. c. Monitoring and maintenance will be addressed in the SWPPPs.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
		b. Reduce, through designed management practices and appropriate erosion mitigation and vegetation/restoration measures, the project caused on-site erosion rates (calculated with appropriate Universal Soil Loss Equation methodology) by 75% within the first year after disturbance. Reduce project caused on-site erosion by 95% within five years after initial disturbance (USDA Tech. Pub. SA-TP 11, 1980: USDA SCS Tech. Note No. 10, 1977) c. Design continuing mitigation/restoration practices and follow-up maintenance activities to insure that 80% original ground cover (vegetation) recovery occurs within five years after disturbance.	
Transportation System Management	01 Provide access for resource development or management activities.		Because the railroad would transport mineral resources developed, in part, on NFS lands, Forest Service approval of a special use permit would be consistent with this general direction.
	02 Provide easements where existing state and county highways are located on National Forest System lands.		Not applicable to the alternatives.
	03 Classify areas as to whether off-road vehicle use is permitted.	a. Specify off-road vehicle restrictions based on ORV use management (FSM 2355, R2 Supp. 88).	Not applicable to the alternatives.
	04 Close all newly constructed roads to public motorized use unless documented analysis shows: a. Use does not adversely impact other resources; b. Use is compatible with the ROS class established for the area; c. They are located in areas open to motorized use; d. They provide user safety; e. They serve an identified public need; f. The area accessed can be adequately managed; or g. Financing is available for maintenance or coop-maintenance can be arranged.		Not applicable to the alternatives.
	05 Manage road use by seasonal closure if: a. Use causes unacceptable damage to soil and water resources due to weather or seasonal conditions b. Use conflicts with the ROS class established for the area; c. Use causes unacceptable wildlife conflict or habitat degradation; d. Use results in unsafe conditions due to weather conditions; e. They serve a seasonal public or administration need, or f. Area accessed has seasonal need for protection or nonuse.		The alternatives would be required to comply with road closures on BGNG, if adopted. Currently, no roads would be crossed on BGNG which have established seasonal closures.
	06 Keep existing roads open to public motorized use unless: a. Financing is not available to maintain the facility or manage the associated use of adjacent lands; b. Use causes unacceptable damage to soil and water resources; c. Use conflicts with the ROS class established for the area; d. They are located in areas closed to motorized use and are not "designated routes" in the Forest travel management direction. e. Use results in unsafe conditions unrelated to weather conditions; f. There is little or no public need for them; or g. Use conflicts with wildlife management objectives.		Not applicable to the alternatives.
	07 Closed or restricted roads may be used for and to accomplish administrative purposes when: a. Prescribed in management area direction statements; b. Authorized by the Forest Supervisor; and c. In case of emergency.		Not applicable to the alternatives.
Arterial and Collector Road Construction and Reconstruction	01 Construct and reconstruct arterial and collector roads to meet multiple resource needs.		Not applicable to the alternatives.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	02 Construct and reconstruct local roads to provide access for specific resource activities such as campgrounds, trailheads, timber sales, range allotments, mineral leases, etc., with the minimum amount of earthwork.		It is anticipated that access to construction sites on BGNG would primarily use existing roads. However, if it becomes necessary to construct an access road on NFS lands, this general direction would be applied.
Road Maintenance	01 Maintain all roads to the following minimum requirements: a. All arterial and open collectors - Level 3; b. All open local roads - Level 2; and c. All closed roads - Level 1.	a. Level 1 maintenance includes upkeep of drainage structures and vegetation cover necessary to prevent erosion.	A detailed Transportation Plan will be developed for activities on NFS lands. That plan will specifically address maintenance of roads on NFS lands during construction.
	02 Maintain structures, bridges, cattleguards, etc., to be structurally sound and safe for use.		A detailed Transportation Plan will be developed for activities on NFS lands. That plan will specifically address maintenance of roads on NFS lands during construction.
Trail System Management	01 Maintain all trails for foot and horse travel unless specifically closed to either or both class of user.		The alternatives will not affect trails on NFS lands on BGNG.
	02 Maintain all trails to the following minimum requirements: a. Structures (bridges, corduroy, etc.) are structurally sound and safe for specified class of user, b. Maintain drainage structures to prevent unacceptable resource damage, and c. Remove hazards from trails to allow safe passage for specified class of users. A safety hazard is a physical condition of a trail which may cause injury, is unusual or unexpected, and not readily identifiable by the trail user. It is not a condition which is easily identifiable and normally encountered for the type or location of the trail involved. The following examples illustrate this distinction: A hazard is a rotten bridge decking or handrail. A stream crossing where no bridge is provided and the user would expect this on the type and location of the trail is not a hazard. A hazard is a stable-appearing loose rock in a constructed treadway where all other rocks are stable. A trail treadway made up of rocks in a near-natural position, many of which are loose, is not a hazard. A hazard is a perennial bog-hole on a horse trail. An intermittent bog-hole which will dry up by early summer or within a few days following a rain storm is not a hazard. A hazard is a section of trail treadway supported by rotten cribbing. A section of trail where the treadway is obviously slippery is not a hazard. A hazard is a marked ford with holes deeper than the normal channel. A deep ford with a consistent stream bed is not a hazard.		Not applicable to the alternatives.
	03 Provide a full range of trail opportunities in coordination with other Federal, State, and municipal jurisdictions and private industries both on and off NFS lands.		Not applicable to the alternatives.
	04 Construct or reconstruct trails when needed as part of the transportation system.	a. Maintain trails in accordance with standards in the Trail Handbook (FSH 7709.12). b. Schedule trail maintenance in accordance with Regional Acceptable Work Standards. (FSM 1310 R2 ID No. 1 7/22/82.) c. Cross drains and conveyance structures are planned according to Forest Design Standards.	Not applicable to the alternatives.

Appendix A, Table 1. Railroad Alternative Consistency With Management Requirements of the 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
Fire Planning and Suppression	01 Provide a level of protection from wildfire that is cost efficient and that will meet management objectives for the area considering the following: a. The values of the resources that are threatened by fire, b. The probability of fire occurrence, c. The fuelbed that fires will probably occur in, d. The weather conditions that will probably influence fires that occur, e. The costs of fire protection programs (FFP and FFF), f. The social, economic, political, cultural, environmental, life and property concerns; and g. Management objectives for the area. Use the Fire Management Analysis process (FSH 5109.19) for this analysis.		Not applicable to the alternatives.
Escaped Fire Suppression	01 Take suppression action on all escaped fires considering the following: a. The values of the resources threatened by the fire (both positive and negative), b. Management objectives for the threatened area(s), c. The fuelbeds the fire may burn in, d. The current and projected weather conditions that will influence fire behavior, e. Natural barriers and fuel breaks, f. Social, economic, political, cultural, and environmental concerns, g. Public safety, h. Firefighter safety; and i. Costs of alternative suppression strategies. Use the escaped fire situation analysis to make this determination (FSM 5130.31).		Not applicable to the alternatives.
Fuel Treatment	01 Maintain fuel conditions which permit fire suppression forces to meet fire protection objectives for the area.	a. Reduce or otherwise treat all fuels so the potential fireline intensity of an area will not exceed 400 BTU's/sec/ft (B. I. -68) on 90% of the days during the regular fire season, or Break up continuous fuel concentrations exceeding the above standard into manageable units with fuel breaks or fire lanes, or Provide additional protection for areas exceeding the above standard when such protection will not be required for more than five years.	Not applicable to the alternatives.
Vegetation Treated by Burning	01 Use prescribed fire to accomplish resource management objectives, such as reducing fuel load buildup, wildlife habitat improvement, etc.		Not applicable to the alternatives.
	02 Limit use of prescribed fires on areas adjacent to riparian areas to protect riparian and aquatic values.		Not applicable to the alternatives.

Appendix A, Table 2. Railroad Alternative Consistency With Management Prescription 4G, Emphasis on Habitat Indicator Species, 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland

Management Activity	General Direction	Standards and Guidelines	Railroad Alternative Consistency
Visual Resource Management	01 Design and implement management activities to blend with the natural landscape.	a. Do not exceed an adopted Visual Quality Objective (VQO) of modification	All alternatives would comply with the VQO of modification. Under the modification VQO, management activities may dominate the landscape.
Dispersed Recreation Management	01 Manage human recreational activities so they do not conflict with habitat needs of selected indicator species.		Not applicable to the alternatives.
	02 Semi-primitive nonmotorized, semi-primitive motorized, roaded natural and rural recreation opportunities can be provided.	a. Specify off-road vehicle restrictions based on ORV use management (FSM 2355, R2 Supp. 88). b. See FSM 2331, FSM 7732, FSH 7709.12 (Trails Handbook), FSH 7109. 11a and 11 b (Sign Handbook). c. Maximum Use and Capacity Levels are: Recreation use and capacity range during the snow-free period (PAOT/acre): Trail use and capacity range (PAOT/mile of trail): Capacity Range Use Level / Very Low / Low / Moderate / High ROS Class - Semi-Primitive Nonmotorized On Trails PAOT/mile: 2.0 / 3.0 / 9.0 / 11.0 Area-wide PAOT/acre: .004 / .008 / .05 / .08 ROS Class - Semi-Primitive Motorized On Trails PAOT/mile: 2.0 / 3.0 / 9.0 / 11.0 Area-wide PAOT/acre: .004 / .008 / .05 / .08 ROS Class - Roaded Natural On Trails PAOT/mile: - / - / - / - Area-wide PAOT/acre: .04 / .08 / 1.2 / 2.5 ROS Class - Rural	Not applicable to the alternatives.

Appendix A, Table 2. Railroad Alternative Consistency With Management Prescription 4G, Emphasis on Habitat Indicator Species, 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activity	**General Direction**	**Standards and Guidelines**	**Railroad Alternative Consistency**
		On Trails PAOT/mile - - - - Area-wide PAOT/acre .5 .8 5.0 7.5 Reduce the above use level coefficients as necessary to reflect usable acres, patterns of use, and general attractiveness of the specific management area type as described in the ROS Users Guide, Chapter 25. Reduce the above use levels where unacceptable changes to the biophysical resources will occur. d. Close areas to off-road vehicle use when ground cover, reflected by the C factor used in USLE, would be reduced to the point that the natural erosion rate is increased 10 percent per acre per year.	
	03 Facilities provided include development level 1 and 2 campgrounds, trails suitable for motorized trail bike use, local roads with primitive surface and parking lots at trail heads. Provide signing compatible with intended use.		Not applicable to the alternatives.
	04 Permit undesignated sites in Frissell condition class 1 through 3 where unrestricted camping is permitted.	a. Campsite condition class based upon Frissel, S.S., Journal of Forestry, May, 1978.	Not applicable to the alternatives.
	05 Manage site use and occupancy to maintain sites within Frissell condition class 3 except for designated sites which may be class 4. Close and restore class 5 sites.		Not applicable to the alternatives.
Wildlife and Fish Resource Management	01 Manage to maintain or improve habitat capability for deer, pronghorn antelope, and sharp-tailed grouse.		In consultation with the SDGFP and USFWS, DM&E is exploring mitigation opportunities to minimize impacts to deer, antelope and sage grouse habitat. With adequate mitigation, the alternatives would be consistent with this general direction.
	02 In cooperation with State wildlife agencies, develop residual cover guidelines for prairie grouse by close of FY 1988.		Not applicable to the alternatives.
	03 Manage wildlife and fish resources as outlined in the appropriate State Comprehensive Wildlife Management Plan.		Not applicable to the alternatives.
	04 Manage hayable sites within riparian and woody draw areas to enhance value.		Not applicable to the alternatives.
Range Resource Management	01 Practice intensive range management where it is consistent with maintaining or enhancing wildlife habitat.		Not applicable to the alternatives.
	02 Ensure that grazing agreements established with Grazing Associations provide for integrated management of associated private and other public rangeland and consider interrelationships of other resources.		Not applicable to the alternatives.
	03 Alter grazing systems, season of use, and stocking rates to enhance wildlife habitat.		Not applicable to the alternatives.
	04 Maintain at least 60 percent of rangeland in good or better condition, the other 40 percent should be in at least fair condition.	a. Base range condition on the standards in Range Analysis Handbook (FSH 2209.21) or SCS methods.	Not applicable to the alternatives.
Range Improvement and Maintenance	01 Provide range improvements and conservation practices that are multipurpose in nature.	a. Manage 40-50 percent of all grazing allotments under a noncontinuous system, except for the Fort Pierre National Grassland where at least 80 percent will be under a noncontinuous system. b. Livestock water developments will not exceed an average of one per 640 acres, except on the Ft. Pierre National Grassland where the average density will not exceed three per 640 acres. c. Fill in behind nonuse or grant temporary extensions only when suitable habitat conditions can be assured beforehand.	Not applicable to the alternatives.

Appendix A, Table 2. Railroad Alternative Consistency With Management Prescription 4G, Emphasis on Habitat Indicator Species, 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activity	**General Direction**	**Standards and Guidelines**	**Railroad Alternative Consistency**
Transportation System Management	01 Manage road use to provide for habitat needs of management indicator species, including road closures and area closures, and to maintain habitat effectiveness.		Not applicable to the alternatives.
Fuel Treatment	01 Maintain fuel conditions which permit fire suppression and prescribed fire to maintain habitat needed for selected species or species population levels.		Not applicable to the alternatives.
	02 Provide firewood material using both commercial and noncommercial methods when surplus to wildlife needs.		Not applicable to the alternatives.

Appendix A, Table 3. Railroad Alternative Consistency With Management Prescription 6G, Emphasis on Livestock Grazing, 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activity	**General Direction**	**Standards and Guidelines**	**Railroad Alternative Consistency**
Visual Resource Management	01 Design and implement management activities to blend with the natural landscape.	a. Do not exceed an adopted Visual Quality Objective (VQO) of modification.	All alternatives would comply with the VQO of modification. Under the modification VQO, management activities may dominate the landscape.
	02 Permit undesignated sites in Frissell condition class 1 through 3 where unrestricted camping is permitted.	a. Campsite condition class based upon Frissel, S.S.; Journal of Forestry, May, 1978.	Not applicable to the alternatives.
	03 Manage site use and occupancy to maintain sites within Frissell condition class 3 except for designated sites which may be class 4. Close and restore class 5 sites.		Not applicable to the alternatives.
Dispersed Recreation Management	01 Semi-primitive nonmotorized, semi-primitive motorized, roaded natural and rural recreation opportunities can be provided.	a. Specify off-road vehicle restrictions based on ORV use management (FSM 2355, R2 Supp. 88). b. Close areas to off-road vehicle use when ground cover, reflected by the C factor used in USLE, would be reduced to the point that the natural erosion rate is increased 10 percent per acre per year.	Not applicable to the alternatives.
	02 In semi-primitive nonmotorized recreation settings, manage use to provide a low to moderate incidence of contact with other groups and individuals. Facilities provided include development level 1 and 2 campgrounds, trails, and parking lots at trail heads. Provide signing compatible with intended use.	a. Maximum Use and Capacity Levels are: -Trail and camp encounters during peak use days are less than 30 other parties per day. -Trail and area-wide use capacity: ROS Class - Semi-Primitive Motorized Use Level / Very Low / Low / Moderate / High On Trails PAOT/mile / 2.0 / 3.0 / 9.0 / 11.0 Area-wide PAOT/acre / .004 / .008 / .05 / .08 Reduce the above use level coefficients as necessary to reflect usable acres, patterns of use, and general attractiveness of the specific management area type as described in the ROS Users Guide, Chapter 25. Reduce the above use levels where unacceptable changes to the biophysical resources will occur.	Not applicable to the alternatives.
	03 Facilities provided include development level 1 and 2 campgrounds, trails, local roads with predominantly primitive surfaces, and parking lots at trail heads. Provide signing compatible with intended use.		Not applicable to the alternatives.
Wildlife Habitat Improvement and Maintenance	01 Manage wildlife and fish resources as outlined in the appropriate State Comprehensive Wildlife Management Plan.		Not applicable to the alternatives.
	02 Provide adequate forage to sustain big-game population levels agreed to in the Statewide Comprehensive Wildlife Management Plan on NFS lands.		Not applicable to the alternatives.
Range Resource Management	01 Manage to achieve and maintain a high standard of range condition for increased sustained livestock use. Practice intensive range management and use all available range and livestock management technology.	a. Base range condition on the standards in Range Analysis Handbook (FSH 2209.21) or SCS methods.	Not applicable to the alternatives.
Range Improvement and Maintenance	01 Alter grazing schemes, season of use, and livestock stocking rates to optimize use of forage for red meat production.	a. Fill in up to 100 percent of the nonuse requested for personal convenience.	Not applicable to the alternatives.

Appendix A, Table 3. Railroad Alternative Consistency With Management Prescription 6G, Emphasis on Livestock Grazing, 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activity	**General Direction**	**Standards and Guidelines**	**Railroad Alternative Consistency**
	02 Provide range improvements and conservation practices that are multipurpose in nature.	a. Manage at least 51 percent of all grazing allotments under a noncontinuous system with even livestock distribution.	Not applicable to the alternatives.
	03 Allow cropping, seeding, fertilizing, and mechanical treatment.		Not applicable to the alternatives.
	04 Ensure that grazing agreements established with Grazing Associations provide for integrated management of associated private and other public rangeland and consider interrelationships of other resources.		Not applicable to the alternatives.

Appendix A, Table 4. Railroad Alternative Consistency With Management Prescription 9A, Emphasis on Riparian Area Management, 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland

Management Activity	General Direction	Standards and Guidelines	Railroad Alternative Consistency
Visual Resource Management	01 Design and implement management activities which sustain inherent visual values of riparian areas and blend with the surrounding natural landscapes.	a. Do not exceed an adopted Visual Quality Objective (VQO) of partial retention.	While the partial retention VQO allows management activities to be evident they must remain subordinate to the natural landscape. They should not dominate the view. Alternatives B and C (including both route variations) would not be consistent with the partial retention VQO. Where it would cross through Management Prescription 9A, the operating railroad is expected to dominate the view and attract the viewer's attention.
Dispersed Recreation Management	01 Permit undesignated sites in Frissell condition class 1 through 3 where unrestricted camping is permitted.	a. Campsite condition class based upon Frissell, S.S.; Journal of Forestry, May, 1978.	Not applicable to the alternatives.
	02 Manage site use and occupancy to maintain sites within Frissell condition class 3 except for designated sites which may be class 4. Close and restore class 5 sites.		Not applicable to the alternatives.
Dispersed Recreation Management	03 Semi-primitive nonmotorized, semi-primitive motorized, roaded natural and rural recreation opportunities can be provided.		Not applicable to the alternatives.
	04 Provide roaded natural recreation opportunities within ½ mile of Forest arterial, collector and local roads with better than primitive surfaces which are open to public travel. Provide semi-primitive motorized recreation opportunities with a low to moderate incidence of contact with other groups and individuals within ½ mile of designated local roads with primitive surfaces and trails open to motorized recreation use. Where local roads are closed to public motorized recreation travel, provide for dispersed non-motorized recreation opportunities. Manage recreation use to provide for the incidence of contact with other groups and individuals appropriate for the established ROS class. Provide semi-primitive non-motorized recreation opportunities in all areas more than ½ mile away from roads and trails open to motorized recreation use.	a. Maximum Use and Capacity Levels are: --- Recreation use and capacity range during the snow-free period (PAOT/acre): --- Trail use and capacity range (PAOT/mile of trail): --- Capacity Range Use Level — Very Low — Low — Moderate — High --- ROS Class - Semi-Primitive Nonmotorized On Trails PAOT/mile — 2.0 — 3.0 — 9.0 — 11.0 Area-wide PAOT/acre — .004 — .008 — .05 — .08 ROS Class - Semi-Primitive Motorized On Trails PAOT/mile — 2.0 — 3.0 — 9.0 — 11.0 Area-wide PAOT/acre — .004 — .008 — .05 — .08 ROS Class - Roaded Natural On Trails PAOT/mile — - — - — - — -	Not applicable to the alternatives.

Appendix A, Table 4. Railroad Alternative Consistency With Management Prescription 9A, Emphasis on Riparian Area Management, 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activity	**General Direction**	**Standards and Guidelines**	**Railroad Alternative Consistency**
		Area-wide PAOT/acre .04 .08 1.2 2.5 ROS Class - Rural On Trails PAOT/mile - - - - Area-wide PAOT/acre .5 .8 5.0 7.5 Reduce the above use level coefficients as necessary to reflect usable acres, patterns of use, and general attractiveness of the specific management area type as described in the ROS Users Guide, Chapter 25. Reduce the above use levels where unacceptable changes to the biophysical resources will occur. b. Specify off-road vehicle restrictions based on ORV use management (FSM 2355, R2 Supp. 88). c. See FSM 2331, FSM 7732, FSH 7709.12 (Trails Handbook), FSH 7109.11a and 11b (Sign Handbook).	
Wildlife Habitat Improvement and Maintenance	01 Provide habitat diversity through vegetation treatments, in conjunction with other resource activities, designed to maintain or improve wildlife or fisheries habitat.		Not applicable to the alternatives.
	02 Provide habitat for viable populations of all native vertebrate species of fish and wildlife.		The alternatives would result in localized losses of wildlife habitat associated with riparian areas. Although the losses may be locally significant, such losses would not eliminate viable populations of native vertebrate fish or wildlife on BGNG.
	03 Plan lake and stream habitat improvement projects with the assistance of state wildlife agencies, where aquatic habitats are below productive potential. Plan those improvements that harmonize with the visual setting.		Not applicable to the alternatives.
	04 Maintain a current fish habitat inventory in cooperation with state wildlife agencies.		Not applicable to the alternatives.
	05 Maintain instream flows in cooperation with state wildlife agencies to support a sustained yield of natural fisheries resources.		Temporary dewatering of streams at construction sites may be required during installation of instream structures. However, to protect aquatic resources, downstream flow would be maintained at all times where necessary.
Range Resource Management	01 Prohibit trailing of livestock along the length of riparian areas except where existing stock driveways occur. Rehabilitate existing stock driveways where damage is occurring in riparian areas. Relocate them outside riparian areas if possible, and if necessary to achieve riparian area goals.		Not applicable to the alternatives.
	02 Maintain proper stocking and livestock distribution to protect riparian ecosystems.		Not applicable to the alternatives.
Silvicultural Examination and Prescription	01 Manage forest cover types to perpetuate tree cover and provide healthy stands, high water quality and wildlife and fish habitat.		Not applicable to the alternatives.
	02 Provide firewood material using both commercial and noncommercial methods when surplus to wildlife needs.		Not applicable to the alternatives.
	03 Prohibit log landing and decking areas within the riparian area.		Not applicable to the alternatives.

Appendix A, Table 4. Railroad Alternative Consistency With Management Prescription 9A, Emphasis on Riparian Area Management, 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activity	**General Direction**	**Standards and Guidelines**	**Railroad Alternative Consistency**
	04 Reduce debris jam potential by cutting stumps to near ground level in the 100-year floodplain of streams and lakes.		This general direction would be incorporated into construction plans for the alternatives.
Water Resource Improvement and Maintenance	01 Prevent or remove debris accumulations that reduce stream channel stability and capacity.		Design of the alternative's instream structures address the prevention of debris accumulations. All culverts would be a minimum of 36 inches in diameter. This size was chosen specifically to reduce debris accumulation and reduce the need for maintenance.
	02 Prevent soil surface compaction and disturbance in riparian ecosystems. Allow use of heavy construction equipment for construction, residue removal, etc., during periods when the soil is least susceptible to compaction or rutting.		The alternatives would not be consistent with this general direction. All alternatives would result in disturbance to riparian ecosystems on NFS lands on BGNG. In addition, it will be necessary for construction of bridges to occur year round including during the period when soils are wet and subject to compaction and rutting. BMPs (such as using mats) are being developed to address concerns regarding compaction and rutting. However, some compaction and rutting would occur during construction in riparian areas regardless of the BMPs employed.
	03 Proposed new land-use facilities (roads, campgrounds, buildings) will not normally be located within floodplain boundaries for the 100-year flood. Protect present and all necessary future facilities that cannot be located out of the 100-year floodplain by structural mitigation (deflection structures, riprap, etc.)	a. Implement mitigation measures when present or unavoidable future facilities are located in the active floodplain to ensure that State water quality standards, sediment threshold limits, bank stability criteria, flood hazard reduction and instream flow standards are met during and immediately after construction.	Because they are linear in nature, the alternatives can not avoid crossing floodplains. BMPs are being developed that address the concerns listed in the standards and guidelines. These BMPs will be incorporated into SWPPPs being prepared in compliance with SDENR regulations. Hydrology and hydraulic studies are being conducted to evaluate flood hazards. The Forest Service will be provided an opportunity to review and comment on the results of those studies for streams on NFS lands.
	04 Maintain sediment yield within threshold limits. The effects on water and sediment yields from vegetation manipulation and road construction projects will be determined through the use of appropriate modeling and/or quantification procedures to determine sediment yield threshold limits and water yield increase potentials.	a. Limit Changes in Channel rating or classification stores to an increase of 10 percent or less. Use channel stability criteria established by Cooper, 1978 and Pfankuch, 1975. Use channel classification criteria established by Rosgen, 1980. b. Prescription-induced water yield increases should not exceed prescribed thresholds of allowable increase nor should the total yield of water and sediment exceed maximum allowable amounts as stated in the above references. c. Maintain at least 80 percent of potential ground cover within 100 ft. from the edges of all perennial streams, lakes and other waterbodies, or to the outer margin of the riparian ecosystem, where wider than 100 feet.	a. & b. DM&E is currently completing hydrology and hydraulic studies of stream crossings. These studies will address channel stability, water yield, etc. Results of the studies will be provided to the Forest Service for review and comment for streams on NFS lands. c. The alternatives would not be consistent with this standard and guideline. At stream crossings, all ground cover would be removed within the construction right-of-way to the water's edge. Ground cover would be completely removed in the construction right-of-way through riparian areas. To varying degrees, all alternatives would cross riparian areas on BGNG.
	05 Avoid channelization of natural streams. Where channelization is necessary for flood control or other purposes, use stream geometry relationships to reestablish meanders, width/depth ratios, etc. consistent with each major stream type.		The need for channelization on NFS lands will be addressed in hydrology and hydraulic studies being conducted by DM&E. The Forest Service will be provided an opportunity to review and comment on these studies for streams on NFS lands.
	06 Treat disturbed areas resulting from management activities to reduce sediment yields to the natural erosion rates in the shortest possible time.		This general direction will be incorporated into the SWPPPs being prepared in compliance with SDENR regulations. These SWPPPs will specifically address reclamation requirements as well as timing.
	07 Stabilize streambanks which are damaged beyond natural recovery in a reasonable time period with appropriate methods or procedures that emphasize control by vegetation.	.	Bank stabilization will be addressed in the BMPs and SWPPPs being prepared in compliance with SDENR regulations. The COE 404 permit applications will address where bank armoring would be required.
	08 Require concurrent monitoring to ensure that mitigative measures are effective and in compliance with state water quality standards.	.	Monitoring and maintenance requirements will be incorporated into the SWPPPs.
Soil Resource Management	01 Rehabilitate disturbed soils areas where adverse impacts would occur according to the following priorities: - Aquatic ecosystems; - Riparian ecosystems; and - Riparian areas outside of aquatic and riparian ecosystems.		These priorities are consistent with the general restoration emphasis included in storm water regulations. These priorities will be incorporated into the SWPPPs.

Appendix A, Table 4. Railroad Alternative Consistency With Management Prescription 9A, Emphasis on Riparian Area Management, 1984 Nebraska National Forest Plan - Buffalo Gap National Grassland			
Management Activity	**General Direction**	**Standards and Guidelines**	**Railroad Alternative Consistency**
	02 Maintain or enhance the long-term productivity of soils within the riparian ecosystem.		The alternatives would not adversely affect the long-term productivity of soils within the riparian ecosystem. Adverse impacts from compaction and rutting would be alleviated with proper reclamation techniques. SWPPPs and restoration plans for the project will address topsoil salvage in riparian areas.
Mining Law Compliance and Administration	01 Minimize detrimental disturbance to the riparian area by mineral activities. Initiate timely and effective rehabilitation of disturbed areas and restore riparian areas to a state of productivity comparable to that before disturbance.	a. Prohibit the depositing of soil material from drilling, processing, or site preparation in natural drainageways. b. Locate the lower edge of disturbed or deposited soil banks outside the active floodplain. c. Prohibit stockpiling of topsoil or any other disturbed soil in the active floodplain. d. Prohibit mineral processing (milling) activities within the active floodplain. e. Discontinue heavy equipment use when soil compaction, rutting, and puddling is present.	Not applicable to the alternatives.
	02 Locate mineral removal activities away from the water's edge or outside the riparian area.		Not applicable to the alternatives.
	03 Confine heavy equipment use to areas necessary for mineral extraction.		Not applicable to the alternatives.
	04 Require concurrent monitoring to ensure that mitigative measures are effective and in compliance with State water quality standards.		Not applicable to the alternatives.
	05 Locate mining camps outside the active floodplain.	a. Locate drilling mud pits outside the active floodplain unless alternate locations are more environmentally damaging. If location is unavoidable, seal and dike all pits to prevent leakage. b. Drain and restore roads, pads, and drill sites immediately after use is discontinued. Revegetate to 80 percent of ground cover in the first year. Provide surface protection during storm-flow and snowmelt runoff events.	Not applicable to the alternatives.
Transportation System Management	01 Locate roads and trails outside riparian areas unless alternative routes have been reviewed and rejected as being more environmentally damaging.	a. Do not parallel streams when road location must occur in riparian areas except where absolutely necessary. Cross streams at right angles. Locate crossings at points of low bank slope and firm surfaces.	Although this standard and guideline specifically relates to roads, it has also been reviewed for consistency with the railroad alternatives. The 404(b)(1) showing in the COE application states that the location of the alternatives avoid water bodies and wetlands (including riparian areas) to the extent practicable. The COE had not ruled on the adequacy of the 404(b)(1) showing at the time this report was prepared. Crossings of streams are dictated by grade and curve limitations associated with the railroad design. Consequently, the locations of stream crossings can not be adjusted to comply with these standards and guidelines. Alternative B would have the largest impact on riparian areas on NFS lands on BGNG. Alternative B would impact riparian areas on NFS lands along Cottonwood Creek, Spring Creek and at several locations adjacent to the Cheyenne River. Riparian impacts on NFS lands along Cottonwood Creek and the Cheyenne River would be eliminated by Alternative C but the impact to Spring Creek would remain. The Phiney Flat Route Variation of Alternative C would eliminate riparian impacts on NFS lands along Spring Creek.
	02 Create artificial sediment traps with barriers where the natural vegetation is inadequate to protect the waterway or lake from significant accelerated sedimentation.		BMPs that address sediment traps and their use during construction are being developed for the SWPPPs. Sediment traps, such as hay bales, silt fence, settling basins, etc., will be incorporated in the BMPs and used on-site as appropriate. The SWPPPs will contain specific criteria describing where and when BMPs will be used in the field.
	03 Minimize detrimental disturbance to the riparian area by construction activities. Initiate timely and effective rehabilitation of disturbed areas and restore riparian areas so that a vegetation ground cover or suitable substitute protects the soil from erosion and prevents increased sediment yield.		Reclamation requirements will be addressed in the SWPPPs being prepared in compliance with SDENR regulations. Timing requirements for interim and final stabilization, including seeding, will be specifically addressed. The potential for sprigging as a means of accelerating restoration of riparian woody species will be assessed in the SWPPPs.

Appendix A, Table 5. Railroad Alternative Consistency With Additional Standards and Design Criteria from the Forest Service Watershed Conservation Practices Handbook (FSH 2509.25) that are Applicable to Management Prescription 9A, Emphasis on Riparian Area Management, Nebraska National Forest - Buffalo Gap National Grassland.	
Standard/Design Criteria	**Railroad Alternative Consistency**
In the water influence zone next to perennial and intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition. **(standard)**	The alternatives would not be consistent with this standard. Where crossed by the alternatives, riparian ecosystem condition would be degraded from direct and indirect impacts. All activities associated with the alternatives that would occur within wetland or stream portions of the water influence zone on BGNG are regulated by the COE and SDENR. Regulatory programs implemented by those agencies will assure that no adverse impacts occur to the long-term health of streams. Mitigation pursuant to the COE's 404 permitting program will replace any direct wetland impacts associated with the project. Direct impacts will include the loss of a relatively narrow strip (approximately 200 feet in width) of riparian ecosystem to the railroad track bed. This loss would be most severe where the alternatives have been routed within drainages because of grade. Alternative B would have the largest impact on riparian areas on NFS lands on BGNG. Alternative B would impact riparian areas on NFS lands along Cottonwood Creek, Spring Creek and at several locations adjacent to the Cheyenne River. Riparian impacts on NFS lands along Cottonwood Creek and the Cheyenne River would be eliminated by Alternative C but the impact to Spring Creek would remain. The Phiney Flat Route Variation of Alternative C would eliminate riparian impacts on NFS lands along Spring Creek. The direct loss would be permanent (for the life of the project). Indirect impacts from noise would also occur. Noise impacts would further degrade the condition/habitat suitability of adjacent riparian areas. There are no regulatory programs that require compensatory mitigation from indirect adverse impacts to riparian ecosystems. DM&E, in consultation with the SDGFP and USFWS, is voluntarily exploring mitigation opportunities to offset these types of impacts.
Allow no action that will cause the long-term change to a lower stream health class in any stream reach. In degraded systems, progress toward robust stream health within the next plan period. **(design criteria)**	All streams which would be crossed by the alternatives on BGNG have been provided a water quality designation by the SDENR (see Chapter 3). Through the 401 certification process, the SDENR must certify to the COE that implementation of the alternatives would not violate state water quality standards. Stipulations can be added to the certification to further protect water quality and aquatic resources. The certification process will assure that the alternatives are consistent with this design criteria.
Allow no action that will cause long-term change away from desired condition in any riparian or wetland vegetation community. In degraded systems, progress toward desired condition within the next plan period. **(design criteria)**	Within the railroad right-of-way the alternatives would not be consistent with this design criteria. The nature of the railroad requires fill material be placed under the tracks. Where that fill material is added to wetland or riparian communities, the function and value of the vegetative community under the track will cease to exist. This is a relatively narrow impact area (generally less than 200 feet wide) and would be most severe where the alternatives have been routed along drainages to accommodate grade restrictions. In addition, the COE 404 permitting process will require DM&E to replace lost wetland function and value. Although the site-specific impact would result in a change in desired condition of wetland and riparian vegetation communities within the railroad right-of-way, the overall function and value of wetlands and riparian communities within each basin would be retained in the long-term.
Keep heavy equipment out of streams, swales, and lakes, except to cross at designated points, build crossings, or do restoration work, or if protected by at least 1 foot of packed snow or 2 inches of frozen soil. Keep heavy equipment out of streams during fish spawning, incubation, and emergence period. **(design criteria)**	Construction of the alternatives would comply with this design criteria. Equipment would work in streams only to support construction of railroad stream crossings. No timing restrictions to protect fish spawning, incubation and emergence have been developed for the streams on BGNG which would be crossed by the alternatives. If such timing restrictions are developed by the agencies, DM&E would be required to comply with the restriction.
Ensure at least one-end log suspension in the water influence zone. Fell trees in a way that protects vegetation in the water influence zone from damage. Keep log landings and skid trails out of water influence zones, including swales. **(design criteria)**	The alternatives would comply with this design criteria. The design criteria would be incorporated into construction plans for the alternatives.
Locate new concentrated-use sites outside the water influence zone if feasible and outside riparian areas and wetlands always. Harden or reclaim existing sites in the water influence zone to prevent detrimental soil and bank erosion. **(design criteria)**	The alternatives would comply with this design criteria. Alternative facilities have been located outside of water influence zones to the extent practicable. No facilities (other than tracks) are proposed for wetlands and riparian areas.
Exclude livestock from riparian areas and wetlands that are rated as Not Functioning by the PFC protocol, and where livestock grazing would impede improvement. **(design criteria)**	Not applicable to the alternatives.
Keep stock tanks, salt supplements, and similar features out of the water influence zone if feasible and out of riparian areas and wetlands always. Keep stock driveways out of the water influence zone except to cross at designated points. Harden water gaps and designated stock crossings where needed and feasible. **(design criteria)**	Not applicable to the alternatives.
Remove livestock from riparian areas and wetlands when the average stubble height of Carex species reaches 3-4 inches in spring-use pastures and 4-6 inches in summer/autumn use pastures. **(design criteria)**	Not applicable to the alternatives.
Avoid season-long grazing in riparian areas and wetlands. Apply short-duration grazing as feasible (generally less than 20 days) to provide greater opportunity for regrowth and to avoid utilization of woody species. Avoid livestock grazing, as feasible, during the hot season (mid-to-late summer) when livestock are more likely to concentrate in riparian areas and wetlands and to utilize woody species. **(design criteria)**	Not applicable to the alternatives.
Design grazing systems to limit utilization of woody species. Move livestock from riparian areas and wetlands when they begin to have a preference for woody species, especially plants in the young maturity classes. **(design criteria)**	Not applicable to the alternatives.
Maintain the extent of stable banks in each stream reach at 80 percent or more of reference conditions. Consider degree of livestock trampling on stream banks, by stream type, when timing livestock moves between units. As a general rule, stream banks can receive a maximum of 20-25% alteration and still maintain their integrity. **(design criteria)**	The alternatives would not adversely affect bank stability. BMPs that specifically address bank stability are being developed for the project. In some cases the alternatives would be designed to improve bank stability. The remainder of this design criteria is not applicable to the alternatives.
Adjust management in riparian areas and wetlands to remedy detrimental soil compaction whenever it occurs. **(design criteria)**	Remedying soil compaction would be addressed in the SWPPPs. The alternatives would comply with this design criteria.

Appendix A, Table 5. Railroad Alternative Consistency With Additional Standards and Design Criteria from the Forest Service Watershed Conservation Practices Handbook (FSH 2509.25) that are Applicable to Management Prescription 9A, Emphasis on Riparian Area Management, Nebraska National Forest - Buffalo Gap National Grassland.	
Standard/Design Criteria	**Railroad Alternative Consistency**
Do not excavate earth material from, or store excavated earth material in, any stream, swale, lake, or water influence zone. **(design criteria)**	The alternatives would not be consistent with this design criteria. It would be impossible to construct any of the alternatives without excavating or filling these areas. Mitigation for the loss of these areas would be provided through the COE's 404 permitting process.
Design and construct all stream crossings and other instream structures to provide for passage of flow and sediment, withstand expected flood flows, and allow free movement on resident aquatic life. **(standard)**	In response to COE permitting requirements, hydrology and hydraulic studies are being conducted for all stream crossings on BGNG. These studies will provide information necessary to correctly size instream structures (i.e., culverts, bridges, etc.) to withstand expected flood flows and allow sediment passage. No structures which would impede movement of aquatic species would be installed. Consequently, the alternatives would comply with this design criteria.
Install stream crossings to meet Corps of Engineers and State permits, pass normal flow, and be hardened to withstand floods as follows: Design Life (years): 1 2 5 10 20 50 Design Flood (years): 10 10 25 50 100 200 **(design criteria)**	The alternatives would comply with this design criteria. Before construction can begin, permits must be secured from the State of South Dakota and the COE which address the ability of the railroad's proposed instream structures to pass normal flow and floods. General design criteria for all railroad structures is to allow passage of 100 year floods.
Size culverts and bridges to pass debris. Engineers work with hydrologists and aquatic biologists on site design. **(design criteria)**	Culverts will generally be a minimum of 36 inches in diameter. This size was chosen specifically to reduce debris accumulation. Bridges will be designed to address concerns with flood flows. The alternatives would be consistent with this design criteria.
Install stream crossings on straight an resilient stream reaches, as perpendicular to flow as possible, and to provide passage of fish and other aquatic life. **(design criteria)**	The alternatives would not be consistent with this design criteria. Because of design constraints on curves and grade, the alternatives have, in many cases, been routed parallel and adjacent to drainages. Consequently, some crossings of streams would not occur perpendicular to flow nor at straight or resilient reaches.
Install stream crossings to sustain bankfull dimensions of width, depth, and slope and keep stream beds and banks resilient. Favor hardened fords and bridges on streams with floodplains, and bottomless arches instead of pipe culverts. **(design criteria)**	The alternatives would not be consistent with this design criteria. The design of instream structures proposed by the railroad favors culverts instead of bottomless arches. However, crossings would sustain bankfull dimensions of width, depth and slope.
Conduct actions so that stream pattern, geometry, and habitats are maintained or improved toward robust stream health. **(standard)**	BMPs designed to address these concerns are being developed to support the 404 permit and 401 water quality certification applications. Generally, these permits would not allow any degradation of overall stream health. The alternatives would be consistent with this design criteria.
Add and remove rocks, wood, or other material in streams or lakes only if such action maintains or improves streams and lake health. Leave rocks and portions of wood that are embedded in beds or banks to prevent channel scour. **(design criteria)**	This design criteria would be incorporated into construction plans for the project. The alternatives would be consistent with this design criteria.
Install fish migration barriers only if needed to protect endangered, threatened, sensitive, or unique native aquatic populations, and only where natural barriers do not exist. **(design criteria)**	No fish migration barriers would be installed.
Do not relocate natural stream channels if avoidable. Return flow to natural channels where feasible. Construct channels and floodways with natural stream pattern and geometry and stable beds and banks. **(design criteria)**	The need for stream channelization is being evaluated in hydrology and hydraulic studies being conducted by DM&E to support the COE 404 application. The Forest Service will be provided an opportunity to review and comment on these studies.
Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function, per 404 regulation. **(standard)**	A 404 permit must be issued by the COE before construction of any of the alternatives can begin. The 404 approval would address these design criteria. The alternatives would be consistent with this design criteria.
Keep ground vehicles out of wetlands unless protected by at least 1 foot of packed snow or 2 inches of frozen soil. Do not disrupt water supply or drainage patterns into wetlands. **(design criteria)**	Equipment would be limited to the construction right-of-way and approved access roads. Disruption of water supply or drainage patterns into wetlands is being addressed in the 404 permit applications. The alternatives would be consistent with this design criteria.
When feasible, keep roads and trails out of wetlands. If roads or trails must enter wetlands, use bridges or raised prisms to diffuse drainage to sustain flow patterns. Set crossing bottoms at natural levels of channel beds and wet meadow surfaces. Avoid actions that may dewater or reduce water budgets in wetlands. **(design criteria)**	Any roads necessary to support construction of the alternatives would avoid wetlands to the extent feasible. If wetlands are disturbed by road construction activities, adequate mitigation would be required before construction approval is granted. The impacts to wetlands would be addressed in the COE 404 permit. The alternatives would be consistent with this design criteria.
Avoid long-term reduction in organic ground cover and organic soil layers in any wetland. **(design criteria)**	This design criteria would be addressed in the COE 404 permitting process. The alternatives would be required to be consistent with this design criteria.
When feasible, keep buried utility and pipelines out of wetlands. If such a line must enter a wetland, use measures that sustain long-term wetland function. **(design criteria)**	Not applicable to the alternatives.
Avoid any loss of rare wetlands such as fens and springs. **(design criteria)**	No fens or springs would be affected on NFS lands on BGNG.
Do not build firelines in or around wetlands unless needed to protect life, property or wetlands. Use hand lines with minimum feasible soil disturbance. Use wetland features as firelines if feasible. **(design criteria)**	Not applicable to the alternatives.
Maintain enough water in perennial streams to sustain existing stream health. Return some water to dewatered perennial streams when needed and feasible. **(standard)**	It may be necessary to dewater portions of perennial stream beds temporarily during construction of instream structures. However, flow downstream of construction sites would be maintained at all times, where necessary, to protect aquatic resources. The alternatives would be consistent with this standard.

Appendix A, Table 5. Railroad Alternative Consistency With Additional Standards and Design Criteria from the Forest Service Watershed Conservation Practices Handbook (FSH 2509.25) that are Applicable to Management Prescription 9A, Emphasis on Riparian Area Management, Nebraska National Forest - Buffalo Gap National Grassland.	
Standard/Design Criteria	**Railroad Alternative Consistency**
For existing dams and diversions on naturally perennial streams, obtain bypass flows at the point of diversion or storage that support a healthy, self-sustaining community of aquatic life having all regionally-expected species and population dynamics at permit reissuance. Bypass flows must exceed the native median flow of the lowest winter month for the fall-winter seasons, and the native median flow of the lowest summer month for the spring-summer seasons. **(design criteria)**	Not applicable to the alternatives.
For new dams and diversions, obtain bypass flows at the point of diversion or storage that protect stream processes, aquatic and riparian habitats and communities, and recreation and aesthetic values. Include base flows, and a range of high flows that bracket bankfull discharge, as needed to support these uses. **(design criteria)**	Not applicable to the alternatives.
Obtain instream flow water rights under federal and state law to protect stream processes, aquatic and riparian habitats and communities, and recreation and aesthetic values. Top priority is to protect imperiled native species. **(design criteria)**	Not applicable to the alternatives.
Manage water-use facilities to prevent gully erosion of slopes and to prevent sediment and bank damage of streams. **(standard)**	Not applicable to the alternatives.
Design all ditches, canals, and pipes with at least an 80% chance of passing high flow and remaining stable during their life. **(design criteria)**	Not applicable to the alternatives.
Do not flush or deposit sediment from behind diversion structures into the stream below. Deposit sediment in a designated upland site. **(design criteria)**	Not applicable to the alternatives.
Mitigate water imports so that the extent of stable banks in each receiving stream reach is at least 80 percent of reference conditions. **(design criteria)**	Not applicable to the alternatives.
Limit roads and other disturbed sites to the minimum feasible number, and total length consistent with the purpose of the specific operations, local topography, and climate. **(standard)**	The 404(b)(1) showing demonstrates how disturbance has been minimized to the extent practicable. At the time this report was prepared, the COE had not ruled on the adequacy of the railroad's 404(b)(1) showing.
Construct roads on ridge tops, stable upper slopes, or wide valley terraces if feasible. Stabilize soils onsite. End-haul soil if full-bench construction is used. Avoid slopes steeper than 70 percent. **(design criteria)**	If it is necessary to construct new roads on BGNG to access construction sites, the alternatives would comply with this design criteria.
Avoid soil-disturbing actions during periods of heavy rain or wet soils. Apply travel restriction to protect soil and water. **(design criteria)**	BMPs are being developed to address protection of wet soils from compaction and rutting. These issues will be addressed in the SWPPPs.
Install cross drains to disperse runoff into filter strips and minimize connected disturbed areas. Make cuts, fills, and road surfaces strongly resistant to erosion between each stream crossing and at least the nearest cross drain. Revegetate using certified local native plants as feasible; avoid persistent or invasive exotic plants. **(design criteria)**	The alternatives would comply with this design criteria. Specific BMPs, being designed for inclusion in the SWPPPs, would address these and other types of erosion control techniques including reclamation.
Where feasible, construct roads with rolling grades instead of ditches or culverts. **(design criteria)**	If it is necessary to construct new roads on BGNG to access construction sites, the alternatives would comply with this design criteria.
Retain stabilizing vegetation on unstable soils. Avoid new roads or heavy equipment use on unstable or highly-erodible soils. **(design criteria)**	If it is necessary to construct new roads on BGNG to access construction sites, the alternatives would comply with this design criteria.
Use existing roads unless other options will produce less long-term sediment. Reconstruct for long-term soil and drainage stability. **(design criteria)**	New road construction would be minimized on NFS lands on BGNG. Access to construction sites would primarily use existing roads. If new roads are required they would be constructed in compliance with the design criteria contained in this handbook.
Avoid ground skidding with blades lowered or on highly erodible slopes steeper than 40%. Conduct logging to disperse runoff as feasible. **(design criteria)**	Not applicable to the alternatives.
Designate, construct, and maintain recreational travelways for proper drainage and harden their stream crossings as needed to control sediment. **(design criteria)**	Not applicable to the alternatives.
Construct roads and other disturbed sites to minimize sediment discharge into streams, lakes, and wetlands. **(standard)**	The alternatives would be consistent with this standard. Sediment control would be addressed in site-specific SWPPPs.
Design all roads, trails, and other soil disturbances to the minimum standard for their use and to "roll" with the terrain as feasible. **(design criteria)**	Design criteria for the railroad generally limits grade to 1 percent or less. The alternatives would not, therefore, roll with the terrain. The alternatives would consist of a series of cuts and fills that level the bed regardless of the rolling nature of the terrain.
Use filter strips, and sediment traps if needed, to keep all sand-sized sediment on land and disconnect disturbed soil from streams, lakes and wetlands. Disperse runoff into filter strips. **(design criteria)**	The alternatives would be consistent with this standard. Sediment control would be addressed in site-specific SWPPPs.
Key sediment traps into the ground. Clean them out when 80% full. Remove sediment to a stable, gentle upland site and revegetate. **(design criteria)**	The alternatives would be consistent with this standard. Sediment control would be addressed in site-specific SWPPPs. Maintenance and inspection of sediment control structures will be a key issue addressed in the SWPPPs.
Keep heavy equipment out of filter strips except to do restoration work or build hardened stream or lake approaches. Yard logs up out of each filter strip with minimum disturbance of ground cover. **(design criteria)**	The alternatives would be consistent with this standard. Sediment control would be addressed in site-specific SWPPPs.
Build firelines outside filter strips unless tied into a stream, lake, or wetland as a firebreak with minimal disturbed soil. Retain organic ground cover in filter strips during prescribed fires. **(design criteria)**	Not applicable to the alternatives

Appendix A, Table 5. Railroad Alternative Consistency With Additional Standards and Design Criteria from the Forest Service Watershed Conservation Practices Handbook (FSH 2509.25) that are Applicable to Management Prescription 9A, Emphasis on Riparian Area Management, Nebraska National Forest - Buffalo Gap National Grassland.	
Standard/Design Criteria	**Railroad Alternative Consistency**
Stabilize and maintain roads and other disturbed sites during and after construction to control erosion. **(standard)**	The alternatives would be consistent with this standard. Sediment control would be addressed in site-specific. The SWPPPs will specifically address interim stabilization control techniques and their application during construction of the alternatives.
Do not encroach fills or introduce soil into stream, swales, lakes or wetlands. **(design criteria)**	The alternatives would not be consistent with this design criteria. It would be necessary to fill certain wetlands and cut others to maintain the design grade requirements and construct the track. Fill may be introduced in and adjacent to streams during construction of crossings.
Properly compact fills and keep woody debris out of them. Revegetate cuts and fills upon final shaping to restore ground cover, using certified local native plants as feasible; avoid persistent or invasive exotic plants. Provide sediment control until erosion control is permanent. **(design criteria)**	The alternatives would be consistent with this standard. Restoration requirements would be addressed in site-specific SWPPPs.
Do not disturb ditches during maintenance unless needed to restore drainage capacity or repair damage. Do not undercut the cut slope. **(design criteria)**	The alternatives would be consistent with this standard.
Space cross drains, from no more than 120 feet in highly erodible soils on steep grades, to no more than 1,000 feet in resistant soils on flat grades. Do not divert water from one stream to another. **(design criteria)**	The alternatives would be consistent with this standard. Water would not be diverted between streams and spacing of cross drains would be addressed in the SWPPPs.
Empty cross drains onto stable slopes that disperse runoff into filter strips. On soils that may gully, armor outlets to disperse runoff. Tighten cross-drain spacing so gullies are not created. **(design criteria)**	The alternatives would be consistent with this standard. Armoring of outlets and methods to repair rills and gullies will be addressed in the SWPPPs. Specific recommendations for waterbar spacing based on slope will be provided in the SWPPPs.
Harden rolling dips as needed to prevent rutting damage to the function of the rolling dips. Ensure that road maintenance provides stable surfaces and drainage. **(design criteria)**	Not applicable to the alternatives.
Where berms must be used, construct and maintain them to protect the road surface, drainage features, and slope integrity while also providing safety. **(design criteria)**	Not applicable to the alternatives.
Build firelines with rolling grades and minimum downhill convergence. Outslope or backblade, permanently drain, and revegetate firelines immediately after the burn. Use certified local native plants as feasible; avoid persistent or invasive exotic species. **(design criteria)**	Not applicable to the alternatives.
Reclaim roads and other disturbed sites when use ends, as needed, to prevent resource damage. **(standard)**	The alternatives would be consistent with this standard. Reclamation would be addressed in site-specific SWPPPs.
Site-prepare, drain, revegetate, and close temporary and intermittent use roads and other disturbed sites within one year after use ends. Provide stable drainage that disperses runoff into filter strips and maintains stable fills. Do this work concurrently. Use certified local native plants as feasible; avoid persistent or invasive exotic plants. **(design criteria)**	The alternatives would be consistent with this standard. Reclamation would be addressed in site-specific SWPPPs.
Remove all temporary stream crossings (including all fill material in the active channel), restore the channel geometry, and revegetate the channel banks using certified local native plants as feasible; avoid persistent or invasive exotic plants. **(design criteria)**	The alternatives would be consistent with this standard. Reclamation would be addressed in site-specific SWPPPs.
Manage land treatments to limit the sum of severely burned and detrimentally compacted, eroded, and displaced land to no more than 18% of any land unit. **(standard)**	Not applicable to the alternatives.
Restrict roads, landings, skid trails, concentrated-use sites, and similar soil disturbances to designated sites. **(design criteria)**	The alternatives would be consistent with this design criteria.
Operate heavy equipment for land treatments only when soil moisture is below the plastic limit, or protected by at least 1 foot of packed snow or 2 inches of frozen soil. **(design criteria)**	Not applicable to the alternatives.
Conduct prescribed fires when soil, humus, and large fuels are moist. **(design criteria)**	Not applicable to the alternatives.
Maintain and improve long-term levels of organic matter and nutrients on all lands. **(standard)**	The alternatives would not result in a reduction of organic matter or nutrients in soils.
On soils with topsoil thinner than 1 inch, topsoil organic matter less than 2%, or effective rooting depth less than 15 inches, retain 90% or more of the fine (less than 3 inches in diameter) logging slash in the stand after each clearcut and seed-tree harvest, and retain 50% or more of such slash in the stand after each shelterwood and group-selection harvest, considering existing and projected levels of fine slash. **(design criteria)**	Not applicable to the alternatives.
If machine piling of slash is done, conduct piling to leave topsoil in place and to avoid displacing soil into piles or windrows. **(design criteria)**	Not applicable to the alternatives.
Place new sources of chemical and pathogenic pollutants where such pollutants will not reach surfaces or ground water. **(standard)**	The alternatives would be consistent with this design criteria. A Spill Prevention, Control and Countermeasure (SPCC) Plan would be developed for the alternatives. Specific limits on fueling activities within close proximity to water bodies and wetlands would be incorporated into the SPCC Plan.
Put pack and riding stock sites, sanitary sites, and well drill-pads outside the water influence zone. **(design criteria)**	Not applicable to the alternatives.

Appendix A, Table 5. Railroad Alternative Consistency With Additional Standards and Design Criteria from the Forest Service Watershed Conservation Practices Handbook (FSH 2509.25) that are Applicable to Management Prescription 9A, Emphasis on Riparian Area Management, Nebraska National Forest - Buffalo Gap National Grassland.	
Standard/Design Criteria	**Railroad Alternative Consistency**
Put vehicle service and fuel areas, chemical storage and use areas, and waste dumps and areas on gentle upland sites. Do mixing, loading, and cleaning on gentle upland sites. Dispose of chemicals and containers in State-certified disposal areas. **(design criteria)**	The alternatives would be consistent with this design criteria. A SPCC Plan would be developed for the alternatives. Fuel and construction material storage will be addressed in that plan.
Apply runoff controls to disconnect new pollutant sources from surface and ground water. **(standard)**	Drainage from fuel and material storage sites would be addressed in the SPCC Plan. Runoff controls, such as berms, liners, drips, etc. would be used to isolate spilled material from surface or ground water.
Install contour berms and trenches around vehicle service and refueling areas, chemical storage and use areas, and waste dumps to fully contain spills. Use liners as needed to prevent seepage to ground water. **(design criteria)**	The alternatives would be consistent with this design criteria. Specific design of spill containment would be addressed in the SPCC Plan.
Reclaim each mine waste dump when its use ends, using certified local native plants as feasible; avoid persistent or invasive exotic plants. Stabilize waste dumps and tailing in non-use periods to prevent wind and water erosion. If non-use will exceed one year, perform concurrent reclamation. **(design criteria)**	Not applicable to the alternatives.
Use lined ponds below waste dumps and tailing to contain all inflow. Build tailings dams with a 95% chance of containing floods over their design life. Permanently stabilize dams at final shaping. **(design criteria)**	Not applicable to the alternatives.
Clean waste water from concrete batching and aggregate operations before returning the water to streams, lakes or wetlands. **(design criteria)**	The alternatives would be consistent with this design criteria.
Inspect chemical equipment daily for leaks. If leaks or spills occur, report them and install emergency traps to contain them and clean them up. **(design criteria)**	The alternatives would be consistent with this design criteria. Inspection and reporting requirements would be incorporated into the SPCC plan.
Apply chemicals using methods which minimize risk of entry to surface and ground water. **(standard)**	The only chemical which would be applied is herbicides. Only licensed applicators would be used to apply herbicides. Application would be in strict conformance with federal and state regulations, including considerations necessary to protect ground and surface water. Use of herbicides on NFS lands would be coordinated with the Forest Service.
Favor pesticides with half-lives of 3 months or less. Apply at lowest effective rates as large droplets or pellets. Follow the label. Favor selective treatment. Use only aquatic-labeled chemicals in water influence zones. **(design criteria)**	Forest Service approval of herbicide application on NFS lands would be secured before application in compliance with appropriate regulations.
Use non-toxic, non-hazardous drilling fluids when feasible. **(design criteria)**	Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
Diversity on National Forests and National Grasslands	1. Maintain structural diversity of vegetation on units of land 5,000 to 20,000 acres in size, or fourth-order watersheds, that are dominated by forested ecosystems.	a. Maintain or establish a minimum of 20 percent of the forested area within a unit to provide vertical diversity except where the forest vegetation is comprised of more than 81 percent lodgepole pine in a unit, the vertical diversity may be less than 20 percent. b. Maintain or establish a minimum of 30 percent of the forested area within a unit to provide horizontal diversity. c. In forested areas of a unit, maintain at least 5 percent in grass/forb stages and at least 10 percent of the conifer potential natural vegetation type in old growth. This 10 percent must meet true old growth characteristics (if available) and occur in 30 acre or larger patches. Spruce/fir is the preferred type for old growth. d. In forested units, create or modify created openings so they have natural appearing shapes. Openings larger than 26 acres should be designed so they have a Patton edge shape index of at least 1.4. Openings smaller than 26 acres are not constrained by the diversity index.	Not applicable to the alternatives.
	2. Retain existing medium- or high-contrast edges within forested diversity units.		Not applicable to the alternatives.
	3. If medium-contrast edges are created in units dominated by grassland or shrubland, create openings with Patton edge-shape index of at least 1.4. Manage unmanipulated plant communities to reach late seral stages.	a. Maximum size of individual treated areas is 500 acres.	Not applicable to the alternatives.
	4. In forested diversity units, maintain at a minimum on each treated area, an average of 20-30 snags (in all stages of development) per 10 acres, well distributed over the diversity unit.	a. Provide at a minimum, an average of 4-6 snags per 10 acres of the following minimum diameters (where biologically feasible): - Ponderosa pine, Douglas-fir and spruce/fir: 12 inches DBH - Aspen and Lodgepole pine: 8 inches DBH. b. Retain an average length per acre of down-dead logs (where biologically feasible) of the following minimum diameters: - Ponderosa Pine, Douglas-fir and spruce-fir - 12 inch diameter 50 linear feet/acre. - Aspen and Lodgepole pine - 10 inch diameter 33 linear feet/acre.	Not applicable to the alternatives.
	5. Manage aspen for retention wherever it occurs, unless justified by one of the following: a. Conversion of determinate aspen to conifers, or shrub-or grass/forb seral stages for wildlife, esthetic, recreation, transportation, or watershed purposes. b. Conversion of determinate aspen to conifers on sites with high site index for conifers, in conjunction with a high demand for softwood; or c. Areas of aspen which are larger than are needed for wildlife or esthetic purposes.	a. For each 10 acres of aspen treatment, reserve one group (at least five trees, not of the same clone treated) of the largest aspen for wildlife habitat. b. Maintain at least 10 percent of aspen in over mature/old growth condition (90+ years).	Aspen would not be affected by the alternatives on TBNG.
	6. Conversion of any aspen stand for the above reasons will require regeneration of aspen stands elsewhere on the Forest to maintain about 77,700 acres of aspen on the Forest.		Aspen would not be affected by the alternatives on TBNG.
	7. If determinate aspen stands are managed for regeneration, treat contiguous areas no larger than 40 acres, unless larger areas are needed to protect aspen regeneration or prevent decadence. Treat entire clones. Indeterminate (climax) aspen stands can be converted to other cover types if needed to meet other objectives.		Aspen would not be affected by the alternatives on TBNG.
National Grassland Management	1. Manage National Grasslands for the use(s) that best demonstrate programs of sound land conservation and utilization (grassland agriculture). Demonstrations should include, but not be limited to: a. Improved range utilization techniques; b. Wildlife habitat protection and improvement; c. Surface resource protection, management, and rehabilitation during and after mineral operations. d. Soil conservation and watershed protection;	a. Confine demonstrations of cropping practices to soils recommended by the Soil Conservation Service (SCS).	The alternatives would be consistent with the general direction described. a. The alternatives would not limit the ability of the Forest Service to initiate improved range utilization techniques. b. Wildlife habitat will be adversely affected on TBNG. In places, the impacts are expected to be locally severe (i.e., where construction would be directly adjacent to sage grouse lek). However, the impacts would affect a relatively small portion of TBNG. Mitigation opportunities are being explored that will offset impacts to important wildlife resources.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	e. Development of recreational potential; f. Cropping practices, and g. Sites which should be retained in perennial vegetation.		c. Not applicable to the alternatives. d. BMPs are being developed that address conservation of soil, sedimentation and the protection of water quality and watersheds. These BMPs are being prepared for incorporation into site-specific SWPPPs. e. Operation of the railroad may preclude opportunities to develop certain types of recreation on parts of TBNG. However, the impact would be restricted to the vicinity of the railroad and, for the most part, would be consistent with current Recreation Opportunity Spectrum (ROS) designations on TBNG. f. & g. Not applicable to the alternatives.
	2. Manage sites with unique or exceptional recreational, esthetics, or wildlife habitat, and areas with Research Natural Area (RNA) or special interest site values for their inherent values as part of the National Grassland demonstration.		Alternative B would cross through the Rosecrans area which has been designated as a reintroduction site for the black-footed ferret. From a ferret reintroduction standpoint, the prairie dog towns in the Rosecrans area provide exceptional wildlife habitat. Consequently, Alternative B would not be consistent with this general direction. In addition to potential inconsistencies with the Rosecrans area, all the alternatives would also cross areas in the vicinity of the Rochelle Hills identified by the Wyoming Game and Fish Department (WGFD) as crucial elk winter range. Several elk calving areas are also located in close proximity to the alternatives. It is the policy of the Wyoming Game and Fish Commission that no net loss of these unique wildlife habitats occur. The railroad alternatives would result in a net loss (direct and indirect) of these habitats and would be inconsistent with the general direction contained in the forest plan. Mitigation is being explored that will offset these impacts.
	3. Accommodate appropriate objectives of all U.S. Department of Agriculture (USDA), State, and other Federal agencies and institutions pertinent to grassland agriculture in National Grassland management objectives.		Not applicable to the alternatives.
Cultural Resource Management	1. Protect, find an adaptive use for, mitigate according to an approved mitigation plan, or interpret all cultural resources on National Forest System (NFS) lands which are listed on the National Register of Historic Places, the National Register of Historic Landmarks, or have been determined to be eligible for the National Registers.	a. Follow direction in FSM 2360.	The alternatives would be consistent with this general direction. Refer to the Cultural Resources Programmatic Agreement in Appendix F of this report for additional information.
	2. Nominate or recommend cultural resource sites to the National Register of Historic Places by 1990 in the following priority: a. Sites representing multiple themes; b. Sites representing themes which are not currently on the National Register within the State; or c. Sites representing themes which are currently represented by single sites.		Not applicable to the alternatives.
	3. Protect and foster public use and enjoyment of cultural resources: a. Complete cultural resource surveys prior to any ground-disturbing project; b. Avoid disturbance of known cultural resources until evaluated and determined not significant; c. Collect and record information from sites where there is no other way to protect the properties; d. Issue antiquities permits to qualifying academic institutions or other organizations for the study and research of sites.		The alternatives would be consistent with this general direction. a. Surveys will be completed for all NFS lands which would be disturbed during construction of the alternatives. b. Disturbance of sites will not be allowed until adequate mitigation plans have been developed, approved and implemented. c. Site data collection will be incorporated into mitigation planning, where appropriate. d. Appropriate permits have been issued to cultural contractors working for the STB. Refer to the Cultural Resources Programmatic Agreement in Appendix F of this report for additional information.
	4. Interpret one representative sample of the following key historic themes: Forest Service management, logging/tie hack, lodges/resorts, mining, and livestock grazing.		Not applicable to the alternatives.
Visual Resource Management	1. Apply the Visual Management System to all National Forest System (NFS) lands. Travel routes, use areas and water bodies determined to be of primary importance are sensitivity level 1 and appropriate visual quality objectives are established according to the Visual Management System.	a. Follow direction provided in FSM 2380 and FSH 2309.16 through FSH 2309.25.	This general direction required Forest Service action following approval of the forest plan in 1985. The general direction is not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	2. Rehabilitate all existing projects and areas which do not meet the adopted visual quality objective(s) (VQO) specified for each management area. Set priorities for rehabilitation, considering the following: a. Relative importance of the area and the amount of deviation from the adopted VQO. Foreground areas have highest priority; b. Length of time it will take natural processes to reduce the visual impacts so that they meet the adopted VQO; c. Length of time it will take rehabilitation measures to meet the adopted VQO; and d. Benefits to other resource management objectives to accomplish rehabilitation.		This general direction required Forest Service action following approval of the forest plan in 1985. The general direction is not applicable to the alternatives.
	3. Achieve enhancement of landscapes through addition, subtraction or alteration of elements of the landscape such as vegetation, rockform, water features or structures. Examples of these include: a. Addition of vegetation species to introduce unique form, color or texture to existing vegetation. b. Vegetation manipulation to open up vistas or screen out undesirable views.		Not applicable to the alternatives.
	4. Plan, design and locate vegetation manipulation in a scale which retains the color and texture of the characteristic landscape, borrowing directional emphasis of form and line from natural features.	a. Meet the Visual Quality Objectives of retention and partial retention one full growing season after completion of a project. Meet modification and maximum modification objectives three full growing seasons after completion of a project. b. Determine sensitivity levels in accordance with FSH 2309.16, Agriculture Handbook No. 462, Vol. 2, Chapter 1; Sensitivity Levels.	Not applicable to the alternatives.
	5. Blend soil disturbance into natural topography to achieve a natural appearance, reduce erosion and rehabilitate ground cover.		The alternatives would not be consistent with this general direction. Soil disturbance would not blend with the natural topography because of the general need to cut and fill to meet the grade design requirement not to exceed 1 percent.
	6. Revegetate disturbed soils. In large projects, this may have to be done in stages.	a. Initiate revegetation of disturbed soils by the growing season following disturbance.	The alternatives would be consistent with this general direction and standard and guideline. SWPPPs will be developed in compliance with requirements of the Wyoming Department of Environmental Quality (WDEQ). Revegetation, including timing of restoration efforts, will be addressed in these SWPPPs.
	7. Choose facility and structure design, color of materials, location and orientation to meet the adopted visual quality objective(s) for the management area.		The VQO for the majority of the NFS lands on TBNG which would be crossed by the alternatives is designated by the forest plan as "modification". The modification VQO recognizes that management activities may dominate the landscape. All the alternatives would comply with the level of contrast allowed by modification. All fixed facilities and structures on NFS lands would be painted to blend with the natural environment as required by the general direction. Approximately 4 miles of Alternatives B, C and D would cross areas designated as Management Prescription 9A in the Medicine Bow Forest Plan. Management Prescription 9A applies to the aquatic ecosystem, the riparian ecosystem, and adjacent ecosystems that remain within approximately 100 feet from both edges of all perennial streams and from shores of lakes and other still water bodies. Management Prescription 9A has a VQO of "partial retention". Management activities may be evident but should be subordinate to the natural landscape. Activities may introduce forms, lines and colors not found in the natural landscape but they should not dominate the views. Other natural features should attract the viewer's attention. Where the alternatives would cross or run parallel to Management Prescription 9A, the railroad is expected to dominate the natural landscape and the views, particularly when a train is present. Other natural features would likely be subordinate to the railroad. Therefore, Alternatives B, C and D are not consistent with this general direction on TBNG.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
Recreation Site Construction and Rehabilitation	1. Provide appropriate development facilities where the private sector is not meeting the demand.		Not applicable to the alternatives.
	2. Maintain cost-effective developed recreation facilities which complement non-Forest Service developments.		Not applicable to the alternatives.
	3. Provide facilities which are accessible to handicapped persons.		Not applicable to the alternatives.
	4. Facilities proposed for construction or reconstruction which lie within identified 100-year floodplains will be evaluated as to the specific flood hazards and values involved with the site. Viable alternatives will be thoroughly evaluated.	a. Follow procedures and guidelines in FSM 2527.04c.	Not applicable to the alternatives.
	5. Past and probable flood heights in inventoried 100-year floodplains will be posted to provide visible warnings to the using public about possible periodic flooding.	a. Follow procedures and guidelines in FSM 2527.6.	Not applicable to the alternatives.
Management of Developed Recreation Sites	1. Design, construct and operate developed sites which are adjacent to or provide an access point into a wilderness to complement wilderness management objectives.		Not applicable to the alternatives.
	2. Construct, reconstruct and maintain developed sites in accordance with the established Recreation Opportunity Spectrum (ROS) classification for the management area.	a. Standards and Guidelines ROS Class* — Site Development Scale** P — Not to exceed 1 SPNM — Not to exceed 2 SPM — Not to exceed 2 RN — Class 3 or 4 R — Class 3 or 4 U — Class 5 * P = Primitive; SPNM = Semi-primitive non-motorized; SPM = Semi-primitive motorized; RN = Roaded Natural; R = Rural; U = Urban ** FSM 2331.47	Not applicable to the alternatives.
	3. Manage development scale 3 and 4 sites for full service when at least one of the following are met: a. A campground is designated as a fee site b. A group campground or picnic ground has a reservation system and/or user fee c. The site is a staffed visitor information center.	a. FSM 2331.47	Not applicable to the alternatives.
Dispersed Recreation Management	1. Provide a broad spectrum of dispersed recreation opportunities in accordance with the established Recreation Opportunity Spectrum (ROS) classification for the management area.		Not applicable to the alternatives.
	2. Close or rehabilitate dispersed sites where unacceptable environmental damage is occurring.	a. Close sites that cannot be maintained in Frissell Condition Class 1, 2, or 3 (Campsite Condition, Frissell, S.S.; Journal of Forestry August 1978). b. Rehabilitate sites that are in Frissell condition class 4.	Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland

Management Activities	General Direction	Standards & Guidelines	Railroad Alternative Consistency
	3. Manage dispersed recreation activities to not exceed the established ROS PAOT/acre capacity. Manage use of trails in dispersed areas to not exceed the established PAOT/mile of trail guidelines.	a. Standards and Guidelines: Recreation use and capacity range during the snow-free period (PAOT/acre): Trail use and capacity range (PAOT/mile of trail):	Not applicable to the alternatives.

Use Level	Capacity Range Very Low	Low	Moderate	High
ROS class - Primitive				
On Trails PAOT/Mile	0.5	1.0	2.0	3.0
Area-wide PAOT/acre	.001	.002	.007	.025
ROS Class - Semi-Primitive Nonmotorized				
On Trails PAOT/mile	2.0	3.0	9.0	11.0
Area-wide PAOT/acre	.004	.008	.05	.08
ROS Class - Semi-Primitive Motorized				
On Trails PAOT/mile	2.0	3.0	9.0	11.0
Area-wide PAOT/acre	.004	.008	.05	.08
ROS Class - Roaded Natural				
On Trails PAOT/mile	-	-	-	-
Area-wide PAOT/acre	.04	.08	1.2	2.5
ROS Class - Rural				
On Trails PAOT/mile	-	-	-	-
Area-wide PAOT/acre	.5	.8	5.0	7.5

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
		Reduce the above use level coefficients as necessary to reflect usable acres, patterns of use, and general attractiveness of the specific management area type as described in the ROS Users Guide, Chapter 25. Reduce the above use levels where unacceptable changes to the biophysical resources will occur. VERY LOW applies to alpine; LOW applies to rock, mtn. grass, and clearcuts 1-20 years old; MODERATE applies to LP size class 9, mtn. grass, PP size class 9, 8 and 7, DF size class 9, 8 and 7, Aspen size class 9, SF size class 7, shelterwood cuts 90-120 years old, selection cuts 1-20 years old and clearcuts 80-120 years old; HIGH applies to SF size class 9 and 8, LP size class 8 and 7, Aspen size class 8 and 7 and clearcuts 20-80 years old.	
	4. Prohibit camping within a minimum of 100 feet from lakes and streams unless exceptions are justified by terrain or specific design which protects the riparian and aquatic ecosystems.		Not applicable to the alternatives.
	5. Manage resource activities and facilities in accordance with the Regional Acceptable Work Standards.	a. FSM 1310 R2 ID No. 1 7/22/82	Not applicable to the alternatives.
	6. Prohibit motorized vehicle use (except over snow vehicles operating on snow) off of Forest System roads and trails in alpine and Krummholtz ecosystems.		Not applicable to the alternatives.
	7. Manage outfitted recreation use to ensure at least 50% of the established ROS PAOT/Ac capacity for the management area is available for non-outfitted recreation use. Also manage outfitted use to ensure at least 50% of the available dispersed campsites in the management area are available for non-outfitted users. Outfitted use may be further limited based upon local agreement with the Wyoming Game and Fish Department in furtherance of their objectives.		Not applicable to the alternatives.
Recreation Management (Private and Other Public Sector)	1. Ensure that permitted private and public sector sites on Forest Service lands which are adjacent to, or provide an access point into, a wilderness complement wilderness management objectives.		Not applicable to the alternatives.
Wilderness Area Management	1. Cultural resources sites will be managed in accordance with the Wyoming Wilderness Act of 1984.		Not applicable to the alternatives.
	2. Provide opportunities for human isolation, solitude, self-reliance and challenge while traveling cross-country and on system trails.		Not applicable to the alternatives.
	3. Utilize a permit system to manage use levels and patterns during the summer use period based upon the following criteria: a. When acceptable use levels, as specified in the individual prescriptions, are exceeded during 20 percent of the summer use season, or b. When acceptable capacities, as specified in the individual prescriptions, in primitive or pristine management areas are exceeded on 10 percent or more of the days during the summer use season. c. Apply a permit system to an entire wilderness, not just impacted portions of a wilderness.		Not applicable to the alternatives.
	4. Do not impose party-size limits during traditionally light-use seasons or during fall hunting seasons unless necessary to prevent unacceptable levels of change to the biological and physical resources.		Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	5. Maximum party-size limit for the summer use period is 25 people and/or recreational stock. Party size limits less than 25 people and/or recreational stock will be established where biological and physical resource capability cannot support that level of use. Party sizes established for protection of biophysical resources will set limits for both people and recreational stock. Parties larger than established limits may be allowed under permit on a case-by-case basis when compatible with other wilderness management objectives.		Not applicable to the alternatives.
	6. Prohibit competitive contest events, group demonstrations, ceremonies, and other similar events.		Not applicable to the alternatives.
	7. Prohibit dogs, or require them to be physically controlled on a leash. Exceptions will be made for permittee's working dogs, and for hunting dogs while hunting during legal seasons.		Not applicable to the alternatives.
	8. Prohibit recreational stock along lake shores and streambanks except for watering and through-travel.		Not applicable to the alternatives.
	9. Require users camping overnight with recreational stock to carry cubed, pelleted, or rolled feed and/or certified weed-free hay where grazing is prohibited.		Not applicable to the alternatives.
	10. Control overnight grazing of recreational stock in alpine and Krummholtz ecosystems according to use standards in Management Activity DO2, Forest Direction.	a. Base range condition on the standards in Range Analysis Handbook (FSH 2209.21). b. Allowable soil disturbance criteria: 20% maximum disturbance on ranges with good-excellent soil stability condition on 0-15% slopes. 15% maximum disturbance on ranges with fair soil stability conditions on slopes less than 15% and good or better soil stability conditions on slopes of 16-25% 10% maximum disturbance on ranges with fair soil stability conditions on slopes of 16-25%, and good soil stability conditions on slopes of 26-45%.	Not applicable to the alternatives.
	11. Prohibit new range improvement structures other than corrals, fences or water developments essential to sustain current permitted numbers.		Not applicable to the alternatives.
	12. Implement revegetation only for rehabilitation of areas in less than "fair" range condition based upon their natural potential. Use only native species for revegetation. Implement only where natural vegetation possibilities are poor, and only where degradation was due to human activities.	a. Base range condition on the standards in Range Analysis Handbook (FSH 2209.21).	Not applicable to the alternatives.
	13. Permit fish and wildlife research and management utilizing guidelines adopted by the International Association of Fish and Wildlife Agencies (FSM 2323.3).		Not applicable to the alternatives.
	14. See Mining Law Compliance and Administration and Minerals Management Activities in Forest Direction for minerals direction.		Not applicable to the alternatives.
	15. Suppress man-caused wildfires.		Not applicable to the alternatives.
	16. Maintain fire-dependent ecosystems using prescribed fires ignited naturally. Reclaim areas disturbed as part of fire control activities to meet the visual quality objective of retention.		Not applicable to the alternatives.
	17. Protect air quality related values from adverse affects from air pollution.	a. See criteria and standards in FSM 2120.	See the project-specific EIS for estimates of impacts to air quality related values.
	18. Control natural insect or disease outbreaks in wilderness only when justified by predicted loss of resource values outside of wilderness. Conduct analysis in accordance with FSM 3430.		Not applicable to the alternatives.
	19. Control problem animals on a case-by-case basis in cooperation with other agencies (FSM 2610) using methods directed at the offending animal but which presents the least risk to other wildlife and/or visitors.		Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
Wildlife and Fish Resource Management	1. Where present on National Forest lands, the following species are management indicator species. a. FEATURED SPECIES 1) Elk; 2) Mule Deer; 3) Bighorn Sheep; 4) Turkey; b. RECOVERY SPECIES 1) Bald Eagle; 2) Peregrine Falcon; 3) Black-footed Ferret c. ECOLOGICAL INDICATORS 1) Pine Marten; 2) Beaver; 3) Redbacked Vole; 4) Longtailed Vole; 5) Dwarf Shrew; 6) Western Jumping Mouse; 7) Osprey; 8) Goshawk; 9) Whitetailed Ptarmigan; 10) Sage Grouse; 11) Blue Grouse; 12) Hairy Woodpecker; 13) Yellowbellied Sapsucker; 14) Lewis Woodpecker; 15) White Crowned Sparrow; 16) Ruby Crowned Kinglet; 17) Yellow Warbler; 18) Cedar Waxwing; 19) Sandhill Crane; 20) Boreal Toad; 21) Smooth Green Snake; 22) Wood Frog d. FISH 1) Colorado River cutthroat trout; 2) Common trout species		Not applicable to the alternatives.
	2. Where present on Thunder Basin National Grassland, the following species are management indicator species. a. FEATURED SPECIES 1) Antelope; 2) Mule Deer; 3) Elk b. RECOVERY SPECIES 1) Bald Eagle; 2) Black-footed Ferret; 3) Peregrine Falcon c. ECOLOGICAL INDICATORS 1) Prairie Vole; 2) Blacktailed Prairie Dog; 3) Sage Grouse; 4) Yellow Breasted Chat ; 5) Golden Eagle; 6) Brewers Sparrow; 7) Willow Flycatcher; 8) House Wren; 9) Ferruginous Hawk; 10) Red Crossbill; 11) Mountain Plover; 12) Upland Sandpiper; 13) Longbilled Curlew; 14) Red-headed Woodpecker; 15) Woodhouse's Toad		Potential impacts to each of these species is addressed in Chapter 4 of this report.
	3. Manage and provide habitat for recovery of endangered and threatened species.		On TBNG, Alternatives C and D would not adversely affect habitat for currently listed federally-endangered or -threatened species. A bald eagle winter roost occurs in the vicinity of the alternatives on NFS lands. However, its status is unknown and the bald eagle has been proposed for down listing. Alternative B would cross NFS lands designated for reintroduction of the black-footed ferret. Alternative B would not be consistent with this general direction. Unless adequate mitigation could be developed, it is anticipated that habitat fragmentation and noise from the operating railroad through the Rosecrans area would adversely affect the site and its suitability for ferret reintroduction/recovery. Several species occur on TBNG which could be listed as federally-threatened or -endangered in the future. The mountain plover has been proposed for listing as threatened by the USFWS. It likely occurs in prairie dog towns across TBNG and is a management indicator species for the grassland. The USFWS is currently evaluating the status of the black-tailed prairie dog. Based on existing information the USFWS has determined that listing as threatened may be warranted. Black-tailed prairie dog towns would be crossed by all the alternative but are particularly abundant along Alternative B in the Rosecrans area. It is expected that the USFWS will receive a petition to list the sage grouse as threatened in the future. Listing decisions for these species are anticipated during the construction period for the railroad.
	4. Maintain habitat for viable populations of all existing vertebrate wildlife species.	a. Habitat for each species on the forest will be maintained at least at 40 percent or more of potential.	The alternatives would be consistent with this general direction. The alternatives would not reduce habitat for any species on TBNG to below 40 percent of potential.
	5. Maintain existing population level of the wood frog.		The alternatives would be consistent with this general direction. Impacts to wood frog are addressed in Chapter 4 of this report.
	6. Manage habitat occupied by existing populations of Colorado River Cutthroat Trout to maintain the population and protect species purity.		The alternatives would not cross or run adjacent to streams which contain Colorado cutthroat trout.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	7. Provide habitat for management indicator species at a level no lower than 40 percent of potential. Maintain effective wildlife habitat by providing habitat continuity and juxtaposition of cover and open areas around critical wildlife habitat.	a. No activities shall be allowed within one mile of an active bald eagle nest or peregrine falcon nest from February 1 to July 31 if they would cause nesting failure or abandonment. No activities shall be allowed within one half mile of an active bald eagle or peregrine falcon nest at any time if they would cause disturbance of the adult birds on the nest. b. No activities shall be allowed within one mile of an active bald eagle winter roost site from November 1 to April 1 if they would cause reduction of use of the roost. c. No activities shall be allowed within one quarter mile of an active golden eagle nest from February 1 to July 31 if they would cause nesting failure or abandonment. d. No activities shall be allowed within one quarter mile of an active ferruginous hawk, Swainson's hawk, goshawk, osprey, or prairie falcon nest from March 1 to July 31 if they would cause nesting failure or abandonment. e. No activities shall be allowed within 300 feet of any raptor (identified in item d) nest at any time if they would cause nest abandonment, unless specific practices are successfully implemented to maintain or increase nesting opportunities at other sites. This does not apply to existing surface occupancies. f. New roads or other developments shall be placed out of sight of the existing raptor nest if possible, unless specific practices are successfully implemented to maintain or increase nesting opportunities at other sites. g. No activities shall be allowed within one quarter mile of any rookery from March 1 to July 31 if they would cause abandonment of the rookery, unless specific practices are successfully implemented to maintain or increase the opportunities at other rookery sites.	An operating railroad on NFS lands would not be capable of complying with these restrictions. These standards and guidelines could be reasonably imposed on construction activities but not on operation of the railroad. As is discussed in Chapter 2, at peak 34 coal trains would pass along the track daily. Traffic would occur round the clock. It would be impossible to operate the railroad economically and comply with these requirements. For the project to proceed on NFS lands, the Forest Service would be required to amend the forest plan and waive these standards and guidelines for areas directly and indirectly affected by operation of the railroad. Mitigation opportunities are being explored which may prove successful in offsetting some of these impacts.
		h. No activities shall be allowed within one quarter mile of a sage grouse or sharp-tailed grouse lek at any time if they would cause abandonment of the lek, unless specific practices are successfully implemented to maintain or increase the existing habitat capability for grouse. i. Maintain shrubland for a minimum distance of 300 feet, where shrubs exist, from edges delineating natural openings, perennial streams, lakes, other water bodies, riparian zones, aspen or conifer stands, cliffs, rimrocks, caves and talus. Shrublands should extend from the edges of natural openings for a distance of at least 300 feet into the opening. j. Treated blocks of sagebrush and mountain shrub shall be no larger than 80 acres in areas that are used by sage grouse or sharp-tailed grouse, or are classified as winter range. k. Vegetation treatment, excluding timber harvest, shall not be undertaken within two miles of leks unless initiated specifically to enhance brood rearing habitat. Treatment of shrubs will not exceed 20 percent of the total management area within a ten year period. l. Restrict activities within one mile of known bighorn sheep lambing grounds from May 1 through June 20 if they would cause unacceptable stress to lambing ewes.	An operating railroad on NFS lands would not be capable of complying with the restrictions contained in h. The alternatives would pass within 0.25 miles of several sage grouse lek on TBNG. In addition, noise from the railroad would carry further than 0.25 miles and may adversely affect strutting sage grouse beyond the usual 0.25 mile buffer. Although the railroad could attempt to provide new strutting grounds for displaced birds on NFS lands, success is expected to be limited.
	8. Manage fish habitats to maintain viable populations of all existing vertebrate species in the planning unit and to maintain and improve habitat of management indicator species.		Impacts to fisheries are addressed in Chapter 4 of this report. Implementation of the alternatives is not anticipated to have an adverse effect on fisheries on TBNG.
	9. Manage fish habitat which is providing a fishery at or near its potential to maintain fish populations at existing levels. Manage fish habitat which is determined to be limiting a fish population to a level below its potential to improve habitat conditions which may be limiting.		Impacts to fisheries are addressed in Chapter 4 of this report. Implementation of the alternatives is not anticipated to have an adverse effect on fisheries on TBNG.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland

<table>
<tr><th>Management Activities</th><th>General Direction</th><th>Standards & Guidelines</th><th>Railroad Alternative Consistency</th></tr>
<tr><td></td><td>10. Plan water development, mineral exploration and development, timber harvest, livestock grazing, and other project uses and management practices to ensure activities are compatible with fishery management objectives, to ensure adequate protection is given to the fishery resource to prevent fish habitat degradation, and to ensure unavoidable adverse impacts are mitigated.</td><td>a. Require minimum (conservation) pools of at least 1/3 of the water surface area for all new impoundments capable of sustaining fishery resources.</td><td>Impacts to fisheries are addressed in Chapter 4 of this report. Implementation of the alternatives is not anticipated to have an adverse effect on fisheries on TBNG.</td></tr>
<tr><td>Wildlife Habitat Improvement and Maintenance</td><td>1. Use both commercial and noncommercial silvicultural practices to accomplish wildlife habitat objectives.</td><td>a. In forested areas, maintain deer or elk hiding cover on 60 percent or more of the perimeter of all natural openings, all created openings and along at least 75 percent of the edge of arterial and collector roads and 40 percent along streams and rivers. Not more than one half of the hiding cover can be contiguous to another portion of the hiding cover. Along streams and rivers in addition to hiding cover, 20 percent or more of the edge must be in thermal cover.
b. In diversity units dominated by forested ecosystems, maintain a minimum of 40 percent of the diversity unit in deer or elk hiding cover. This hiding cover should be well distributed over the unit. Maintain 20 percent of the diversity unit in thermal cover (winter or spring-summer). Hiding cover can be used to meet thermal cover requirements also, if they indeed coincide biologically.
c. In diversity units dominated by non-forested ecosystems, maintain deer and elk hiding cover as follows:

%of Unit Forested — % of Forested Area in Cover
35-50 — at least 50%
20-34 — at least 60%
less than 20 — at least 75%

These levels may be exceeded temporarily during periods when stands are being regenerated to meet the cover standard, or to correct tree disease problems, in aspen stands, or where windthrow or wildfire occurred. Maintain hiding cover along at least 75 percent of the edge of arterial and collector roads, and at least 60 percent along streams and rivers, where trees occur.
d. Alter age classes of browse stands in a diversity unit, no more than 25 percent within a ten-year period.</td><td>Not applicable to the alternatives.</td></tr>
<tr><td></td><td>2. Maintain edge contrast of at least medium or high along at least 30 percent of the edge next to all created and natural openings, roads, and riparian areas.</td><td>a. Contrast by Age Class is:

Contrast**

Age Class* — OG — M — P — SSS — GF — Shr — Gra
OG — - — L — M — H — H — M — H
M — L — - — M — M — H — M — H
P — M — M — - — M — H — M — H
SSS — H — M — M — - — L — L — L
GF — H — H — H — L — - — M — L
Shr — M — M — M — L — M — - — M
Gra — H — H — H — L — L — M — -

* OG = Old Growth; M = Mature; P = Poles; SSS = Shrub-seedling-sapling; GF = Grass-forb; Shr = Shrubland; Gra = Grassland
** H = High contrast; ; M = Medium contrast; L = Low contrast</td><td>Not applicable to the alternatives.</td></tr>
</table>

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	3. Improve habitat capability through direct treatments of vegetation, soil, and waters.		Not applicable to the alternatives.
	4. Conduct habitat improvement projects jointly or cooperatively funded with the States.		Not applicable to the alternatives.
Wildlife and Fish Cooperation With Other Agencies	1. Manage animal damage in cooperation with the State Wildlife Agencies, Fish and Wildlife Service, other appropriate agencies, and cooperators to prevent or reduce damage to other resources and direct control toward preventing damage or removing only the offending animal.		Not applicable to the alternatives.
	2. Allow denning or aerial gunning only for the purpose of animal damage control and under the following conditions: a. Methods are specified in the Forest Animal Control Plan; b. Denning and aerial gunning is done by an authorized individual; and c. The permit is issued by the State for aerial gunning.		Not applicable to the alternatives.
Range Resource Management	1. Provide forage to sustain local dependent livestock industry as well as wildlife populations agreed to in Statewide Comprehensive Wildlife Management Plans for National Forest System lands.		Not applicable to the alternatives.
	2. Remove livestock for the remainder of the grazing season from allotments managed under a continuous grazing system when further utilization on key areas will exceed allowable use criteria for the season.		Not applicable to the alternatives.
	3. Manage livestock and wild herbivores forage use by implementing allowable use guides.	a. Livestock and wild herbivores allowable forage use by grazing system and range type are: 1. Rest Rotation System: a. Use by range type: - Mainly seed reproduction: (Bunchgrass, plains grassland, foothills shrub and alpine range types): 50-60 percent on heavy use pastures. Up to 45 percent on light use pastures. - Mainly vegetation reproduction (meadow, sandhill prairie, bluegrass bottoms, and aspen range types): Bluegrass: maximum up to 80 percent; others, 55-65 percent on heavy use pastures, 40-50 percent on light use pastures. - Wild herbivores use during spring in rest-pastures will not exceed 25%. b. Allowable soil disturbance or recovery criteria: Soil and vegetation condition must be restored to at least the pre-treatment condition by the return to the same point in the grazing cycle. 2. Deferred Rotation System: a. Use by range type: - Mainly seed reproduction: 40-50 percent on all pastures. - Mainly vegetation reproduction: 45-55 percent on all pastures. b. Allowable soil disturbance or recovery criteria: Soil and vegetation conditions must be restored to at least the pre-treatment condition by the return to the same point in the grazing cycle. 3. Rotation System a. Use by range type: - Mainly seed reproduction: Max. of 50 percent on last used pastures; Max. of 40 percent on first used pasture. - Mainly vegetation reproduction: Max. Of 55 percent on last used pasture. Max. Of 45 percent on first used pasture. b. Allowable soil disturbance or recovery criteria: Same as deferred rotation system above.	Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland

Management Activities	General Direction	Standards & Guidelines	Railroad Alternative Consistency
		4. Continuous System (grazing same time and place every year): -Mainly seed reproduction Season / Excellent / Fair / Poor / Very Poor Full Grazing Season or Spring: 31-40% / 21-30% / 11-20% / 0-10% Summer: 36-45% / 26-35% / 11-25% / 0-10% Fall and/ro winter: 46-55% / 31-45% / 16-30% / 0-15% - Mainly vegetation reproduction: Same as primary seed reproduction except increase utilization by 10% on bluegrass. Allowable soil disturbance: 20% maximum disturbance on ranges with good-excellent soil stability condition on 0-15% slopes. 15% maximum disturbance on ranges with fair soil stability condition on less than 15% slopes, and on good or better soil stability condition on 16-25% slopes. 10% maximum disturbance on ranges with fair soil stability condition on 16-25% slopes, and good or better soil stability condition on 26-45% slopes.	Not applicable to the alternatives.
		5. Alternate Years System: a. Use by range type on key areas: -Mainly seed reproduction: Condition Class on Key Area / Use Good-Excellent: 51-60% Fair: 36-50% Poor: 21-35% Very Poor: 0-20% -Mainly vegetation reproduction: Condition Class on Key Area / Use Good-Excellent: 56-65% Fair: 41-55% Poor: 31-40% Very Poor: 0-30%	Not applicable to the alternatives

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland

Management Activities	General Direction	Standards & Guidelines	Railroad Alternative Consistency
		Bluegrass 80% on good or better condition and same proper use percent for fair and lower as above. Soil Disturbance criteria is same as for continuous grazing.	
	4. Achieve or maintain satisfactory range conditions on all rangelands.		The alternatives would not adversely affect range conditions.
	5. Where "Herbage Left Ungrazed Standards" have been developed, such as for the Sandhills Prairie and Shortgrass Plains, they may be used in lieu of the standards in Item 3 above.		Not applicable to the alternatives.
	6. Treat noxious farm weeds in the following priority: a. Leafy spurge and Russian and spotted knapweed; b. Invasion of new plant species classified as noxious farm weeds; c. Infestation in new areas; d. Expansion of existing infestations of Canada and musk thistle, and other noxious farm weeds; and e. Reduce acreage of current infestation.		Not applicable to the alternatives.
Range Improvement and Maintenance	1. Structural range improvement should be designed to benefit wildlife and livestock.	a. Structural improvements and maintenance will be in accordance with FSH 2209.22-R2.	Not applicable to the alternatives.
Silvicultural Prescriptions	1. Provide for wildlife habitat improvement and enhancement of other renewable resources in Sale Area Improvement Plans.		Not applicable to the alternatives.
	2. Apply a variety of silvicultural systems and harvest methods which best meet resource management objectives.	a. The appropriate harvest method by forest cover type are: Appropriate Harvest Methods* Forest Cover Type — Even-aged — Uneven- aged Interior Ponderosa Pine — SW, CC &S — GS & ST Mixed Conifer ** — SW & CC — GS Aspen — CC — -- Lodgepole Pine — SW & CC — GS Engelmann spruce-Subalpine-fir — SW & CC — GS & ST * The following abbreviations are used for harvest methods: SW = Shelterwood; CC = Clearcut; GS = Group Selection; ST = Single tree selection; S = See Tree ** Mixed Conifer includes Interior Douglas fir and white fir. b. Utilization standards by National Forest for live and dead material are: Species — Min. DBH — Min. Top Dia. — Length (feet) — %Net of Gross Live Trees - All Periods Sawtimber Black Hills: Conifers — 8.0 — 6.0 — 8 — 33-1/3 Aspen — 7.0 — 6.0 — 8 — 50	Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
		All others: Conifers 7.0 6.0 8 33-1/3 Aspen 7.0 6.0 8 50 Products Other than Sawtimber Black Hills: 5.0 4.0 8-1/3 -- All Others: 5.0 4.0 6-1/2 --	
		Dead Trees - All Periods Sawtimber Colorado & Medicine Bow Forests: Lodgepole Pine 8.0 7.0 16 50* Other Conifers** 12.0 10.0 16 50* Bighorn & Shoshone Forests: Lodgepole Pine 8.0 7.0 16 50* Other Conifers** 12.0 10.0 16 50* Black Hills: Same Standards as Live Trees Products Other than Sawtimber 5.0 4.0 Variable * Considering all defects except weather checking. Prominent checks or splits are considered defects. ** Dead subalpine fir will not require removal on sawtimber sales on any National Forests in Colorado and the Medicine Bow National Forest in Wyoming.	Not applicable to the alternatives.
		c. Silvicultural standards by harvest method: 1. Clearcut (patch or stand): Forest Cover Type / Rotation Age / Growing Stock Level / Cutting Cycle Ldgpl Pine 90 to 140 yrs 80 to 120 20 to 30 yrs Aspen 80 to 120 yrs N/A N/A Other 100 or more yrs. 60 to 120 20 to 30 yrs 2. Two-step shelterwood: Forest Cover Type / Rotation Age / Growing Stock Level / Cutting Cycle PP, MC, and SF 100 to 180yrs. 80 to 160 20 to 30 yrs LP 90 to 140 yrs. 80 to 140 20 to 30 yrs. Other 100 or more yrs. 60 or 120 20 to 30 yrs. First cut (seed cut) : Remove up to 70 percent of the stand basal area for all species.	Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland

Management Activities	General Direction	Standards & Guidelines	Railroad Alternative Consistency
		Second cut (removal cut): Remove all overstory when regenerate stand meets minimum stocking standards.	
		3. Three-step shelterwood: Rotation age, and cutting cycle is the same as two-step shelterwood. First cut (preparatory cut): Remove up to 30 percent of the stand basal area for all species. Second cut (seed cut) Remove up to 43 percent of the remaining stand basal areas for all species. Third cut (removal cut): Remove all overstory when regenerated stand meets minimum stocking standards. 4. Selection Forest Cover Type / Residual BA / Cutting Cycle SF and MC: 80 to 160: 20 to 30 yrs Other: 80 to 140: 20 to 30 yrs d. To facilitate the control of soil erosion within acceptable tolerance: 1. Permit conventional logging equipment on slopes of less than 20 percent where soil surveys or site-specific soil data are unavailable. 2. Allow conventional logging equipment on slopes up to 40 percent where soil or site-specific soil data are available to design erosion mitigation needs. 3. Utilize high flotation equipment on slopes up to 60 percent or cable and aerial systems on any slope.	Not applicable to the alternatives.
	3. Clearcuts may be applied to dwarf mistletoe infected stands of any forest cover type.		Not applicable to the alternatives.
	4. Assure that all even-aged stands scheduled to be harvested during the planning period will generally have reached the culmination of mean annual increment of growth.		Not applicable to the alternatives.
	5. The maximum size of openings created by the application of even-aged silviculture will be 40 acres regardless of forest cover type. Exceptions are: a. Proposals for larger openings are subject to a 60-day public review and are approved by the Regional Forester; b. Larger openings are the result of natural catastrophic conditions of fire, insect or disease attack, windstorm; or c. The area does not meet the definition of created openings.	a. Size of openings: Patch clearcuts : 1-10 acres Clearcuts :10-40 acres	Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland

<table>
<tr><th>Management Activities</th><th>General Direction</th><th>Standards & Guidelines</th><th>Railroad Alternative Consistency</th></tr>
<tr><td></td><td>6. Acceptable management intensity activities to determine harvest levels are:

<table>
<tr><th>Management Activity</th><th>Engelmann Spruce Subalpine Fir</th><th>Interior Ponderosa Pine</th><th>Lodgepole Pine</th><th>Interior Douglas Fir and White Fir</th><th>Aspen</th><th>Other Pines</th><th>Hardwoods</th></tr>
<tr><td>Tree Improvement</td><td>X</td><td>X</td><td>X</td><td>N</td><td>N</td><td>N</td><td>X</td></tr>
<tr><td>Site Preparation</td><td>X</td><td>X</td><td>X</td><td>X</td><td>N</td><td>N</td><td>X</td></tr>
<tr><td>Reforestation</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Planting</td><td>X</td><td>X</td><td>X</td><td>X</td><td>O</td><td>N</td><td>X</td></tr>
<tr><td>Seeding</td><td>O</td><td>X</td><td>N</td><td>O</td><td>O</td><td>O</td><td>X</td></tr>
<tr><td>Natural</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr>
<tr><td>Regeneration</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Protection</td><td>X</td><td>X</td><td>X</td><td>X</td><td>N</td><td>N</td><td>X</td></tr>
<tr><td>Stocking Control (thinning):</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Pre-Commercial</td><td>X</td><td>X</td><td>X</td><td>X</td><td>O</td><td>X</td><td>X</td></tr>
<tr><td>Commercial</td><td>X</td><td>X</td><td>X</td><td>X</td><td>O</td><td>X</td><td>X</td></tr>
<tr><td>Salvage of Dead Material</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>N</td><td>X</td></tr>
<tr><td>Cutting Methods:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Clearcut</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>N</td><td>X</td></tr>
<tr><td>Shelterwood</td><td>X</td><td>X</td><td>N</td><td>X</td><td>O</td><td>N</td><td>X</td></tr>
<tr><td>Selection</td><td>X</td><td>X</td><td>N</td><td>X</td><td>O</td><td>X</td><td>X</td></tr>
</table>
*Various combinations of these activities provide the acceptable range of management intensity for timber production (36 CFR 291.2 (b) (2)).
X = Appropriate practice; O = Not an appropriate practice; N = Appropriate, but not a standard practice. May be acceptable where justified.</td><td></td><td>Not applicable to the alternatives.</td></tr>
<tr><td></td><td>7. Make Christmas trees available in areas where other resource objectives can be accomplished through commercial or personal use Christmas tree sales.</td><td></td><td>Not applicable to the alternatives.</td></tr>
<tr><td></td><td>8. Utilize firewood material when compatible with other resources.</td><td></td><td>Not applicable to the alternatives.</td></tr>
<tr><td>Reforestation</td><td>1. Establish a satisfactory stand on cutover areas, emphasizing natural regeneration within five years after final harvest except:
a. For permanent openings that serve specific management objectives;
b. When other resource objectives dictate a different period such as spruce-fir clearcuts where planting must occur within three years after harvest;
c. In those lodgepole pine stands where the period for natural regeneration should be extended up to seven years after clearcutting; and
d. When provided for otherwise in specific management prescriptions.</td><td>a. Establish a seven-year regeneration period for lodgepole pine stands meeting the following criteria:
(1) Natural regeneration is expected to provide satisfactory stocking within 7 years after cutting,
(2) Establishment of trees is not impaired by competing vegetation, and
(3) Maintenance of favorable site condition does not require additional site preparation.</td><td>Not applicable to the alternatives.</td></tr>
<tr><td></td><td></td><td>b. MINIMUM STOCKING STANDARDS BY PRODUCTIVITY AND FOREST COVER TYPE:

<table>
<tr><th>Forest Cover Type</th><th>Site Prod. (Cu. Ft./A/YR)</th><th>Planting Densities 1/ (Trees/A)</th></tr>
<tr><td>Spruce-fir</td><td>85+</td><td>360-680</td></tr>
<tr><td></td><td>50-84</td><td>360-540</td></tr>
<tr><td></td><td>20-49</td><td>300</td></tr>
<tr><td>Aspen</td><td>all</td><td>---</td></tr>
<tr><td>Mixed</td><td>85+</td><td>435-680</td></tr>
</table></td><td>Not applicable to the alternatives.</td></tr>
</table>

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland

Management Activities	General Direction	Standards & Guidelines	Railroad Alternative Consistency
		Conifer 50-84 435-550 20-49 300-360 Lodgepole Pine 85+ 360-680 50-84 360-540 20-49 300 Ponderosa Pine 85+ 435-680 50-84 435-550 20-49 300-360 Seedling Stocking Per Acre Forest Cover Type Min. 2/ Desir.3/ Spruce-fir 200 340 200 280 150 155 Aspen 300 600 Mixed Conifer 205 310 205 255 190 240 Lodgepole Pine 245 340 200 280 150 250 Ponderosa Pine 205 310 205 255 190 240	
		Percent of Plots or Transects That are Stocked Forest Cover Type Minimum Desired Spruce-fir 75 100 75 100 75 100 Aspen 75 100 Mixed Conifer 75 100 75 100 75 100 Lodgepole Pine 75 100 75 100 75 100 Ponderosa Pine 70 100 70 100 70 100 Seedling Height (Inches) Forest Cover Type Minimum Desired Spruce-fir 3" 18" Aspen 12" 45" Mixed Conifer 3" 18"	Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
		Lodgepole Pine 3" 18" Ponderosa Pine 3" 18" _____ 1/ Lower densities are recommended to meet minimum stocking standards. Higher densities are recommended to meet desired stocking standards, with ample stock for selecting genetically superior trees. 2/ Minimum stocking standards are to be used where no precommercial cutting will be done, and only one harvest will be made to regenerate the stand. 3/ Desired stocking standards are to be used where at least one precommercial cut will be done followed by two sawlog harvests before the final cut is done. (Aspen will have only one final cut.)	
	2. Do not apply final shelterwood removal cut until the desired number (as specified in Minimum Stocking Standards) of well-established seedling/acre are expected to remain following overwood removal.		Not applicable to the alternatives.
	3. Use trees of the best genetic quality available which are adapted to the planting site when supplemental planting. (Reference FSM 2475)		Not applicable to the alternatives.
Timber Stand Improvement	1. Utilize Christmas tree sales for stocking controls where the opportunity exists.		Not applicable to the alternatives.
Riparian Area Management	1. Also see Management Prescription 9A for riparian area management.		See Appendix A, Table 10
	2. Design and implement activities in management areas to protect and manage the riparian ecosystem.	a. Maintain all riparian ecosystems in at least an upper mid-seral successional stage based upon the R2 Riparian Ecosystem Rating System.	All of the alternatives would result in direct and indirect impacts to riparian areas on TBNG. These impacts would be mitigated somewhat through the COE's 404 permitting process. However, it is likely that the COE would limit replacement to only those acres of wetland habitat that would be directly lost through construction activities. DM&E is exploring mitigation opportunities to offset indirect habitat impacts. Without such mitigation that alternatives would be inconsistent with this general direction.
	3. Deposit no waste material (silt, sand, gravel, soil, slash, debris, chemicals or other material) below high water lines, in riparian areas, in areas immediately adjacent to riparian areas, or in natural drainageways (draws, land surface depressions or other areas where overland flow concentrates and flows directly into streams or lakes).		The alternatives would be consistent with this general direction. Disposal of waste material will not be allowed in areas specified in the general direction.
	4. Manage riparian areas to reach the latest seral stage possible within the stated objectives.		Not applicable to the alternatives.
	5. Prescribe silvicultural and livestock grazing systems to achieve riparian area objectives.		Not applicable to the alternatives.
	6. Locate and construct arterial and collector roads to maintain the basic natural condition and character of riparian areas.		Not applicable to the alternatives.
Water Uses Management	1. Protest water right applications of others when such uses will lower streamflows below levels acceptable for National Forest uses and purposes.		Not applicable to the alternatives.
	2. Special Use Permits, easements, rights-of-way, and similar authorizations for use of NFS lands shall contain conditions and stipulations to maintain instream or bypass flows necessary to fulfill all National Forest uses and purposes.		The alternatives would be consistent with this general direction.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
Water Resource Improvement and Maintenance	1. Maintain instream flows and protect public property and resources.	a. Provide for instream flows to protect from change the scenic esthetic values and fish and wildlife habitats and otherwise protect the environment. In all streams that support a fishery or receive seasonal spawning use, prescribed flows shall include habitat maintenance flows of at least 30 percent of the average daily flow (ADF) for the year or the full natural low flow, whichever is less, and a flushing flow of not less than the estimated bankfull discharge for a continuous 72 hour period that coincides with the spring runoff season. Determine instream flow needs using an accepted method, prior to the implementation of any project that will directly or indirectly alter the streamflow in any fishery support stream.	Only temporary impacts to streamflow are anticipated during construction of crossings. The area affected would generally be limited to that portion of the stream directly adjacent to the construction site. Downstream streamflow would be maintained at all times, where necessary, to protect aquatic resources.
	2. Improve or maintain water quality to meet State water quality standards. However, where the natural background water pollutants cause degradation, it is not necessary to implement improvement actions.		Prior to construction the WDEQ must certify to the COE that implementation of the project will comply with state water quality standards. Construction cannot commence until the 401 water quality certification has been issued. In reviewing the certification request, WDEQ will evaluate the suitability of BMPs contained in the site-specific SWPPPs. If the BMPs are found to be deficient, WDEQ can impose additional conditions to protect state water quality. In addition to the 401 certification application, DM&E must also prepare site-specific BMPs which specify where and how erosion/sediment controls will be implemented and a maintenance and inspection protocol for those controls. These SWPPPs are designed to prevent/minimize the introduction of sediment and other pollutants into ground and surface water.
	3. Develop a schedule of water yield treatments within fourth-order watersheds which attains desired water yield increases while maintaining stream channel stability.	a. Provide mitigation measures necessary to prevent increased sediment yields from exceeding "threshold limits" (as determined by "State of the Art" modeling [HYSED] or actual measurements) identified for each (fourth-order) watershed.	A series of BMPs are being developed for inclusion in SWPPPs required by WDEQ. These BMPs will specifically address methods to control sedimentation impacts.
	4. Rehabilitate disturbed areas that are contributing sediment directly to perennial streams as a result of management activities to maintain water quality and reestablish vegetation cover.	a. Reduce to natural rate any erosion due to management activity in the season of disturbance and sediment yields within one year of the activity through necessary mitigation measures such as waterbarring and revegetation.	A series of BMPs are being developed for inclusion in SWPPPs. These BMPs will specifically address methods to control sedimentation impacts. Reclamation requirements will be addressed in the SWPPPs.
	5. Limit use of herbicides, insecticides, rodenticides, or other chemical agents as part of management activities to times and places where possible transport to or by surface water has a low probability of occurrence. Follow all label requirements concerning water quality protection.		The alternatives would be consistent with this general direction. Any application of biocides on NFS lands would require Forest Service approval and only licensed applicators would be employed.
Minerals Management General	1. Administer areas with producing sites and known reserves with consideration of ongoing and potential mineral activities.		Not applicable to the alternatives.
	2. Avoid or minimize capital investments, such as developed recreation, in or adjacent to areas with known reserves and alienated mineral rights.		Not applicable to the alternatives.
	3. In areas of actively producing sites or areas containing known reserves, consider only surface resource programs compatible with minerals activities.		Not applicable to the alternatives.
	4. In areas of high to moderate potential for valuable mineral deposits, perform site-specific mineral evaluations prior to making substantial capital investments, such as recreational developments.		Not applicable to the alternatives.
Mining Law Compliance and Administration	1. Prevent or control adverse impacts on surface resources in accordance with 36 CFR 228. a. Unclassified lands: Provide for reclamation of disturbed lands to achieve the planned uses specified in the Forest Plan, when those lands are no longer needed for mining operations. b. Designated Wilderness, Congressionally designated Wilderness Study Areas, and areas recommended for wilderness designation by RARE II on which Congressional action has not been completed: Provide for reasonable access of the type necessary to the purpose of proposed operations and for restoration of disturbed lands as near as practical to their natural condition when they are no longer needed for operations.		Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	c. Other classified lands not withdrawn from operations under the General Mining Laws: Such lands may include Research Natural Areas, National Recreation Areas, "RARE II" Further Planning Areas, Special Interest Areas such as scenic and geologic, National Historic Sites, or some other type of specific classification. The status of classified lands with respect to withdrawal must be checked before an operating plan can be approved. Provide for reasonable protection of the purposes for which the lands were classified and for reclamation of disturbed lands to a condition suitable for the purposes for which the lands were classified.		
	2. Withdrawals must be for the purpose of protecting specific existing or proposed uses. Initiate actions for withdrawal from entry under the General Mining Laws when 36 CFR 228 and other applicable laws and regulations will not provide the opportunity for protection of surface resources and uses.		Not applicable to the alternatives.
	3. Review cases of suspected abuse of the mining laws such as occupancy of the land for purposes other than prospecting, mining and related operations. Initiate appropriate actions to resolve. First action should be administrative. Failure of such action requires examination of claims for validity, followed by appropriate contest proceedings or legal action.		Not applicable to the alternatives.
Minerals Management-Oil, Gas and Geothermal	1. Withdrawals of lands from operations of the mineral leasing acts will be requested only in exceptional situations because Federal decisions on mineral disposals under these acts are discretionary on a case-by-case basis.		Not applicable to the alternatives.
	2. Recommendations for or consent to issuance of leases or permits: 1. Unclassified Lands: a. Forest Service authorization of geophysical prospecting will include terms and conditions controlling operating methods and times to prevent or control adverse impacts on surface resources and uses. b. Recommendations for and consent to BLM issuance of leases and permits will include all current standard stipulations and the Regionally approved special stipulations that may be necessary for additional protection of specific surface resources and uses. Reclamation requirements will have the objective of returning disturbed lands to the planned uses. These standard and current Regionally-approved special stipulations are in Appendix D to the forest plan. (1) Standard stipulations, in addition to those in the basic lease or permit document, are BLM Form 3109-3, "Stipulation for Lands Under Jurisdiction of the Department of Agriculture" and Forest Service (R-2) Supplement D to BLM Form 3109-3, "Surface Disturbance Stipulation." (2) Special Region 2 Forest Service stipulations will be used as appropriate to the surface resource situation on the lands involved in a lease or permit. These stipulations are titled as supplements to Form 3109-3 and are listed below: (a) Forest Service (R-2) Supplement C to Form 3109-3, "Limited Surface Use Stipulation." This stipulation notifies a lessee or permittee that certain described conditions exist upon the lands involved that require special operating plan provisions for their protection. (b) Forest Service (R-2) supplement F to Form 3109-3, "Surface Use Stipulation." This stipulation notifies a prospective lessee or permittee that surface use or occupancy that would cause significant surface disturbance is not authorized upon tracts within the proposed lease or permit area. This stipulation is also used to protect wilderness values in areas being considered or studied as potential additions to the wilderness preservation system. Recision and replacement of this stipulation is provided if Congress removes the area from further consideration as wilderness.		Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	(c) Forest Service (R-2) Supplement H to Form 3109-3, "Conditional No Surface Disturbance Stipulation." This stipulation notifies a prospective lessee or permittee that certain described conditions exist upon tracts within the proposed lease or permit area that will prevent any surface disturbance affecting those tracts unless an operating plan can be devised that will convince the Forest Service that surface use, occupancy and reclamation can take place without causing irretrievable environmental damage. (d) Forest Service (R-2) Supplement G to Form 3109-3, "Activity Coordination Stipulation." This stipulation notifies the lessee that surface values exist that are sensitive to high levels of activity. In such circumstances, the Forest Service may require that activities on the lease lands, when multiple leaseholds are involved, be conducted by a single operator, similar to the conduct of operations under a unitization agreement approved by the BLM. An alternative approach would be joint Forest Service/BLM approval of a coordinated plan of operations involving multiple operators. (e) Forest Service (R-2) Supplement A to Form 3109-3, "Further Planning Area Stipulation". This stipulation applies to lands identified for further planning in RARE II decision documents. It specifies the nature and extent of operations allowed and the conditions to be met for their approval.		
	c. Recommend against or deny consent to BLM for issuance of leases where operational damages on surface resources, including the impacts of surface-based access, product transportation and ancillary facilities necessary to production and related operations, would be irreversible and irretrievable, with no potential for reclamation and attachment of the no surface occupancy stipulation (Forest Service (R-2) Supplement F to Form 3109-3) would prevent the effective recovery of the Federal mineral resource, as determined by the BLM. Negative recommendations or consent denials will be based on site-specific consideration of the following criteria: (1) Slopes steeper than 60 percent. (2) High erosion hazard rating. (3) High geologic hazard rating. (4) Low visual absorption capacity that prevents reclamation to established visual quality objective (VQO). (5) A conclusion by the Forest Service (FS) and/or the United States Fish and Wildlife Service (USFWS) that the action will jeopardize the survival or recovery of federally listed threatened and endangered (T&E) wildlife or plant species. (6) Intrusions upon the identified critical (USFWS) or essential (FS) habitat of a federally listed (T&E) wildlife or plant species or upon the plant or animal itself. (7) Intrusion upon the habitat of individual plant or animal species listed by a State as threatened or endangered. (8) Intrusion upon the habitat of individual plant or animal species identified by the Regional Forester as needing special management to prevent its need for listing as a threatened or endangered species.		Not applicable to the alternatives.
	2. Designated Wilderness, Congressionally-designated Wilderness Study Areas, and areas recommended for Wilderness on which Congress has not taken final action: a. Geophysical prospecting, when authorized, will be subject to terms and conditions insuring that operations will be done by methods and at such times that there will be no significant adverse impacts on surface resources. b. Wilderness is withdrawn from all leasing, subject to valid existing rights. c. No exploration permits or leasing is recommended in Wilderness Study Areas or areas recommended for Wilderness designation by the Forest Service until such time as Congress acts on the disposition of those areas, designates them Wilderness or releases them from Wilderness consideration.		Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	3. Classified lands other than Wilderness and areas described in "2" foregoing, which are not by law or otherwise withdrawn from operations under the mineral leasing acts. Examples of such lands include Wild and Scenic Rivers, National Recreation Areas, National Historic Sites, Natural Areas, Special Areas--such as geological, scenic and zoological, and some other specific classifications. a. Forest Service authorizes geophysical and similar prospecting only when terms and conditions can be applied that will protect the purposes for which the lands were classified. b. Recommendations for and consent to BLM for issuance of leases and permits will include all current standard stipulations and the current Regionally-approved special stipulations necessary to protect the purposes for which the lands were classified. Standard and special stipulations are in Appendix D to the forest plan. See 1.b(1) under this Management Activity heading, foregoing, for the standard stipulations. Special stipulations to be applied as appropriate are: (1) Forest Service (R-2) Supplement B to Form 3109-3, "Classified Area Stipulation." This stipulation applies to lands classified under 36 CFR 251.23 and 294.1 for specific management purposes. Because of the regulatory provisions, no use or occupancy inconsistent with the classification is permitted. This does not necessarily mean recommendation against or denial of consent to BLM for issuance of leases. The reason is that classified areas may be only small portions of large leaseholds. (2) Forest Service (R-2) Supplement C to Form 3109-3, "Limited Surface Use Stipulations." This stipulation notifies a lessee or permittee that certain described conditions exist upon the lands involved that require special operating plan provisions for their protection. (3) Forest Service (R-2) Supplement E to Form 3109-3, "Wild and Scenic Rivers System Stipulations." This stipulation establishes operating conditions for lands under study by Congress for inclusion in the National Wild and Scenic Rivers System. It also provides for establishing appropriate operational controls should the lands be included in that system or should the lands not be added to the system. (4) Forest Service (R-2) Supplement F to Form 3109-3, "Surface Use Stipulation." This stipulation notifies prospective lessees or permittees that surface use or occupancy causing significant surface disturbance is not authorized for described lands. This stipulation may be applied in a wide variety of conditions in lieu of recommending against or denying consent to BLM for issuance of a lease. (5) Forest Service (R-2) Supplement H to Form 3109-3, "Conditional No Surface Disturbance Stipulation." This stipulation notifies a prospective lessee that certain described conditions exist upon tracts within the proposed lease or permit area that will prevent any surface disturbance affecting those tracts unless an operating plan can be devised that will convince the Forest Service that surface use, occupancy and reclamation can take place without causing irretrievable environmental damage. (6) Forest Service (R-2) Supplement G to Form 3109-3, "Activity Coordination Stipulation." This stipulation notifies the lessee that surface values exist that are sensitive to high levels of activity. In such circumstance, the Forest Service may require that activities on the leased lands, when multiple leaseholds are involved, be conducted by a single operator, similar to the conduct of operations under a unitization agreement approved by the BLM. An alternative approach would be joint Forest Service/BLM approval of a plan of operations involving multiple operators.		Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	c. Recommend against or deny consent to BLM for issuance of leases where operation damages to surface resources, including the impacts of surface-based access, product transportation and ancillary facilities necessary to production and related operations would be irreversible and irretrievable, with no potential for reclamation and attachment of the no surface occupancy stipulation (Forest Service (R-2) Supplement F to Form 3109-3) would prevent the effective recovery of the Federal mineral resource, as determined by the BLM. Negative recommendations or consent denials will be based on site-specific consideration of the following criteria: (1) Operations destroy or irretrievably damage the characteristics or purposes for which the lands were classified. (2) Slopes steeper than 40 percent. (3) High erosion hazard rating. (4) High geologic hazard rating. (5) Low visual absorption capacity that prevents reclamation to established visual quality objective (VQO). (6) A conclusion by the Forest Service (FS) and/or the United States Fish and Wildlife Service (USFWS) that the action will jeopardize the survival or recovery of federally listed threatened or endangered (T&E) wildlife or plant species. (7) Intrusions upon the identified critical (USFWS) or essential (FS) habitat of a federally listed (T&E) wildlife or plant species or upon the plant or animal itself. (8) Intrusion upon the habitat of individual plant or animal species listed by a State as threatened or endangered. (9) Intrusion upon the habitat of individual plant or animal species identified by the Regional Forester as needing special management to prevent its need for listing as a threatened or endangered species.		
Minerals Management-Coal, Leasable Uranium and Non-Energy Common Minerals Materials	1. Withdrawals of lands from operations of the mineral leasing acts will be requested only in exceptional situations because Federal decisions on mineral disposals under these acts are discretionary on a case-by-case basis.		Not applicable to the alternatives.
	2. Withdrawals from disposal of common variety mineral materials are unnecessary. The Forest Service has total discretionary authority for such disposals.		Not applicable to the alternatives.
	3. General direction for unclassified lands, designated wilderness, and classified lands other than Wilderness are: 1. Unclassified Lands. a. Forest Service authorize common variety exploration and disposals under terms and conditions to prevent or control adverse impacts on surface resources and uses. The objective of reclamation requirements will be to return disturbed lands to the planned uses. b. Recommendations for and consent to BLM for issuance of leases, permits, and coal exploration licenses will include all current standard stipulations and the Regionally-approved special stipulations that may be necessary for additional protection of specific surface resources. The objective of reclamation requirements will be to return disturbed lands to the planned uses. The standard and current Regionally-approved special stipulations are in Appendix D to the forest plan.		Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	(1) Standard Stipulations, in addition to those in the basic lease, permit or license document, are BLM Form 3109-3, "Stipulation for Lands Under Jurisdiction of the Department of Agriculture," and Forest Service (R-2) stipulation, Supplement D to BLM Form 3109-3, "Surface Disturbance Stipulation." (2) Special Forest Service, Region 2, Stipulations will be used as appropriate to the surface resource situation involved in a lease, permit or license. These stipulations are titled as supplements to BLM Form 3109-3 and are listed below: (a) Forest Service (R-2) Supplement C to Form 3109-3, "Limited Surface Use Stipulations." This stipulation notifies a lessee, permittee or licensee that certain described conditions exist upon the lands involved that require special operating plan provisions for their protection. (b) Forest Service (R-2) Supplement H to Form 3109-3, "Conditional No Surface Disturbance Stipulation." The usual application of this stipulation for minable minerals will be in exploration permits and licenses. The stipulation notifies a prospective lessee, permittee or licensee that certain described conditions exist upon tracts within the proposed lease or permit area that will prevent any surface disturbance affecting those tracts unless an operating plan can be devised that will convince the Forest Service that surface use, occupancy and reclamation can take place without causing irretrievable environmental damage.		
	c. Recommend against or deny consent to BLM for issuance of leases, permits or coal exploration licenses where operational damages on surface resources, including the impacts of surface-based access, product transportation and ancillary facilities necessary to production and related operations, would be irreversible and irretrievable, with no potential for reclamation. Negative recommendations or consent denials will be based on site-specific consideration of the following criteria: (1) Terrain as it affects waste dumps and tailings disposal--related to dump and tailing stability, adequate room for placement. (2) Whether or not negative impacts on water quality are preventable. (3) For surface-based access, product transportation and ancillary facilities necessary to operations; Slopes steeper than 60 percent; high erosion hazard; high geologic hazard. (4) Low visual absorption capacity that prevents reclamation to established visual quality objective (VQO). (5) A conclusion by the Forest Service (FS) and/or the United States Fish and Wildlife Service (USFWS) that the action will jeopardize the survival or recovery of federally listed threatened or endangered (T&E) wildlife or plant species. (6) Intrusions upon the identified critical (USFWS) or essential (FS) habitat of a federally listed (T&E) wildlife or plant species or upon the plant or animal itself. (7) Intrusion upon the habitat or individual plant or animal species listed by a State as threatened or endangered. (8) Intrusion upon the habitat of individual plant or animal species identified by the Regional Forester as needing special management to prevent its need for listing as a threatened or endangered species.		Not applicable to the alternatives.
	2. Designated Wilderness, Congressionally-designated Wilderness Study Areas, and areas recommended for Wilderness on which Congress has not taken final action. a. Prospecting for and disposals of common varieties of mineral materials will not be authorized. b. Coal mining in the National Wilderness Preservation System is prohibited by the Coal Leasing Amendments Act of 1975. Therefore, coal leasing and coal exploration licenses will not be authorized for any of the foregoing described lands.		Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	c. Designated Wildernesses were withdrawn from exploration and leasing on December 31, 1983, subject to prior valid existing rights. d. No exploration permits or leasing is recommended in Wilderness Study Areas or areas recommended for Wilderness designation by the Forest Service until such time as Congress acts on the disposition of those areas, designates them Wilderness, or releases them from Wilderness consideration. A non-wilderness determination will result in the mineral resources being managed the same as other nonclassified National Forest System lands.		
	3. Classified lands other than Wilderness and areas as described in "2" foregoing, which are not by law or otherwise withdrawn from operations under the mineral leasing acts. Examples of such lands include Wild and Scenic Rivers, Natural Areas, Special Areas--such as geological, scenic and zoological, and some other specific classifications. a. The Forest Service authorizes common variety exploration and disposals under terms and conditions to protect the purposes for which the lands were classified. The objective of reclamation requirements will be to return disturbed lands to a condition suitable for the purposes for which they were classified. For Special Areas classified under 36 CFR 294 and 251.23 for specific management purposes, the regulatory provisions permit no use or occupancy inconsistent with the classification. b. Coal mining is prohibited by the Coal Leasing Amendment Act of 1975, within the National System of Trails and the Wild and Scenic Rivers System, including Study rivers designated by that Act. This prohibition also applies to the National Park System and the National Wildlife Refuge System, which lands are not under Forest Service jurisdiction.		Not applicable to the alternatives.
	c. Recommend or consent to BLM for issuance of leases, permits or licenses only when terms and conditions can be applied that will protect the purposes for which the lands were classified. d. Recommendations and consent to BLM for issuance of leases, permits or licenses will include all current standard stipulations and the current Regionally approved special stipulations necessary to protect the purposes for which the lands were classified. Standard and special stipulations are in Appendix D to the forest plan. See 1.b.(1) under this management heading for the standard stipulations. Special stipulations to be applied as appropriate are: (1) Forest Service (R-2) Supplement A to Form 3109-3, "Further Planning Area Stipulation." This stipulation applies to lands identified for further planning in the RARE II decision documents. It specifies the nature and extent of operations allowed and the conditions to be met for their approval. (2) Forest Service (R-2) Supplement B to Form 3109-3, "Classified Area Stipulation." This stipulation applies to lands classified under 36 CFR 294 and 251.23 for specific management purposes. Because of the regulatory provisions, no use or occupancy inconsistent with the classification is permitted. This does not necessarily mean recommendation against or denial of consent to issuance of leases, permits or licenses is necessary. The reason is that classified areas may be only small portions of the lands involved.		Not applicable to the alternatives.
	(3) Forest Service (R-2) Supplement C to Form 3109-3, "Limited Surface Use Stipulation." This stipulation notifies a lessee, permittee or licensee that certain described conditions exist upon the lands involved that require special operating plan provisions for their protection. (4) Forest Service (R-2) Supplement F Form 3109-3 "Surface Use Stipulation." This stipulation notifies prospective lessees or permittees that surface use or occupancy that would cause significant surface disturbance is not authorized for described lands. This "no surface occupancy" stipulation may be applied in a wide variety of conditions in lieu of recommending against or denying consent to BLM for issuance of a lease.		Not applicable to the alternatives.

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Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	(5) Forest Service (R-2) Supplement H to Form 3109-3, "Conditional No Surface Disturbance Stipulation." This stipulation notifies the prospective lessee, permittee or licensee that certain described conditions exist upon tracts within the proposed lease or permit area that will prevent any surface disturbance affecting those tracts unless a operating plan can be devised that will convince the Forest Service that surface use, occupancy and reclamation can take place without causing irretrievable environmental damage.		
	e. Recommend against or deny consent to issuance of leases, permits or licenses where operational damages on surface resources including the impacts of surface-based access, product transportation and ancillary facilities necessary to production and related operations, would be irreversible and irretrievable, with no potential for reclamation and attachment of the no surface occupancy stipulation (Forest Service (R-2) Supplement F to Form 3109-3) would prevent the effective recovery of the Federal mineral resource, as determined by the BLM. Negative recommendations or consent denials will be based on the consideration of the following criteria: (1) Operations destroy or irretrievably damage the characteristics or purposes for which the lands are classified. (2) Terrain as it affects waste dumps and tailings disposal--related to dump and tailing stability, adequate room for placement, and whether or not waste and tailings can be handled or treated in a manner that results in no detrimental effects on the purposes for which the lands were classified. (3) Whether or not negative impacts on water quality are preventable. (4) For surface-based access, product transportation and ancillary facilities necessary to operations: Slopes steeper than 40 percent; high erosion hazard; high geologic hazard. (5) Low visual absorption capacity that prevents reclamation to established visual quality objective (VQO). (6) A conclusion by the Forest Service (FS) and/or the United States Fish and Wildlife Service (USFWS) that the action will jeopardize the survival or recovery of federally listed threatened or endangered (T&E) wildlife or plant species. (7) Intrusions upon the identified critical (USFWS) or essential (FS) habitat of a federally listed (T&E) wildlife or plant species or upon the plant or animal itself. (8) Intrusion upon the habitat or individual plant or animal of a species listed by a State as threatened or endangered. (9) Intrusion upon the habitat or individual plant or animal of a species identified by the Regional Forester as needing special management to prevent its need for listing as a threatened or endangered species.		Not applicable to the alternatives.
Special Use Management (Non-Recreation)	1. Act on special use applications according to the following priorities: a. Land and land use activity requests relating to public safety, health and welfare, e.g., highways, powerlines and public service improvements. b. Land and land use activities contributing to increased economic activity associated with National Forest resources, e.g., oil and gas, and energy minerals. c. Land and land use activities that benefit only private users, e.g., road permits, rights-of-way for powerlines, telephones, waterlines, etc.		This general direction establishes Forest Service processing priorities.
	2. Do not approve any special use applications that can be reasonably met on private or other Federal lands unless it is clearly in the public interest.		According to DM&E, it would not be possible to construct and operate an economically-viable heavy haul railroad between the SPRB mines and DM&E's existing main line without crossing NFS lands. In addition, the STB has made an initial determination that DM&E's proposed project satisfies the transportation-related requirements of 49 U.S.C. 10901 and is therefore at least not inconsistent with the public necessity and convenience. STB regulations state that *"the Board shall issue a certificate...unless the Board finds that such activities are inconsistent with the public convenience and necessity..."* While the statute does not define "*public convenience and necessity*", a 3-part test has

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
			been developed to aid in this determination. The test requires a determination of whether: 1) the applicant is financially fit to undertake the construction and provide service; 2) there is a public demand or need for the proposed service; and 3) the construction project is in the public interest and will not unduly harm existing services. In its December 9, 1998 decision STB determined that DM&E's proposal meets the 3-part test. However, STB's initial determination does not grant approval to construct the project. No final decision by STB permitting construction to begin would be issued until such time as all statutory requirements - under both environmental and transportation law - have been satisfied. In fact, it is possible that in their final analysis STB could determine that, due to possible adverse environmental impacts, the public interest dictates that the application be denied even though the criteria of 49 U.S.C. 10901 have otherwise been met.
	3. Bury electrical utility lines of 33 KV or less and telephone lines except when: a. Visual quality objectives of the area can be met using an overhead line. b. Burial is not feasible due to geologic hazard or unfavorable geologic conditions. c. It is not economical as determined by a cost analysis. d. Greater long-term site disturbance would result. e. It is not technically feasible.		Any powerlines installed on NFS lands on TBNG would comply with this general direction.
	4. Design and construct all power and distribution lines to protect all birds of prey from electrocution.		Any powerlines installed on NFS lands on TBNG would comply with this general direction.
	5. Do not approve special use applications for areas adjacent to developed sites unless the proposed use is compatible with the purpose and use of the developed site.		The alternatives would not be located adjacent to developed sites on TBNG. The alternatives would be consistent with this general direction.
Rights-of-way and Land Adjustments	1. Acquire rights-of-way on existing Forest System roads and trails that cross private land.		Not applicable to the alternatives.
	2. Insure floodplain and wetland values are approximately equal on both offered and selected tracts in proposed land exchanges or that values are in favor of the United States.		Not applicable to the alternatives.
	3. Classify lands or interest in lands for acquisition where lands are valuable for NFS purposes according to the following priorities: a. In designated wilderness areas and other Congressionally classified areas. b. Where lands or rights-of-way are needed to meet resource management goals and objectives. c. Lands which provide habitat for threatened and endangered species of animals and plants. d. Lands which include floodplain or wetlands. e. On lands of the National Grassland that provide opportunities for demonstration of multiple uses in grassland agriculture. f. On lands having historical or cultural resources, outstanding scenic values or critical ecosystems, when these resources are threatened by change of use or when management may be enhanced by public ownership.		Not applicable to the alternatives.
	4. Classify lands for disposal according to the following priorities: a. To States, counties, cities, or other Federal agencies when disposal will serve a greater public interest. b. In small parcels intermingled with mineral or homesteads patents. c. When suitable for development by the private sector, if development (residential, agricultural, industrial, recreational, etc.) is in the public interest.		As is discussed in Chapter 2 of this report, a portion of the proposed western yard site consists of a small, isolated parcel of NFS lands. It has been proposed that this parcel be exchanged for lands in the Rosecrans area that would make management of the black-footed ferret reintroduction site more efficient. Such an exchange would be consistent with this general direction.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	d. When critical or unique resource (wetlands, floodplains, essential big game winter range, threatened or endangered species habitat, historical or cultural resources, critical ecosystems, etc.) effects are mitigated by reserving interests to protect the resource, or by exchange where other critical resources to be acquired are considered to be of equal or greater value. e. In National Grasslands, when they offer no opportunity to meet National Grassland demonstration objectives.		
	5. Effect jurisdictional transfers which achieve the following objectives: a. Reduce duplication of efforts by users and agencies in terms of time, cost, and coordination. b. Improve or maintain user access to the administering agency. c. Decrease travel and enhance management. d. Improve public understanding of applicable laws, regulations, policies, and procedures. e. Develop more effective and efficient work units. f. Reduce administrative cost.		Not applicable to the alternatives.
Property Boundary Location	1. Locate, mark, and post landlines according to the following priorities: a. Lines needed to meet planned activities; b. Lines needed to protect NFS lands from encroachment, and c. All other lines.		Not applicable to the alternatives.
Soil Resource Management	1. Maintain soil productivity, minimize man-caused soil erosion, and maintain the integrity of associated ecosystems. a. Use site preparation methods which are designed to keep fertile, friable topsoil essentially intact. b. Give roads and trails special design considerations to prevent resource damage on capability areas containing soils with high shrink-swell capacity. c. Provide adequate road and trail cross drainage to reduce sediment transport energy. d. Revegetate all areas, capable of supporting vegetation, disturbed during road construction and/or reconstruction to stabilize the area and reduce soil erosion. Use less palatable plant species on cuts, fills, and other areas subject to trampling damage by domestic livestock and big game to discourage grazing by herbivores. e. Prevent livestock and wildlife grazing which reduces the percent of plant cover to less than the amount needed for watershed protection and plant health. f. Place tractor-built firelines on the contour, where possible, and avoid use of tractors on highly erodible sites. g. Provide permanent drainage and establish protective vegetative cover on all new temporary roads or equipment ways, and all existing roads which are being removed from the transportation system. h. Minimize soil compaction by reducing vehicle passes, skidding on snow, frozen or dry soil conditions, or by off-ground logging systems. i. Restore soil disturbance caused by human use to soil loss tolerance levels commensurate with the natural ecological processes for the treatment areas.	a. Use the following Standards and Guidelines unless more site specific requirements are developed during project design. 1. Limit intensive ground disturbing activities on unstable slopes and highly erodible sites. 2. Apply Packer's guides in the design for cross drain spacing and buffers. 3. Chisel or rip, on the contour, compacted soils. Soils are considered compacted if there is a 15 percent increase in bulk density or a 50 percent decrease in macro pore space.	Soil productivity and erosion control would be addressed using BMPs being prepared for the SWPPPs required by WDEQ. This general direction and standards and guidelines would be incorporated into the SWPPPs as appropriate. Compaction relief will be addressed specifically as it is critical to overall reclamation process.
	2. Identify at the project level, upland areas that are immediately adjacent to Riparian (Prescription 9A) Management Areas. Adjacent upland areas are those portions of a management area which, when subjected to management activities, have a potential for directly affecting the condition of the adjacent Riparian Management Area. The magnitude of effects is dependent upon slope steepness, and the kind, amount, and location of surface and vegetation disturbance within the adjacent upland unit.	a. The following is a guide to identify the approximate extent of adjacent upland areas: Slope Gradient of Upland Areas Adjacent to Riparian Management Area — Upslope Distance from Boundary of Riparian Management Area % Slope Range — Feet 0-20 — 100 20-30 — 180 30-40 — 280	b. BMPs have been designed to control sedimentation to these sites. These BMPs will be implemented through site-specific SWPPPs. c. Monitoring and maintenance will be addressed in the SWPPPs. Reclamation success monitoring will incorporate the Forest Service's 5 year - 80 percent goal.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
		40-50 400 50-60 520 60-70 640 70-80 760 80-90 880 90-100 1000 100-150 1000-1300 b. Reduce, through designed management practices and appropriate erosion mitigation and vegetation/restoration measures, the project caused on-site erosion rates (calculated with appropriate Universal Soil Loss Equation methodology) by 75% within the first year after disturbance. Reduce project caused on-site erosion by 95% within five years after initial disturbance (USDA Tech. Pub. SA-TP 11, 1980: USDA SCS Tech. Note No. 10, 1977). c. Design continuing mitigation/restoration practices and follow-up maintenance activities to insure that 80% original ground cover (vegetation) recovery occurs within five years after disturbance.	
Transportation System Management	1. Classify areas as to whether off-road vehicle use is permitted based on the overall land management objectives.		Not applicable to the alternatives.
	2. Manage public motorized use on roads and trails to maintain or enhance effective habitat for elk.	a. Work toward an open road and trail density of not more than 2.0 miles per 640 acres, except on Pole Mountain and Thunder Basin National Grasslands, within fourth order watersheds. In calculating miles of open road and motorized trail density, one mile of open road or motorized trail with an average of five or more vehicles per day (ADT) counts as 1.00 mile of road; one mile with an ADT of one to five counts as 0.70 miles of road; and one mile with less than one ADT counts as 0.05 miles of road. b. Specify off-road vehicle restrictions based on ORV use management (FSM 2355, R2 Supp.88).	The alternatives would not result in increased open road and trail density on TBNG. Any roads constructed for temporary construction access would be reclaimed upon completion of construction.
	3. Close all newly constructed roads to public motorized use unless documented analysis shows: a. Use does not adversely impact other resources; b. Use is compatible with the ROS class established for the area; c. They are located in areas open to motorized use; d. They provide user safety; e. They serve an identified public need; f. The area accessed can be adequately managed; or g. Financing is available for maintenance or coop-maintenance can be arranged.		If new temporary roads are necessary on TBNG they would be closed to protect the public.
	4. Manage road use by seasonal closure if: a. Use causes unacceptable damage to soil and water resources due to weather or seasonal conditions b. Use conflicts with the ROS class established for the area; c. Use causes unacceptable wildlife conflict or habitat degradation; d. Use results in unsafe conditions due to weather conditions; e. They serve a seasonal public or administration need; or f. Area accessed has seasonal need for protection or nonuse.		The alternatives would be required to comply with seasonal road closures on TBNG roads, if adopted. Currently, no roads would be crossed on TBNG which have established seasonal closures.
	5. Keep existing roads open to public motorized use unless: a. Financing is not available to maintain the facility or manage the associated use of adjacent lands; b. Use causes unacceptable damage to soil and water resources; c. Use conflicts with the ROS class established for the area; d. They are located in areas closed to motorized use and are not "designated routes" in the Forest travel management direction.		Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	e. Use results in unsafe conditions unrelated to weather conditions; f. There is little or no public need for them; or g. Use conflicts with wildlife management objectives.		
	6. Restrict vehicle traffic to minimize wildlife harassment in essential wildlife habitat, and to prevent resource damage in forage and cover areas.		Currently, such restrictions do not exist on TBNG in areas which would be crossed by the alternatives. However, if such restrictions are imposed in the future, the alternatives would be required to comply with the restrictions.
	7. Closed or restricted roads may be used for and to accomplish administrative purposes when: a. Prescribed in management area direction statements; b. Authorized by the Forest Supervisor; and c. In case of emergency.		Not applicable to the alternatives.
Arterial and Collector Road Construction and Reconstruction	1. Construct and reconstruct arterial and collector roads to meet multiple resource needs.	a. Construction and reconstruction standards for arterial and collector roads are: --- Standard: Arterial: Collector --- Travel Speed: Average 30-55 mph: Average 10-30 mph --- Lanes: Generally 2 lanes: Generally 1 lane --- Surface: All weather, generally asphalt or gravel: Generally gravel or native surface, sometimes asphalt --- Width: Typically 20 to 24 feet, but some single land with intervisible 10-foot turnouts: Typically 12 to 16 feet, with intervisible 10-foot turnouts --- Drainage: Permanent, not to impede traffic: Permanent, but may impede traffic ---	Not applicable to the alternatives.
	2. Construction and reconstruction of roads will be implemented on a project by project basis. Construction and reconstruction standards will be consistent with the expected use on the road. Existing roads will be used if practical. Roads not needed after the project is complete will be closed.		Not applicable to the alternatives.
Local Road Construction and Reconstruction	1. Construct and reconstruct local roads to provide access for specific resource activities such as campgrounds, trailheads, timber sales, range allotments, mineral leases, etc., with the minimum amount of earthwork.	a. Construction and reconstruction standards for local roads are: --- Trave Speed: Average less than 20 mph --- Lanes: Usually single lane except for developed recreation sites. --- Surface: Varies from asphalt to native surface; majority native surface.	It is anticipated that access to construction sites on TBNG would primarily use existing roads. However, if it becomes necessary to construct an access road on NFS lands, the general direction and standards would be applied.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
		Width :Typically 10 thru 14 feet. Turnouts optional depending upon traffic management. Usually not intervisible. Drainage: Dips and culverts.	
	2. Construction and reconstruction of roads will be implemented on a project by project basis. Construction and reconstruction standards will be consistent with the expected use on the road. Existing roads will be used if practical. Roads not needed after the project is complete will be closed.		The alternatives would be consistent with this general direction.
Road Maintenance	1. Maintain all roads to the following minimum requirements: a. arterials-Level 3 b. collectors-Level 2 c. all open local roads-Level 2 d. all closed local roads-Level 1.	a. See levels of maintenance in FSM 7730. b. Level 1 maintenance includes upkeep of drainage structures and vegetation cover necessary to prevent erosion.	A Transportation Plan will be developed for NFS lands. That plan will specifically address maintenance of roads on NFS lands on TBNG during construction. This general direction will be incorporated into the Transportation Plan.
	2. Require shared maintenance responsibility by National Forest System resource users when appropriate.		The Forest Service will work with DM&E to determine whether shared maintenance responsibilities are appropriate for roads used to access the operating railroad. DM&E would be solely responsible for maintaining roads used on NFS lands to access construction sites.
	3. Maintain structures, bridges, cattleguards, etc., to be structurally sound and safe for use.		The Transportation Plan will address maintenance of roads on NFS lands on TBNG during construction.
Trail Construction and Reconstruction	1. Construct or reconstruct trails when needed as part of the transportation system.	a. Cross drains and conveyance structures are planned according to Forest Design Standards.	The alternatives will not affect trails on NFS lands on TBNG.
	2. Obliterate unauthorized short cuts and undesired trails. Reroute trails where resource damage is occurring.		The alternatives will not affect trails on NFS lands on TBNG.
Trail System Management	1. Maintain all trails for foot and horse travel unless specifically closed to either or both class of user.		Not applicable to the alternatives.
	2. Maintain all trails to the following minimum requirements: a. Structures (bridges, corduroy, etc.) are structurally sound and safe for specified class of user, b. Maintain drainage structures to prevent unacceptable resource damage, and c. Remove hazards from trails to allow safe passage for specified class of users. A safety hazard is a physical condition of a trail which may cause injury, is unusual or unexpected, and not readily identifiable by the trail user. It is not a condition which is easily identifiable and normally encountered for the type or location of the trail involved. The following examples illustrate this distinction: A hazard is a rotten bridge decking or handrail. A stream crossing where no bridge is provided and the user would expect this on the type and location of the trail is not a hazard. A hazard is a stable-appearing loose rock in a constructed treadway where all other rocks are stable. A trail treadway made up of rocks in a near-natural position, many of which are loose, is not a hazard. A hazard is a perennial bog-hole on a horse trail. An intermittent bog-hole which will dry up by early summer or within a few days following a rain storm is not a hazard.		Not applicable to the alternatives.

Appendix A, Table 6. Railroad Alternative Consistency With Management Requirements of the 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activities	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
	A hazard is a section of trail treadway supported by rotten cribbing. A section of trail where the treadway is obviously slippery is not a hazard. A hazard is a marked ford with holes deeper than the normal channel. A deep ford with a consistent stream bed is not a hazard.		
	3. Provide a full range of trail opportunities in coordination with other Federal, State, and municipal jurisdictions and private industries on and off NFS lands.		Not applicable to the alternatives.
	4. CONTINENTAL DIVIDE NATIONAL SCENIC TRAIL (CDNST): Apply Interim Management for the CDNST corridor to identified alternative routes utilizing both existing trails and roads and nonexisting routes which may be used as connecting travel segments. Interim management will establish visual quality objectives for the Foreground and Middleground areas within the corridor.	a. The CDNST corridor is that area which encompasses the foreground and middleground of the seen-area as viewed from the alternative travel routes identified in the CDNST Comprehensive Plan. Interim management which protects the current scenic quality and recreation opportunities will be applied until such time that a specific trail route is formally designated as a part of the CDNST System. b. All travel route alternatives within the CDNST corridor have a Visual Management System (VMS) sensitivity Level I classification until a specific trail route is formally designated. Foreground and middleground areas within the corridor will meet the highest visual quality objective available within the existing visual condition class constraints and the visual quality objective of the management area.	The alternatives will not affect the Continental Divide National Scenic Trail.
	5. Do not mark existing travel routes as being a part of the CDNST system until they have been formally designated.		Not applicable to the alternatives.
	6. Upon formal designation of a travel route segment as a part of the CDNST system, manage the segment to emphasize foot travel, provide for horse use where safe to do so, and the continuation of motorized use where presently permitted and considered appropriate in the management direction for the overall management area. Give consideration to the needs of the long-distance traveler. Where motorized use is permitted, limit to snowmobiles operating on snow and vehicles with less than 40 inch width. Where the route coexists with a primitive local road, it may be open to use by larger vehicles.	a. The formally designated CDNST travelway will have a sensitivity Level I classification. Foreground and middleground areas, as seen from the trail, will meet the highest visual quality objective available within the existing visual condition class constraints, and the visual quality objective of the specific management area. b. Mark trail routes using the CDNST logo according to appropriate standards in the Comprehensive Plan. c. All other prescribed direction, standards and guidelines for the specific management area through which the (CDNST) passes apply. d. Maintain trails in accordance with standards in the Trail Handbook (FSH 7709.12). e. Schedule trail maintenance in accordance with Regional Acceptable Work Standards. (FSM 1310 R2 ID No. 1 7/22/82.)	Not applicable to the alternatives.
Fire Protection	1. Protect life, property, and resource values from wildfire in a cost efficient manner that maximizes the benefits of shared resources and developing technologies (FSM 5100).	a. Planned budgets and programs are based on an analysis of efficiency and public concern. b. Fiscal year fire program activities are based on a cost-efficient analysis of the budget. c. Wildfire suppression is based on least-cost plus damages with consideration for public concerns.	Not applicable to the alternatives.
Prescribed Fire	1. Prescribed fire will be used as a vegetative and fuels management technique where it is the most cost-efficient and acceptable alternative to achieve management objectives (FSM 5140).	a. A historical record will be maintained with each prescribed fire plan which documents the biological/physical effects and the fire behavior which produced the effects. b. Use current technologies to achieve an optimum balance between positive and negative effects, and prevent escaped fires	Not applicable to the alternatives.
Air Resource Management	1. Comply with State and Federal air quality standards. (See FSM 2120)		The alternatives would be consistent with this general direction. See the EIS for detailed information regarding impacts to air quality.
Insect and Disease Management/Suppression	1. Prevent or suppress epidemic insect and disease populations that threaten forest tree stands with an integrated pest management (IPM) approach consistent with resource management objectives.		Not applicable to the alternatives.

Appendix A, Table 7. Railroad Consistency With Management Prescription 4B, Emphasis on Habitat Indicator Species, 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland

Management Activity	General Direction	Standards and Guidelines	Railroad Alternative Consistency
Visual Resource Management	1. Design and implement management activities to blend with the natural landscape.	a. Do not exceed an adopted Visual Quality Objective (VQO) of modification.	All alternatives would comply with the VQO of modification. Under the modification VQO, management activities may dominate the landscape.
Dispersed Recreation Management	1. Manage human recreational activities so they do not conflict with habitat needs of selected indicator species.		Not applicable to the alternatives.
	2. Semi-primitive nonmotorized, semi-primitive motorized, roaded natural and rural recreation opportunities can be provided.	a. Maximum Use and Capacity Levels are: Recreation use and capacity range during the snow-free period (PAOT/acre): Trail use and capacity range (PAOT/mile of trail): Capacity Range Use Level / Very Low / Low / Moderate / High ROS Class - Semi-Primitive Nonmotorized On Trails PAOT/mile / 2.0 / 3.0 / 9.0 / 11.0 Area-wide PAOT/acre / .004 / .008 / .05 / .08 ROS Class - Semi-Primitive Motorized On Trails PAOT/mile / 2.0 / 3.0 / 9.0 / 11.0 Area-wide PAOT/acre / .004 / .008 / .05 / .08 ROS Class - Roaded Natural On Trails PAOT/mile / - / - / - / - Area-wide PAOT/acre / .04 / .08 / 1.2 / 2.5 ROS Class - Rural On Trails PAOT/mile / - / - / - / - Area-wide PAOT/acre / .5 / .8 / 5.0 / 7.5	Not applicable to the alternatives.

Appendix A, Table 7. Railroad Consistency With Management Prescription 4B, Emphasis on Habitat Indicator Species, 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activity	**General Direction**	**Standards and Guidelines**	**Railroad Alternative Consistency**
		Reduce the above use level coefficients as necessary to reflect usable acres, patterns of use, and general attractiveness of the specific management area type as described in the ROS Users Guide, Chapter 25. Reduce the above use levels where unacceptable changes to the biophysical resources will occur.	
		b. Specify off-road vehicle restrictions based on ORV use management (FSM 2355, R2 Supp. 88). c. See FSM 2331, FSM 7732, FSH 7709.12 (Trails Handbook), FSH 7109. 11a and 11b (Sign Handbook).	Not applicable to the alternatives.
	3. Permit undesignated sites in Frissell condition class 1 through 3 where unrestricted camping is permitted.		Not applicable to the alternatives.
Wildlife and Fish Resource Management	1. Manage for habitat needs of management indicator species.	a. Maintain habitat capability at a level at least 80 percent of potential capability.	Alternatives B and C may not be consistent with this general direction. Both alternatives parallel the Little Thunder Creek drainage on TBNG and could reduce habitat capability to below 80 percent of potential for some management indicator species, particularly nesting golden eagles and Swainson's hawks. The alternatives pass through elk crucial winter range on TBNG and may reduce habitat capability to below 80 percent of potential for wintering elk.
		b. Limit human activities associated with the issuance of contracts and permits to maintain habitat capability at a level at least 80 percent of potential capability.	Human activities associated with construction and operation of any alternatives could decrease habitat capability on TBNG to below 80 percent of potential capability on crucial elk winter range and where Alternatives B and C parallel Little Thunder Creek, nesting habitt for some management indicator species.
		c. Maintain at least 90 percent of the habitat needed to support the State population goals for each species.	Only a small portion of the habitat on NFS lands on TBNG would be affected by the alternatives. The alternatives would be consistent with this standard and guideline.
	2. Provide effective habitat for elk and deer where these species are present.	a. Maintain, along 75 percent of all arterial and collector road edges, cover that hides 90 percent of an adult elk or deer from human view at a distance of 150 feet from the road.	Not applicable to the alternatives.
		b. In diversity units dominated by forested ecosystems, maintain a minimum of 50 percent of the diversity unit in deer or elk hiding cover. This hiding cover should be well distributed over the unit. Maintain 30 percent of the diversity unit in thermal cover (winter or spring-summer). Hiding cover can be used to meet thermal cover requirements if they indeed coincide biologically.	Not applicable to the alternatives.
Wildlife Habitat Improvement and Maintenance	1. Improve habitat capability through direct treatments of vegetation, soil, and waters.		Not applicable to the alternatives.
	2. Maintain habitat for old growth dependent species.	a. Management areas will be managed to attain at least 20 percent in old growth and occur in 30 acre or larger patches.	Old growth would not be affected by implementation of the alternatives.
	3. Maintain existing natural shrub and grassland openings unless treatment is designed to benefit wildlife.		Not applicable to the alternatives.
	4. Manage habitat for birds and small mammals.		The alternatives would have insignificant impacts on habitat for birds and small mammals.
	5. Retain prairie dog towns needed to provide essential habitat for the black-footed ferret.	.	Alternatives C and D would be consistent with this general direction. Alternative B would not. Alternative B would cross through portions of the Rosecrans area which has been designated a reintroduction site for the black-footed ferret.
	6. Manage grasslands and grassland shrub types to improve wildlife habitat. Improve habitat conditions by increasing forage available to wildlife and enhancing vegetation diversity.		The alternatives will temporarily and permanently remove grassland and grassland-shrub vegetation within TBNG and would be inconsistent with this general direction.

Appendix A, Table 7. Railroad Consistency With Management Prescription 4B, Emphasis on Habitat Indicator Species, 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland

Management Activity	General Direction	Standards and Guidelines	Railroad Alternative Consistency
	7. Manage the Ponderosa Pine Association on the Thunder Basin National Grassland for wildlife and esthetics.		All the alternatives would cross small areas of ponderosa pine in the vicinity of the Rochelle Hills. Impacts to this association are expected to be negligible.
Range Resource Management	1. Implement rotation grazing systems.		Not applicable to the alternatives.
	2. Apply wildlife and livestock forage allowable use guides specified in Forest Direction. Modify so needs of management indicator species are met.		Not applicable to the alternatives.
	3. Structural range improvement should be designed to benefit wildlife and livestock.	a. Structural improvements will not adversely affect big game movement (FSH 2209.22).	Not applicable to the alternatives.
Silvicultural Prescriptions	1. Manage forest cover types to provide variety in stand sizes, shape, crown closure, edge contrast, age structure and interspersion.		Not applicable to the alternatives.
	2. Vegetation treatment of forested areas will be used to work towards a forest environment that is a mosaic of tree stands that provide cover and forage for indicator species of wildlife.		Not applicable to the alternatives.
	3. Manage forest cover types using the following harvest methods. - Clearcut in aspen and lodgepole - Shelterwood or clearcut in interior ponderosa pine, mixed conifer and Engelmann spruce-subalpine fir.	a. Apply harvest methods to forest cover types as specified in General Direction on at least 80% of the forest cover type. Up to 20 percent of the type may be treated using other appropriate harvest methods specified in Forest Direction. Follow silvicultural standards as specified in Forest Direction Requirements.	Not applicable to the alternatives.
	4. Apply intermediate treatments to maintain growing stock level standards.		Not applicable to the alternatives.
	5. For management purposes, a cut-over area is considered an opening until minimum stocking standards by forest cover type and site productivity are met.	a. When the Visual Quality Objective of an area is modification or maximum modification, the regenerated stand shall meet or exceed all of the following characteristics before a cut-over area is no longer considered an opening: --- Forest Cover Type — Minimum Stocking Level (Trees/acre) — Tree Stand Height (ft) 1/ --- Inland Ponderosa Pine — 190 — 6 Mixed Conifers — 190 — 6 Lodgepole Pine — 150 — 6 Engelmann Spruce-Subalpine Fir — 150 — 6 Aspen — 300 — 6 --- Forest Cover Type — Crown Closure (Percent) — Distribution /2 --- Inland Ponderosa Pine — 30 — 70% Mixed Conifers — 30 — 75% Lodgepole Pine — 30 — 75% Engelmann Spruce-Subalpine fir — 30 — 75% Aspen — 30 — 75% --- 1/ Applies to trees specified as minimum stocking level. 2/ Percent of plots or transects that are stocked.	Not applicable to the alternatives.
	5. Use trees of the best genetic quality available which are adapted to the planting site when supplemental planting. (Reference FSM 2475)		Not applicable to the alternatives.

Appendix A, Table 7. Railroad Consistency With Management Prescription 4B, Emphasis on Habitat Indicator Species, 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland			
Management Activity	**General Direction**	**Standards and Guidelines**	**Railroad Alternative Consistency**
Transportation System Management	1. Manage road use to provide for habitat needs of management indicator species, including road closures and area closures, and to maintain habitat effectiveness.	a. Achieve an open road and trail density except on Pole Mountain and Thunder Basin National Grassland, of not more than 1.2 miles per 640 acres. In calculating miles of open road and motorized trail density, one mile of open road or motorized trail with an average of five or more vehicles per day (ADT) counts as 1.00 mile of road; one mile with an ADT of one to five counts as 0.70 miles of road; and one mile with less than one ADT counts as 0.05 miles of road.	The alternatives could not be subject to closure to maintain habitat effectiveness for managment indicator species and would not be consistent with this general direction.
Arterial and Collector Road Construction and Reconstruction	1. Meet the following practices unless practical design alternatives are available. Screen meadows, clearcuts, and other openings from roads by means of vegetation or topography. Locate and construct cuts and fills so they do not block big game travel routes. Lay out roads to facilitate closure for management needs. Avoid single tangents of roads of more than .25 mile in forested sites to increase the cover values and discourage road hunting.		The general direction provided applies to roads. However, at least one of the practices also has direct applicability to impacts from the railroad alternatives. The alternatives would not be consistent with the general direction to construct cut and fills so that they do not block game travel routes. Without adequate mitigation the railroad could prove to be a barrier to big game migration in several areas on TBNG. DM&E is exploring mitigation opportunities to allow movement of wildlife across the existing track, including evaluating the feasibility of installing large box culverts and fencing to direct wildlife to safe crossing locations.
Fuel Treatment	1. Maintain fuel conditions which permit fire suppression and prescribed fire to maintain habitat needed for selected species or species population levels.		Not applicable to the alternatives.

Appendix A, Table 8. Railroad Alternative Consistency With Management Prescription 4C, Emphasis on Wildlife Habitat in Woody Draws and Other Woody Vegetation Areas on Rangelands, 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland.

Management Activity	General Direction	Standards & Guidelines	Railroad Alternative Consistency
Visual Resource Management	1. Design and implement management activities to blend with the natural landscape.	a. Do not exceed an adopted Visual Quality Objective (VQO) of modification.	The alternatives would comply with the VQO of modification. Under the modification VQO, management direction may dominate the landscape.
Dispersed Recreation Management	1. Manage human recreational activities so they do not conflict with habitat needs of selected indicator species.		Not applicable to the alternatives.
	2. Semi-primitive nonmotorized, semi-primitive motorized, roaded natural and rural recreation opportunities can be provided.	a. Maximum Use and Capacity Levels are: Recreation use and capacity range during the snow-free period (PAOT/acre): Trail use and capacity range (PAOT/mile of trail):	Not applicable to the alternatives.

	Capacity Range			
Use Level	Very Low	Low	Moderate	High
ROS Class - Semi-Primitive Nonmotorized				
On Trails PAOT/mile	2.0	3.0	9.0	11.0
Area-wide PAOT/acre	.004	.008	.05	.08
ROS Class - Semi-Primitive Motorized				
On Trails PAOT/mile	2.0	3.0	9.0	11.0
Area-wide PAOT/acre	.004	.008	.05	.08
ROS Class - Roaded Natural				
On Trails PAOT/mile	-	-	-	-
Area-wide PAOT/acre	.04	.08	1.2	2.5

Appendix A, Table 8. Railroad Alternative Consistency With Management Prescription 4C, Emphasis on Wildlife Habitat in Woody Draws and Other Woody Vegetation Areas on Rangelands, 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland.			
Management Activity	**General Direction**	**Standards & Guidelines**	**Railroad Alternative Consistency**
		ROS Class - Rural --- On Trails PAOT/mile - - - - --- Area-wide PAOT/acre .5 .8 5.0 7.5 --- Reduce the above use level coefficients as necessary to reflect usable acres, patterns of use, and general attractiveness of the specific management area type as described in the ROS Users Guide, Chapter 25. Reduce the above use levels where unacceptable changes to the biophysical resources will occur. b. Specify off-road vehicle restrictions based on ORV use management (FSM 2355, R2 Supp. 88). c. See FSM 2331, FSM 7732, FSH 7709.12 (Trails Handbook), and 11b (Sign Handbook).	
	3. Permit undesignated sites in Frissell Condition Class 1 through 3 where unrestricted camping is permitted.		Not applicable to the alternatives.
Wildlife Habitat Improvement and Maintenance	1. Manage for habitat needs of indicator species.	a. Maintain habitat capability at a level at least 70 percent of potential capability for species other than early succession-oriented species.	It is not anticipated that the alternatives would reduce habitat capability to below 70 percent of potential capability.
	2. Maintain existing natural shrub and grassland openings unless treatment is designed to benefit wildlife.	a. In areas where shrub types are actively managed, maintain at least 25% of the browse in young growth and 50% in mature growth. If cover is needed for optimum habitat, tree planting may be done.	Not applicable to the alternatives.
	3. Manage habitat for birds and small mammals.	a. All turkey roost tree groups are retained. The group includes the trees actually used for roosting and other trees used for cover. A minimum size group of .10 acre is retained.	A survey for turkey roosts has not been completed. If present, they could be impacted directly or made unsuitable for use from noise. If so, the alternatives would not be consistent with this standard unless mitigation is developed to offset the impact.
	4. Manage grasslands and grassland shrub types to improve wildlife habitat. Improve habitat conditions by increasing forage available to wildlife and enhancing vegetation diversity.		Not applicable to the alternatives.
	5. Manage the area to maintain wildlife habitat in good condition. Design range improvements to increase the carrying capacity for wildlife species. Invest in special wildlife habitat structure improvements to meet the special needs of indicator species.		Where crossed by the operating railroad, habitat quality would degrade to less than good condition from direct as well as indirect impacts, particularly in woody draws. The alternatives would not be consistent with this direction.
Range Resource Management	1. Prevent habitat degradation adjacent to water sources.	a. Unregulated livestock access to water impoundments behind dams must be less than 50 percent of the impoundment perimeter. b. Maintain late seral stage vegetation on at least 20 percent of the area within a 100 foot radius around all created water sources except impoundments behind dams.	Not applicable to the alternatives.
	2. Perpetuate woody vegetation.	a. Maintain woody vegetation in all stages of development on at least 60 percent of the area.	Not applicable to the alternatives.
	3. Apply wildlife and livestock forage allowable use guides specified in Forest Direction. Modify so needs of management indicator species are met.	a. Maintain vegetation in fair or better range condition.	Not applicable to the alternatives.
	4. Implement rotation grazing systems.		Not applicable to the alternatives.
	5. Manage for sustained yield of livestock with the intent to upgrade range conditions for wildlife and livestock while using the available forage.		Not applicable to the alternatives.

Appendix A, Table 8. Railroad Alternative Consistency With Management Prescription 4C, Emphasis on Wildlife Habitat in Woody Draws and Other Woody Vegetation Areas on Rangelands, 1985 Medicine Bow National Forest Plan - Thunder Basin National Grassland.

Management Activity	General Direction	Standards & Guidelines	Railroad Alternative Consistency
Range Improvement and Maintenance	1. Structural range improvement should be designed to benefit wildlife and livestock.	a. Structural improvements will not adversely affect big game movement (FSH 2209.22).	Not applicable to the alternatives.
Silvicultural Prescriptions	1. For management purposes, a cut-over area is considered an opening until minimum stocking standards by forest cover type and site productivity are met.	a. When the Visual Quality Objective of an area is modification or maximum modification, the regenerated stand shall meet or exceed all of the following characteristics before a cutover area is no longer considered an opening. Forest Cover Type / Minimum Stocking Level (Trees/acre) / Tree Stand Height (ft) 1/ Inland Ponderosa Pine: 190 / 6 Mixed Conifers: 190 / 6 Lodgepole Pine: 150 / 6 Engelmann Spruce-Subalpine Fir: 150 / 6 Aspen: 300 / 6 Forest Cover Type / Crown Closure (Percent) / Distribution 2/ Inland Ponderosa Pine: 30 / 70% Mixed Conifers: 30 / 75% Lodgepole Pine: 30 / 75% Engelmann Spruce-Subalpine Fir: 30 / 75% Aspen: 30 / 75% 1/ Applies to trees specified as minimum stocking level. 2/ Percent of plots or transects that are stocked.	Not applicable to the alternatives.
Water Uses Management	1. Avoid locating new wells in the area.		Not applicable to the alternatives.
Transportation System Management	1. Restrict off-road vehicle travel as needed to protect management indicator species and other species.	a. Determine off-road vehicle restrictions based on the needs of wildlife. Follow ORV Management Guidelines Handbook (R2 FSH 2309.26).	Not applicable to the alternatives.
	2. Locate and construct roads to maintain the basic natural condition, character, and habitat effectiveness of woody draws.		If new roads are necessary to access construction sites, they would be consistent with this general direction.