

Construction of Alternative B during spring and early summer along the corridor of the Cheyenne River could displace piping plovers from sandbars or islands within the river. However, water flows in the Cheyenne River during some years would inundate or scour sandbars and islands, making them unsuitable for nesting. If that were the case during construction, there would be no short-term impacts to piping plovers. In years with low water flows, construction activities prior to nesting may cause them to avoid the area. Since piping plovers appear to tolerate distant noise associated with highways and railroads, they may nest anyway, resulting in minimal impacts.

4.2.2.1.2 Operational Impacts

Long-term impacts to piping plovers may include noise and nest disturbance from increased human activity. Selenium concentrations in subbituminous coal from the Powder River Basin (0.73 ppm) are far below concentrations found in bituminous coals of the mid-west and Appalachian basins (range of 2.5 to 5.7 ppm) (Ensminger 1977). Thus, elevated selenium levels due to coal dust entering water or soils is unlikely.

Spills of petroleum products such as diesel fuels or lube oils during construction of the proposed project could affect aquatic invertebrates which piping plovers rely on for their food source. However, DM&E would store these substances (fuels and oil) away from drainages and a Spill Prevention Control and Countermeasure (SPCC) plan would be in place in case of spills.

4.2.2.2 Alternative C (Modified Proposed Action)

4.2.2.2.1 Construction Impacts

Construction of this alternative would have similar impacts as Alternative B. Nesting piping plovers could be disturbed by construction noise. Spills of petroleum products could affect aquatic invertebrates. However, DM&E would have SPCC plans in place in case of spills and would store toxic (fuels and oil) substances away from drainages.

DM&E would employ erosion and sedimentation control measures during construction activities to minimize impacts on water resources.

Bioaccumulation of selenium and possibly other trace elements could adversely affect piping plovers known to nest on the Cheyenne River downstream as well as potential nests within the project area. Construction occurring adjacent to the river may require riprap or other structures for stabilization that in turn could change the flow of the river.

Construction during spring and early summer along the Cheyenne River corridor could displace piping plovers if they select sandbars or islands within the river to nest. However, high water flows in the Cheyenne River during some years would destroy any potential nesting habitats. If that were the case during construction, there would be no short-term impacts to piping plovers.

4.2.2.2.2 Operational Impacts

Carrion along the track may result in an increase in predators that may lead to relatively high nest predation for nests in the vicinity of the rail line compared to those further removed (Reeve 1990, Hein & Andelt 1996). Additional impacts include noise and nest disturbance from increased human activity. Significant amounts of coal dust entering water or soils is unlikely.

4.2.2.3 Alternative C with the Phiney Flat Variation

Impacts for this alternative would be similar to Alternatives B and C.

4.2.2.4 Alternative C with the W G Flat Variation

Impacts for this alternative would be similar to Alternatives B and C.

4.2.2.5 Alternative D (Existing Transportation Corridors)

4.2.2.5.1 Construction Impacts

Nesting piping plovers could be disturbed by construction noise, although this alternative would have fewer impacts to nesting piping plovers than Alternatives B and C since it only crosses the Cheyenne River once. Spills of petroleum products during construction could affect aquatic invertebrates which piping plovers rely on for their food source. Since the alternative crosses the river only once, the opportunity for the possibility of a spill occurring is even more unlikely than for the other alternatives. However, DM&E has SPCC plans in place in case of spills and would store toxic (fuels and oil) substances away from drainages to reduce the potential for release into a waterway.

DM&E would employ erosion and sedimentation control measures during construction activities to minimize impacts on water resources due to possible selenium accumulation.

Construction of Alternative D during spring and early summer along the Cheyenne River corridor could displace the birds. However, Alternative D would cross the Cheyenne River only once, between the confluence of Spring Creek and Wasta, and would only affect nesting areas in proximity to this crossing. Due to this limited opportunity to affect potential nesting areas, Alternative D would not be expected to impact piping plovers.

4.2.2.5.2 Operational Impacts

The impact to piping plovers from nest predation would be less for this alternative than for Alternatives B and C. Elevated selenium levels due to coal dust entering water or soils is unlikely.

4.3 WHOOPING CRANE

4.3.1 Minnesota

This species does not occur in Minnesota; therefore, there would be no impacts.

4.3.2 South Dakota and Wyoming

No impacts to whooping cranes are anticipated since the only documentation of their occurrence within the proposed project area is infrequently during migrations.

4.4 INTERIOR LEAST TERN

4.4.1 Minnesota

Interior least terns are known to nest along the Missouri River and have been observed near DM&E's bridge crossing at Pierre, South Dakota and downstream at the Farm Island Recreation Area (SDNHDB 1998). In this area, approximately 4.8 miles of the existing railroad is within 500 feet of the Missouri River.

4.4.1.1 Construction Impacts

Nesting interior least terns appear tolerant of vehicular and railroad traffic, but abandon nests and colonies if directly disturbed by pedestrians, off-road vehicles, pets and livestock (Carreker 1985), or recreational activities (Kruse et al. 1993, Mayer 1993). Increased human activity during construction may impact nesting interior least terns.

Spills of petroleum products could affect fish which interior least terns rely on for their food source. However, DM&E would have SPCC plans in place in case of spills and would store toxic (fuels and oil) substances away from drainages.

Traditionally, wood treated with creosote used to inhibit wood-destroying fungi, has been the principal material for rail ties and bridge construction where small drainages were crossed. Coal tar creosote is

heavier than water and practically insoluble (Budavari et al. 1989). Phenols, which may be components of creosote, are highly toxic by ingestion, inhalation or skin absorption (Talmage 1977). Contamination of local water sources could occur if railroad ties or other similar products are stored near waterways which in turn could impact invertebrates that the birds feed upon.

4.4.1.2 Operational Impacts

There could be an increase in carrion along the track, which could draw more predators to the area. Ground nesting birds are extremely susceptible to predation.

4.4.2 South Dakota and Wyoming

4.4.2.1 Alternative B (Proposed Action)

4.4.2.1.1 Construction Impacts

Construction impacts are similar to those listed under Section 4.2.2.1.1 for the piping plover. Increased human activity during construction could impact nesting interior least terns. If selenium occurs in the soils, increased sediment loads in the Cheyenne River could occur following erosion and runoff from construction sites increasing selenium concentrations. However, this is unlikely since DM&E would employ erosion and sedimentation control measures during construction activities. Bioaccumulation of selenium could impact interior least terns known to nest downstream of erosion sites. Construction occurring adjacent to the river may require riprap or other structures for stabilization that in turn could change the flow of the river. Change in river flow could alter existing deposition and erosion regimes that created local mud, sand, or gravel bars that provide suitable nesting habitats. However, these areas could be lost and others created. Habitats currently overgrown could be scoured, making them again suitable for nesting.

Contamination of local water sources could occur if railroad ties or other similar products are stored near waterways and runoff from these storage areas is not properly contained.

Spills of petroleum products could contaminate adjacent waters. However, DM&E would have SPCC plans in place in case of spills and would store fuels and oil away from drainages.

Construction of this alternative during spring and early summer along the Cheyenne River corridor could displace interior least terns if they select sandbars or islands within the river to nest.

4.4.2.1.2 Operational Impacts

Operational impacts are similar to those listed for piping plovers under Section 4.2.2.1.2. An increase in predators may result from the increase in carrion along the track. Ground nesting birds, such as interior least terns, are extremely susceptible to nest predation.

Elevated selenium levels due to coal dust entering water or soils is unlikely since selenium concentrations in subbituminous coal from the Powder River Basin (0.73 ppm) are far below concentrations found in bituminous coals of the mid-west and Appalachian basins (range of 2.5 to 5.7 ppm) (Ensminger 1977). Thus, elevated selenium levels due to coal dust contamination of water or soils is unlikely.

4.4.2.2 Alternative C (Modified Proposed Action)

4.4.2.2.1 Construction Impacts

Construction impacts are similar to those listed under Alternative B. Increased human activity during construction may impact nesting interior least terns. Birds are known to abandon nests and colonies if directly disturbed by pedestrians, off-road vehicles and pets (Kruse et al. 1993, Mayer 1993).

DM&E would employ erosion and sedimentation control measures during construction activities to avoid possible increased loads of selenium in the Cheyenne River. Bioaccumulation of selenium and possibly

other trace elements could adversely affect interior least terns known to nest on the Cheyenne River downstream as well as potential nests within the project area. Therefore, construction adjacent to the river may require riprap or more substantial structures to stabilize the riverbank that could change river flow dynamics. The change in river flow could alter existing deposition and erosion regimes that created local mud, sand, or gravel bars that might serve as suitable nesting habitats. However, many of the piping plovers found in the proposed project area have adapted to nesting at sandpits which would be unaffected by changes in river flows.

There is a remote possibility of spills of petroleum products occurring that could affect fish that interior least terns eat. However, DM&E would have SPCC plans in place in case of spills and would store toxic (fuels and oil) substances away from drainages.

Interior least terns could be displaced during construction along the Cheyenne River.

4.4.2.2 Operational Impacts

Once the rail line is operational there could be an increase in predators that could impact interior least terns.

Selenium concentrations in subbituminous coal from the Powder River Basin (0.73 ppm) are far below concentrations found in bituminous coals of the mid-west and Appalachian basins (range of 2.5 to 5.7 ppm) (Ensminger 1977). Thus, elevated selenium levels due to coal dust entering water or soils is unlikely.

4.4.2.3 Alternative C with the Phiney Flat Variation

Impacts for this alternative would be similar to Alternatives B and C.

4.4.2.4 Alternative C with the W G Flat Variation

Impacts for this alternative would be similar to Alternatives B and C.

4.4.2.5 Alternative D (Existing Transportation Corridors)

4.4.2.5.1 Construction Impacts

Construction impacts are similar to those listed under section 4.2.2.1.1 for the piping plover. Increased human activity during construction may impact nesting interior least terns.

If selenium occurs in the soils, increased loads in the Cheyenne River could occur following erosion and runoff from construction sites. However, this is unlikely since DM&E would employ erosion and sedimentation control measures during construction activities. Additionally, this alternative crosses the Cheyenne River only once therefore there should be fewer impacts due to construction along the river.

Spills of petroleum products could affect fish which interior least terns rely on for their food source. However, DM&E would have SPCC plans in place in case of spills and would store toxic (fuels and oil) substances away from drainages.

Interior least terns could be displaced during construction. 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.

4.4.2.5.2 Operational Impacts

Once the rail line is operational there may be an increase in predators. Local concentrations of predators could impact ground-nesting birds (Baker et al. 1999), including interior least terns that are in close proximity to the rail line.

Selenium concentrations in subbituminous coal from the Powder River Basin (0.73 ppm) are far below concentrations found in bituminous coals of the mid-west and Appalachian basins (range of 2.5 to 5.7 ppm) (Ensminger 1977). Thus, elevated selenium levels due to coal dust entering water or soils is unlikely.

4.5 TOPEKA SHINER

4.5.1 Minnesota

The existing railroad crosses streams known to be or potentially inhabited by Topeka shiners at 12 sites in Minnesota (Table 4-1). The railroad is within 500 feet of those streams for approximately 5.2 miles. Those crossing sites and areas within 500 feet of streams are most likely to be at risk of increased sedimentation during construction and operation. Sedimentation could adversely affect water and substrate quality since Topeka shiners inhabit cool, low order prairie streams with good water quality and mostly with silt-free substrates of gravel, cobble, and sand.

4.5.1.1 Construction Impacts

Topeka shiners downstream from the project area could be adversely affected if petroleum products were accidentally discharged into aquatic environments. Such materials are toxic to algae, invertebrates, and fish. However, DM&E would have SPCC plans in place in case of spills and would store these substances away from drainages. Short-term impacts could occur during construction with increased sedimentation due to runoff from cut-and-fill activities, placement of bridges and culverts in drainages, and erosion from the disturbed construction right-of-way.

4.5.1.2 Operational Impacts

During operation, short- or long-term impacts could occur downstream if there were derailments and accidental releases of diesel fuels and other petroleum products. However, this is unlikely because of increased safety of the rail line. Impacts would be most likely if derailments or accidental releases are within 500 feet of surface waters where there may be insufficient riparian vegetation to prevent flows from entering drainages.

4.5.2 South Dakota and Wyoming

The existing railroad crosses streams known to be or potentially inhabited by Topeka shiners at 41 sites in South Dakota (Table 4-1). The railroad is within 500 feet of those streams for approximately 13.2 miles. Those crossing sites and areas within 500 feet of streams are most likely to be at risk of increased sedimentation during construction and operation. Sedimentation could adversely affect water and substrate quality since Topeka shiners inhabit cool, low order prairie streams with good water quality and mostly with silt-free substrates of gravel, cobble, and sand.

4.5.2.1 Construction Impacts

Construction impacts would be similar to those listed for Minnesota.

4.5.2.2 Operational Impacts

Operational impacts would be similar to those listed for Minnesota.

Table 4-1 Topeka Shiner Streams by DM&E's Existing Rail Line			
State	County	Existing Railroad Crossings and Paralleling Streams inhabited by Topeka Shiners	
		Number of Stream Crossings	Distance of ROW within 500 feet of Streams (miles)
Minnesota	Lincoln	12	5.2
South Dakota	Brookings	24	8.6
	Kingsbury	5	1.5
	Beadle	8	2.2
	Hand	4	0.9
Total:		53	18.4

4.6 PALLID STURGEON

4.6.1 Minnesota

This species does not occur in Minnesota; therefore, there would be no impacts.

4.6.2 South Dakota and Wyoming

From 1967 to 1989 there have been records of pallid sturgeon in the Missouri River between DM&E's existing bridge crossing at Pierre, South Dakota downstream to the Medicine Knoll Creek confluence and where the existing railroad parallels the Missouri River. In this portion of the existing railroad, there are approximately 4.8 miles where the tracks are within 500 feet of the Missouri River.

Rebuilding the existing railroad is not likely to contribute to further degradation of riverine habitats inhabited by pallid sturgeons. Sturgeons are adapted to turbid waters, possibly depending on turbidity as cover from predators and feeding on fish species likewise adapted to turbid water. Consequently, any increases in sedimentation in the Missouri River due to construction and operation of the rebuild project, such as rehabilitation of the existing or construction of a new rail bridge over the river, is not likely to pose a hazard to pallid sturgeon in the river. Pallid sturgeon inhabiting the Missouri River in the project area or downstream could be adversely affected if petroleum products were accidentally discharged into aquatic environments.

4.6.2.1 Alternatives

Since suitable habitat does not exist in the vicinity of the alternatives paralleling the Cheyenne River there would be no impacts.

4.7 AMERICAN BURYING BEETLE

4.7.1 Minnesota

This species does not occur in Minnesota; therefore, there would be no impacts.

4.7.2 South Dakota and Wyoming

Potentially suitable habitat is crossed by the existing railroad from Brookings County in eastern South Dakota to Pennington County, South Dakota in the west and includes cropland, pastures, grassland (herbaceous rangeland) and deciduous forestlands. The American burying beetle may occur wherever suitable habitat is present. Nearly 460 miles of existing railroad cross these land cover types in South Dakota. However, farmed cropland would probably not be suitable habitat due to frequent disturbances and pesticide use. Additionally, the right-of-way would provide only limited habitat for carrion species and American burying beetle's presence within the ROW would be incidental if they even occurred within the project area. Impact projections are impossible because of inadequate information about the beetles' distribution in the vicinity of the existing rail line. Adequate litter could have developed along

DM&E's right-of-way where limited or no maintenance work has occurred. Consequently, there could be adequate litter developed in which beetles could bury carrion.

Estimates of potential habitats affected can be made, based on general habitat and soils types where suitable soils are assumed to include sandy soils (those with high wind erosion potential) and prime farmland soils (those with relatively well-developed topsoils). These soils are considered sensitive to impacts by any of the alternatives. Other soils in the project area that might be inhabited by American burying beetles include those with silt loam, loam and sandy loam textures.

4.7.2.1 Alternative B (Proposed Action)

4.7.2.1.1 Construction Impacts

American burying beetle habitat within the right-of-way may be disturbed or lost during construction and operation of the rail line. More likely are impacts due to construction such as removal and compaction of soils, but only if beetles are present within construction rights-of-way. Once the ballast is laid and the earth compacted in the right-of-way it is unlikely these areas would be suitable habitat for the beetle.

Though not documented in the vicinity of Alternative B in South Dakota, American burying beetles could occur in suitable soils. Suitable soils include those with high sand content (soils with high wind erosion potential) and those with relatively well developed topsoil. Soils in both groups are sensitive to impacts by Alternative B. Given the recent collections of American burying beetles in southern South Dakota in riparian areas, grasslands, and grasslands with interspersed stands of cottonwoods (Backlund and Marrone, 1997), Alternative B could affect similar potentially suitable habitats along the route in South Dakota. Over 3 miles (approximately 73 acres within ROW) of forested (cottonwood riparian) wetlands and 113 miles (approximately 2739 acres within ROW) of herbaceous rangeland would be affected. Also, this alternative would pass through 20.5 miles (approximately 497 acres within ROW) of cropland and pasture that could also serve as suitable habitats.

Potential habitat that may be disturbed by construction of Alternative B is provided in Table 4-7. Construction disturbance would probably contribute short- and long-term impacts to American burying beetles if the beetles are actually present. There are approximately 33 miles (approximately 800 acres within the ROW) in South Dakota where Alternative B would pass through soils and habitats that might be used by American burying beetles for burying carrion and reproduction. The majority of those soils, 26 miles (approximately 630 acres within the ROW), are potentially prime farmland soils but it is unknown whether all or some are irrigated and/or cultivated. It is assumed that irrigation and/or cropland would make a site unsuitable for American burying beetles due to frequent disturbances.

Impacts due to artificial lights, which are known to attract and disorient many species of nocturnal insects, could occur if construction takes place at night.

County State	Suitable Soil Type	Distance (miles) of potential habitat crossed				County Total
		Cropland Pasture	Herbaceous Rangeland	Forested Wetland	Deciduous Forest	
Pennington SD	Sandy, Erosive	0	0.06	0	0	0.06
	Prime Farmland	0.99	1.36	0	0	2.35
Custer SD	Sandy, Erosive	0	1.12	0.47	0	1.59
	Prime Farmland	1.02	2.86	0.74	0	4.62
Fall River SD	Sandy, Erosive	0.60	5.07	0.26	0	5.93
	Prime Farmland	7.62	10.66	0.53	0	18.81
Alternative B Total:		10.23	21.13	02.00	0	33.36

4.7.2.1.2 Operational Impacts

Impacts due to artificial lights in staging areas could occur. Other operational impacts are expected to be minimal since once the rail line is operational, soils within the right-of-way would be compacted and unsuitable for the American burying beetles.

4.7.2.2 Alternative C (Modified Proposed Action)

4.7.2.2.1 Construction Impacts

Impacts would be similar to those for Alternative B. Table 4-8 lists potential American burying beetle habitat along Alternative C. There are approximately 35 miles (approximately 849 acres within the ROW) in South Dakota where Alternative C would pass through suitable soils in potential habitats that might be used by American burying beetles, 2 miles more than Alternative B. Nearly 27 miles (approximately 655 acres of the ROW) of Alternative C passes through soils with characteristics of prime farmland, but whether all or some are irrigated and/or cultivated is unknown.

Habitat of the American burying beetle may be disturbed and/or lost. Removal and compaction of soils during construction could also impact the beetles, but only if they are present within construction rights-of-way. Impacts due to artificial lights, which are known to attract and disorient many species of nocturnal insects, could occur if construction takes place at night.

County State	Suitable Soil Type	Distance (miles) of potential habitat crossed				
		Cropland Pasture	Herbaceous Rangeland	Forested Wetland	Deciduous Forest	County Total
Pennington SD	Sandy, Erosive	0	0.84	0	0.20	1.04
	Prime Farmland	0.99	1.90	0	0	2.89
Custer SD	Sandy, Erosive	0	0	0	0	0
	Prime Farmland	2.95	1.13	0	0	4.08
Fall River SD	Sandy, Erosive	1.28	6.36	0.12	0	7.76
	Prime Farmland	5.79	13.13	0.73	0	19.65
Alternative C Total		11.01	23.36	0.85	0.20	35.42

4.7.2.2.2 Operational Impacts

Operational impacts would be similar to Alternative B.

4.7.2.3 Alternative C with the Phiney Flat Variation

4.7.2.3.1 Construction Impacts

Impacts for this alternative would be similar to Alternatives B and C. Overall disturbances by this alternative are over 3 miles more than disturbances by Alternative B and about 0.5 mile more than Alternative C. American burying beetles could occur in suitable soils along the Phiney Flat Variation. The amount of disturbances by the Phiney Flat Route Variation in these soils and potentially suitable habitats are provided in Table 4-9.

County State	Suitable Soil Type	Distance (miles) of potential habitat crossed				
		Cropland Pasture	Herbaceous Rangeland	Forested Wetland	Deciduous Forest	County Total
Pennington SD	Sandy, Erosive	0	0.84	0	0.46	1.30
	Prime Farmland	0.99	1.90	0	0	2.89
Custer SD	Sandy, Erosive	0	0	0	0	0
	Prime Farmland	4.05	1.37	0	0	5.42

County State	Suitable Soil Type	Distance (miles) of potential habitat crossed				
		Cropland Pasture	Herbaceous Rangeland	Forested Wetland	Deciduous Forest	County Total
Fall River SD	Sandy, Erosive	1.28	5.08	0.12	0	6.48
	Prime Farmland	5.79	13.41	0.73	0	19.93
Alternative C with the Phiney Flat Alternative Total:		12.11	22.60	0.85	0.46	36.02

4.7.2.3.2 Operational Impacts

Impacts would be similar to Alternatives B and C.

4.7.2.4 Alternative C with the W G Flat Variation

4.7.2.4.1 Construction Impacts

Impacts for this alternative are similar to Alternatives B and C. American burying beetles could occur in suitable soils and potentially suitable habitats along the W G Flat Variation in South Dakota. Those potentially affected areas are provided in Table 4-10. Overall disturbances by the W G Flat Route Variation to suitable soils and potential habitats used by American burying beetles is over 3 miles more than disturbances by Alternative B, about 1.4 miles more than Alternative C and 0.8 miles more than the Phiney Flat Variation.

County State	Suitable Soil Type	Distance (miles) of potential habitat crossed				
		Cropland Pasture	Herbaceous Rangeland	Forested Wetland	Deciduous Forest	County Total
Pennington SD	Sandy, Erosive	0	0.84	0	0.46	1.30
	Prime Farmland	0.99	1.90	0	0	2.89
Custer SD	Sandy, Erosive	0	0	0	0	0
	Prime Farmland	3.38	1.21	0	0	4.59
Fall River SD	Sandy, Erosive	2.10	6.06	0.12	0	8.28
	Prime Farmland	7.65	11.38	0.73	0	19.76
Alternative C with the W G Flat Alternative Total:		14.12	21.39	0.85	0.46	36.82

4.7.2.4.2 Operational Impacts

Operational impacts for this alternative would be similar to Alternatives B and C.

4.7.2.5 Alternative D (Existing Transportation Corridors)

4.7.2.5.1 Construction Impacts

Construction of this alternative would have similar impacts as Alternatives B and C. However, this alternative passes through more miles of American burying beetle potential habitat. Habitat of the beetle may be disturbed and/or lost. Removal and compaction of soils during construction could also impact the beetles, but only if they are present within construction rights-of-way. Additionally, impacts due to artificial lights, which are known to attract and disorient many species of nocturnal insects, could occur if construction takes place at night and if the beetle is found to occur in the proposed project area.

There are approximately 42 miles (approximately 1018 acres within the ROW) in South Dakota where Alternative D would pass through suitable soils in potential habitats that might be used by American burying beetles, 8 miles more than Alternative B and between 5 and 6 miles more than Alternative C or either of the variations. Over 34 miles (approximately 824 acres within the ROW) of Alternative D

passes through soils with characteristics to be prime farmlands, but whether all or some are irrigated and/or cultivated is unknown (Table 4-11).

County State	Suitable Soil Type	Distance (miles) of potential habitat crossed					County Total
		Cropland Pasture	Herbaceous Rangeland	Forested Wetland	Deciduous Forest		
Pennington SD	Sandy, Erosive	0.08	0	0	0	0.08	
	Prime Farmland	4.06	0.99	0	0	5.05	
Custer SD	Sandy, Erosive	0	0	0	0	0	
	Prime Farmland	2.06	5.00	0	0	7.06	
Fall River SD	Sandy, Erosive	0.97	6.06	0.12	0	7.15	
	Prime Farmland	7.96	13.63	0.73	0	22.32	
Alternative D Total:		15.13	25.68	0.85	0	41.66	

4.7.2.5.2 Operational Impacts

Operational impacts are similar to Alternatives B and C.

4.8 MINNESOTA DWARF TROUT LILY

4.8.1 Minnesota

Minnesota dwarf trout lily occurs in woodland habitats adjoining floodplains in Steele, Rice and Goodhue counties in Minnesota. Construction would occur in Steele County; however the area of proposed construction is approximately 15 miles south of where the lily is found east of Faribault, Minnesota. The MNHDB has no record of the lily occurring in the proposed project area. Suitable habitat does not occur in the proposed project area; therefore, no impacts to the Minnesota dwarf trout lily are expected.

4.8.2 South Dakota and Wyoming

This species does not occur in South Dakota or Wyoming; therefore, there would be no impacts.

4.9 HIGGIN'S EYE PEARLY MUSSEL

4.9.1 Minnesota

The MNHDB (1998) provided reports of mussel surveys conducted in the Mississippi River during 1990 (Burlington Northern Railroad bridge crossing) and 1995 (Lock and Dam 6 tailwaters) in Winona County; in the South Fork of the Zumbro River during 1988 in the vicinity of Rochester, Olmsted County; in the Straight River (tributary to the Cannon River) during 1987 in the vicinity of Owatonna, Steele County; and in the Minnesota River during 1989 in Brown, Nicollet and Blue Earth counties between New Ulm and Mankato. These mussel survey sites were within 1-2 miles of the existing railroad. While several mussel species that are listed as state endangered and threatened in Minnesota were found during those surveys, no Higgin's eye pearly mussels were found. If the species is present, sedimentation of inhabited waters could adversely affect it. Accidental release of petroleum products could also adversely affect the species. Given the known limits of the species' distribution and local survey efforts, it is unlikely to be present in the project area and vicinity. Therefore, the species is not expected to be impacted by this project.

4.9.2 South Dakota and Wyoming

This species does not occur in South Dakota and Wyoming; therefore, there would be no impacts.

4.10 WINGED MAPLELEAF MUSSEL

4.10.1 Minnesota

No impacts to the winged mapleleaf mussel are anticipated as a result of any part of this project since the only extant population of this species occurs below the St. Croix Falls dam on the St. Croix River, Wisconsin, 125 miles upstream from Winona, Minnesota.

4.10.2 South Dakota and Wyoming

This species does not occur in South Dakota and Wyoming; therefore, there would be no impacts.

4.11 KARNER BLUE BUTTERFLY

4.11.1 Minnesota

Portions of the existing rail line are within 1 mile of potential Karner blue habitat, mesic oak savannah (MNHDB 1998). However, none of the MNHDB site description records for mesic oak savannah or any other unique vegetation associations near the rail line include *Lupinus perennis*, or any other lupine species. No impacts to the Karner blue butterfly are anticipated as a result of any part of this project. Additionally, DM&E's existing line in Minnesota was surveyed by the MCBS in 1998. Wild lupine was not found at that time.

4.11.2 South Dakota and Wyoming

This species does not occur in South Dakota and Wyoming; therefore, there would be no impacts.

4.12 UTE LADIES'-TRESSES ORCHID

4.12.1 Minnesota

This species does not occur in Minnesota; therefore, there would be no impacts.

4.12.2 South Dakota and Wyoming

4.12.2.1 Alternative B (Proposed Action)

Two sites along Alternative B were identified during surveys in 1998 that have been determined potential habitat for Ute ladies'-tresses; one site in Wyoming (Lodgepole Creek) and one site in South Dakota (Dry Creek). One other site in South Dakota (Plum Creek) and three in Wyoming (East Fork Coal Creek, Dry Creek, and Caballo Creek) could not be evaluated because access was denied. In Wyoming, Alternative B would cross a total of 0.12 mile (approximately 3 acres of the ROW) of wet meadows, palustrine emergent wetland temporarily and seasonally flooded, that could be potential habitat for the orchid. The route in South Dakota would cross 0.78 mile (approximately 18 acres of the ROW) of the same wetland type.

4.12.2.1.1 Construction Impacts

Direct impacts to this species would most likely occur during construction if machinery and surface disturbances obliterated local populations. Additionally, Ute ladies'-tresses orchid could be impacted with the introduction of noxious weeds or exotics resulting from revegetation, borrow material and/or railroad ties.

4.12.2.1.2 Operational Impacts

Direct impacts could occur from maintenance of DM&E's rights-of-way if herbicide spraying is required or if noxious weeds are introduced.

4.12.3.1 Alternative C (Modified Proposed Action)

Four sites along Alternative C were identified during surveys in 1998 that have been determined potential habitat for Ute ladies'-tresses; two sites in Wyoming (Lodgepole Creek and School Creek) and two sites in South Dakota (Hay Canyon South and Dry Creek). Two other sites in South Dakota (French Creek and Plum Creek) and three in Wyoming (East Fork Coal Creek, Belle Fourche River, and Caballo Creek)

could not be evaluated because access to the proposed right-of-way was denied. In Wyoming, Alternative C would cross a total of 0.16 mile (approximately 4 acres of the ROW) of wet meadows, palustrine emergent wetland temporarily and seasonally flooded, that could be potential habitat for the orchid. The route in South Dakota would cross 0.70 mile (approximately 17 acres of the ROW) of the same wetland type.

4.12.3.1.1 Construction Impacts

Construction of this alternative would have similar impacts as Alternative B. Machinery and surface disturbances during construction could kill existing populations. Additional impacts include the introduction of noxious weeds from revegetation and borrow material. Individuals of Ute ladies'-tresses inhabiting the construction right-of-way would be eliminated, both for the short- and long-term.

4.12.3.1.2 Operational Impacts

Operational impacts would be similar to Alternative B.

4.12.4.1 Alternative C with the Phiney Flat Variation

Two sites along Alternative C with the Phiney Flat Route Variation in South Dakota were identified during surveys in 1998 that have been determined potential habitat for Ute ladies'-tresses. Those sites are Hay Canyon South and Dry Creek. In South Dakota, the Phiney Flat Route Variation would cross a total of 0.8 mile (approximately 19 acres of ROW) of wet meadows, palustrine emergent wetland temporarily and seasonally flooded, that could be potential habitat for the orchid. The route in Wyoming would cross 0.16 mile (approximately 4 acres of ROW) of the same wetland type; the same amount affected as Alternative C, above.

4.12.4.1.1 Construction Impacts

Construction of this alternative would have similar impacts as Alternatives B and C.

4.12.4.1.2 Operational Impacts

Operational impacts would be similar to Alternatives B and C.

4.12.5.1 Alternative C with the W G Flat Variation

One site along Alternative C with the W G Flat Variation in South Dakota was identified during surveys in 1998 that has been determined as potential habitat for Ute ladies'-tresses. That site is at Dry Creek. In South Dakota, the W G Flat Variation would cross a total of 0.57 mile (approximately 14 acres of ROW) of wet meadows, palustrine emergent wetland temporarily and seasonally flooded, that could be potential habitat for the orchid. This alternative in Wyoming would cross 0.16 mile (approximately 4 acres of ROW) of that wetland type; the same amount affected as Alternative C, above.

4.12.5.1.1 Construction Impacts

Construction of this alternative would have similar impacts as Alternatives B and C.

4.12.5.1.2 Operational Impacts

Operational impacts would be similar to Alternatives B and C.

4.12.6.1 Alternative D (Existing Transportation Corridors)

One site along Alternative D was identified during surveys in 1998 that has been determined 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 three in Wyoming (East Fork Coal Creek, Belle Fourche River, and Caballo Creek) could not be evaluated because access to the proposed right-of-way was denied. In South Dakota, Alternative D would cross a total of 0.27 mile (approximately 6.5 acres of ROW) of wet meadows, palustrine emergent wetland temporarily and

seasonally flooded, that could be potential habitat for the orchid. The route in Wyoming would cross 0.81 mile (approximately 20 acres of ROW) of that wetland type, more than affected by Alternative B and Alternative C, above. In both states, most wet meadows impacted by the alternative are on private lands.

4.12.6.1.1 Construction Impacts

Construction of this alternative would have similar impacts as Alternatives B and C. However, there are fewer potential habitat locations for Ute ladies'-tresses along Alternative D. Direct impacts to this species would most likely occur during construction if machinery and surface disturbances obliterated local populations. Additionally Ute ladies'-tresses orchid could be impacted with the introduction of noxious weeds or exotics resulting from revegetation, borrow material and/or railroad ties.

4.12.6.1.2 Operational Impacts

Operational impacts would be similar to Alternatives B and C.

4.13 PRAIRIE BUSH-CLOVER

4.13.1 Minnesota

4.13.1.1 Construction Impacts

A 1998 inventory conducted by the MCBS did not record the presence of prairie bush-clover along DM&E's existing right-of-way. However, the plant has been recorded within one mile of the proposed project area in Brown and Dodge counties (MNHDB 1998). Direct impacts to this species would most likely occur during construction if machinery and surface disturbances destroyed local populations, but only if the plant is present within construction rights-of-way. Table 4-12 is a summary of data collected by the Minnesota County Biological Survey along DM&E's existing right-of-way that could be potential habitat for the species. If the plant was found along the right-of-way it could be impacted with the introduction of noxious weeds or exotics resulting from revegetation, borrow material and/or railroad ties.

4.13.1.2 Operational Impacts

Operational impacts include the spraying of herbicides and grass fires along DM&E's rights-of-way. However, fire appears to promote the regeneration of native plants including prairie bush-clover.

County	Total miles of Prairie in ROW	Number of Prairie Remnants	Number of Prairie Types and Range of Prairie Quality ¹ as Potential Habitat			
			Dry Prairies	Prairie Quality Range	Mesic Prairies	Prairie Quality Range
Olmsted	3.2	10	0	--	10	8-Fair 1-Good 1-Very Good
Dodge	0.9	4	0	--	4	4-Fair
Steele	1.7	3	0	--	3	2-Fair 1-Good
Waseca	3.2	16	0	--	14	4-Fair 10-Good
Blue Earth	0.9	3	1	1-Good	0	--
Brown	8.8	8	0	--	8	2-Fair 3-Good 3-Very Good
Redwood	3.0	5	0	--	5	2-Fair 2-Good 1-Very Good

County	Total miles of Prairie in ROW	Number of Prairie Remnants	Number of Prairie Types and Range of Prairie Quality ¹ as Potential Habitat			
			Dry Prairies	Prairie Quality Range	Mesic Prairies	Prairie Quality Range
Lyon	4.3	10	0	--	10	4-Fair 4-Good 2-Very Good
Lincoln	5.5	6	1	1-Good	3	3-Fair

¹ – Prairie Quality Rating Guidelines (MCBS 1999)
 Very Good: > 70% native grass cover, > 15 native wildflower species, < 10% native trees and shrubs, < 10% disturbance Indicators
 Good: > 55% native grass cover, > 10 native wildflower species, < 25% native trees and shrubs, < 25% disturbance Indicators
 Fair: > 25% native grass cover, > 6 native wildflower species, < 50% native trees and shrubs, < 50% disturbance Indicators

4.13.2 South Dakota and Wyoming

This species does not occur in South Dakota and Wyoming; therefore, there would be no impacts.

4.14 LEEDY'S ROSEROOT

4.14.1 Minnesota

The plant is restricted to limestone cliffs that lead to underground caves. There is no documentation of the plant occurring in the proposed project area; therefore no impacts to the plant or its habitat are anticipated.

4.14.2 South Dakota and Wyoming

This species does not occur in South Dakota and Wyoming; therefore, there would be no impacts.

4.15 WESTERN PRAIRIE FRINGED ORCHID

4.15.1 Minnesota

The orchid was previously recorded from Dodge and Nicollet counties in Minnesota, although no records of the western prairie fringed orchid have been reported within 1.0 mile of the existing DM&E railroad (MNHDB 1998). Additionally, a survey by the MCBS in 1998 along the existing DM&E rail line did not result in occurrences of the orchid. However, MCBS did delineate remnants of wet prairies, potential habitat for the western prairie fringed orchid, within DM&E's existing right-of-way. Two remnant wet prairies were identified in each of the counties of Lincoln, Blue Earth, and Waseca. While there may be potential habitats, in addition to native wet prairies, within the existing right-of-way (the orchid also occurs in borrow areas, abandoned fields, and along roadways), the availability of potential habitat suitable for western prairie fringed orchids appears limited. (The species has not been recorded in the proposed project area). No impacts to the plant or its habitat are anticipated.

4.15.2 South Dakota and Wyoming

This species does not occur in South Dakota and Wyoming; therefore, there would be no impacts.

4.16 BALD EAGLE

4.16.1 Minnesota

Bald eagles may winter along the Minnesota River within the rebuild portion of the proposed project area. Although most breeding records for bald eagles are distributed in the northeastern and northcentral portion of Minnesota, 2 nests have been documented in the project vicinity. One nest was recorded from the Minnesota River floodplain, 1.7 miles from DM&E's existing rail line, north of Mankato, Blue Earth

County, and the other on the Mississippi River floodplain 1.1 miles from the exiting rail line near Winona, Minnesota (MNHDB 1998).

4.16.1.1 Construction Impacts

Since bald eagles tend to avoid human activities during all times of the year, construction activities can temporarily displace eagles during their migration, wintering, and nesting periods. Typically, the recommended spatial buffers for endangered and threatened species are 1.0 miles. Spatial buffer zones recommended for raptor nesting protection are also encouraged for activities occurring proximal to raptor winter concentration areas from November through March. The USFWS recommends maintaining a spatial buffer equal to one-half of the recommended buffers for nests unless site-specific topography or vegetation allow for smaller buffers. Daily activities, which must occur within, recommended spatial buffers at winter night roost sites should be scheduled after 0900 hours, after which most raptors have vacated their roost. Likewise, daily activities should terminate at least one hour prior to official sunset to allow birds an opportunity to return to the roost site undisturbed.

Approximately, 28 miles of the existing railroad passes within 0.5-mile of potential bald eagle winter habitats in Minnesota (Table 4-13). Short-term construction disturbances, such as noise and increased human activity, could affect wintering bald eagles. Approximately 31 miles of existing rail line would be within 1.0 mile of potential habitats in Minnesota (Table 4-13). Potential bald eagle nesting habitats also occur within both 0.5 and 1.0 mile of the existing rail line where there are cottonwood riparian woodlands. Though the only known bald eagles nests in the project vicinity are more than 1.0 mile from the existing railroad, more may nest closer in the future as nesting populations expand their range. Future nests would not likely be impacted by the project as nesting pairs would be exposed to train activity on a regular basis, including prior to nesting. They would be expected to be tolerant of train disturbance during subsequent nesting.

Disturbances to eagles when they are migrating would probably not displace them from habitats that are key to their survival since during this time they are generally moving between habitats.

Location	ROW within 0.5 mile of Potential Habitat (miles)	ROW within 1.0 mile of Potential Habitat (miles)
Minnesota River – Blue Earth County	20.2	22.1
Minnesota River – Brown County	7.4	9.3
Missouri River – Hughes County	14.0	17.1
Missouri River – Stanley County	2.5	3.1
Bad River – Stanley County	14.5	16.1
Existing Railroad Total:	58.6	67.7

4.16.1.2 Operational Impacts

Bald eagles may be displaced from feeding sites, perch sites, and/or nocturnal communal winter roosts and nest sites due to noise and human activity along the right-of-way during operation of the train. Eagle mortalities could occur if bald eagles were drawn to the rail line to feed upon carrion left on the tracks.

4.16.2 South Dakota and Wyoming

Approximately, 31 miles of the existing railroad passes within 0.5-mile of potential bald eagle winter habitats in South Dakota. Short-term construction disturbances, such as noise and increased human activity, could affect wintering bald eagles. Approximately 36 miles of existing rail line would be within 1.0 mile of potential habitats in Minnesota.

4.16.2.1 Alternative B (Proposed Action)

4.16.2.1.1 Construction Impacts

Potential impacts to wintering bald eagles would be from human activity associated with project construction, operation, or maintenance. Approximately 82 miles and 126 miles of Alternative B would be within 0.5 and 1.0 miles, respectively, of potential bald eagle wintering habitat. Construction of this alternative during winter within the TBNG and along the corridor of the Cheyenne River in South Dakota and its major tributaries in Wyoming (Black Thunder Creek, Little Thunder Creek and Antelope Creek) is likely to displace wintering bald eagles from perches and feeding areas or make those sites temporarily unsuitable. Sites within at least a 0.5-mile up to a 1-mile zone of the Cheyenne River and major tributaries that could be affected are provided in Table 4-14. No bald eagle nests occur within 1.0 mile of this alternative. Noise from blasting and the operation of heavy earthmoving equipment and other activities associated with construction and preparation of the rail bed could potentially disturb bald eagles. Some trees suitable as bald eagle winter roost sites or future nesting sites could be removed during construction. However, winter construction would generally be scattered throughout the project area and limited to the immediate area of culvert and bridge installations. This would limit the potential to disturb wintering eagles to those sites where construction was actually occurring. While some roost sites may be disturbed, others would not, providing areas for eagles to roost undisturbed.

Since wintering bald eagles in some areas feed on big game carrion, they sometimes suffer direct mortalities when struck by vehicles while feeding at roadsides. It is unlikely that slow moving construction vehicles would inadvertently kill eagles feeding on carcasses. However, personal vehicles driven to and from construction sites would increase traffic on local roads. Increased traffic could lead to increased big game road kills and increased risk of mortality to eagles feeding along the roadways.

4.16.2.1.2 Operational Impacts

Alternative B would be within 0.5 miles of potential bald eagle wintering habitat for approximately 82 miles in South Dakota and Wyoming (Table 4-14). Nearly 126 miles of the right-of-way is within 1.0 mile of potential wintering habitat. Disturbances to wintering bald eagles could occur along 82 to 126 miles of Alternative B during project operation because of train noise and increased human activity. If roosts do not provide sufficient cover or buffer from this disturbance they would be abandoned. As eagles are exposed to train activity throughout the PRB, they are expected to have some level of tolerance to trains. Therefore, only minor impacts to roosting eagles would be expected during train operations.

Potential nesting habitat for bald eagles occurs throughout the project area. Although no nests are currently known, future nesting could occur as eagles expand their range and increase in number. Future nests would not likely be impacted by the project as nesting pairs would be exposed to train activity on a regular basis, including prior to nesting. They would be expected to be tolerant of train disturbance during subsequent nesting.

County State	ROW within 0.5 mile of Potential Habitat (miles)	ROW within 1.0 mile of Potential Habitat (miles)
Pennington SD	12.33	22.96
Custer SD	21.70	24.28
Fall River SD	17.23	28.32
Niobrara WY	4.29	7.08
Weston WY	14.17	24.90
Converse WY	6.43	9.52

County State	ROW within 0.5 mile of Potential Habitat (miles)	ROW within 1.0 mile of Potential Habitat (miles)
Campbell WY	5.76	8.90
Alternative B TOTAL:	81.91	125.96

Train operations would likely lead to mortality of big game, resulting in carcasses along the rail line. Trains could kill bald eagles gorging themselves on these carcasses so as not being able to fly off the tracks when a train approaches. Such mortalities have been recorded elsewhere in Wyoming where bald eagles feed on big game carcasses along highways and railroads (Lockwood 1999). Actual mortality is difficult to predict as it would depend on many factors such as location of carcasses in relation to the rail line, operating times of trains, availability of food in other areas, and the presence of eagles. Only incidental mortality would be anticipated. Future nests would not likely be impacted by the project as nesting pairs would be exposed to train activity on a regular basis, including prior to nesting. They would be expected to be tolerant of train disturbance during subsequent nesting.

4.16.3.1. Alternative C (Modified Proposed Action)

4.16.3.1.1 Construction Impacts

Over 58 miles of Alternative C passes within 0.5-miles of potential bald eagle winter habitats in each of the counties in South Dakota and Wyoming. This is less than the 82 miles of Alternative B that is estimated to be within 0.5-mile of potential winter habitats. If short-term construction related disturbances affected wintering bald eagles 1 mile away, almost 95 miles of Alternative C would be within that distance from potential habitats identified in Table 4-5, but less than the 126 miles of Alternative B right-of-way within the 1-mile zone.

Construction of this alternative would have similar impacts as Alternative B. Impacts to bald eagles include disturbance by construction activities that could displace them during wintering and nesting periods, mortality caused by vehicles driving to and from the construction site and loss of suitable roosting habitat if trees are removed for construction.

Construction during winter within TBNG and along the corridor of the Cheyenne River in South Dakota and its major tributaries in Wyoming (Black Thunder Creek, Little Thunder Creek and Antelope Creek) is likely to displace wintering bald eagles from perches and feeding areas or make those sites temporarily unsuitable. Estimates of potential bald eagle wintering habitats within 0.5-mile and 1-mile zone of the Cheyenne River and major tributaries that could be affected by Alternative C are provided in Table 4-14.

4.16.3.1.2 Operational Impacts

Mortalities resulting from bald eagles being struck by trains while they are feeding on carrion along the rail line could occur. Human activity during maintenance activities could also disturb roosting and nesting bald eagles.

County State	ROW within 0.5 mile of Potential Habitat (miles)	ROW within 1.0 mile of Potential Habitat (miles)
Pennington SD	14.12	22.82
Custer SD	0	2.01
Fall River SD	11.00	21.11
Niobrara WY	4.21	7.16
Weston WY	12.71	18.82
Converse WY	6.33	9.60

County State	ROW within 0.5 mile of Potential Habitat (miles)	ROW within 1.0 mile of Potential Habitat (miles)
Campbell WY	10.03	13.02
Alternative C TOTAL:	58.40	94.54

4.16.4.1 Alternative C with the Phiney Flat Variation

4.16.4.1.1 Construction Impacts

Twenty-six miles of the Phiney Flat Variation passes within 0.5-mile of potential bald eagle winter habitats in affected counties in South Dakota, 1.0-mile more than Alternative C for the same counties. Approximately 51 miles of the Phiney Flat Variation would be within 1.0-mile of potential habitats in South Dakota (Table 4-16), nearly 6 miles more than Alternative C in South Dakota.

Types of impacts would be similar to Alternatives B and C, although more bald eagle habitat could be affected than by Alternative C.

County State	ROW within 0.5 mile of Potential Habitat (miles)	ROW within 1.0 mile of Potential Habitat (miles)
Pennington SD	14.13	23.53
Custer SD	0.88	5.94
Fall River SD	11.00	21.11
Alternative C with Phiney Flat Variation TOTAL:	26.01	50.58

4.16.4.1.2 Operational Impacts

Impacts would be similar to Alternatives B and C.

4.16.5.1 Alternative C with the W G Flat Variation

4.16.5.1 Construction Impacts

Nearly 26 miles of the W G Flat Variation passes within 0.5-mile of potential bald eagle winter habitats in the counties in South Dakota, the same as the Phiney Flat Variation and about 1 mile more than Alternative C where it passes through the same counties. If short-term construction related disturbances affected wintering bald eagles 1 mile away, over 48 miles of the W G Flat Variation would be within that distance from potential habitats (Table 4-17). This would be almost 2.5 miles less than the Phiney Flat Variation, but over 2 miles more than Alternative C in South Dakota. All the Alternative C routes would affect less potential bald eagle habitat in South Dakota than Alternative B.

Impacts would be similar to Alternatives B and C.

County State	ROW within 0.5 mile of Potential Habitat (miles)	ROW within 1.0 mile of Potential Habitat (miles)
Pennington SD	14.12	22.82
Custer SD	0	1.96

County State	ROW within 0.5 mile of Potential Habitat (miles)	ROW within 1.0 mile of Potential Habitat (miles)
Fall River SD	11.70	23.39
Alternative C with W G Flat Variation TOTAL:	25.82	48.17

4.16.4.2 Operational Impacts

Impacts would be similar to Alternatives B and C.

4.16.5 Alternative D (Existing Transportation Corridors)

4.16.5.1 Construction Impacts

Nearly 30 miles of Alternative D passes within 0.5-mile of potential bald eagle winter habitats in two counties in Wyoming and two in South Dakota. This is less than the 82 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, almost 46 miles of Alternative D would be within that distance from potential habitats identified in Table 4-18, less than the 126 miles of Alternative B and 95 miles of Alternative C rights-of-way within the 1-mile zone. Specifically in South Dakota, Alternative D would affect less potential habitats along the Cheyenne River than either the Phiney Flat or W G Flat alternatives.

Construction of this alternative would have similar impacts as Alternatives B and C; however, fewer miles of proposed construction would impact the Cheyenne River and its tributaries where bald eagles would likely be located. Bald eagles roosting or nesting in the proposed project area could be disturbed by human activity during construction. Additionally, personal vehicles driving to and from the construction sites could kill bald eagles feeding on carrion along the roads.

Construction during winter within TBNG and along the corridor of the Cheyenne River in South Dakota and its major tributaries in Wyoming (Black Thunder Creek, Little Thunder Creek and Antelope Creek) is likely to displace wintering bald eagles from perches and feeding areas or make those sites temporarily unsuitable within at least a 0.5-mile up to a 1-mile zone surrounding construction activities. Estimates of potential bald eagle wintering habitats within 0.5-mile and 1-mile zone of the Cheyenne River and major tributaries that could be affected by Alternative D are provided in Table 4-18.

4.16.5.2 Operational Impacts

Maintenance activities may disturb bald eagles along the rail line. Additionally, trains may kill bald eagles if the eagles frequent rail line rights-of-way to feed on carrion.

Disturbances to wintering bald eagles could thus occur along 30 to 46 miles of Alternative D during the short- and long-term if eagles are affected by noise associated with train traffic 0.5-mile to 1 mile away.

County State	ROW within 0.5 mile of Potential Habitat (miles)	ROW within 1.0 mile of Potential Habitat (miles)
Pennington SD	7.85	9.36
Custer SD	0	0
Fall River SD	11.20	20.01
Niobrara SD	0	0
Weston SD	0	0

County State	ROW within 0.5 mile of Potential Habitat (miles)	ROW within 1.0 mile of Potential Habitat (miles)
Converse SD	6.33	9.60
Campbell SD	4.47	7.01
Alternative D TOTAL:	29.85	45.98

4.17 MOUNTAIN PLOVER

Mountain plover show high site fidelity to breeding territories between years and nest aggregation sites may be more important than the availability of suitable habitat. Therefore, the amount of mountain plover suitable habitat that may be disturbed during construction of this project could be overstated if these areas are not part of the species historic nesting sites.

4.17.1 Minnesota

This species does not occur in Minnesota; therefore, there would be no impacts.

4.17.2 South Dakota and Wyoming

4.17.2.1 Alternative B (Proposed Action)

4.17.2.1.1 Construction Impacts

Since mountain plovers nest on the ground, adult birds, eggs and young are susceptible to mortality by vehicles and construction equipment, especially along 2-track range roads and undeveloped areas along the alignment of Alternative B and within the project area. Noise disturbance could displace mountain plovers from nesting near the new construction. Mountain plovers are known to nest on short-grass prairie in association with prairie dog colonies. Table 3-7 provides estimates of the amount of prairie dog colonies potentially disturbed or lost due to Alternative B. Approximately 279 acres of potential nesting habitat would be converted to railroad right-of-way. Additional habitat outside the right-of-way may be unsuitable for nesting due to human activity and noise during construction.

4.17.2.1.2 Operational Impacts

Operation of Alternative B could result in disturbance to nesting plovers selecting to nest within or near the right-of-way. However, expected disturbance would be minimal as mountain plovers would experience regular train events prior to selecting to nest and would likely be somewhat acclimated to this. Human activity associated with maintenance activities would be less common and could disturb nesting birds, leading to nest abandonment. Nests in proximity to the rail line, including in the right-of-way and adjacent areas, may be more susceptible to predation from predators traveling the rail line in search of carrion that stumble upon the nest and take the opportunity for a quick meal.

4.17.3.1 Alternative C (Modified Proposed Action)

4.17.3.1.1 Construction Impacts

Construction of this alternative would have similar impacts as Alternative B. Mountain plovers or their nests may be lost from vehicles traveling to and from the construction site and operation of heavy equipment. Nests in adjacent areas may be abandoned because of disturbance. Table 3-7 provides estimates of the amount of prairie dog colonies potentially disturbed or lost due to Alternative C. Additional habitat outside the right-of-way may be unsuitable for nesting due to human activity and noise during construction. Approximately 424 acres of prairie dog colony nesting habitat would be converted to railroad right-of-way.

4.17.3.1.2 Operational Impacts

Once the proposed project is constructed there may be an increase in predators because of the presence of carrion along the rail line. Additionally, mammals and raptors may prey upon nesting mountain plovers.

4.17.4.1 Alternative C with the Phiney Flat Variation

Impacts would be similar to Alternatives B and C.

4.17.5.1 Alternative C with the W G Flat Variation

Impacts would be similar to Alternatives B and C.

4.17.6.1 Alternative D (Existing Transportation Corridors)**4.17.6.1.1 Construction Impacts**

Construction of this alternative would have similar impacts as Alternatives B and C. Noise during construction could displace mountain plovers from nesting in the area. Table 3-7 provides estimates of the amount of prairie dog colonies potentially disturbed or lost due to Alternative C. Approximately 150 acres of potential nesting habitat would be converted to railroad right-of-way. Additional habitat outside the right-of-way may be unsuitable for nesting due to human activity and noise during construction.

4.17.6.1.2 Operational Impacts

Predators drawn to carrion along the track could prey on mountain plovers and their young.

4.18 SWIFT FOX**4.18.1 Minnesota**

This species does not occur in Minnesota; therefore, there would be no impacts.

4.18.2 South Dakota and Wyoming**4.18.2.1 Alternative B (Proposed Action)****4.18.2.1.1 Construction Impacts**

Swift fox are probably found using all upland habitats in the vicinity of the proposed project in South Dakota and Wyoming. They are more at risk where the proposed project crosses prairie dog colonies (Refer to Table 3-7). Removal of vegetation from the project area may reduce prey species and potential swift fox habitat. This species is occasionally killed by vehicular traffic, which has been estimated as contributing 5 percent of annual swift fox mortality in one study, but most swift fox mortality is from coyotes (Rongstad et al. 1989). Swift fox dens could be destroyed by heavy equipment and the fox may be displaced due to construction activity and human presence.

4.18.2.1.2 Operational Impacts

Swift foxes will consume carrion (Samuel and Nelson 1982, Uresk and Sharps 1986, Scott-Brown et al. 1987) and so are vulnerable to being struck by trains if they feed on carcasses along the railroad. However, they will not approach carrion that is being utilized by coyotes (Rongstad et al 1989).

4.18.3.1 Alternative C (Modified Proposed Action)**4.18.3.1.1 Construction Impacts**

Construction of this alternative would have similar impacts as Alternative B. Impacts include a reduction in prey species, loss of swift fox habitat (Refer to Table 3-7) and mortalities from vehicular traffic.

4.18.3.1.2 Operational Impacts

Operational impacts for this alternative are similar to Alternative B.

4.18.4.1 Alternative C with the Phiney Flat Variation

Impacts would be similar to Alternatives B and C.

4.18.5.1 Alternative C with the W G Flat Variation

Impacts would be similar to Alternatives B and C.

4.18.6.1 Alternative D (Existing Transportation Corridors)

4.18.6.1.1 Construction Impacts

Impacts would be similar to Alternatives B and C. Swift fox habitat would be lost (Refer to Table 3-7) and the removal of vegetation may reduce prey species. Swift fox may be killed by vehicular traffic travelling to and from the proposed construction sites.

4.18.6.1.2 Operational Impacts

Impacts would be similar to Alternatives B and C. Swift fox could be struck by trains while feeding on carcasses along the railroad.

4.19 STURGEON CHUB

4.19.1 Minnesota

This species does not occur in Minnesota; therefore, there would be no impacts.

4.19.2 South Dakota and Wyoming

4.19.2.1 Alternative B (Proposed Action)

4.19.2.1.1 Construction Impacts

Changes in stream flow due to bank stabilization could impact downstream habitats as could accidental release of petroleum products.

Accidental releases of toxic (fuel, lubricants, oils) substances present during construction could lead to mortality of Sturgeon chubs if these substances enter the Cheyenne River. Generally, these materials would not be stored near drainages and vehicles would be serviced at designated maintenance areas. Only minimal amounts of these substances would be present at an individual construction site. As with sedimentation, impacts from accidental spills would be most likely if the spill occurred at a crossing of the Cheyenne River, one of its tributaries, or in proximity to the river (Table 4-19).

Water depletions from the Cheyenne River could impact the species during construction. Sturgeon chubs probably spawn in late spring to midsummer (Lee et al. 1980) and may depend on deep water with fast currents to allow eggs and larva to be carried downstream (USFWS 1993c). Since flows in the Cheyenne River are highly variable, dependent in part on water released from Angostura Reservoir, water withdrawals for project construction could exacerbate existing limiting flow regimes, particularly during drought conditions.

Table 4-19
Alternative B Sites within 500 feet of the Cheyenne River or Tributary Streams

County State	Cheyenne River		Perennial Tributary Streams	
	Number of Sites	Total Distance (miles)	Number of Sites	Total Distance (miles)
Pennington SD	15	0.80	26	1.96
Fall River SD	5	0.96	25	5.44
Custer SD	40	4.29	75	7.68
Weston WY	0	0	0	0
Niobrara WY	0	0	0	0
Converse WY	0	0	0	0
Campbell WY	0	0	6	1.21
Alternative B Total:	60	6.05	132	16.29

4.19.2.1.2 Operational Impacts

During operation, impacts could also result from increased sedimentation or accidental spills. Increased sedimentation could occur during maintenance of bridges or culverts. Spills from maintenance equipment

or derailments could also occur. However, the limited amount of material released from maintenance equipment would not likely be sufficient to affect Sturgeon chub. Derailments would be unlikely because of the implementation of standard inspection and maintenance procedures. Any impacts from a spill would likely be localized and short-term as the released material, if it even entered the water, would be quickly diluted to concentrations below toxic levels.

4.19.3.1 Alternative C (Modified Proposed Action)

4.19.3.1.1 Construction Impacts

Construction of this alternative would have similar impacts as Alternative B. Sturgeon chub are susceptible to increased sediment that could occur during construction. Additionally, accidental releases of diesel fuels and other petroleum products could occur during construction. However, DM&E would have a SPCC plan in place and would store toxic (fuels and oil) substances away from drainages.

Impacts would be most likely if potential discharge sites are within 500 feet of surface waters where there may be insufficient riparian vegetation to prevent flows from entering drainages.

Table 4-20 indicates the number of sites and/or distances at which this alternative would be within 500 feet of the Cheyenne River or tributary streams with perennial flows. There are 144 sites on the Cheyenne River and perennial tributary streams, combined, where Alternative C is within 500 feet of the drainages. More than 20 miles of Alternative C is within 500 feet of the Cheyenne River and tributaries, only 2 miles less than Alternative B. These sites are believed to be those most likely where sediments and/or accidental releases of toxic compounds could be discharged.

County State	Cheyenne River		Perennial Tributary Streams	
	Number of Sites	Total Distance (miles)	Number of Sites	Total Distance (miles)
Pennington SD	35	3.95	44	4.88
Fall River SD	3	0.86	20	2.99
Custer SD	0	0	28	6.56
Weston WY	0	0	0	0
Niobrara WY	1	0.34	0	00
Converse WY	0	0	0	0.90
Campbell WY	0	0	12	
Alternative C Total:	40	5.15	104	15.33

4.19.3.1.2 Operational Impacts

Impacts would be similar to Alternative B and would include increased sedimentation during maintenance activities or accidental spills from maintenance equipment or during derailments.

4.19.4.1 Alternative C with the Phiney Flat Variation

4.19.4.1.1 Construction Impacts

Impacts would be similar to Alternatives B and C. Table 4-21 indicates the number of sites and/or distances at which this alternative would be within 500 feet of the Cheyenne River or tributary streams with perennial flow. There are 106 sites on the Cheyenne River and perennial tributary streams, combined, where the Phiney Flat Variation is within 500 feet of the drainages where impacts to aquatic resources could occur. This would be 80 sites less than Alternative B and 26 less than Alternative C in the same South Dakota counties.

Table 4-21 Alternative C with the Phiney Flat Variation Sites within 500 feet of the Cheyenne River or Tributary Streams				
County State	Cheyenne River		Perennial Tributary Streams	
	Number of Sites	Total Distance (miles)	Number of Sites	Total Distance
Pennington SD	36	3.95	48	5.01
Fall River SD	3	0.86	19	2.99
Custer SD	0	0	6	1.58
Phiney Flat Variation Total:	39	4.81	67	9.58

4.19.4.1.2 Operational Impacts

Impacts would be similar to Alternatives B and C.

4.19.5.1 Alternative C with the W G Flat Variation

4.19.5.1.1 Construction Impacts

Impacts would be similar to Alternatives B and C and would include. Table 4-22 lists the number of sites and/or distances at which this alternative would be within 500 feet of the Cheyenne River or tributary streams with perennial flow. There are 134 sites in these areas where the W G Flat Variation is within 500 feet of the drainages where impacts to aquatic resources could occur. This is 28 sites more than the Phiney Flat Variation, but 52 sites fewer than Alternative B and about the same number of sites as Alternative C in the same South Dakota counties.

Table 4-22 Alternative C with the W G Flat Alternative Sites within 500 feet of the Cheyenne River or Tributary Streams				
County State	Cheyenne River		Perennial Tributary Streams	
	Number of Sites	Total Distance (miles)	Number of Sites	Total Distance (miles)
Pennington SD	36	3.95	45	4.88
Fall River SD	4	0.86	21	2.99
Custer SD	0	0	28	6.56
Alternative C with the W G Flat Alternative Total:	40	5.15	94	15.33

4.19.5.1.2 Operational Impacts

Impacts would be similar to Alternatives B and C.

4.19.6.1 Alternative D (Existing Transportation Corridors)

4.19.6.1.1 Construction Impacts

Impacts would be similar to Alternatives B and C. Sturgeon chub appear susceptible to increased sedimentation that could occur during and following construction of the proposed project. Further, changes in stream flow due to bank stabilization structures could impact downstream habitats as could accidental release of petroleum products. Impacts would be most likely if potential discharge sites are within 500 feet of surface waters where there may be insufficient riparian vegetation to prevent flows from entering drainages. Table 4-23 indicates the number of sites and/or distances at which the Alternative D route would be within 500 feet of the Cheyenne River or tributary stream with perennial flows.

There are 68 sites on the Cheyenne River and perennial tributary streams, combined, where Alternative D is within 500 feet of the drainages, fewer than the 192 sites and 144 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, 9 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.

County State	Cheyenne River		Perennial Tributary Streams	
	Number of Sites	Total Distance (miles)	Number of Sites	Total Distance (miles)
Pennington SD	3	1.95	30	3.25
Fall River SD	3	0.73	20	5.70
Custer SD	0	0	0	0
Weston WY	0	0	0	0
Niobrara WY	0	0	0	0
Converse WY	0	0	0	0
Campbell WY	0	0	0	1.65
Alternative D Total:	6	2.68	62	10.60

4.19.6.1.2 Operational Impacts

During operation, short- or long-term impacts could occur downstream if there were derailments which released diesel fuels or other petroleum products into the Cheyenne River hydrologic basin.

4.20 BLACK-TAILED PRAIRIE DOG

4.20.1 Minnesota

This species does not occur in Minnesota; therefore, there would be no impacts.

4.20.2 South Dakota and Wyoming

4.20.2.1 Alternative B (Proposed Action)

4.20.2.1.1 Construction Impacts

At least 11.5 miles (approximately 279 acres of the ROW) of Alternative B would pass through prairie dog colonies in South Dakota and Wyoming. Direct impacts to black-tailed prairie dogs are most likely to occur during the construction phase of the project if the animals occur in the right-of-way. These impacts include mortality from construction equipment and vehicles, loss of habitat, and recreational shooting.

4.20.2.1.2 Operational Impacts

Long-term impacts include fragmentation of black-tailed prairie dog colonies' habitat, increased mortality by train and vehicular traffic, increased predation and disease from predators traveling along the rail line, and increased recreational shooting from increased human activities.

4.20.2.2 Alternative C (Modified Proposed Action)

4.20.2.2.1 Construction Impacts

At least 17.5 miles (approximately 424 acres of the ROW) of Alternative C would pass through prairie dog colonies in South Dakota and Wyoming compared to at least 11.5 miles of Alternative B and 6.2 miles of Alternative D.

Construction of this alternative would have similar impacts as Alternative B. Prairie dogs may be killed during construction by vehicular and construction traffic.

4.20.2.2.2 Operational Impacts

Fragmentation of prairie dog colonies could impact the reintroduction of black-footed ferrets. Black-tailed prairie dog mortality could increase due to train traffic, increased predation and spread of disease by predators.

4.20.2.3 Alternative C with the Phiney Flat Variation

Impacts of this alternative would have similar impacts as Alternatives B and C.

4.20.2.4 Alternative C with the W G Flat Variation

Impacts of this alternative would have similar impacts as Alternatives B and C.

4.20.2.6 Alternative D (Existing Transportation Corridors)**4.20.2.6.1 Construction Impacts**

Construction of this alternative would have similar impacts as Alternative B and C.

At least 6.2 miles (approximately 150 acres of the ROW) of Alternative D would pass through prairie dog colonies in South Dakota and Wyoming compared to at least 11.5 miles of Alternative B and 17.5 miles of Alternative C. But since Alternative D is mostly within an existing railroad corridor, fewer prairie dog colonies would be affected, particularly if vegetation growth within the existing right-of-way has been minimized by maintenance.

4.20.2.6.2 Operational Impacts

Long-term impacts include increased mortality by train traffic and increased predation.

PART 5

CUMULATIVE IMPACTS

Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation.

Since most of the existing railroad in Minnesota and South Dakota passes through private lands where current land uses are mostly human developments or agricultural (93 percent of the lands crossed in Minnesota and 80 percent of the lands crossed in South Dakota), it is reasonably certain that those land uses will continue, if not expand to other lands, in the future. Similarly, the project alternatives analyzed for building the new railroad in South Dakota would cross private lands ranging from 84 percent (Alternative B) to 98 percent (Alternative D) of the total length. In Wyoming, the percentage of private lands crossed ranges from 67 percent for Alternative C to 80 percent for Alternative D. Land use along the new rail line extension alternatives is mostly a combination of agriculture and livestock grazing, the latter occurring on private, state and Federal lands. Table 5-1 summarizes the measurable effects to habitats potentially or known to be occupied by listed endangered, threatened, proposed, candidate and petitioned species that would result from implementing alternatives for new railroad construction and rebuild of the existing rail line.

5.1 BLACK-FOOTED FERRET

5.1.1 Existing Contributing Factors

Black-footed ferrets were one of the first species to be identified as endangered under the Endangered Species Preservation Act of 1966 and were listed as endangered in 1967. At that time, no specific reasons for listing species as endangered were provided. Later, reasons for endangerment of ferrets were provided in the recovery plan. They include: 1) aggressive control or extermination of prairie dogs, 2) reduction of prairie dog populations by sylvatic plague, 3) susceptibility of black-footed ferrets to canine distemper and other diseases, and 4) susceptibility of small, isolated populations to extinctions due to demographic and environmental variation (USFWS 1988b).

5.1.2 Foreseeable Impacts

Expansion of coal bed methane development on lands in the Powder River Basin could impact this species because of fragmentation of prairie dog colonies. However, coal bed methane development is a federal activity and is not considered a cumulative impact. Black-footed ferrets' survival is linked to prairie dogs. If any of the affected colonies are of suitable size for ferret reintroduction, these sites could be rendered unsuitable and jeopardize efforts to reestablish ferrets in the wild. Since at least half of prairie dog colonies are on private and state lands, impacts to prairie dogs (poisoning, habitat alteration and loss, recreational shooting) will continue and sylvatic plague will continue to be a threat to extant populations. Some states actively promote unregulated and unlimited prairie dog shooting for sport. In many areas development (including minerals, oil and gas) proceeds without regard to the impact on prairie dogs or their habitat. All of these factors continue to influence prairie dog populations, which in turn influence black-footed ferret populations.

5.2 PIPING PLOVER

5.2.1 Existing Contributing Factors

The primary threats to the piping plover are habitat modification and destruction and human disturbance to nesting adults and flightless chicks. USFWS identified the elimination of suitable nesting sites on in-river islands and sandbars because of dam construction as a contributing factor in piping plover decline. Those effects are present on the Missouri River and on the Cheyenne River, below Angostura Reservoir.

5.2.2 Foreseeable Impacts

Since the 1950's, Angostura Reservoir has provided irrigation water for livestock forage and grain crops. Currently, the Bureau of Reclamation is preparing an EIS that will address future operation of the Angostura Dam and Irrigation Project. Additional water withdrawals by private landowners from the Cheyenne River probably will occur and continue in the future.

Continued water development upstream of piping plover habitat may affect the birds. Elevated water temperatures affect forage fish physiology, which influences fish survival rate, growth rate, embryonic development, and susceptibility to parasites and disease. Channelization, irrigation, and the construction of reservoirs and pools have contributed to the elimination of much of the piping plover sandbar-nesting habitat in the Missouri River system. The Missouri River Bank Stabilization and Navigation Project is an example. The wide and braided character of the Missouri River was engineered into reservoirs and a single, narrow navigation channel. Sandbars virtually disappeared between Sioux City, Iowa and St. Louis, Missouri. Current regulation for the Missouri River dam discharges pose additional problems for piping plovers nesting in remaining habitats. Reservoir storage of flows responsible for scouring sandbars has resulted in the encroachment of vegetation along many rivers and greatly reduced channel width. In addition, river mainstem reservoirs now trap much of the sediment load, which results in less aggradation and more degradation of the riverbed and, subsequently, fewer sandbars. Water development on the Platte River system has also been extensive. Continuing water depletions reduce the width and/or depth of water surrounding nest sites, which may increase predation and human disturbance; increased depletions in turn permit vegetation encroachment into nesting areas.

5.3 WHOOPING CRANE

5.3.1 Existing Contributing Factors

Whooping cranes were one of the first species to be identified as endangered under the Endangered Species Preservation Act of 1966 and were listed as endangered in 1967. The whooping crane recovery plan identified the following as contributing to their endangerment: 1) life history and sociobiological characteristics, 2) predation of nests, unpredictable weather during nesting and migration, drought leading to food shortages and fire destruction of nests, 3) human disturbances during nesting, 4) habitat conversion (mid-continental prairies and prairie pot-holes) to agriculture and construction of powerlines within principal migration corridors, 5) environmental pollution, particularly due to oil spills in the Gulf of Mexico, that could threaten wintering areas, and 6) shooting deaths (USFWS 1986a).

5.3.2 Foreseeable Impacts

Migrating whooping cranes may occasionally utilize wetlands and/or grain fields in the vicinity of the existing railroad along the Bad and Missouri rivers in South Dakota. Sixty-four percent of the existing railroad in those areas (Haakon, Jones, Stanley, and Hughes counties) coincides with human developments and croplands, the latter potentially providing feeding and resting sites during migrations. The same land use in those areas is likely to continue and possibly expand in the future.

5.4 INTERIOR LEAST TERN

5.4.1 Existing Contributing Factors

USFWS identified the following as the principal factors that have contributed to the species' endangerment: 1) nest predation by terrestrial carnivores as well as domestic pets contributing to declining reproductive success, and 2) elimination of suitable nesting sites on in-river islands and sandbars due to dam construction with altered flow regulations, whether leading to nest inundation or by altering river flows that formerly scoured islands, removing permanent vegetation and creating new islands and sandbars as suitable nesting habitat. Those effects are present on the Missouri River and on the Cheyenne River, below Angostura Reservoir.

5.1.2 Foreseeable Impacts

Since the 1950's, Angostura Reservoir has provided irrigation water for livestock forage and grain crops. Currently, Bureau of Reclamation is preparing an EIS that will address future operation of the Angostura Dam and Irrigation Project. Additional water withdrawals by private landowners from the Cheyenne River probably will occur and continue in the future.

5.5 TOPEKA SHINER

5.2.1 Existing Contributing Factors

Sedimentation and eutrophication (diminished dissolved oxygen resulting from release of nutrients in streams) have been cited as primary impacts to Topeka shiners. Intensive agricultural developments within inhabited watersheds and diminished aquifer recharge has led to siltation and pollution of streams, which may become warm, muddy and ephemeral during summers. Impoundments on tributaries and channelization of drainages has also reduced in-stream flows and degraded habitats while over-grazing by livestock in riparian zones has reduced water quality. These practices have, and will continue to occur, on private and agricultural lands in southwestern Minnesota and eastern South Dakota in the vicinity of the existing railroad.

5.1.2 Foreseeable Impacts

The continued implementation of small watershed flood control programs in portions of the species' range is a continued threat to the population. Feedlot operations on or near streams are also known to impact prairie fishes due to organic input resulting in eutrophication.

The Vermillion River basin contains the largest complex of Topeka shiner populations in South Dakota. Multiple reservoir construction is now planned on streams occupied by the Topeka shiner in this basin, further threatening the species. Additionally, the continued use of pesticides and fertilizers near stream channels the fish may inhabit could be detrimental to their continued survival.

5.6 PALLID STURGEON

5.6.1 Existing Contributing Factors

Dams and altered water flows on the Missouri River have blocked sturgeon migration, eliminated or altered spawning habitats, reduced food sources, altered water temperatures, reduced turbidity, and changed the hydraulics of the river (Dryer and Sandvol 1993). Along with over-fishing, pollution, (principally from organic wastes but also from insecticide residues and trace metals) has contributed to the species' decline.

Destroyed and altered habitats are believed to be the primary cause of adverse effects on reproduction, growth, and survival of the pallid sturgeon, as well as other fish species native to the Missouri, Platte, and Mississippi rivers. Recovery of the pallid sturgeon is unlikely to be successful without restoring the critical portions of morphology, hydrology, temperature regimes, and sediment/organic matter transport to the rivers that provide the life requisites for the pallid sturgeon.

5.6.2 Foreseeable Impacts

Six mainstem dams on the Missouri River without fish passage facilities block pallid sturgeon migrations and have inundated spawning and nursery areas. The remaining mainstem riverine habitat between dams and downstream of the dams has been altered by removal of snags, reductions in sediment and organic matter transport and deposition, channel bed degradation, flow modification, and hypolimnetic releases. Since most pollution sources are from private lands and commercial enterprises (packinghouses, stockyards, landfills, mines, sewage treatment plants, and industrial effluents), water quality degradation is expected to continue.

5.7 AMERICAN BURYING BEETLE

5.7.1 Existing Contributing Factors

Reasons for declines of American burying beetles are unclear. Some have speculated that destruction of virgin forests is to blame, however populations have been found in native grasslands. Widespread use of pesticides, principally DDT, may have contributed to endangerment, but there is no supporting evidence. Agricultural and grazing practices within the beetle's range could have changed vertebrate species composition and densities, making suitable carrion difficult for beetles to locate.

5.7.2 Foreseeable Impacts

As human populations increase in more remote areas, beetles could be impacted by artificial lights and electronic bug-zappers. If any of these are current sources of species' endangerment, they are likely to continue since all occur on private lands.

As linear projects are constructed, there is the possibility of increasing edge habitat which may result in the increase in the occurrence and density of vertebrate predators and scavengers such as the American crow, raccoon, fox, opossum, and skunk, which compete with the American burying beetle for carrion. Increased agricultural and grazing practices within the beetle's range compound the changes in vertebrate species composition and densities caused by habitat fragmentation. Additionally, as the human population increases and more remote areas are inhabited, impacts due to artificial lights (which are known to attract and disorient many species of nocturnal insects) may be a threat to the species.

5.8 MINNESOTA DWARF TROUT LILY

5.8.1 Existing Contributing Factors

The most significant reasons for the plant's current status are biological and historical. The species is a narrow endemic that spreads very slowly. Direct habitat destruction probably accounts for the greatest population losses over the last century. Expansion of the cities of Faribault and Zumbrota probably has destroyed colonies. Agricultural development may also impact the species. Where cultivation has occurred at the base of bluffs, colonies may have been destroyed.

5.8.2 Foreseeable Impacts

Since the species is restricted to only a few sites, most of which are on private lands, it is subject to physical disturbance by people driving off-road vehicles, conversion of habitat to cropland, residential or commercial development and removal by wildflower collectors.

5.9 HIGGIN'S EYE PEARLY MUSSEL

5.9.1 Existing Contributing Factors

Habitat modification including land use changes, river channel modifications, and pollution continue to affect this mussel. Large to medium clear water streams where the species is found have been lost due to continued development of impoundments, channelization, soil erosion and sediment accumulation originating from land use practices.

5.9.2 Foreseeable Impacts

Expanded agriculture or modified land use practices in the watershed, toxic substance spills, point discharges of harmful chemicals, low water levels and recreational boat traffic continue to be a threat to its population.

5.10 WINGED MAPLELEAF MUSSEL

5.10.1 Existing Contributing Factors

Development of impoundments, channelization, soil erosion, and sediment accumulation contributed to the mussel being listed.

5.10.2 Foreseeable Impacts

Continued habitat modification and expanded agriculture practices in watersheds could further impact the species. Power plant operations can cause toxic substance spills, point discharges, and low water levels which could impact the mussel.

5.11 KARNER BLUE BUTTERFLY

5.11.1 Existing Contributing Factors

Oak savannah habitat on which this species depends have been modified or eliminated by urbanization, silviculture, and fire suppression, which has led to altered vegetation succession with diminished habitat suitability. These contributing factors to the species' endangerment are likely to continue since most occur on private lands.

5.11.2 Foreseeable Impacts

The continued loss or alteration of habitat from industrial, commercial, and residential development; fire suppression and habitat fragmentation are likely to continue.

5.12 UTE LADIES'-TRESSES ORCHID

5.12.1 Existing Contributing Factors

The species is primarily threatened by loss and modification of riparian habitat through urbanization, stream channelization, and construction projects in wetlands and meadows.

5.12.2 Foreseeable Impacts

Overgrazing or heavy summer grazing and trampling by livestock in occupied habitat is detrimental. Introduction of exotic weeds and indiscriminate application of herbicides both can affect populations. Habitats on private lands will continue to be affected by agriculture and livestock grazing.

Additionally, expansion of coal bed methane development on lands in the Powder River Basin could impact Ute ladies'-tresses orchid if ground disturbing activities occur within existing populations or suitable habitat (wetlands) for the species to establish. However, coal bed methane development is a federal activity and is not considered a cumulative impact.

5.13 PRAIRIE BUSH-CLOVER

5.13.1 Existing Contributing Factors

Agricultural development, as well as quarrying, road and residential developments, have been cited as responsible for eliminating this plant from most of its former prairie habitat. Heavy livestock grazing could also be detrimental.

5.13.2 Foreseeable Impacts

The practices noted above are expected to continue for the life of this project. The steady increase in conversion of prairies to agricultural land use, increased linear projects such as construction of roads and railroads, herbicide use and mowing will result in a decrease in suitable habitat for the species.

5.14 LEEDY'S ROSEROOT

5.14.1 Existing Contributing Factors

Ground water contamination by municipal and residential wastes and agricultural pesticides, decreased ground water seepage, and physical destruction of cliff habitats have contributed to this species' decline.

5.14.2 Foreseeable Impacts

Future water contamination could impact this species.

5.15 WESTERN PRAIRIE FRINGED ORCHID

5.15.1 Existing Contributing Factors

The species is primarily threatened by loss and modification of habitat through conversion to cropland, overgrazing by livestock, hay mowing, drainage of wetlands and fire suppression.

5.15.2 Foreseeable Impacts

Insecticide use has and will continue to affect the species' pollinator, hawkmoths. Water demands on private and public lands are likely to lower ground water tables, thereby affecting wetlands inhabited by the orchid (Hansen et al, 1999). Habitats on private lands will continue to be affected by agriculture, livestock grazing, mowing, habitat conversion and application of insecticides.

5.16 BALD EAGLE

5.16.1 Existing Contributing Factors

The USFWS has proposed to remove the bald eagle as a threatened species from the endangered species list citing success of recovery and protection efforts. Recovery and protection efforts include protection of wintering and nesting habitats on Federal lands and regulation of adverse activities on private lands under various protective laws, the prohibition of collecting bald eagles, reduction and regulation of harmful chemicals, principally DDT and other toxic pesticides, and reduction of known mortality sources such as electrocution from power lines, and indiscriminate shooting.

5.16.2 Foreseeable Impacts

Human populations in areas affected by the proposed project are likely to expand in the future; therefore, there will probably be some cumulative effects of additional project-related disturbances to bald eagles. While those may temporarily or permanently displace some individuals from wintering and feeding sites near the project, such displacement may or may not negatively affect those individuals' reproductive success and/or long-term survival.

Coal bed methane expansion on lands in the Powder River Basin could impact bald eagles due to increased activity and loss of some foraging habitat. However, coal bed methane development is a federal activity and is not considered a cumulative impact. Three bald eagle winter roost sites are known to occur within the project area.

5.17 MOUNTAIN PLOVER

5.17.1 Existing Contributing Factors

Mountain plover habitat is threatened by the conversion of grasslands to croplands and urban uses, domestic livestock management, and other land uses (e.g., prairie dog control, and mineral development) throughout this species breeding and wintering range. Many grasslands are not suitable breeding habitat, and therefore, are not used by mountain plovers. Conversion of these grasslands to cropland also can be considered detrimental because such conversion may create locally acceptable habitat on which mountain plovers are then exposed to tilling. Consequently, grassland conversion may be considered a threat to mountain plover conservation whether or not the grasslands are presently suitable breeding habitat, particularly when conversions are proposed within the southern portion of the bird's breeding range. This species has been proposed for listing as threatened because, in part, a significant amount of their breeding habitats in grasslands have been converted to agriculture. Such effects also apply to loss of prairie dog colonies in which mountain plovers may nest. Livestock grazing practices do not mimic grazing effects by bison and do not promote vegetative conditions suitable for mountain plover nesting.

5.17.2 Foreseeable Impacts

Prairie dog control on private lands is expected to continue as well as conversion of grasslands to croplands. Additionally, range management practices for domestic livestock, together with extensive

eradication of prairie dogs and other burrowing rodents will continue to adversely affect mountain plover habitat.

Oil, gas and mineral leasing and development occur throughout the breeding range of the mountain plover. Ongoing development of natural gas resources in southwest Wyoming now exceeds the rate of development projected three years ago, and the volume of natural gas development expected to occur could make the rate of development the highest in the Nation. Oil and gas development requires construction of individual well pads, access roads, travel corridors, and pipelines. Mineral resources found within the range of the mountain plover include coal, uranium-vanadium, bentonite, and hard rock minerals. Many of these resources occur on public lands and are commonly mined using surface mining techniques. However, coal bed methane development is a federal activity and is not considered a cumulative impact. Up to 25 percent of mountain plover habitat at the Antelope Coal Mine in Converse County, Wyoming, has been affected by mining disturbance in the past. Other surface coal mining is proposed in Wyoming that may impact mountain plovers or their habitat. In southwest Wyoming the "checkerboard" pattern of alternating private and public land (Federal and State sections) also reduces the effectiveness of Federal plover conservation measures.

The expansion of coal bed methane development on lands in the Powder River Basin could impact this species. The expansion would entail drilling, completing, operating, and reclaiming approximately 3,000 new productive wells and related production facilities in Campbell and Converse counties in Wyoming. Mountain plover could be displaced because of noise, human activity and vehicles using two-track roads.

Land exchange or disposal by Federal agencies may also involve mountain plover habitat. Land exchanges on the Thunder Basin National Grassland in Wyoming have resulted in transfer of known habitat on private land to Forest Service ownership.

5.18 SWIFT FOX

5.18.1 Existing Contributing Factors

Swift fox currently are not a protected species under the ESA. Loss of native prairie habitat, trapping, hunting, automobiles and prey reduction from rodent control are some reasons for its continued decline. Since the animal is not listed under the ESA, in many states it is still legal to shoot swift fox. Prairie dog poisoning on private and Federal lands has reduced prey availability for the species and may concentrate swift fox in the same areas where coyotes hunt. This may lead to greater predation of coyotes on swift fox. Coyote control by animal damage control agents may have accidentally affected swift fox. But, increase coyote control may benefit swift fox by reducing coyote populations, thereby reducing their overall predation on swift fox (Hansen et al. 1999).

5.18.2 Foreseeable Impacts

Swift fox are susceptible to mortality on highways and also vulnerable to trapping, whether inadvertent or deliberate. These sources of impacts are likely to continue.

The expansion of coal bed methane development on lands in the Powder River Basin could impact swift fox. Human activity, noise and mortalities from maintenance vehicles could be some of the impacts from this development.

5.19 STURGEON CHUB

5.19.1 Existing Contributing Factors

The sturgeon chub is presently a candidate species and receives no protection under ESA. However, the sturgeon chub was petitioned for listing as endangered because of habitat alteration (flooded river valleys, altered temperature and flow regimes, reduced sediment transport and turbidity, habitat fragmentation, restricted movements) by dams.

5.19.2 Foreseeable Impacts

Impacts to the sturgeon chub have resulted by continued small-scale impoundments, levees, and diversion projects throughout the Missouri River basin. Presently, only one-third of the river remains in a free-flowing state. Water manipulation through dams and irrigation diversions continues to threaten the species. Water manipulation, habitat loss, and predation are the greatest threats facing sturgeon chub populations. Further fragmentation of sturgeon chub populations due to dam construction and channelization are a potential threat to the species, reducing genetic variability and preventing repopulation of tributaries after severe drought conditions. Dredging for channel maintenance and sand/gravel extraction may be an obstacle to fish movement.

Future habitat losses are likely to result from energy development (coal mining) in the upper Missouri River Basin. Other impacts to sturgeon chub may result from inter-basin diversions and increased municipal, industrial and irrigation usage. Power plant and water supply intakes may entrain and impinge sturgeon chub.

5.20 BLACK-TAILED PRAIRIE DOG

5.20.1 Existing Contributing Factors

Black-tailed prairie dogs were petitioned for listing as threatened because of multiple factors that include conversion of prairie habitats to agriculture, urbanization of occupied habitats, sport shooting, sylvatic plague, poisoning on rangelands grazed by livestock, and extensive fragmentation of grasslands.

However, the USFWS has determined that listing the species is warranted but precluded by other higher priority acts. Presently, prairie dog poisoning has been suspended on Federal lands. Prairie dog shooting is regulated by state wildlife agencies; but the Forest Service can and has issued closure orders in the past for prohibiting specific activities including shooting or the discharge of firearms (Hansen et al. 1999).

5.20.2 Foreseeable Impacts

Expansion of coal bed methane development on lands in the Powder River Basin could impact this species due to fragmentation of prairie dog colonies.

Since at least half of prairie dog colonies are on private and state lands, impacts to prairie dogs (poisoning, habitat alteration and loss, recreational shooting) will continue and sylvatic plague will continue to be a threat to extant populations. Some states actively promote unregulated and unlimited prairie dog shooting for sport. And since the animal is not protected under the ESA, in many areas development (including minerals, oil and gas) proceeds without regard to the impact on prairie dogs or their habitat. All of these factors continue to influence prairie dog populations, which in turn influence black-footed ferret populations.

**Table 5-1
Summary of Measurable Effects to Habitats**

Species	Potential or Occupied Habitat	Measurable Effects to Habitat Parameter	Measurement of Effect to Habitat Parameter by Alternative						Mitigation Possible	
			Existing Railroad	Alternative B	Alternative C	Phiney Flat Alternative	W G Flat Alternative	Alternative D		
Black-footed ferret	Potential	miles within prairie dog colonies in SD and WY	Unknown	11.5	17.5	17.5	17.5	17.5	6.2	Yes
Piping plover	Potential	Miles within 1.0 mile	20.2	75.6	46.9	50.6	48.2	29.4	Yes	
		Miles within 0.5 mile	16.5	51.2	25.1	26.0	25.8	19.1		
Whooping crane	Potential	Miles within 500 feet of rivers in SD	4.8	6.1	4.8	4.8	5.2	2.7	No	
		Miles within 1.0 mile	36.3	none	none	none	none	none		
Interior least tern	Potential	Miles within 0.5 mile	31.0	none	none	none	none	none	Yes	
		Miles within 500 feet of rivers in SD	8.7	75.6	45.9	50.6	48.2	29.4		
Topeka shiner	Occupied	Miles within 1.0 mile	20.2	51.2	25.1	26.0	25.8	19.1	Yes	
		Miles within 0.5 mile	16.5	51.2	25.1	26.0	25.8	19.1		
Pallid sturgeon	Potential	Miles within 500 feet	4.8	6.1	4.8	4.8	5.2	2.7	Yes	
		Number of sites within 500 feet of streams in MN and SD	18.4	none	none	none	none	none		
American burying beetle	Potential	Miles within 500 feet	53	21.1	19.2	14.4	20.5	11.6	Yes	
		Number of sites within 500 feet of rivers in SD	8.7	186	130	106	134	56		
Minnesota dwarf trout lily	No Potential	Miles within potentially suitable land cover (including suitable soils on new railroad) in SD	460.0	33.4	35.4	36.0	36.8	41.7	No not applicable	
		None	none	none	none	none	none	none		
Higgin's eye pearly mussel	No Potential	None	none	none	none	none	none	none	not applicable	
		None	none	none	none	none	none	none		
Winged maple leaf mussel	No Potential	None	none	none	none	none	none	none	not applicable	
		None	none	none	none	none	none	none		
Karner blue butterfly	Potential	Miles within potential deciduous forest land cover in MN	5.0	none	none	none	none	none	Yes	
		Miles within wet meadow wetlands	none	0.90	0.86	0.96	0.73	1.08		
Ute ladies'-tresses orchid	Potential	Miles within wet meadow wetlands	none	0.90	0.86	0.96	0.73	1.08	Yes	

**Table 5-1
Summary of Measurable Effects to Habitats**

Species	Potential or Occupied Habitat	Measurable Effects to Habitat Parameter	Measurement of Effect to Habitat Parameter by Alternative							Mitigation Possible
			Existing Railroad	Alternative B	Alternative C	Phiney Flat Alternative	W G Flat Alternative	Alternative D	Alternative D	
		Number of potential habitat sites crossed in SD and WY		2	4	4	4	3	1	
Prairie bush-clover	Potential	Number of dry, mesic prairie remnants intersected in MN	59	none	none	none	none	none	none	Yes
Leedy's roseroot	No Potential	None	none	none	none	none	none	none	none	not applicable
Western prairie fringed orchid	Potential	number of wet prairie remnants intersected in MN	6	none	none	none	none	none	none	Yes
Bald eagle	Occupied	Miles within 1.0 mile Miles within 0.5 mile Miles within 500 feet of rivers in MN, SD, WY	67.7 58.6 14.2	125.0 81.9 6.1	94.5 58.4 5.2	99.2 59.3 5.2	96.8 59.2 5.5	46.0 29.9 2.7	46.0 29.9 2.7	Yes Yes Yes
Mountain plover	Occupied	Miles within grassland Miles within prairie dog colonies in WY	none	120.7 8.1	208.0 12.4	108.0 12.4	108.0 12.4	108.0 12.4	67.1 3.3	Yes Yes
Swift fox	Occupied	Miles within grassland, Shrub steppe-miles within prairie dog colonies in SD and WY	none	248.8 11.5	230.4 17.5	226.3 17.5	227.2 17.5	227.2 17.5	267.4 6.2	Yes Yes
Sturgeon chub	Occupied	Miles within 500 feet Number of sites within 500 feet of rivers and tributaries in SD	none	21.1 186	19.2 130	14.4 106	20.5 134	11.6 5.6	11.6 5.6	Yes Yes
Black-tailed prairie dog	Occupied	Miles within prairie dog colonies in SD and WY	unknown	11.5	17.5	17.5	17.5	17.5	6.2	No

PART 6

CONCLUSIONS

The proposed PRB expansion project is designed to provide efficient and competitive rail service from coal mines in Wyoming's Southern Powder River Basin to more eastern electrical utilities. The project involves construction and operation of approximately 280 miles of new rail line in Minnesota, South Dakota and Wyoming and rebuilding of approximately 600 miles of existing rail line in Minnesota and South Dakota. Table 6-1 summarizes preliminary determination of effects to Federally listed endangered, threatened, proposed, candidate and petitioned species that could result from implementing different alternatives for this project in Minnesota, South Dakota, and Wyoming.

6.1 BLACK-FOOTED FERRET

The species' recovery is dependent on captive breeding animals and their reintroduction to suitable habitats. One reintroduction site is within portions of BGNG and Badlands National Park, the Conata Basin/Badlands site in South Dakota. Another proposed reintroduction site is on TBNG, the Rosecrans site in Wyoming. Since Alternative B would pass through that site on TBNG, it would likely no longer be suitable for reintroduction of black-footed ferrets thus Alternative B would impede the species' recovery.

None of the other alternatives for new railroad construction would affect ferret reintroduction. But, because of continued reductions in prairie dog populations on private lands (Hansen et al. 1999) and the spread of sylvatic plague and other diseases through extant prairie dog populations, black-footed ferrets are likely to remain endangered during and after project completion. However, successful reestablishment of reintroduced populations will reduce risks of the species' extinction.

However, if extant populations exist in the project area they may be impacted. The USFWS's Biological Opinion in response to the Continental Divide/Wamsutter II proposed project stated that the Service's Black-footed survey Guidelines (1989) may not be applicable to large projects and suitable habitat was redefined. Additionally, in the Biological Opinion the USFWS takes the position that the lethal take of an individual black-footed ferret does not give rise to a finding of jeopardy.

6.2 PIPING PLOVER

The primary threats to piping plover are habitat modification and destruction, and human disturbance during nesting season. While construction and operation of new railroad alternatives and rebuilding the existing railroad will not alter in-stream flows in the same way that dams do, water removal from the Cheyenne River during construction could reduce flows temporarily. Additional water depletions would reduce the width and/or depth of water surrounding nest sites, which may increase predation and human disturbance. Construction of stabilization measures required on Cheyenne River banks could alter river hydraulic dynamics, thus altering island and sandbar erosion or deposition patterns downstream. Neither water depletion nor altered river hydraulics is likely to adversely affect piping plovers if they do not occur during the nesting period. Construction of alternatives B or C would impact more areas along the Cheyenne River than Alternative D. Alternative D crosses the river only once. The project is not expected to contribute to any change in the species' status during or after completion.

6.3 WHOOPING CRANE

It is doubtful that any short- or long-term projects effects would actually influence whooping cranes. The project is not expected to contribute to any change in the species' status during or after completion.

6.4 INTERIOR LEAST TERN

USFWS identified elimination of suitable nesting sites on in-river island and sandbars and nest predation as the principal factors contributing to the species decline. While construction and operation of new railroad alternatives and rebuilding the existing railroad will not alter in-stream flows in the same way that dams do, water removal from the Cheyenne River during construction could reduce flows temporarily. Additional water depletions would reduce the width and/or depth of water surrounding nest sites, which may increase predation and human disturbance. Increased water depletions also allow for vegetation encroachment into nesting areas, making them less suitable as nesting habitat. Extreme depletions may dewater river reaches sufficiently to kill small fishes, the least tern's principal food.

Construction of stabilization measures required on Cheyenne River banks could alter river hydraulic dynamics, thus altering island and sandbar erosion or deposition patterns downstream. Neither water depletion nor altered river hydraulics is likely to adversely affect interior least terns if they do not occur during the nesting period, but only if terns are nesting contemporaneously with construction and water withdrawn from the Cheyenne River.

Other potential project impacts to interior least terns include noise during construction and operation causing displacement from nesting and feeding areas and accidental releases of petroleum products and creosote from ties, that could affect terns and/or their food supply. Construction of either alternatives B or C would impact more areas along the Cheyenne River than Alternative D; since Alternative D crosses the river only once. The project is not expected to contribute to any change in the species' status during or after completion.

6.5 TOPEKA SHINER

Sedimentation and eutrophication have been cited as primary impacts to this species. In those counties where the Topeka shiner presently exists (Lincoln County, Minnesota; Brookings, Kingsbury, Beadle, and Hand counties, South Dakota), ninety-eight percent of the existing railroad route is through human developments and croplands.

Mitigation measures such as: prohibiting in-stream construction during the shiner's spawning period (May 15 to August 15) in any inhabited or potentially inhabited streams; utilization of span bridges instead of culverts to cross streams inhabited by Topeka shiners; avoiding placing any structures, such as pilings or bents, within stream channels; utilization of concrete rail ties rather than creosote-treated wood anywhere the route is within 500 feet of a stream or tributary inhabited or potentially inhabited by Topeka shiners; and the use of best-management practices during rebuild and operation of the existing railroad which should minimize any discharge and habitat degradation to inhabited streams crossed or adjacent to the railroad. The project is not expected to contribute to any change in the species' status during or after completion.

6.6 PALLID STURGEON

Destroyed and altered habitats are believed to be the primary cause of adverse effects to the species survival. The new railroad project alternatives and rebuild and operation of the existing railroad could contribute to pollution through accidental release or chronic discharge of petroleum products and creosote from ties, that could affect pallid sturgeons downstream. It is impossible to predict if, when and where these short- and long-term project effects would actually influence sturgeons since the likelihood of such events is unknown: mitigation measures and best-management practices will be implemented to minimize any discharge to the Cheyenne River. The project is not expected to contribute to any change in the species' status during or after completion.

6.7 AMERICAN BURYING BEETLE

It is unclear why American burying beetles are on the decline. The new railroad alternatives and rebuild of the existing railroad may increase edge habitat which could be used by predators and scavengers (American crow, raccoon, fox, opossum, and skunk), potential competitors with the American burying beetle for carrion as well as

potentially preying on beetles. Too, construction machinery could crush beetles but it is impossible to predict if, when and where project components would actually impact burying beetles since none are known to occur in the project area. Therefore, it is impossible to project the impacts of the project on this species. Only minimal impacts, if any, would be anticipated because the species is not expected to be present. The project is not expected to contribute to any change in the species' status during or after completion.

6.8 MINNESOTA DWARF TROUT LILY

There is no indication that the species occurs within the project area or would be affected by rebuilding and operating the existing railroad in Minnesota. The project is not expected to contribute to any change in the species' status during or after completion.

6.9 HIGGIN'S EYE PEARLY MUSSEL

There is no indication that the species occurs within the project area or would be affected by rebuilding and operation of the rail line in Minnesota. The project is not expected to contribute to any change in the species' status during or after completion.

6.10 WINGED MAPLELEAF MUSSEL

There is no indication that the species occurs within the project area or would be affected by rebuilding and operating the existing railroad in Minnesota. The project is not expected to contribute to any change in the species' status during or after completion.

6.11 KARNER BLUE BUTTERFLY

Oak savannah habitat has been modified or eliminated by urbanization, silviculture, and fire suppression contributing to the species endangerment. There is no indication that the existing railroad in Minnesota coincides with suitable habitat for Karner blue butterflies. Unless the species' only known larval food plant, wild lupine (*Lupinus perennis*), is found growing in the construction right-of-way, the project would not impact the Karner blue butterflies. The project is not expected to contribute to any change in the species' status during or after completion.

6.12 UTE LADIES'-TRESSES ORCHID

The primary threat to this species is loss and modification of riparian habitat. Although this species is not known to occur in any counties within the analysis areas in South Dakota and Wyoming, it was included on lists of potential species inhabiting the project area in the Cheyenne River drainage by USFWS. Four sites along Alternative B were identified as potential habitat for the orchid; compared to two sites along Alternative C and one site along Alternative D. Proposed mitigation for this species should ensure that potential cumulative effects contributed by the proposed new railroad alternatives do not occur. The project is not expected to contribute to any change in the species' status during or after completion.

6.13 PRAIRIE BUSH-CLOVER

Agricultural development and road and residential developments have been cited as the primary causes of the species decline. Rebuilding the existing railroad has the potential to impact at least one known population of this species that has been observed growing within or near the existing right-of-way in Brown County, MN and the existing railroad intersects mesic and dry prairie remnants, potential habitat for prairie bush-clover. Searching for prairie bush-clover prior to construction and protecting populations found within construction zones is the only practicable means to completely eliminate impacts to the species. The project is not expected to contribute to any change in the species' status during or after completion.

6.14 LEEDY'S ROSEROOT

Suitable habitat for the species is not present along the existing railroad in southeastern Minnesota and there is no indication that the species occurs within the project area or would be affected by rebuilding and operating the existing railroad in Minnesota. The project is not expected to contribute to any change in the species' status during or after completion.

6.15 WESTERN PRAIRIE FRINGED ORCHID

This species is primarily threatened by loss and modification of habitat. Although this species is not known to occur in any counties within the analysis areas in Minnesota and South Dakota, it was included on lists of potential species inhabiting the project area in adjacent Pipestone and Rock counties, Minnesota by USFWS.

There are several wet prairie remnants intersected by the existing railroad in 3 counties in Minnesota. Searching for western prairie fringed orchid prior to construction and protecting populations found within construction zones is the only practicable means to completely eliminate impacts to the species. The project is not expected to contribute to any change in the species' status during or after completion.

6.16 BALD EAGLE

Construction and operation of the new railroad and rebuilding the existing railroad are likely to be sources of disturbance and potential mortality to wintering bald eagles in Minnesota, South Dakota, and Wyoming. Proposed mitigation can reduce the likelihood of direct eagle mortality by operating trains through removal of any carrion from tracks and rights-of-way. However, noise and activities associated with construction and operation of the railroad are likely to disturb wintering eagles within some distance of the tracks along the Minnesota River (Minnesota); Bad and Missouri rivers (South Dakota); and the Cheyenne River (Wyoming and South Dakota).

Mitigation measures and stipulations will provide some measure of protection to bald eagles if applied to lands adjacent to rivers crossed by the new railroad alternatives and existing railroad reconstruction. Those measures could reduce risks of the project contributing significant cumulative effects. The project is not likely to contribute to any change in the species' status during or after completion.

6.17 MOUNTAIN PLOVER

Mountain plover habitat is threatened by the conversion of grasslands to croplands and urban uses, domestic livestock management, mineral development and prairie dog control. If prairie dog management on Federal lands was directed to expanding colonies and populations, the effect would be beneficial to mountain plover. Mitigation measures will provide some measure of protection to the species if applied to lands crossed by the new railroad alternatives. These measures could reduce risks of the project contributing significant cumulative effects that would change the species' status during or after completion. Alternative B impacts approximately 279 acres of potential nesting habitat compared to 424 acres impacted by Alternative C and 150 acres impacted by Alternative D.

The amount of suitable habitat available may be broad. Mountain plover may not be limited to the availability of suitable habitat.

6.18 SWIFT FOX

Loss of native habitat, trapping, hunting, vehicular traffic and prey reduction from rodent control are some reasons for the animal's continued decline. Swift fox probably use all upland habitats within the proposed project area in South Dakota and Wyoming. If prairie dog management on Federal lands was directed to expanding colonies and populations, the effect would be beneficial to swift fox. Mitigation measures will provide some measure of protection to the species if applied to lands crossed by the new railroad alternatives. These measures

could reduce risks of the project contributing significant cumulative effects that would change the species' status during or after completion.

6.19 STURGEON CHUB

Habitat alteration and water withdrawals have contributed to the species decline. While construction and operation of new railroad alternatives will not alter in-stream flows in the same way that dams do, water removal from the Cheyenne River during construction could reduce flows temporarily. Additional water depletions could isolate sturgeon chubs in pools with poor water quality and/or increase their risk of predation by introduced piscivorous fish. Construction of stabilization measures required on Cheyenne River banks could alter river hydraulic dynamics, thus altering channel characteristics and potential spawning sites in the immediate area. Mitigation measures and best-management practices employed during construction and operation of the new railroad alternatives should minimize any discharge and water depletions to the Cheyenne River at periods when sturgeon chub are likely to be most vulnerable. Alternative B impacts the Cheyenne River and its tributaries more times than alternatives C and D. The project is not expected to contribute to any change in the species' status during or after completion.

6.20 BLACK-TAILED PRAIRIE DOG

Multiple factors that impact prairie dog populations include conversion of prairie habitats to agriculture, sport shooting, sylvatic plague, fragmentation of grasslands, and poisoning. Each of the new railroad project alternatives pass through prairie dog colonies and construction activities are expected to adversely impact individual prairie dogs; but not contribute significantly to species viability rangewide. Once construction is completed, previously disturbed work zones are likely to be re-colonized as long as healthy populations remain in the vicinity. Alternative B would impact approximately 279 acres of prairie dog colonies compared to 424 acres under Alternative C and approximately 150 acres under Alternative D.

**Table 6-1
Preliminary Determination of Effects to Federally Listed Endangered, Threatened, Proposed, Candidate and Petitioned Species**

Species	Rebuild in MN and SD		New Build in Minnesota		New Build Alternatives in South Dakota and Wyoming			
	Existing	Mankato	Owatonna	B	C	Phiney Flat	W G Flat	D
Black-footed ferret	No Effect	No Effect	No Effect	Likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect
Piping plover	No Effect	No Effect	No Effect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect
Whooping crane	No Effect	No Effect	No Effect	No Effect				
Interior least tern	Not likely to adversely affect	No Effect	No Effect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect
Topeka shiner	Not likely to adversely affect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Pallid sturgeon	Not likely to adversely affect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
American burying beetle	Not likely to adversely affect	No Effect	No Effect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect
Minnesota dwarf trout lily	No Effect	No Effect	No Effect	No Effect				
Higgin's eye pearly mussel	No Effect	No Effect	No Effect	No Effect				
Karner blue butterfly	Not likely to adversely affect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Ute ladies'-tresses orchid	No Effect	No Effect	No Effect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect
Prairie bush-clover	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	No Effect	No Effect	No Effect	No Effect	No Effect
Leedy's roseroot	No Effect	No Effect	No Effect	No Effect				
Western prairie fringed orchid	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	No Effect	No Effect	No Effect	No Effect	No Effect
Bald eagle	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect				
Mountain plover	No Effect	No Effect	No Effect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect
Swift fox	No Impact	No Impact	No Impact	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect
Sturgeon chub	No Impact	No Impact	No Impact	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect
Black-tailed prairie dog	No Impact	No Impact	No Impact	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect

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POWDER RIVER BASIN EXPANSION PROJECT

**INVENTORY
FOR THE
UTE LADIES' TRESSES
(*SPIRANTHES DILUVIALIS* SHEVIAK)**



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POWDER RIVER BASIN EXPANSION PROJECT

INVENTORY
FOR THE
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(*SPIRANTHES DILUVIALIS* SHEVIAK)

Submitted to:

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16 NOVEMBER 1998

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1.0 INTRODUCTION

1.1 Scope

On February 20, 1998, the Dakota, Minnesota & Eastern Railroad Corporation (DM&E) filed an application with the Surface Transportation Board (Board) for authority to construct and operate new rail line facilities in east-central Wyoming, southwest South Dakota, and south-central Minnesota. A large portion of the project involves construction of 280.9 miles of new rail line across southwestern South Dakota and east central Wyoming. Because construction and operation of this project has the potential to result in significant environmental impacts, the Board's Section of Environmental Analysis (SEA) has determined that the preparation of an Environmental Impact Statement (EIS) is appropriate.

Analysis in the EIS will address the proposed activities associated with the construction and operation of new rail facilities and their potential environmental impacts on threatened and endangered species, as appropriate. Ute ladies' tresses (*Spiranthes diluvialis* Sheviak), a low elevation orchid of riparian and palustrine habitats has the potential of occurring in the project area (USFWS per. comm. 1998a). Therefore, the U.S. Fish and Wildlife Service (USFWS) requested an inventory to evaluate the potential project impacts to the orchid and its potential habitat (USFWS per. com. 1998a).

USFWS and Wyoming Natural Diversity Database (WYNDD) cautioned that locating flowering individuals would be difficult because of the late season inventory. Additionally, USFWS personnel indicated the orchid is difficult to find and identify unless flowering and it may only flower every 3-5 years. Therefore, absence during the flowering period in suitable habitat is not considered confirmation that the species is not present. It was determined by the USFWS that documenting the presence or absence of potential habitat was appropriate and if present, new populations would be noted.

1.2 Orchid Life History and Distribution

The USFWS listed Ute ladies' tresses as threatened in January of 1992 under authority of the Endangered Species Act of 1973 (USFWS 1992). *Spiranthes diluvialis* is a perennial, terrestrial orchid usually with a single stem 8 to 20 inches tall, and 3 to 15 small white or ivory-colored flowers arranged in a terminal spike. Geographic distribution of the orchid includes the eastern Great Basin of western Utah and adjacent Nevada, Colorado River drainage of eastern Utah, eastern front of the Rocky Mountains, and south central Idaho and Wyoming.

In Nebraska, the orchid has been found along the Niobrara River in Platte County (Hazlett 1996). In eastern Wyoming, the orchid is known from Converse, Goshen, Laramie, and Niobrara counties (WYNDD per. comm. 1998). To date, the orchid has not been found in South Dakota (USFWS per. comm. 1998b).

Spiranthes diluvialis is a late summer blooming species with a narrow phenological window of approximately five weeks (July 25th - Sept. 7th). Throughout its range, the orchid has been documented as requiring soil saturation, open areas where vegetation is low, and a distinct growth position along stream banks (Franklin 1992, Kass 1994). In eastern Wyoming and western Nebraska, it has been found on moist cutbanks of saline palustrine meadows or abandoned river channels, and on alluvial terraces adjacent to creeks (Hazlett 1996).

In Wyoming, plant species that appear to consistently occur with the orchid include white sweetclover (*Melilotis officinalis*), arrowgrass (*Triglochin maritimum*), creeping bentgrass (*Agrostis stolonifera*) and baltic rush (*Juncus balticus*) (Hazlett 1996).

1.3 Description of Project Area

Project area is located primarily on the periphery of the Black Hills in southwestern South Dakota, and extends northwest to the Powder River Basin of northeastern Wyoming. According to Fenneman (1931), the project area is included in the Great Plains physiographic province. Elevation ranges from 3,300 ft. at Wasta, S. D. in the east, to 4,500 ft. at Gillette, Wyo. in the west. Project area climate is continental and influenced by spring and summer precipitation occurring mainly from March-through September. Annual precipitation varies from approximately 8 inches in Gillette to approximately 15 inches at Wasta (USDA-SCS 1985).

Vegetation in the project area is characterized as short and mixed-grass prairie. Short grass prairie is characterized by the dominance of two common short grasses blue grama (*Bouteloua gracilis*) and buffalograss (*Buchloe dactyloides*). Mixed-grass prairie can be divided into several types, but all are characterized by needle-and-thread (*Stipa comata*), western wheatgrass (*Elymus smithii*), Sandberg bluegrass (*Poa sandbergii*), and Indian ricegrass (*Oryzopsis hymenoides*). Mixed-grass prairie in the foothills is typically dominated by bluebunch wheatgrass (*Elymus spicatum*), little bluestem (*Andropogon scoparius*), and sideoats grama (*Bouteloua curtipendula*) (Knight 1994). Plant species nomenclature follows Dorn (1977).

2.0 METHODS

2.1 Field Inventory & Planning

Field inventory was conducted from September 14th to 25th by Ronald J. Kass, botanist for Intermountain Ecosystems and Carol Cunningham of Burns and McDonnell. Known locations of orchid were visited in southeastern Wyoming. These sites included: (1) Sprager Creek (Laramie Co.), (2) Bear Creek (Goshen Co.), and (3) Van Tassell Creek (Niobrara Co.). Two days were spent searching known sites, gathering data on the species condition, and becoming familiar with orchid habitat. After field inventory members felt comfortable with the search protocol, visits to potential orchid sites in the project area were scheduled.

Twenty-seven potential habitat sites were located by reviewing National Wetland Inventory Maps (NWI) and aerial photographs of the proposed railway alignment. Criteria for potential habitat were any intermittent, perennial or palustrine wetlands within a 1,000 foot corridor of the modified proposed alternative route. Right-of-way (ROW) would be 200 feet, however, a 1,000 foot corridor was surveyed to allow for minor adjustments in the alignment. Each potential site was visited systematically in the field starting at Wasta following the line southwest to Gillette and then visiting sites along the North/South coal mine line near Gillette.

Landowners were contacted and permission was requested prior to each site visit. Only public lands and those for which access was obtained were surveyed. In some areas where access was not obtained, areas outside the proposed ROW were surveyed to gain information on the potential conditions within the ROW. At each site for which access was obtained, the entire area was searched in detail by walking linear transects within the 200 foot ROW. In other areas, visual observations from adjacent areas, generally public roads, were made.

Pertinent ecological information was recorded and photographs were taken at each site (Appendix A-Photo Log). Potential habitat was evaluated primarily on four parameters: (1) presence of a reliable water source throughout the growing season, (2) suitable vegetation structure and composition, (3) suitable channel morphology, and (4) presence of indicator species. Those areas considered as potential habitat were delimited on aerial photographs (Appendix B).

3.0 RESULTS

3.1 Visits to Known Locations

Three known locations of the orchid were visited in southeastern Wyoming. The site at Sprager Creek in Laramie County, Wy. was characterized as a seasonally to semi-permanent flooded palustrine wet meadow that was hayed periodically and the orchid could not be located during a two hour search. The orchid was located at the Bear Creek site (Goshen Co.) on alluvial terraces in a palustrine wet meadow. Plants were in post-fruit and stunted because of continual haying.

The site at Van Tassell Creek (Niobrara Co.) was characterized as a seasonally flooded palustrine meadow that was periodically hayed and grazed. The orchid was not located at this site after a two hour search. It is quite possible that orchids at the Sprager Creek and Van Tassell sites were absent because of the continual haying, grazing or lack of growth due to a less than optimal year.

3.2 Field Inventory Constraints

Access to private property was severely restricted and only 30% (8 of 27) of sites considered potential habitat (based on review of maps and aerial photographs) within the actual ROW were inventoried. Remaining sites were evaluated from a distance usually from a road nearest the actual ROW. Fourteen sites received off-site searches from the road or nearest access point, and 5 sites could not be accessed within a reasonable distance to collect data (No data). Four of the 22 sites or 18% of the sites were considered as potential habitat for Ute ladies' tresses.

3.3 Potential Habitat Descriptions

The following is a brief description of the potential habitats visited and includes a characterization of potential habitats, likelihood of orchid occurrence, and access type. Table 1 provides a comprehensive site index of the inventory data.

1. **Box Elder Creek**--This site was characterized as a meandering perennial stream with steep, dry, banks vegetated to sandbar willow (*Salix exigua*). Plains cottonwood (*Populus deltoides* var. *occidentalis*) was growing on the broad floodplains. Direct access to the ROW was denied and the site was evaluated from the road as **no potential** because of the high, dry, densely vegetated banks (Appendix A: photos 1).
2. **Spring Creek**---This site was characterized as a meandering perennial stream with steep, dry, banks vegetated to sandbar willow and western wheatgrass (*Elymus smithii*). Plains cottonwood was growing on the broad floodplains. Direct access to the ROW was denied and the site was evaluated from the road as **no potential** because of the high, dry, densely vegetated banks (Appendix A: photos 2).
3. **Battle Creek**-- The ROW crosses north of Battle Creek in a ravine vegetated with plains cottonwood and American elm (*Ulmus americana*). Direct access to the ROW was denied and the site was evaluated from the road. The site was evaluated as **no potential** because vegetation was very dense, and landscape position of the ravine was too high in relation to the creek (Appendix A: photo 3).
4. **French Creek**--Access was denied to this site and it could not be evaluated from a distance (no photo).
5. **Cheyenne River at Hay Canyon**--This site was characterized as a meandering perennial stream with steep, dry, banks vegetated to sandbar willow and cordgrass (*Spartina pectinata*). Plains cottonwood was growing on the broad floodplains. ROW access was permitted at this site but it was evaluated as **no potential** because of the high, dry, densely vegetated banks (no photo).

6. **Hay Canyon North**---This site was characterized as a saline wet meadow vegetated to cordgrass on the high, dry banks. A series of springs were present on sloping terrain and supported dense stands of cattails (*Typha latifolia*) and bulrush (*Scirpus sp.*). ROW access was permitted at this site but it was evaluated as **no potential** because of dense vegetation and high, dry, banks (Appendix A: photo 4).
7. **Hay Canyon South**---These sites were characterized as a series of saline wet meadows/marshes vegetated to mainly cattails and cordgrass. ROW access was permitted to several of these site. It was determined that several of these site could be evaluated as **potential habitat** because of suitable vegetation structure, channel morphology, and hydrology (Appendix A: photo 5).
8. **Sand Creek**--The site was characterized as a riparian woodland with heavy understory of silver buffaloberry (*Spherdia argentea*) and wild plum (*Prunus americana*). ROW access was denied and the site was evaluated as **no potential** because of the heavy understory vegetation. (Appendix A: photo 6).
9. **Horsehead Creek**--This site was characterized as a perennial to intermittent stream with some vegetated cutbanks lined with cordgrass and floodplains vegetated to plains cottonwood and red ash (*Fraxinus pennsylvanica*). ROW access was denied and the site was evaluated from the highway. The site was evaluated as **no potential** because cutbanks were high, dry, and densely vegetated (Appendix A: photo 7).
10. **Dry Creek**---This site was characterized as a perennial to intermittent stream with some vegetated cutbanks and abandoned oxbows lined with cattails, cordgrass, and three square bulrush (*Scirpus pungens*). Uplands are dominated by sagebrush and grasses. Access was permitted to the ROW. The site was evaluated as **potential habitat** because vegetation composition and structure were suitable, and cutbanks were gently sloping, moist, and lightly vegetated (Appendix A: photo 8).
11. **Hat Creek**-- This site was characterized as a perennial stream with cordgrass and Canadian wildrye (*Elymus canadensis*) growing on the cutbanks. Floodplain vegetation was dominated by plains cottonwood. Access was permitted to the ROW. The site was evaluated as **no potential** because vegetation composition and structure were not suitable, and cutbanks were generally steep, densely vegetated, and shaded (Appendix A: photos 9).
12. **Plum Creek**---Access was denied and the site could not be evaluated from a distance (no photo).
13. **Red Canyon Creek**--This site was characterized as a channelized perennial stream with little or no vegetation associated with the stream channel. Adjacent floodplains were vegetated to plains cottonwood and sand sagebrush. ROW access was denied and the site was evaluated as **no potential** habitat from the highway (Appendix A: photo 10).

14. **Beaver Creek**--This site was characterized as a channelized perennial stream vegetated to grass, and the adjacent floodplains were vegetated to plains cottonwood and sand sagebrush. ROW access was denied and the site was evaluated as **no potential habitat** from the road (Appendix A: photo 11).

15. **Bobcat Creek**--This site was characterized as an intermittent stream vegetated to Wyoming sagebrush (*Artemisia tridentata* var. *wyomingensis*). Access was denied to this site and the **no potential habitat** was determined from the highway (Appendix A: photo 12).

16. **Alkali Creek**--This site was characterized as a perennial stream with greasewood (*Sarcobatus vermiculatus*), alkali sacaton (*Sporobolus airoides*), and plains cottonwood growing along the broad floodplains. Access was permitted to this site but it was evaluated as **no potential** because of the highly dry, alkaline conditions and dense vegetation (Appendix A: photo 13).

17. **Lodgepole Creek**---This site was characterized as a perennial to intermittent stream with some vegetated cutbanks and abandoned oxbows lined with cattails, cordgrass, and three square bulrush. Uplands were dominated by Wyoming sagebrush and grasses. Access was permitted to the ROW. The site was evaluated as **potential habitat** because vegetation structure and composition, channel morphology, and hydrology were suitable (Appendix A: photo 14).

18. **Lion Creek**--This site was characterized as an intermittent stream vegetated to Wyoming sagebrush with **no potential** because of lack of suitable vegetation composition, and generally arid conditions. ROW access was denied to this site and it was observed from the highway (no photo).

19. **Piney Creek**--This site was characterized as a perennial to intermittent stream vegetated to Wyoming sagebrush with **no potential** because of vegetation composition and generally arid conditions. ROW access was denied at this site and it was observed from a gravel road (Appendix A: photo 15).

20. **Little Thunder Creek**--This site was characterized as a perennial to intermittent stream vegetated to cordgrass with **no potential** because of arid conditions. ROW access was denied at this site and it was observed from a secondary gravel road (Appendix A: photo 16).

21. **School Creek**--This site was characterized as a perennial stream vegetated to cordgrass. ROW access was permitted and this site was evaluated as **potential habitat** because of suitable vegetation structure, hydrology, and channel morphology (Appendix A: photo 17).

22. **West Fork of Beckwith Creek**--This site was characterized as an intermittent stream vegetated to Wyoming sagebrush with **no potential habitat** due to the lack of vegetation composition. ROW access was denied to this site and it was observed from the gravel road (no photo).

23. **Black Thunder Creek**---This site was characterized as an intermittent stream vegetated to Wyoming sagebrush with **no potential habitat** due to lack of suitable vegetation composition ROW access was denied to this site and it was observed from a gravel road (no photo).
24. **East Fork of Coal Creek**--Access was denied to this area and no data is available.
25. **Dry Creek**--Access was denied to this area and no data is available.
26. **Belle Fourche River**---Access was denied to this area and no data is available.
27. **Caballo Creek**---Access was denied to this area and no data is available.

Table 1. Site Index for *Spiranthes diluvialis*.

Site Name	USGS Quad/Legal Description	NWI Maps	Plant Association	Direct Access to ROW	Potential Habitat
Box Elder Creek	Wasta, SD. T1N, R14E, NE4, S31	R2UBA	cottonwood, sandbar willow	No	No
Spring Creek	Scenic SW, SD. T2S, R12E, SW4, S29; NE4, S31	PEMA	cottonwood, sandbar willow	No	No
Battle Creek	RedShirt, Wy. T3S, R10E, NW4, S31	PEMA	cottonwood, American elm	No	No
French Creek	Fairburn, NE, SD. T5S, R9E, S5	PEMCH	No data	No	No data
Cheyenne River at Hay Canyon	Smithwick, NE, SD. T7S, R8E, S1	R2UBG	cottonwood, sandbar willow, cordgrass	Yes	No
Hay Canyon North	Smithwick, NE, SD. T7S, R8E, S12	PEMC PEMA	cordgrass, cattails	Yes	No
Hay Canyon South	Smithwick, NW, SD. T8S, R8E, SE4, S2; SW4, S1	PEMA, PUBH PEMC	cattail, bulrush, cordgrass	Yes	Yes
Sand Creek	Smithwick SD/ T8S, R8E, NW4 S31	PEMC	cottonwood, plum	No	No
Horsehead Creek	Lone Well Creek East, SD. T9S, R7E, S21	PEMA, PUBH	cottonwood, red ash, cordgrass	No	No

Site Name	USGS Quad/Legal Description	NWI Maps	Plant Association	Direct Access to ROW	Potential Habitat
Dry Creek	Lonewell Cr. West, SD. T9S, R6E, SE4, NE4, S29	PEMA	cattails, cordgrass, three-square bulrush	Yes	Yes
Hat Creek	Heppner, SD. T9S, R4E, SW4, S25	PEMA	cottonwood, cordgrass, wildrye	Yes	No
Plum Creek	Rumford, SD. T9S, R4E, S31	PABFH	No data	No	No data
Red Canyon Creek	Edgemont, SD. T8S, R3E, NW4, S29	PEMC	cottonwood, sand sagebrush	No	No
Beaver Creek	Twenty One Divide, Wy-SD T7S, R1E, S16	PEMC	cordgrass,	No	No
Bobcat Creek	Riverview, Wy. T40N, R61W, S9	PEMA	sagebrush	No	No
Alkali Creek	Little Alkali Creek, Wy. T40N, R62W, S4	PEMA	greasewood, alkali sacaton	Yes	No
Lodgepole Creek	The Nose East, Wy. T42N, R64W, SW4, S32	PEMC	baltic rush, three-square bulrush, cordgrass	Yes	Yes
Lion Creek	Darlington Draw East, Wy. T42N, R67W, NE4, S21	PEMA R4SBA	sagebrush	No	No

Table 1. Site Index for *Spiranthes diluvialis* (continued).

Site Name	USGS Quad/Legal Description	NWI	Plant Association	Access to ROW	Site Potential
Piney Creek	Darlington Draw West, Wy. T42N, R68W, S2	PEMA	sagebrush, cottonwood	No	No
Little Thunder Creek	Piney Cyn. NW, Wy. T43N, R69W, SW4, S30	PEMA, PABFH	cordgrass	No	No
School Creek	Piney Cyn. NW, Wy. T42N, R69W, NW4, NE4, S6	PABFH	cordgrass	Yes	Yes
West Fork of Beckwith Creek	Piney Cyn. SW, Wy. T41N, R69W, NE4, S8	PEMB PABH	sagebrush	No	No
Black Thunder Creek	Open A Ranch, Wy. T44N, R70W, S14	PABFH	sagebrush	No	No
East Fork Coal Creek	Rough Creek, Wy. T45N, R70W, S11	PEMAH	No data	No	No data
Dry Creek	Saddle Horse Butte, Wy. T47N, R70W, S29	PEMAH	No data	No	No data
Belle Fourche River	Saddle Horse Butte, Wy. T47N, R70W, S30	PEMAH PEMCH	No data	No	No data
Caballo Creek	Saddle Horse Butte, Wy. T48N, R71W, S35	PEMCH PABFH	No data	No	No data

4.0 DISCUSSION

4.1 Field Inventory Summary

Four of the 22 sites or 18% of the inventoried sites were considered as potential habitat for Ute ladies' tresses. Hay Canyon South, Dry Creek, Lodgepole Creek, and School Creek met the parameters for suitable hydrology, channel morphology, vegetation composition and structure (Table 1). Potential habitats were generally seasonally flooded to semi-permanently flooded channels and abandoned meanders vegetated to cattails, bulrush, cordgrass and baltic rush. Often, these potential habitats had a drier perimeter of creeping bentgrass (*Agrostis stolonifera*), white sweetclover (*Melilotis officinalis*), and foxtail barley (*Hordeum jubatum*). The presence of associated species or indicator species such as white sweetclover were present in at least two of the four sites.

Unsuitable habitats were areas where the banks were too dry, steep, shaded or overgrown with dense and tall vegetation. Intermittent streams vegetated to sagebrush, wet meadows vegetated to dense cordgrass or riparian areas dominated by big cottonwoods were common in the project area and were not considered as potential habitat. It is realized that a rare species is capable of expanding its range and range of habitats, and that it can respond to different sets of environmental circumstances such as different indicator or associated species. For example, in Utah the orchid is found growing in similar hydrologic and geomorphic conditions but is found with a host of different indicator or associated species (Kass 1997). These changing circumstances were taken in consideration when evaluating potential habitats outside the known range of the species (i.e. South Dakota).

4.2 Potential Habitats For Future Inventory

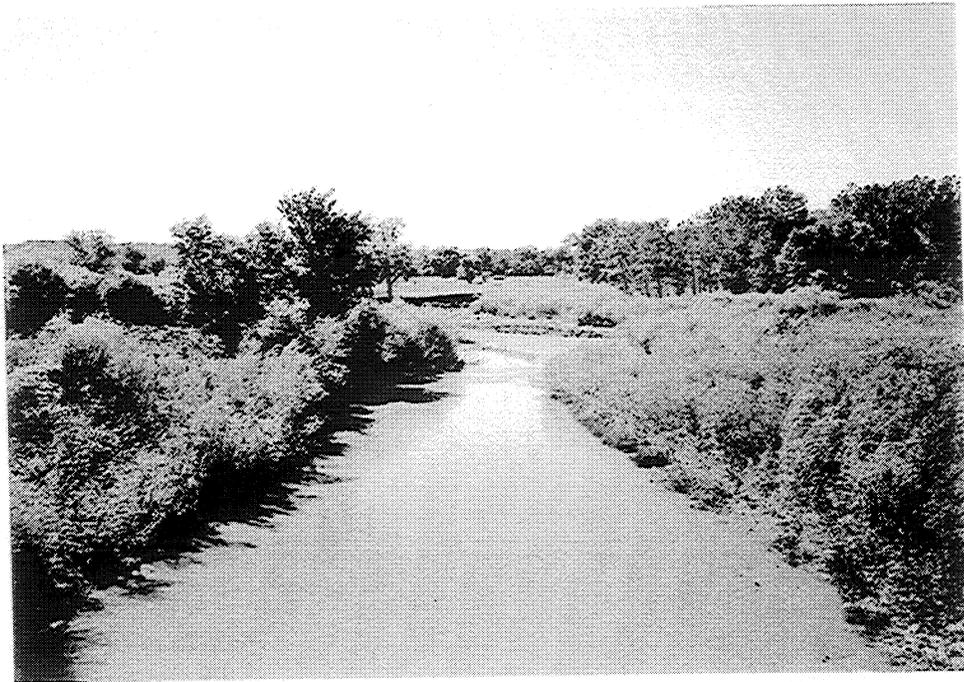
It should be realized that only a subset of potential habitats were inventoried because of access constraints. The inventory was also confounded by a late season search, grazing, haying and a drier than normal growing season. Given these confounding factors, it is probable that *Spiranthes diluvialis* could be found in the project area.

Hay Canyon in Fall River County, S.D. is a long, narrow canyon supporting a diverse systems of palustrine habitats along the ROW. This inventory sampled only a very small portion of Hay Canyon and future investigation is warranted, especially in North Hay Canyon. The inventory could not access the Belle Fourche River or Caballo Creek but these areas should be checked for suitable habitats. The Cheyenne River is the most frequently encountered watercourse along the proposed railway. Despite its frequency of riverine and palustrine habitats, the inventory did not find any suitable habitats for the orchid.

5.0 LITERATURE CITED

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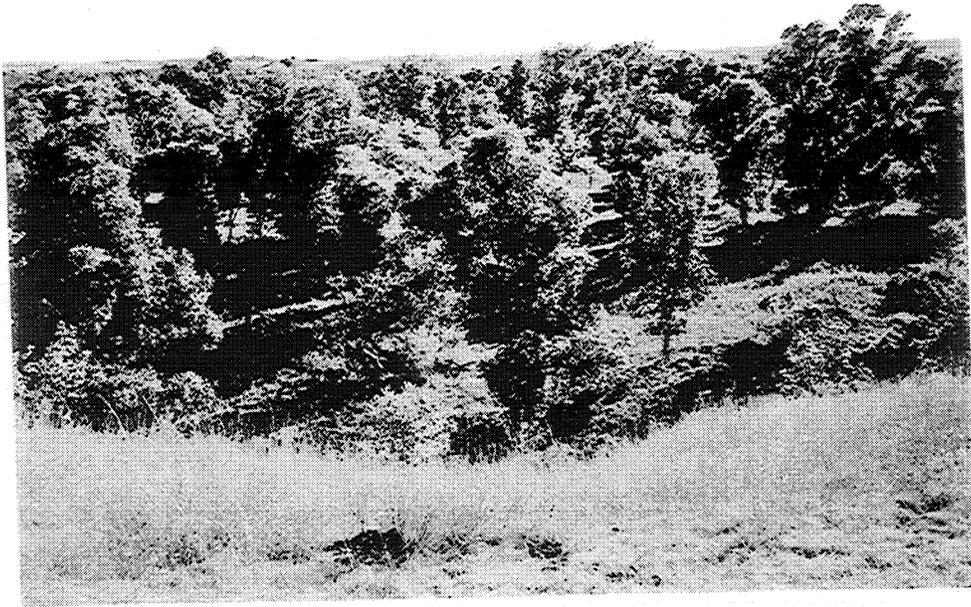
APPENDIX A
Photo Log



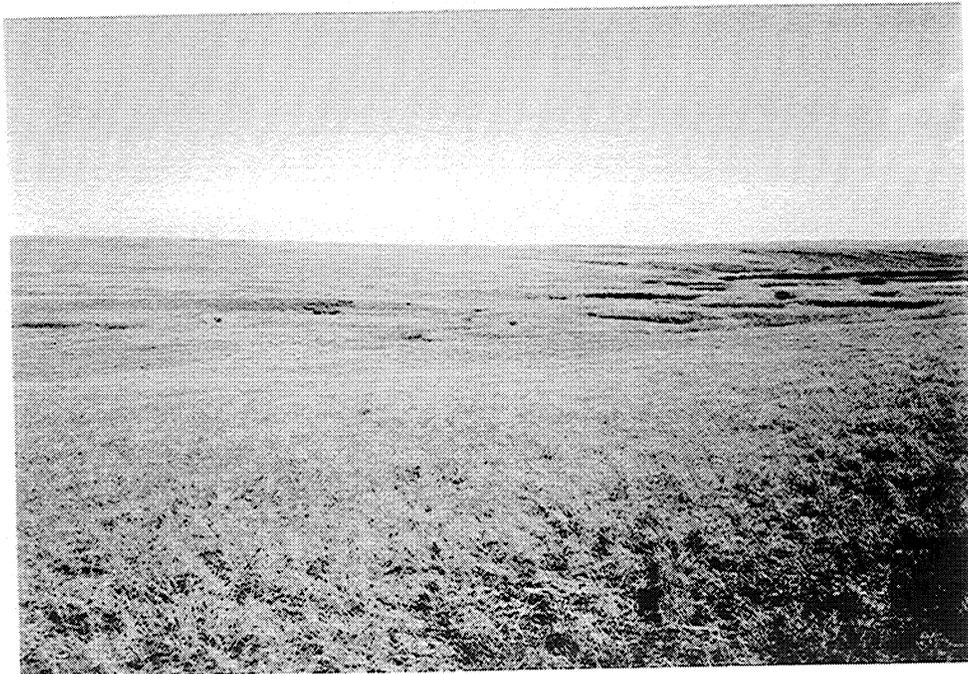
Box Elder Creek
Photo 1



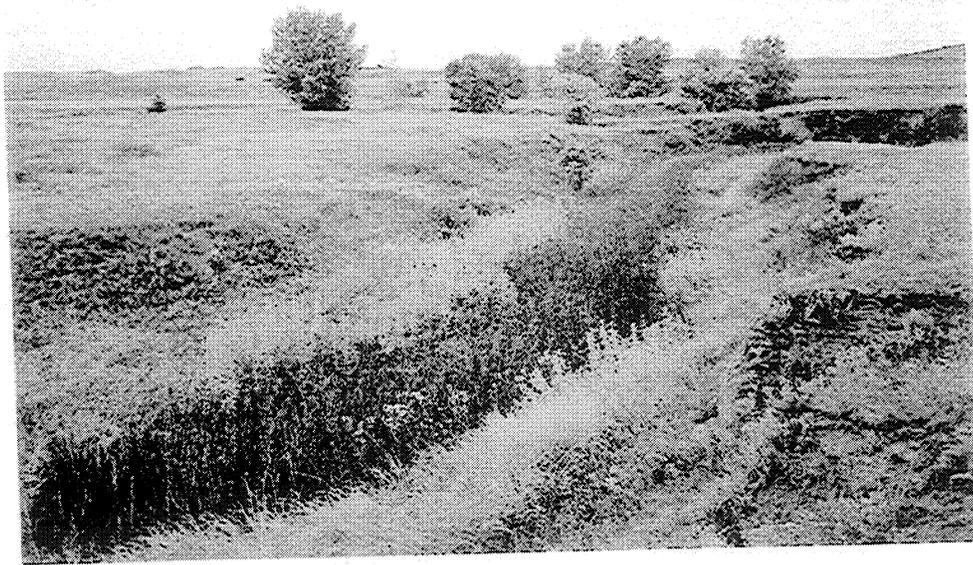
Spring Creek
Photo 2



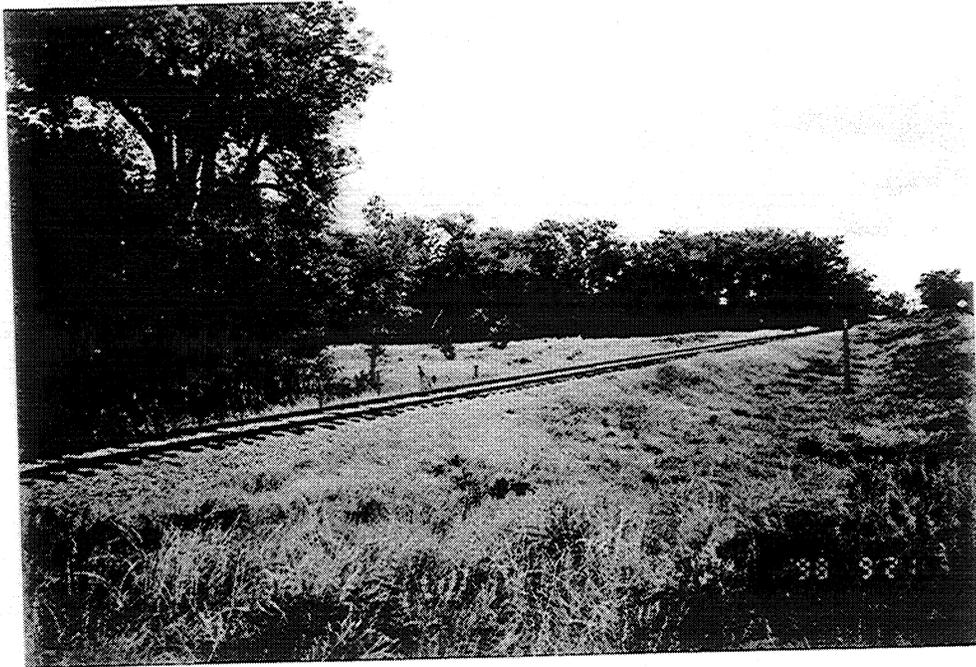
Battle Creek
Photo 3



Hay Canyon North
Photo 4



Hay Canyon South
Photo 5



Sand Creek
Photo 6



Horsehead Creek
Photo 7



Dry Creek
Photo 8



Hat Creek
Photo 9



Red Canyon Creek
Photo 10



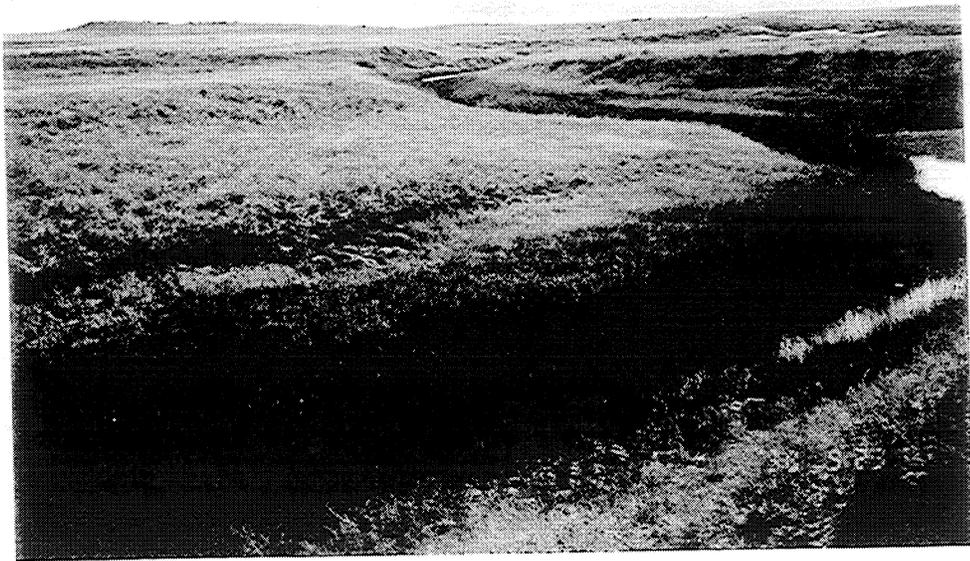
Beaver Creek
Photo 11



Bobcat Creek
Photo 12



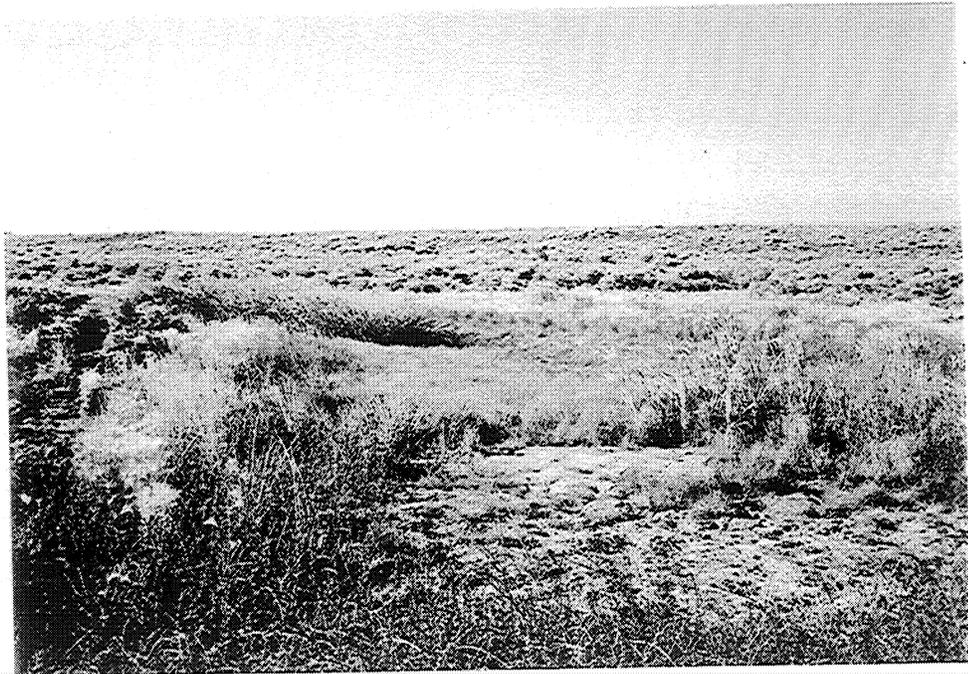
Alkali Creek
Photo 13



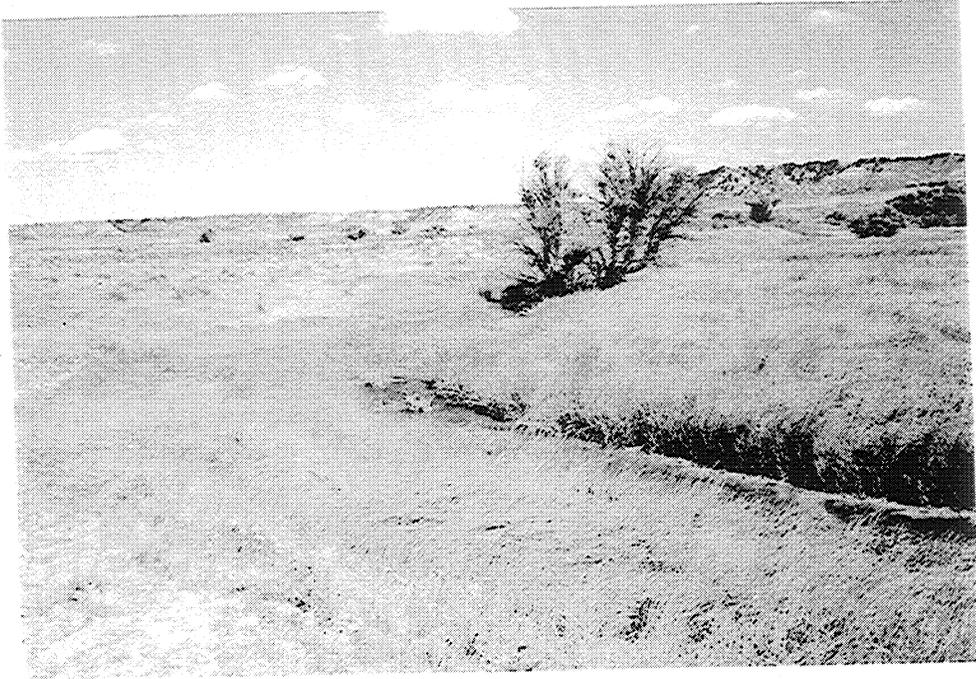
Lodgepole Creek
Photo 14



Piney Creek
Photo 15



Little Thunder Creek
Photo 16



School Creek
Photo 17

APPENDIX B
Location Maps of Potential Habitats



 HR <small>Inc. Engineers, Inc.</small>	 CME <small>ARCHITECTS ENGINEERS PLANNERS</small>	Date 08 NOV 1998 Scale 1" = 200', 20' CL. Sheet 55 of 69	Project 200-000-000 CADD File Name ..\0555.H	Drawing No.	Issue	TRACK LAYOUT PLAN STA - TO - STA Section 7 - Wyoming/3 Dakota Border To "Y"	 DM&E <small>DAKOTA, MINNESOTA & EASTERN RAILROAD</small>
						POWDER RIVER BASIN COAL EXPANSION PROJECT	

LODGEPOLE CREEK



	8400 W 10th St Suite 600 Omaha, NE 68130 (402) 426-2266 www.rrr.com		ARCHITECTS ENGINEERS PLANNERS HNE Engineering, Inc.	Date: 11/06/08 Scale: 1" = 200' 20' C.I. Sheet: 25 of 29	Project No.: 0659-001-259 CADP File Name: 31050808	Drawing No.: Issue:	TRACK LAYOUT PLAN STA. - TO - STA. Section 6 - Smithwick To W/SD Border		POWDER RIVER BASIN COAL EXPANSION PROJECT DAKOTA, MINNESOTA & EASTERN RAILROAD
	SECTION 29 T19S R6E FALL RIVER COUNTY SOUTH DAKOTA								



 HDR Engineers, Inc. 8400 W. 10th St. Suite 600 Fort Collins, CO 80504 Phone: 970.221.1334 Fax: 970.221.1335 www.hdr.com	 HNTE ARCHITECTS ENGINEERS PLANNERS	Date: 06-14-07-08 Scale: 1" = 200', 20' C.L. Sheet: 119 of 132	Project No.: CADW File Name:	Drawing No.: Issue:	TRACK LAYOUT PLAN Section 5 - Wasia, SD to Smithwick, SD	 DM&E DAKOTA, MINNESOTA & EASTERN RAILROAD
		POWDER RIVER BASIN COAL EXPANSION PROJECT				



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APPENDIX L

Resource Technical Reports and Impact Assessment for the Proposed Dakota, Minnesota & Eastern Railroad Forest Management Plan Amendments

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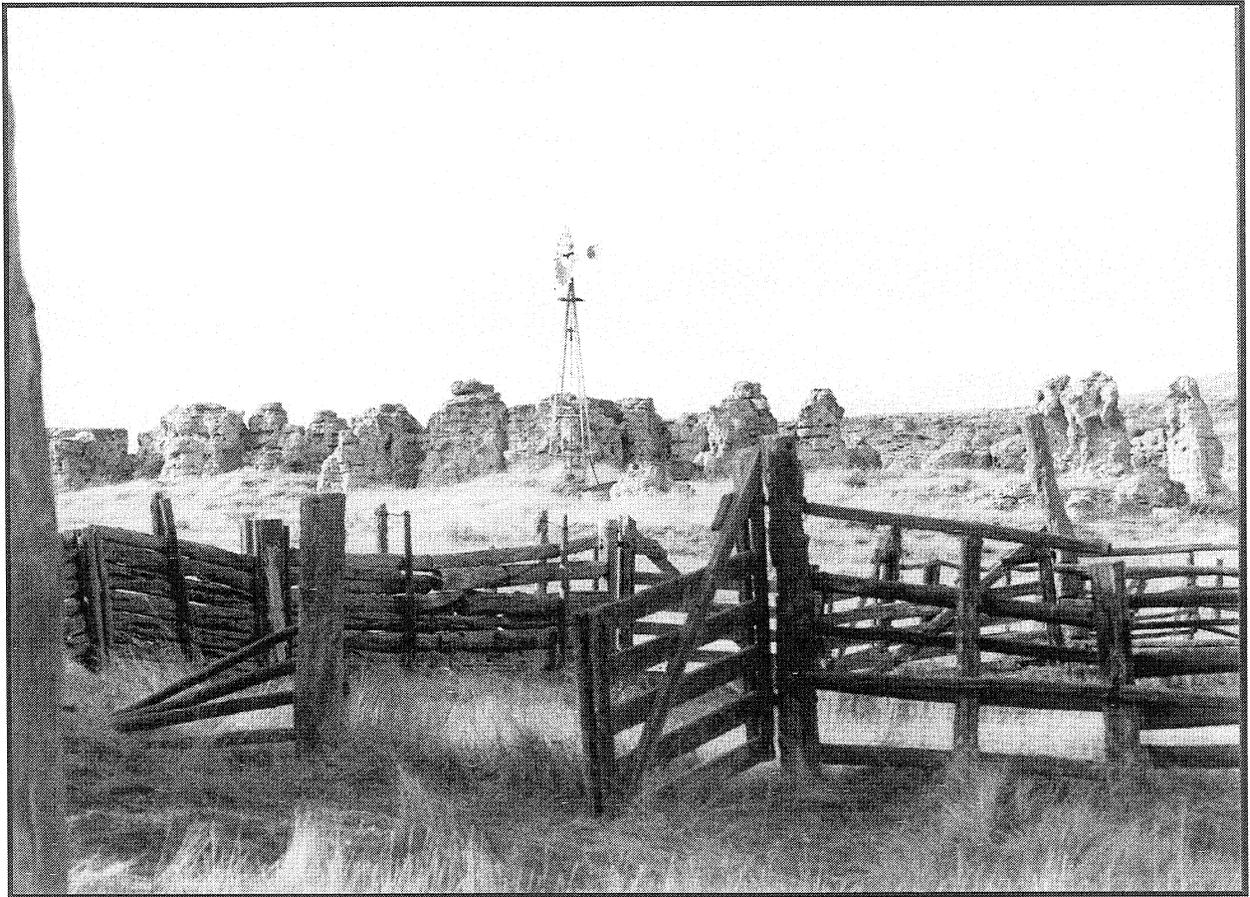
Nebraska National Forest and Buffalo Gap National Grassland Land and Resource Management Plan Rocky Mountain Region - USDA Forest Service Proposed Amendment 8

Medicine Bow National Forest and Thunder Basin National Grassland Land and Resource Management Plan Rocky Mountain Region - USDA Forest Service Proposed Amendment 20

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**Resource Technical Reports and Impact Assessment
for the Proposed Dakota, Minnesota & Eastern Railroad
(May 2000)**

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Resource Technical Reports and Impact Assessment
for the Proposed
Dakota, Minnesota & Eastern Railroad

Prepared by:
U.S. Department of Agriculture
Medicine Bow/Routt National Forest and Nebraska National Forest
and
U.S. Department of the Interior
Bureau of Land Management, Newcastle Field Office
(Cooperating Agencies)

For the:
U.S. Department of Transportation
Surface Transportation Board
(Lead Agency)



May 2000



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CHAPTER ONE - INTRODUCTION AND PLAN CONSISTENCY ANALYSIS

This report was prepared by the U.S. Department of Agriculture, U.S. Forest Service (Forest Service)¹, and the U.S. Department of the Interior, Bureau of Land Management (BLM), to describe the environmental impacts associated with construction, operation and maintenance of a new railroad proposed by the Dakota, Minnesota & Eastern Railroad Corporation (DM&E). In February 1998, DM&E applied to the U.S. Department of Transportation, Surface Transportation Board (STB), for authority to construct and operate a new railroad from its existing main line near Wall, South Dakota to existing Southern Powder River Basin (SPRB) coal mines in eastern Wyoming.² Additionally, DM&E proposed to upgrade its existing main line track, structures, systems and facilities in Minnesota and South Dakota to create a reliable and highly-efficient coal transportation system. For purposes of this report, the line extension from Wall to the SPRB coal mines is referred to as the "new railroad". Any activity associated with the upgrade of DM&E's existing main line system in Minnesota and South Dakota is referred to as the "rebuild". This report deals exclusively with the impacts associated with the new railroad in South Dakota and Wyoming.

The Forest Service is acting upon DM&E's application for an easement, pursuant to the Federal Land Policy and Management Act (FLPMA), to cross portions of Buffalo Gap National Grassland (BGNG) in South Dakota and Thunder Basin National Grassland (TBNG) in Wyoming. The BLM is acting upon a separate application for a right-of-way across public lands in South Dakota and Wyoming. The U.S. Army Corps of Engineers (COE) will be acting upon an application for a permit to dredge and fill waters of the United States and adjacent wetlands. The U.S. Coast Guard (USCG) will be required to issue a permit for construction of a new bridge across the Missouri River near Pierre, South Dakota (part of the rebuild). The Bureau of Reclamation (BOR) will be required to issue approvals to cross irrigation ditch easements in the Angostura Unit (irrigation district) in western South Dakota.

These Federal agencies are participating in the preparation of an environmental impact statement (EIS) for the project. The STB is the "lead agency" with the Forest Service, BLM, COE, BOR and USCG participating as cooperating or consulting agencies. Each agency is expected to issue a separate decision relative to the project.

¹ Medicine Bow-Routt National Forest (Laramie, Wyoming) and Nebraska National Forest (Chadron, Nebraska)

² Copies of the application and supporting information, including maps and supplemental filings, can be found at DM&E's web site at <http://www.dmerail.com>

This report was prepared for the STB for inclusion, as appropriate, into the EIS. Other Federal, state and local agencies will provide input to the EIS under a variety of separate regulatory processes. This report contains detailed descriptions of the affected environment and the environmental consequences of each of the alternatives for the new railroad and supports the disclosures made in the EIS. For completeness, this report addresses environmental consequences on both Federal and non-Federal lands.

1.1 Project Purpose

The purpose of DM&E's project is to transport low sulfur coal from existing coal mines in the SPRB south of Gillette, Wyoming to midwestern electric utilities. The SPRB of Wyoming is the dominant producer of low sulfur coal in the western United States. Currently, coal is transported from the SPRB mines by Burlington Northern and Santa Fe Railway Corporation (BNSF) and Union Pacific Railroad (UP) using what is known as the "joint line". However, the SPRB coal mines are capable of producing more coal than current transportation providers can ship. In addition, several of the SPRB coal producers are seeking regulatory approval to expand production levels³ or develop new lease areas. DM&E's new railroad would provide additional transportation capacity to these mines. DM&E believes it can offer lower-cost operations and shorter, more efficient routes for current SPRB coal production to a range of utilities. Although DM&E proposes to transport coal as its principal commodity, other shippers would benefit from improved services.

DM&E's existing rail line is experiencing safety and service problems based on its deteriorated condition.⁴ This project would allow DM&E to rebuild its main line system which would greatly improve safety and service provided to all shippers. Without rebuilding DM&E's existing main line, it is anticipated that current rail service in central South Dakota and southern Minnesota would cease.

³ BLM provides Powder River Basin coal production statistics at <http://www.wy.blm.gov/minerals/coal/prb/pages/deq-aqd.html>. According to the BLM, as of March 1999, applications had been filed with the Wyoming Department of Environmental Quality/Air Quality Division to increase production from SPRB coal mines by 90 million tons per year. Applications for increased production were on file for Belle Ayr, Jacobs Ranch, Black Thunder, and North Antelope/Rochelle.

⁴ DM&E was created in 1986 through the acquisition of a line that Chicago and North Western Transportation Company had planned to abandon. Despite investments of over \$100 million, serious service and safety problems continue to plague the railroad. These problems result from many years of deferred maintenance by the previous owners.

1.2 General Project Location and Alternatives

1.2.1 General Project Location. If approved, DM&E's new railroad would be constructed in western South Dakota and eastern Wyoming (see Figure 1-1). Generally, DM&E's preferred route for the new railroad (Alternative B) would leave the existing main line north of Wall and proceed south and southwest along the Cheyenne River valley in South Dakota. Between Wall and Smithwick, South Dakota the new railroad would pass north and west of Badlands National Park and the Pine Ridge Indian Reservation, crossing through BGNG. South of Smithwick the new railroad would turn to the west and proceed around the south end of the Black Hills to Edgemont, South Dakota. From Edgemont, DM&E's preferred route would follow an existing railroad corridor (BNSF) to about the South Dakota-Wyoming border. Once in Wyoming the new railroad would proceed across the northeastern corner of Niobrara County, north of the Cheyenne River, and across the southwestern portion of Weston County. TBNG would be crossed in Weston, Converse, and Campbell counties. The SPRB coal mines would be accessed in both Campbell and Converse counties.

1.2.2 Alternatives. This report addresses the following alternatives for the new railroad:

- Alternative A - No Action Alternative;
- Alternative B - DM&E's Proposed Action;
- Alternative C - Modified Proposed Action; and
- Alternative D - Existing Corridors Alternative.

In addition, this report addresses 2 route variations for portions of Alternative C in western South Dakota. In response to comments from Federal and state agencies, the Phiney Flat and W G Flat route variations were designed by DM&E to reduce loss of important wildlife habitat and wetland/riparian areas. Alignment options for accessing the Black Thunder and North Antelope mines are also addressed in this report.

A summary of the alternative lengths, by landowner, is provided on Table 1-1. The vast majority of the lands which would be crossed by the alternatives is private. Nearly 80 percent of Alternatives B and C and 90 percent of Alternative D are privately-owned.

1.2.2.1 Alternative A - No Action Alternative. This alternative serves as the baseline for estimating the impacts of other alternatives presented in this report. The National Environmental Policy Act (NEPA) requires that a No Action Alternative be considered in all environmental documents. In this instance, no action would mean that no new construction of rail line or reconstruction of DM&E's existing main line would occur. Under this alternative DM&E would likely cease to be an economically viable railroad and existing rail service to

much of central South Dakota and southern Minnesota would cease.

1.2.2.2 Alternative B - Proposed Action (Applicant's Proposal). This alternative is the original action proposed by DM&E [but modified in response to operational constraints (grade) on the existing railroad between Wall and Wasta, South Dakota] in their February 20, 1998 application to the STB. That application described the project as follows:

- construct, operate, and maintain approximately 296 miles of new rail line facilities in east-central Wyoming, southwest South Dakota, and south-central Minnesota, including a 13 mile segment at Mankato, Minnesota and a 3 mile segment interchange near Owatonna, Minnesota;
- rebuild, operate and maintain approximately 13 miles of existing track on DM&E's Black Hills Subdivision Branch Line in Fall River County, South Dakota; and
- rebuild, operate and maintain approximately 600 miles of existing main line between Wall and Winona, Minnesota.

The route for Alternative B from Wall to the SPRB coal mines is shown on Figure 1-1. Under Alternative B, and with the incorporation of acceptable mitigation measures, the STB would issue a decision to grant DM&E the authority to construct, operate and maintain a railroad in Minnesota, South Dakota, and Wyoming. The Forest Service would issue an easement under FLPMA to allow DM&E to construct, operate and maintain a new railroad across portions of BGNG in South Dakota and TBNG in Wyoming. The BLM would issue a right-of-way allowing DM&E to do the same on public lands in South Dakota and Wyoming. The COE would issue a permit to allow dredging and filling of waters of the United States, including wetlands. All other relevant Federal, state and locally-required permits would be issued by the responsible agencies.

Reconstruction of the existing railroad would be accomplished, correcting deficiencies and bringing the existing railroad into compliance with industry standards. Low sulfur coal would be provided to midwestern electric utilities from coal mines in the SPRB, helping to meet increasing demand. Additionally, service to existing DM&E shippers would continue and improve. A detailed description of the Alternative B route is included in Chapter 2 of this report.

1.2.2.3 Alternative C - Modified Proposed Action (Including Route Variations). Alternative C is a modification of Alternative B (see Figure 1-1). This alternative was developed by DM&E based on comments received from the public, Federal, state and local agencies and private landowners during scoping for the EIS.

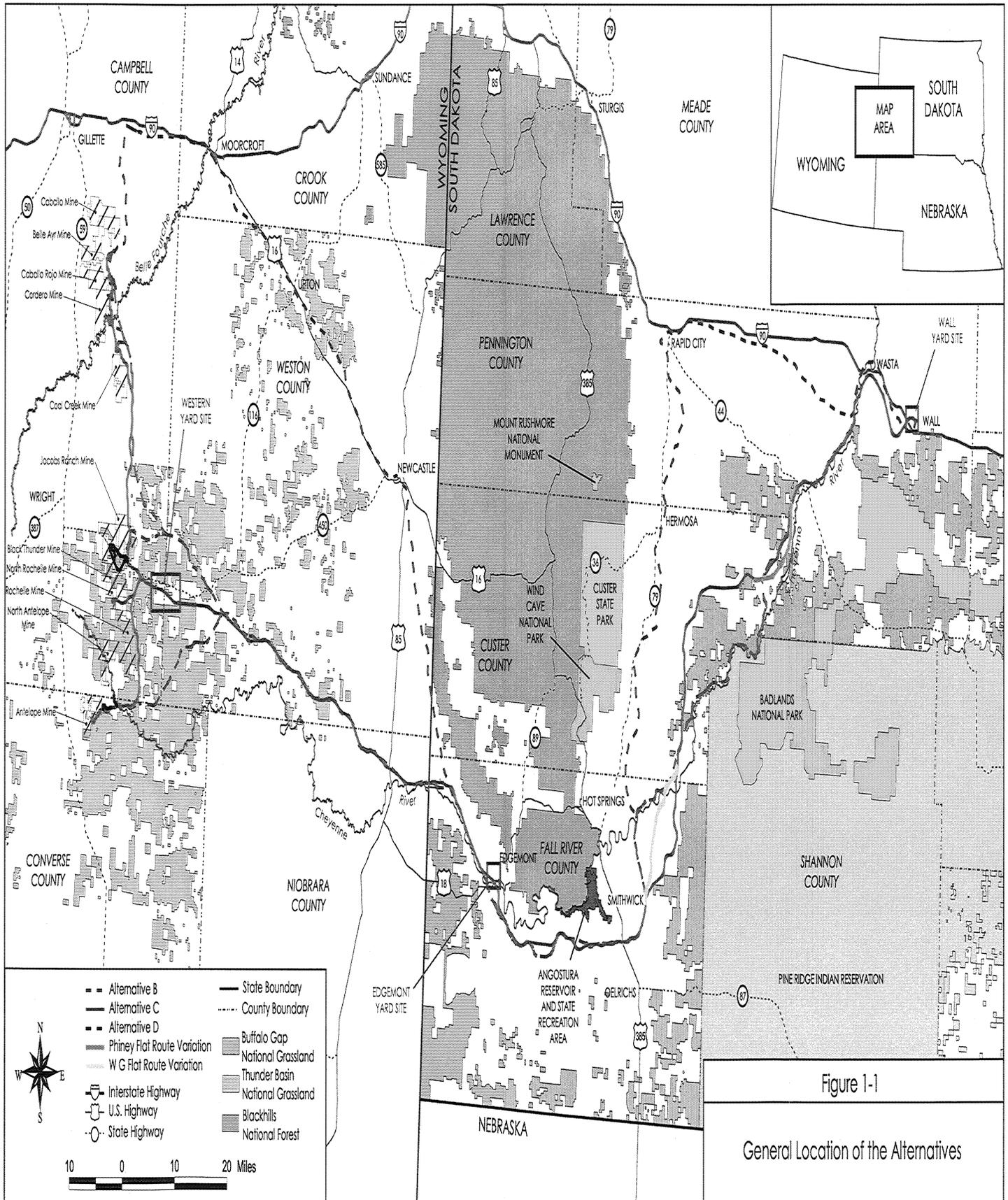


Figure 1-1

General Location of the Alternatives

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Alternative	Total Length	Forest Service	BLM	U.S. Department of Energy	State	Private
Alternative A	0	0	0	0	0	0
Alternative B	296.1	51.9	5.7	0.3	10.1	228.1
Alternative C	273.8	38.9	4.9	0	11.7	218.3
Alternative C with Phiney Flat Route Variation	274.6	38.1	4.9	0	11.7	219.9
Alternative C with W G Flat Route Variation	272.6	38.9	5.0	0	11.7	217.0
Alternative D	360.0	26.7	3.0	0	10.8	319.5
Black Thunder North Mine Loop Option (1)	4.5	0.6	0	0	1.2	2.7
Black Thunder South Mine Loop Option (1)	7.1	3.1	0	0	0.7	3.3
North Antelope East Mine Loop Option (1)	1.5	0	0	0	0	1.5
North Antelope West Mine Loop Option (1)	2.4	0	0	0	0	2.4

1 = Black Thunder and North Antelope Mine Loop options are not included in the mileage summaries for Alternatives B, C or D but could be applied to any of the alternatives.

Although routed similarly to Alternative B in many areas, Alternative C avoids a number of roadless areas on BGNG, reduces many conflicts with wetlands and flood plains along the Cheyenne River and avoids a black-footed ferret (Federally-endangered) recovery site and other important wildlife habitats on TBNG.

Under Alternative C, and with the incorporation of acceptable mitigation measures, STB would issue a decision to grant DM&E authority to construct, operate and maintain a railroad in Minnesota, South Dakota, and Wyoming. The Forest Service would issue an easement under FLPMA to allow DM&E to construct, maintain and operate a new railroad across portions of BGNG and TBNG. The BLM would issue an easement allowing DM&E to do the same on public lands. The COE would issue a permit to allow dredging and filling of waters of the United States and adjacent wetlands. All other Federal, state and locally-required permits would be issued by the respective agencies. Reconstruction of the existing railroad would be accomplished, correcting deficiencies and bringing the railroad into compliance with industry standards. Low sulfur coal would be provided to midwestern utilities, helping to meet increasing demand. Additionally, service to DM&E's existing shippers would continue and improve.

Two route variations have been proposed by DM&E to reduce environmental impacts associated with Alternative C in western South Dakota (see Figure 1-1). These route variations were designed to avoid wildlife habitat and wetland/riparian areas in Hay Canyon and along Spring Creek. Detailed descriptions of Alternative C and the route variations are included in Chapter 2 of this report.

1.2.2.4 Alternative D - Existing Corridors
Alternative. During public scoping for the EIS a number

of comments were received that suggested the new railroad be constructed using existing railroad corridors in western South Dakota and eastern Wyoming. The comments suggested DM&E use its existing railroad lines between Wall and Rapid City, South Dakota and Rapid City and Smithwick instead of constructing a new railroad through the Cheyenne River valley. Alternative D was developed to explore the feasibility of using these and other existing corridors.

DM&E has stated that Alternative D is uneconomic and technically not feasible to operate because of excessive grades and curves in South Dakota and the general circuitous nature of the route in Wyoming. According to DM&E, the company has completed an exhaustive review of possible realignments between Smithwick and Rapid City but has been unable to identify a route that meets the project's heavy haul design criteria. The circuitous route to the SPRB mines makes the alternative uneconomic (particularly when most of the coal is expected to come from the southern mines). DM&E has further stated that if Alternative D is selected by the agencies, DM&E would abandon the project.⁵ DM&E's 404(b)(1) showing, prepared for the COE, contains detailed information that describes why the company has been unable to identify an economic and technically feasible route using existing corridors.

From a NEPA standpoint, however, just because DM&E is not itself capable of implementing Alternative D does not necessarily make the alternative unreasonable. The Council on Environmental Quality (CEQ) specifically

⁵ DM&E's position regarding Alternative D was summarized in a June 9, 1999 letter to STB. That letter can be reviewed on DM&E's web site at <http://www.dmerail.com>. The letter can be found on the web site under STB Regulatory Filings/EIS Final Scope Comments, June 9 1999, Alternative Route Analysis/Kevin V. Schieffer letter to STB.

addressed this issue in its "Forty Most Asked Questions" published in the Federal Register on March 16, 1981. According to CEQ, "Section 1502.14 (40 CFR) requires the EIS to examine all reasonable alternatives to the proposal. In determining the scope of alternatives to be considered, the emphasis is on what is "reasonable" rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant."

Alternative D would follow DM&E's existing railroad from Wasta to Rapid City (see Figure 1-1). At Rapid City, the alternative would turn south along an existing railroad corridor owned by DM&E (known as the Black Hills Subdivision Branch Line) to near Smithwick. At Smithwick the alternative would turn west and follow the route for Alternative C to the South Dakota-Wyoming border. However, rather than turning west at the border, Alternative D would continue northwest along an existing BNSF corridor through Newcastle and Moorcroft, Wyoming. East of Gillette (at Donkey Creek), Alternative D would turn south and proceed to the SPRB mines using a route similar to Alternative C.

1.2.2.5 Proposed Mine Loop Options. Impacts associated with 4 mine loop options in Wyoming are addressed in this report. The Black Thunder North and South mine loops are located north and south of State Highway 450, respectively, in Campbell County. The North Antelope East and West loops are located in Converse County.

1.2.2.6 Proposed Yard Sites. This report also addresses the impacts associated with 3 yard sites designed to support the efficient operation of Alternative C. One yard would be located at the beginning of the alternative northeast of Wall (see Figure 1-1). The Wall Yard will serve as a staging yard for loaded and empty coal trains and will also include 2 marshaling tracks for use by manifest, grain and way freight trains. A second yard would be constructed northeast of Edgemont. This Edgemont Interchange Yard will provide an interchange point with BNSF - allowing a connection for transferring construction material from BNSF to the new railroad. In the future, way freight and grain could be transferred to and from BNSF at this interchange. The third yard associated with Alternative C is the Western Yard which would be located on the Campbell-Weston County line in Wyoming (see Figure 1-1). This yard will be a major rail staging facility and is expected to include maintenance and minor repair facilities. The yard will provide staging for trains to service the mines and a crew change point.

These 3 yards were designed to serve Alternative C. Although required, no yards that would serve Alternatives

B or D have been identified. Therefore, potential impacts associated with yards for these alternatives are not addressed in this report.

1.2.2.7 Alternatives Considered but Eliminated from Detailed Study. Other alternatives were considered but rejected by the STB and cooperating/consulting agencies. It was determined that these alternatives were not reasonable or feasible and, therefore, did not meet the purpose of or need for the project. These alternatives are not discussed in this report but are described in detail in the EIS and DM&E's COE 404(b)(1) showing document.

1.3 Consistency with BLM Resource Management Plans

The alternatives would affect only small, isolated parcels of BLM-managed lands (hereafter termed public lands). Along its entire length, Alternative B would cross less than 6 miles of public lands and Alternatives C and D would cross about 5 and 3 miles, respectively (see Table 1-1).

The alternatives would be constructed through 3 BLM field office areas. Public lands which would be crossed by the alternatives in South Dakota are managed by the South Dakota Field Office in Belle Fourche, South Dakota. The resource management plan (RMP) for this field office area was prepared in 1985. Public lands in Wyoming which would be crossed by the alternatives are managed by the Newcastle and Buffalo Field offices (Newcastle and Buffalo, Wyoming). The Newcastle Field Office recently updated its RMP (1999). However, the Buffalo Field Office RMP is older (1985). The new railroad would be consistent with the land use management direction and/or multiple use objectives in the RMPs for the small, isolated parcels of public lands which would be crossed.

1.4 Forest Service Land and Resource Management Plans Consistency Analysis

The alternatives would cross 2 national grasslands - BNGG and TBNG. Lands managed by the Forest Service [hereafter National Forest System (NFS) lands] represent approximately 17.5 percent (51.9 miles) of the Alternative B alignment and 14.2 percent (38.9 miles) of the Alternative C alignment. Only approximately 7.4 percent (26.7 miles) of the Alternative D alignment consists of NFS lands.

The National Forest Management Act [36 CFR 219.10(e)] requires consistency between projects being proposed and national forest land and resource management plans (forest plans). For this report, 2 existing forest plans (Nebraska and Medicine Bow Forest Plans) were evaluated for consistency with standards and

guidelines, as well as whether or not the new railroad alternatives would be consistent with the desired future condition of the NFS lands affected. The Medicine Bow National Forest Plan was issued in 1985 and the Nebraska National Forest Plan in 1984 (Forest Service, 1985 and 1984, respectively). In addition, because the Northern Great Plains National Grassland Land and Resource Management Plans are in the process of being prepared (a draft EIS and proposed grassland plans were released in July, 1999)⁶, the draft standards and guidelines for the proposed BGNG and TBNG grassland plans (see Forest Service, 1999a and 1999b) were evaluated to determine whether any of the railroad alternatives would predispose the desired future condition of BGNG or the TBNG, if implemented.

The miles which would be crossed by the alternatives in each current and proposed forest plan management prescription area are presented on Table 1-2. Table 1-3 lists whether each railroad alternative would be consistent with the existing and proposed requirements and standards and guidelines.

1.4.1 Forest Plan Direction, Management Requirements and Prescriptions, and Standards and Guidelines. Both the Nebraska and Medicine Bow forest plans require the Forest Supervisor to ensure that all outstanding and future permits and other occupancy and use documents which affect NFS lands are consistent with the forest plan including both forest and management area direction. The management direction contained in the forest plans is used in analyzing proposals by prospective users of NFS lands like DM&E. Forest direction consists of goals, objectives, and management requirements for the forest, including associated national grasslands. The goals and objectives provide broad overall direction regarding the type and amount of goods and services the forest will provide. They are expressed in broad general terms and are timeless (i.e., they have no specific date by which they are to be completed). The management requirements contained in the forest direction set the minimum standards that must be maintained while achieving these goals and objectives.

1.4.1.1 Existing Nebraska National Forest Plan

Plan Direction. One of the goals contained in the Nebraska Forest Plan specifically addresses management of BGNG. That goal states "*manage the Buffalo Gap ... National Grasslands to demonstrate, in accordance with the Bankhead-Jones Farm Tenant Act, to the local community and other interested publics solid land use practices for livestock grazing, wildlife habitat protection and improvement, soil conservation and watershed protection, resource protection during mineral*

operations, recreation development, and other grassland agriculture practices". The forest plan further provides for the exploration, development and extraction of mineral resources while minimizing adverse environmental effects and provides for adequate transportation systems to meet the demands of users (Forest Service, 1984).

Management Requirements. The Nebraska Forest Plan establishes management requirements. Management requirements provide broad multiple-use management direction and generally apply to all areas of the forest including BGNG. These management requirements are listed on Table 1 in Appendix A of this report. The management requirements set the baseline conditions that must be maintained while managing the forest. They establish the environmental quality requirements, natural and depletable resource requirements and mitigation measures that apply to the entire forest including the national grasslands.

Substantive changes which alter the intent of the management requirements may not be made without amending or revising the forest plan. Editorial and other minor modifications to the management requirements, which do not alter their intent, may be made without amending or revising the forest plan.

The Nebraska Forest Plan provides general direction to provide access for resource development. Because the new railroad would transport mineral resources developed, in part, on NFS lands, Forest Service approval of a special use permit to construct and operate the new railroad would be consistent with this general direction.

The Nebraska Forest Plan provides general direction that states "*choose facility and structure design, color of materials, location and orientation to meet the adopted visual quality objective(s) for the management area*" (see Appendix A, Table 1). While the alternatives would be consistent with the modification visual quality objective (VQO) of Management Prescriptions 4G and 6G, they would not be consistent with the partial retention VQO of Management Prescription 9A (explained further below).

Approximately 2.6 miles of partial retention VQO would be crossed by Alternative B on BGNG. Alternative C and its route variations would cross between 0.4 to 0.7 miles of partial retention VQO. NFS lands would not be affected by Alternative D on BGNG. Where the operating railroad crosses this VQO, the railroad is expected to dominate the view which is inconsistent with the prescription requirement and the plan's management requirements.

General direction in the forest plan requires management of hardwood draws and riparian areas to sustain their "*inherent biological, physical, and visual values*" (see Appendix A, Table 1). Alternatives B and C

⁶ Information regarding the Northern Great Plains grassland planning process can be found at <http://www.fs.fed/ngp>

Table 1-2

Miles of Each Forest Plan Management Area Prescription Which Would be Crossed by the Alternatives (1)

Forest Plan Management Area Prescription	Alternative B	Alternative C	Alternative C with Phiney Flat Route Variation	Alternative C with W G Flat Route Variation	Alternative D	Black Thunder North Mine Loop	Black Thunder South Mine Loop
1984 Nebraska National Forest Plan (Buffalo Gap National Grassland)							
4G - Emphasis on Habitat Indicator Species	7.7	2.3	2.1	2.3	0	0	0
6G - Emphasis on Livestock Grazing	6.0	3.1	2.8	3.1	0	0	0
9A - Emphasis on Riparian Area Management	2.6	0.7	0.4	0.7	0	0	0
1985 Medicine Bow National Forest Plan (Thunder Basin National Grassland)							
4B - Emphasis on Habitat Indicator Species	16.3	10.5	10.5	10.5	10.8	0	0
4C - Emphasis on Wildlife Habitat in Woody Draws and Other Woody Vegetation Areas on Rangelands	0.9	0.9	0.9	0.9	0.8	0	0
6B - Emphasis on Livestock Grazing	6.8	5.9	5.9	5.9	0.1	0	0
9A - Emphasis on Riparian Area Management	4.9	4.4	4.4	4.4	4.0	<0.01	0.4
12A - Surface Mining Development	6.7	11.1	11.1	11.1	11.0	0.6	2.7
1999 Proposed National Grasslands Plan for Thunder Basin and Buffalo Gap National Grasslands							
1.2 - Recommended for Wilderness	2.7	0	0.0	0.0	0	0	0
2.1 - Special Interest Areas	2.0	2.4	2.4	2.4	0	0	0
3.63 - Black-footed Ferret Reintroduction Habitat	4.9	0	0.0	0.0	0	0	0
3.64 - Special Plant and Wildlife Habitat	0	0.6	0.6	0.6	0	0	0
3.65 - Rangelands with Diverse Natural-Appearing Landscapes	4.9	5.3	5.3	5.3	2.2	0	0
3.68 - Big Game Range	6.8	4.1	4.1	4.1	5.7	0	0
4.32 - Dispersed Recreation: High Use	0	0	0	0.0	4.7	0	0
5.12 - General Forest and Rangelands: Range Vegetation Emphasis	4.9	3.0	3.0	3.0	0	0	0
6.1 - Rangeland with Broad Resource Emphasis	17.6	9.5	8.7	9.5	0	0	0
8.4 - Mineral Production and Development	8.1	14.0	14.0	14.0	14.1	0.6	3.1
1 = Alternative A (No Action) and the North Antelope East and West mine loops would not affect NFS lands.							

Table 1-3
Alternative Consistency with Each Forest Plan Management Area Prescription Which Would be Crossed (1)

Forest Plan Management Area Prescription	Consistency with Forest Plan							Black Thunder South Mine Loop
	Alternative B	Alternative C	Alternative C with Phinney Flat Route Variation	Alternative C with W G Flat Route Variation	Alternative D	Black Thunder North Mine Loop		
1984 Nebraska National Forest Plan (Buffalo Gap National Grassland)								
Forest Plan Management Requirements	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Crossed
4G - Emphasis on Habitat Indicator Species	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Not Crossed
6G - Emphasis on Livestock Grazing	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Not Crossed
9A - Emphasis on Riparian Area Management (2)	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Crossed
1985 Medicine Bow National Forest Plan (Thunder Basin National Grassland)								
Forest Plan Management Requirements	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Crossed
4B - Emphasis on Habitat Indicator Species	Not Consistent (3)	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Crossed
4C - Emphasis on Wildlife Habitat in Woody Draws and Other Woody Vegetation Areas on Rangelands	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Crossed
6B - Emphasis on Livestock Grazing	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Not Crossed
9A - Emphasis on Riparian Area Management (2)	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Crossed
12A - Surface Mining Development	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent
1999 Proposed National Grasslands Plan for Thunder Basin and Buffalo Gap National Grasslands								
Grassland Wide Management Requirements	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Crossed
1.2 - Recommended for Wilderness	Not Consistent	Not Crossed	Not Crossed	Not Crossed	Not Crossed	Not Crossed	Not Crossed	Not Crossed
2.1 - Special Interest Areas	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Not Crossed
3.63 - Black-footed Ferret Reintroduction Habitat	Not Consistent	Not Crossed	Not Crossed	Not Crossed	Not Crossed	Not Crossed	Not Crossed	Not Crossed
3.64 - Special Plant and Wildlife Habitat	Not Crossed	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Not Crossed
3.65 - Rangelands with Diverse Natural-Appearing Landscapes	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Crossed
3.68 - Big Game Range	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Consistent	Not Crossed
4.32 - Dispersed Recreation: High Use	Not Crossed	Not Crossed	Not Crossed	Not Crossed	Not Crossed	Not Crossed	Not Crossed	Not Crossed
5.12 - General Forest and Rangelands: Range Vegetation Emphasis	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Not Crossed
6.1 - Rangeland with Broad Resource Emphasis	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Not Crossed
8.4 - Mineral Production and Development	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent

1 = Alternative A (No Action) and the North Antelope East and West mine loops would not affect NFS lands.

2 = Includes requirements in the Watershed Conservation Practices Handbook Standards and Design Criteria, FSH 2509.25, effective March 22, 1999.

3 = Adequate mitigation would need to be developed to offset impacts to the Rosecrans Black-footed Ferret Reintroduction Site.

would be inconsistent with this general direction. 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 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.

Special use management requirements (non-recreation based) have been adopted for the Nebraska National Forest (see Appendix A, Table 1). These management requirements prohibit *"the approval of any special use application that can be reasonably met on private or other Federal lands unless it is clearly in the public interest"*. 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.⁷ 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 new railroad 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.

Management requirements of the Nebraska Forest Plan address the location of transportation and utility corridors by providing specific standards and guidelines for avoidance. The forest plan requires avoidance of the

following management areas unless the impact of the corridor can be mitigated:

- developed recreation areas;
- roadless and undeveloped areas (RARE II);
- research natural areas;
- riparian areas;
- proposed wild and scenic river segments; and
- Bessey Nursery.

Not all of the alternatives would be capable of complying with these avoidance requirements. Alternative B would cross roadless and undeveloped areas on BGNG (see Chapter 3) and it is unlikely that adequate mitigation could be designed to minimize, to acceptable levels, the impacts to the wilderness characteristics of these areas that would occur from the noise and visual intrusion of an operating railroad. Alternatives C (including both route variations) and D would not directly affect roadless or undeveloped areas on BGNG.

Alternatives B and C would cross riparian areas on BGNG. 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 reduce riparian impacts on NFS lands along Spring Creek.

Management Area Prescriptions. Management area direction consists of individual management area prescriptions. The management area prescriptions contain requirements specifying which activities will be implemented to achieve goals and objectives within the management area. Management requirements are specific to individual management area prescriptions and are applied in addition to the management requirements described above.

Three management area prescriptions would be affected by Alternatives B and C on BGNG. Alternative D would not affect NFS lands on BGNG. Approximate miles crossed in each management area prescription by the alternatives are provided on Table 1-2. As is shown on Table 1-3, it has been determined that Alternatives B and C (including both route variations) would be consistent with Management Area Prescriptions 4G and 6G. However, neither alternative would be consistent with Management Area Prescription 9A.

Management area prescriptions which would be affected by the alternatives on BGNG, and the consistency of the alternatives with the prescription requirements, are discussed below.

⁷ STB Finance Docket 33407. A copy of the decision is available on STB's web site at <http://www.stb.dot.gov>

Management Area Prescription 4G - Emphasis on Habitat of Indicator Species

Management Prescription Summary. Management emphasis is on the habitat requirements of sharp-tailed grouse, pronghorn antelope, and deer. The goal is to optimize habitat capability and, thus, numbers of species jointly agreed to with state fish and wildlife agencies. The promotion of grassland agriculture and sustained yield management of forage, fish and wildlife, water, recreation, and minerals is emphasized. NFS lands are to be integrated with private land for sound land conservation and utilization. Recreation and other human activities are regulated to favor needs of the designated wildlife species.

General Direction and Standards and Guidelines. All of the general direction recommendations and standards and guidelines for this management area prescription are listed on Table 2 in Appendix A. The alternatives would be consistent with the general direction and standards and guidelines for this prescription. Specific direction and standards and guidelines with direct applicability to the railroad alternatives are discussed briefly below.

This prescription recommends that management activities be designed and implemented to blend with the natural landscape. Specifically, the standards and guidelines for this prescription do not allow exceedance of the adopted VQO of modification. Modification is 1 of 5 VQOs historically used by the Forest Service to define acceptable degrees of alteration of the natural landscape. The degree of alteration permitted using this system is measured in terms of the changes in visual contrast with the surrounding landscape. The 5 VQOs, in descending order of allowable contrast, are: preservation; retention; partial retention; modification; and maximum modification.

Under the modification VQO, management activities may dominate the landscape. However, facilities, buildings, roads, signs, etc., should borrow from the adjacent environment in terms of the materials, textures and colors used. For example, large clear cuts and powerlines may dominate the landscape but their visual impact should still be minimized in places using mitigation measures such as dulling metal surfaces, reseeding, leaving scattered tree groups, etc. DM&E's proposed project would be consistent with the level of contrast allowed by the modification VQO.

However, the Forest Service would still require mitigation of visual impacts to the extent feasible. It is anticipated that conditions of approval addressing facility color, material and texture would be included in any special use permits issued by the Forest Service for activities on NFS lands. Additional visual screening would be addressed based on site-specific conditions.

Management Area Prescription 4G requires the Forest Service to "*maintain or improve habitat capability for deer, pronghorn antelope, and sharp-tailed grouse.*" The alternatives are not expected to significantly effect habitat capability for deer, pronghorn antelope or sharp-tailed grouse on BGNG. Only a small portion of BGNG would be affected by Alternatives B and C. In addition, DM&E is currently working with the South Dakota Department of Game, Fish and Parks (SDGFP) and the U.S. Fish and Wildlife Service (USFWS) to develop mitigation strategies to offset adverse impacts to all wildlife from implementation of the project. It is anticipated that these measures would be adequate to mitigate any impacts to deer, pronghorn antelope, and sharp-tailed grouse on NFS lands on BGNG and that the alternatives would be consistent with this general direction.

Management Area Prescription 6G - Emphasis on Livestock Grazing

Management Prescription Summary. Management emphasis is on livestock grazing and periodic heavy forage utilization occurs. The promotion of grassland agriculture and sustained yield management of forage, fish and wildlife, water, recreation, and minerals are emphasized. Range condition is maintained through use of forage improvement practices, livestock management, and regulation of other resource activities. Investment in structural and nonstructural range improvements to increase forage utilization is moderate to high.

General Direction and Standards and Guidelines. The general direction and standards and guidelines for this management area prescription are listed on Table 3 in Appendix A. The alternatives would be consistent with the general direction and standards and guidelines. The VQO for the management area prescription is modification (see above discussion) and the alternatives would not significantly reduce forage requirements to support big game population levels (see Chapter 4).

Management Area Prescription 9A - Emphasis on Riparian Area Management

Management Prescription Summary. Unlike other management prescriptions, Management Area Prescription 9A is not specifically mapped in the Nebraska Forest Plan. Rather, it exists as inclusions in other mapped management prescriptions. These areas are defined as the "*aquatic ecosystem, the riparian ecosystem, and adjacent ecosystems that remain within approximately 100 feet measured horizontally from both edges of all perennial streams and from the shores of lakes and other still water bodies.*" Clarification of the definition of riparian areas is provided in the recent amendments to the Forest Service's Watershed

Conservation Practices Handbook (FSH 2509.25). Management now emphasizes the water influence zone. The water influence zone is the geomorphic flood plain, riparian ecosystem, and inner gorge. Its minimum horizontal width (from top of each bank) is the greater of 100 feet or the mean height of mature dominant late-seral vegetation. It includes adjacent unstable and highly erodible soils.

For purposes of this report, these areas were identified using a geographic information system (GIS). Each perennial and ephemeral stream [based on 7.5-minute U.S. Geological Survey (USGS) topographic quads] and all wetlands identified on USFWS National Wetland Inventory maps were buffered 100 feet to determine where this management prescription occurs.

The goals of management for this prescription are to provide healthy, self-perpetuating plant communities, meet water quality standards, provide habitats for viable populations of wildlife and fish, and provide stable stream channels and still waterbody shorelines. The aquatic ecosystem may contain fisheries habitat improvements and channel stabilizing facilities that harmonize with the visual setting and maintain or improve wildlife or fish habitat requirements. The linear nature of stream side riparian areas permits programming of management activities which are not visually evident or are visually subordinate.

General Direction and Standards and Guidelines. General direction recommendations and standards and guidelines for this management area prescription contained in the Nebraska Forest Plan are listed on Table 4 in Appendix A. Alternatives B and C would not be consistent with the general direction or standards and guidelines for this prescription. Inconsistencies are explained below.

The VQO for this management prescription is 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 view. For example, a road or pipeline cut may be evident but should not be the dominant feature of the landscape - natural features should attract the viewer's attention. Lines should follow natural contours. Colors found in the natural environment should be repeated and openings in vegetation should be irregular. The operating railroad would not be consistent with the partial retention VQO. When a train is present, it would dominate the view and attract the viewer's attention, particularly in the fore- and middleground. Natural features would be subordinate to the operating railroad.

The forest plan contains general direction that limits use of heavy equipment for construction during periods when soil is least susceptible to compaction or rutting.

Alternatives B and C would not be consistent with this general direction. 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. Best management practices (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.

General direction for this management prescription states that proposed new land use facilities (i.e, roads, buildings) will not normally be located within 100-year flood plain boundaries. However, because of the linear nature of the railroad, it would be impossible to select a route that is operationally viable that avoids flood plains. To address flood plain issues, DM&E is in the process of completing hydrology and hydraulic studies that are designed to reduce the risk of damage to the track and water conveyance structures from flooding and to protect downstream and upstream uses.

This management prescription requires maintenance of at least 80 percent of potential ground cover within 100 feet 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. The alternatives would not be consistent with this standard. 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.

The management prescription contains a number of specific standards and guidelines that apply to the location of new roads and trails on BGNG (see Appendix A, Table 4), including construction techniques (which have been incorporated as standards and guidelines in the forest plan) designed to minimize impacts to aquatic and riparian ecosystems. The prescription requires all roads and trails to be located outside riparian areas unless alternative routes have been reviewed and rejected as being more environmentally damaging. Further, the prescription prohibits new roads and trails from paralleling streams except where absolutely necessary. In addition, streams must be crossed at right angles and crossings located at points of low bank slope and firm surfaces. The forest plan clearly intends to protect riparian and aquatic ecosystems from disturbance associated with roads and trails. However, these standards and guidelines were developed in 1984, well before the new railroad was contemplated. Therefore, it could be argued that these standards and guidelines do not apply to DM&E's proposal (railroads are not specifically included in the general direction).

On-the-other-hand, it is clear that Alternatives B and C would not be consistent with these standards and guidelines if they are applicable. Crossings of streams

are dictated by grade and curve limitations associated with the railroad design. Consequently, the locations of stream crossings cannot 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 significantly reduce riparian impacts on NFS lands along Spring Creek.

Watershed Conservation Practices Handbook Standards and Design Criteria. In addition to the requirements for Management Area Prescription 9A found in the current Nebraska Forest Plan, the Forest Service has recently adopted a number of additional standards and design criteria that will apply to construction of the alternatives on NFS lands. These standards and design criteria, listed on Table 5 in Appendix A, can be found in FSH 2509.25, effective March 22, 1999.

One of the additional standards included in FSH 2509.25 restricts activities in the water influence zone to only those "*actions that maintain or improve long-term stream health and riparian ecosystem condition.*" The alternatives would not be consistent with the riparian ecosystem portion of this standard. Where crossed by the alternatives, riparian ecosystem condition would be degraded from both 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 the South Dakota Department of Environment and Natural Resources (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 loss associated with the project. Direct impacts will include the loss of a relatively narrow strip of riparian habitat to the railroad track bed. This loss would be most severe where the alternatives have been routed within drainages because of grade restrictions. The direct loss would be permanent (for the life of the project). Indirect impacts from noise would also occur. Noise impacts would degrade the condition/habitat suitability of adjacent riparian areas. There are no regulatory programs that require mitigation of 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.

A design criteria included in FSH 2509.25 prohibits actions that will cause long-term change away from the

desired condition in any riparian or wetland vegetation community. Within the railroad right-of-way the alternatives would not be consistent with this design criteria. The nature of the railroad requires fill be placed under the tracks. Where that fill 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 impacts would be most severe where the alternatives have been routed along drainages to accommodate grade restrictions. In addition, the COE's 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.

The handbook requires installation of stream crossings on straight and resilient stream reaches, as perpendicular to flow as possible. Alternatives B and C would not be consistent with these design criteria. Because of design constraints on curves and grade, in some cases the alternatives have been routed parallel to drainages (see discussion above for Spring Creek, Cottonwood Creek and the Cheyenne River). Consequently, some crossings of streams would not occur perpendicular to flow nor at straight or resilient reaches. In addition, because of the meandering nature of Spring Creek, both Alternatives B and C would require a number of crossings of this stream. Under both alternatives Spring Creek would be relocated in a number of areas to reduce the number of crossings (see Chapter 4). The Phiney Flat Route Variation of Alternative C would avoid construction parallel to Spring Creek.

The handbook favors the installation of bottomless arches instead of pipe culverts. The railroad proposes to install culverts and concrete boxes and would, therefore, not be consistent with this design criteria. Another design criteria in the handbook requires all roads, trails, and other soil disturbances be designed to "roll" with the terrain as feasible. The railroad's design generally limits grade to 1 percent or less. Consequently, a heavy haul railroad could not be designed to "roll" with the terrain. The alternatives would consist of a series of cuts and fills that level the track bed regardless of the rolling nature of the terrain.

1.4.1.2 Existing Medicine Bow National Forest Plan

Plan Direction. The goals for management of TBNG contained in the Medicine Bow Forest Plan state: "*demonstrate grassland management and utilization of Thunder Basin National Grassland's resources and values in harmony with nature's requirements and behavior to foster long-term economic stability and*

productivity of the land base and quality of life of the people and communities in the area.” The forest plan permits occupancy and use of NFS lands only upon compliance with “*conditions for protection and administration of the National Forest System lands and resources; for the promotion of public health, welfare, safety or convenience; or when public needs cannot be met on private lands.*” Similar to the Nebraska Forest Plan, the Medicine Bow Forest Plan provides for the exploration, development and production of mineral resources in a manner which adequately protects other resources and the environment.

Management Requirements. Appendix A, Table 6 lists the management requirements for the Medicine Bow Forest Plan and whether the alternatives evaluated in this report would be consistent with the general direction and standards and guidelines. Consistency issues with the management requirements are discussed below.

General direction in the forest plan requires sites with unique or exceptional wildlife habitat to be managed for their inherent values as part of the national grassland. Alternative B would cross through the Rosecrans Area on TBNG which has been designated as a reintroduction site for the Federally-endangered black-footed ferret. From a ferret recovery standpoint, the prairie dog towns in the Rosecrans Area provide exceptional wildlife habitat. In fact, the USFWS ranks the Rosecrans Area in the top 10 nationwide candidate sites for ferret reintroduction/recovery. Consequently, Alternative B would not be consistent with this general direction. In addition to potential conflicts in the Rosecrans Area, all the alternatives would also cross habitats 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 (see Chapter 3). It is the policy of the Wyoming Game and Fish Commission that “no net loss” of these unique wildlife habitats occurs. The railroad alternatives would result in a net loss (from direct and indirect impacts) of these habitats and would be inconsistent with the general direction contained in the forest plan.

General direction for visual resource management in the forest plan requires projects to blend soil disturbance into natural topography to achieve a natural appearance, reduce erosion and rehabilitate ground cover. Soil disturbance during construction of the alternatives would not blend with the natural topography because of the need to cut and fill to meet the grade requirements for the track. The alternatives would not be consistent with this general direction.

Approximately 4 to 5 miles of Alternatives B, C and D would cross areas designated as Management Area Prescription 9A in the Medicine Bow Forest Plan.

Management Prescription 9A has a VQO of partial retention. Management activities may be evident in this management prescription 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 Area 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 would not be consistent with this general direction on TBNG.

The forest plan also requires NFS lands to be managed to provide habitat for recovery of endangered and threatened species. Alternatives C and D would not adversely affect habitats for currently listed Federally-endangered or -threatened species. A bald eagle winter roost occurs in the vicinity Alternatives B and C on NFS lands. However, the status of the roost site is unknown and the bald eagle has been proposed for removal from the list. Alternative B would cross NFS lands designated for reintroduction of the black-footed ferret. 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 recently completed an evaluation of the status of the black-tailed prairie dog. Based on existing information the USFWS determined that listing as threatened was warranted but precluded at this time. Black-tailed prairie dog towns would be crossed by all the alternatives but are particularly abundant along Alternative B in the Rosecrans Area. It is expected that the USFWS will be petitioned to list the sage grouse as threatened in the future. Listing decisions for these and possibly other species are anticipated during the construction period for the railroad.

The Medicine Bow Forest Plan contains a number of management requirements that provide seasonal restrictions for human activities in the vicinity of important wildlife resources and their habitats. These requirements are listed below:

- a. No activities are allowed within 1 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 are allowed

within 0.5 miles 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 are allowed within 1 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 are allowed within 0.25 miles of an active golden eagle nest from February 1 to July 31 if they would cause nesting failure or abandonment;
- d. No activities are allowed within 0.25 miles 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 are allowed within 300 feet of any raptor (identified in item d, above) 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;
- f. New roads or other developments will 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 are allowed within 0.25 miles 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; and
- h. No activities are allowed within 0.25 miles 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.

Although they could be reasonably imposed on construction activities, the operating railroad would not be capable of complying with these seasonal restrictions. As is discussed in Chapter 2, at peak 34 coal trains would pass along the track daily and traffic would occur round the clock. It would be impossible to operate the railroad economically along any of the alternatives 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.

The forest plan provides general direction stating that all activities be designed and implemented to protect and manage riparian ecosystems. All of the alternatives on TBNG would result in direct and indirect impacts to

riparian ecosystems. 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 the alternatives would be inconsistent with this general direction.

Similar to the Nebraska Forest Plan, the Medicine Bow Forest Plan special use management requirements (non-recreation based) prohibit "*the approval of any special use application that can be reasonably met on private or other Federal lands unless it is clearly in the public interest*" (see Appendix A, Table 6). Discussion contained in Section 1.4.1.1, Management Requirements, also applies to TBNG.

A portion of DM&E's proposed Western Yard includes a small, isolated parcel of NFS lands. Essentially, installation of the yard on this parcel would preclude all other uses of the parcel. Public use of the parcel would not be possible because it would be contained within the fenced railroad yard. Because of the level of impact on this parcel, the Forest Service has determined that it would be preferable to exchange this parcel for private lands in the Rosecrans Area. Management requirements in the forest plan specifically address land disposal. Priorities for disposal include:

- to states, counties, cities, or other Federal agencies when disposal will serve a greater public interest;
- in small parcels intermingled with mineral or homesteads patents;
- when suitable for development by the private sector, if development (residential, agricultural, industrial, recreational, etc.) is in the public interest;
- when critical or unique resource (wetlands, flood plains, 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; and
- in national grasslands, when they offer no opportunity to meet national grassland demonstration objectives.

Disposal to the private sector for industrial development is allowed by the Medicine Bow Forest Plan so long as the disposal is deemed to be in the public interest (see discussion of public convenience and necessity in Section 1.4.1.1, above). One of the priorities for disposal listed in the forest plan is the Federal acquisition of critical resources. The Forest Service is targeting acquisition of private lands in the Rosecrans Area in exchange for the parcel within DM&E's proposed Western Yard Site. DM&E would be required to obtain, at

their cost, lands deemed suitable by the Forest Service for exchange. The Wall Yard and Edgemont Interchange Yard would not affect NFS lands.

Management Area Prescriptions. Five management area prescriptions would be affected by Alternatives B, C and D on TBNG. Approximate miles which would be crossed by the alternatives in each management area prescription are provided on Table 1-2. As is shown on Table 1-3, it has been determined that Alternatives B, C and D would be consistent with Management Area Prescriptions 6B and 12A. Similar to BGNG, none of the alternatives (except Alternative A) would be consistent with Management Area Prescription 9A and the additional standards and design criteria adopted recently for FSH 2509.25. In addition, the alternatives would not be consistent with Management Area Prescriptions 4B and 4C which emphasize wildlife habitat.

Management Area Prescription 4B - Emphasis on Habitat for One or More Management Indicator Species

Management Prescription Summary. Management emphasis is on the habitat needs of one or more management indicator species. Species with compatible habitat needs are selected for an area. The goal is to provide effective habitat and increase or maintain numbers of the species. The prescription can be applied to emphasize groups of species such as early succession dependent or late succession dependent, in order to increase species richness or diversity. Vegetation characteristics and human activities are managed to provide effective habitat for the selected species or to meet population goals jointly agreed to with the state fish and wildlife agencies.

General Direction and Standards and Guidelines. Appendix A, Table 7 lists the general direction and standards and guidelines for Management Area Prescription 4B. The general direction requires the Forest Service to manage this area for habitat needs of management indicator species and maintain habitat capability at 80 percent. Potential habitat capability will be reduced below this threshold adjacent to the operating railroad and there would be a loss of habitat for management indicator species which is inconsistent with the general direction for this prescription.

Another inconsistency is general direction to 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. However, without adequate mitigation, Alternative B would not. Alternative B would cross the Rosecrans Area which has been designated a reintroduction site for the black-footed ferret. If this alternative is selected, a detailed mitigation plan

would be required to address potential impacts to the reintroduction site. That plan would need to determine how reintroduced black-footed ferrets would be allowed to maintain access to prairie dog towns located on both sides of the track in the reintroduction area. That plan would also need to address noise, vibration and other potential impacts.

Management Area Prescription 4C - Emphasis on Wildlife Habitat in Woody Draws and Other Woody Vegetation Areas on Rangelands

Management Prescription Summary. Management emphasis is on wildlife habitats in hardwood and shrub-dominated draws and other areas of woody vegetation to sustain their inherent biological, physical, and visual values. Generally, the management prescription anticipates that wildlife habitat will improve.

General Direction and Standards and Guidelines. Table 8 in Appendix A provides the direction and standards and guidelines for this management prescription. The alternatives would not be consistent with the general direction for wildlife habitat improvement and maintenance. The forest plan requires this area to be managed to maintain wildlife habitats in good condition and management is required to improve wildlife habitat. Where crossed by the railroad, habitat quality would degrade to less than good condition from direct, as well as indirect, impacts. It is anticipated that some species which depend on woody draws and/or woody vegetation areas would avoid areas indirectly affected by noise from the operating railroad.

The management prescription requires the retention of turkey roosts, including adjacent trees used for cover. 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.

Management Area Prescription 6B - Emphasis on Livestock Grazing

Management Prescription Summary. The area is managed for livestock grazing and range condition is currently at or above the satisfactory level. Intensive grazing management systems are favored over extensive systems. Range condition is maintained through use of forage improvement practices, livestock management, and regulation of other resource activities. Periodic heavy forage utilization occurs. Conflicts between livestock and wildlife are resolved in favor of livestock.

General Direction and Standards and Guidelines. Appendix A, Table 9 lists the direction and standards and

guidelines for this management prescription. The alternatives would be consistent with all of the standards and guidelines and general direction.

Management Area Prescription 9A - Emphasis on Riparian Area Management

Management Prescription Summary. The summary is the same as the description for Management Prescription 9A on BGNG found in Section 1.4.1.1.

General Direction and Standards and Guidelines. The direction and standards and guidelines for this management area prescription can be found on Table 10 in Appendix A. As was described in Section 1.4.1.1 for BGNG, the alternatives would not be consistent with a number of the general directions and standards and guidelines.

The VQO for this management prescription is 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 view. The operating railroad is likely to dominate the view and will usually attract the viewer's attention, particularly in the fore- and middleground. When trains are present, the natural landscape would be subordinate to the operating railroad which is inconsistent with the partial retention VQO.

On TBNG, wildlife habitat maintenance and improvement standards and guidelines require the retention of all snags, except hazard trees in recreation areas. Cottonwoods cannot be harvested unless regeneration can be assured. In addition, the standards and guidelines require maintenance of nest trees and potential nest trees for raptors as large as possible in diameter, adjacent to water bodies. The alternatives would not be consistent with these requirements. All vegetation within the construction right-of-way would be cleared.

It is not known if snags occur within the construction right-of-way. If so, they would be cleared during construction. Although surveys have not identified raptor nests in the construction right-of-way, potential nest trees do exist and would be removed during construction. Loss of these potential nest trees is expected to be insignificant but is inconsistent with the requirements of the management prescription.

The prescription requires the retention of turkey roost trees and associated cover trees. A survey for turkey roosts has not been completed. If roost/cover trees exist within the construction right-of-way they would be cleared. Impacts from noise at adjacent roost sites may make the site unsuitable. Loss of these trees would be inconsistent with the management prescription.

The forest plan requires this area be managed to "maintain wildlife habitat in good condition". Where this management area prescription would be crossed by the alternatives, the quality of wildlife habitat is expected to decrease within the construction right-of-way as well as in areas adversely affected by noise from the operating railroad. The alternatives would not be consistent with the general direction to maintain wildlife habitat in good condition.

The alternatives would not be consistent with the general direction to use heavy equipment for construction during periods when soils are least susceptible to rutting and/or compaction and to prevent soil disturbance and compaction in riparian ecosystems. All alternatives would result in disturbance to riparian ecosystems on NFS lands on TBNG. In addition, it will be necessary for construction of bridges to occur year round including during periods when soils are wet and subject to rutting and compaction. 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.

Watershed Conservation Practices Handbook Standards and Design Criteria. In addition to the requirements for Management Area Prescription 9A, the Forest Service has recently adopted a number of additional watershed standards and design criteria that apply to construction of the alternatives on NFS lands. These standards and design criteria, listed on Table 11 in Appendix A, can be found in FSH 2509.25, effective March 22, 1999. The alternatives would not be consistent with a number of the design criteria contained in the handbook. The inconsistencies would be similar to those described previously for BGNG in Section 1.4.1.1.

Management Area Prescription 12A - Provides for Surface Mining Development

Management Prescription Summary. Management emphasis is to encourage and facilitate, where possible, surface mining development for coal. The major goal is to improve reclamation procedures and provide improved range, wildlife habitat, or a mix of other resource outputs in accordance with the prescription previously, or subsequently, applied to these lands.

General Direction and Standards and Guidelines. All of the alternatives and the Black Thunder North and South mine loop options would cross this management prescription on TBNG. As can be seen on Table 12 in Appendix A, the alternatives would be consistent with the directions and standards and guidelines.

1.4.1.3 Northern Great Plains Management Plans Revision.

The Forest Service is in the process of

preparing updated plans for the national grasslands in the northern great plains. A draft EIS to support the planning effort and proposed grassland plans for BGNG and TBNG were released in July 1999 (Forest Service, 1999c). The Forest Service is currently evaluating comments received from the public on the draft EIS. The final EIS is expected to be released for public comment at the end of 2000.

The draft EIS did not consider DM&E's pending application. The new railroad is listed as "Other Topics Raised But Not Addressed" on page 1-16 of the draft EIS. The draft EIS lists DM&E's project under "Topics to be Addressed by the Forest Service at the Project Level".

The proposed grassland plans for BGNG and TBNG (Forest Service 1999a and 1999b, respectively) are based on Alternative 3 analyzed in the draft EIS. This is the Forest Service's preferred alternative. Alternative 3 would modify the current management plans for the grasslands by adopting additional special area designations, such as special interest areas (SIA), and placing added emphasis on native plants and animals and recreation opportunities.

To date, both BGNG and TBNG have been managed under more general forest plans for the national forests in which the grasslands occur. The purpose of the proposed grassland plans is to provide guidance for all resource management activities on the grassland. The proposed grassland plans suggest management standards and guidelines, describe resource management practices, levels of resource production, people-carrying capacities, and the availability and suitability of lands for resource management.

After approval, the final grassland plans will provide a framework to guide day-to-day resource management operations and subsequent land and resource management decisions made during project planning. The National Forest Management Act requires that resource plans and permits, contracts, and other instruments issued for the use and occupancy of NFS lands be consistent with the final grassland plans. Site-specific project decisions must also be consistent with the final grassland plans, unless the plans are modified by an amendment.

Consistency of the railroad alternatives with the proposed grassland plans for BGNG and TBNG is addressed below. It is important to remember when reading the following discussion that the management requirements and prescriptions are draft and subject to change based on comments received from the public on the draft EIS and proposed grassland plans.

Proposed Grassland Wide Standards. Both the BGNG and TBNG proposed grassland plans contain specific grassland wide standards. Essentially, the same grassland wide standards are applied to both grasslands. Standards are actions that must be followed or are

required limits to activities in order to achieve grassland goals and objectives. Site-specific deviations from standards must be analyzed and documented in grassland plan amendments. The determination of whether an individual project is consistent with the grassland plan is based on whether the project follows grassland wide standards.

Proposed grassland wide standards for BGNG and TBNG are listed on Table 13 in Appendix A. Certain activities associated with the alternatives would not be consistent with some of the grassland wide standards. They are described below.

The proposed grassland plans require that activities and facilities be located away from the water's edge or outside the riparian areas, woody draws, wetlands and flood plains unless alternatives have been assessed and determined to be more environmentally damaging. Activities are also required to maintain the integrity of the riparian ecosystem. The alternatives would not be consistent with these standards. Implementation of the alternatives would have adverse direct and indirect impacts on riparian ecosystems on NFS lands. The integrity of the riparian ecosystem would also be affected by noise from the operating railroad. The most severe impacts would be associated with Alternative B on BGNG. Some riparian habitat would be lost from construction activities, particularly along Alternative B adjacent to Spring Creek, Cottonwood Creek and the Cheyenne River. Alternative C would also affect the riparian ecosystem on NFS lands adjacent to Spring Creek (but not Cottonwood Creek and the Cheyenne River). The Phiney Flat Route Variation of Alternative C would eliminate much of the direct and indirect riparian impacts on NFS lands associated with Alternative C.

Protection of all raptor nests (including owl nests), unless known to be inactive for at least the last 5 years, is required by both proposed grassland plans. This standard requires protection to be based on proposed management activities, human activities existing before nest establishment, species, topography, vegetation cover, and other factors. The alternatives would not be consistent with this standard. Raptor surveys have shown that there are a number of raptor nests in relatively close proximity to the alternatives - some of these nests are located on NFS lands. Operation of the railroad is expected to make some of these nesting sites unsuitable in the future, particularly those used by sensitive species such as ferruginous hawks, and the occupants will be required to find other suitable nesting habitat away from the railroad.

A bald eagle winter roost is known to occur within 1 mile of the alternatives on TBNG. The proposed grassland wide standards prohibit human activities within 1 mile of bald eagle winter roosting areas from November 15 through February if disturbance could cause an

adverse effect. The proposed grassland plans specifically identify ground-disturbing construction (i.e., range developments, trail or road construction, etc.), seismic surveys, or other activities resulting in high human density and/or noise as activities which could have an adverse effect. The alternatives would not comply with this standard as it would not be economically feasible to restrict operation of the railroad from November 15 through February. A seasonal restriction on construction could be imposed which would reduce impacts during the construction phase.

The proposed grassland wide standards prohibit human activities within 1 mile of ferruginous hawk nests from March 1 through July 31 if disturbance would likely cause nest abandonment or failure. Examples of disturbance which could have an adverse effect identified in the standard includes ground-disturbing construction (i.e., range developments, trail or road construction, etc.), seismic surveys, or other activities resulting in high human density and/or noise. Surveys have identified ferruginous hawk nests within 1 mile of the alternatives on NFS lands. The alternatives would not comply with this standard as it would not be economically feasible to restrict operation of the railroad from March 1 through July 31. A seasonal restriction on construction could be imposed which would reduce impacts during the construction phase.

The proposed grassland plan would prohibit human activity within 1 mile of sharp-tailed grouse display grounds between March 15 and May 15 if disturbance would likely cause abandonment of display grounds. Sharp-tailed grouse display grounds have been identified within 1 mile of the alternatives on NFS lands. As with raptor nests, it would not be possible to operate the railroad in such a manner that restricts noise impacts on these display grounds between March 15 and May 15. The alternatives would not be consistent with this guideline.

A 0.25 mile exclusion is proposed around swift fox dens from March 1 through July 30. Future surveys will be necessary to identify swift fox dens in close proximity to the railroad. However, it will not be possible to restrict railroad operations within the specified dates. Some abandonment/displacement may occur if den sites are located in close proximity to the alternatives.

Sage grouse leks occur in close proximity to the alternatives at a number of locations, particularly on TBNG. The proposed grassland wide standards prohibit human activities within 2 miles of sage grouse leks from March 1 through June 15 if they would likely cause disruption of breeding or abandonment of leks. The alternatives would not be consistent with this standard. It would not be possible to restrict operation of the railroad within 2 miles of the leks during the specified period. Some adverse impacts to leks, including possible

abandonment, are expected. The standards also prohibit construction or placement of structures or facilities within 0.25 miles of sage grouse leks if they are likely to cause disruption of breeding or abandonment of the lek. There are known leks within 0.25 miles of the alternatives. The alternatives would not be consistent with this standard. Rerouting the alternatives to avoid these lek buffers would not be possible without adversely affecting the operating grade of the railroad.

To conserve habitat for at-risk cavity-nesting species, the proposed grassland plans contain a guideline that prohibits harvest of dead trees greater than 10 inch diameter in riparian areas and in other prairie woodlands. The alternatives would not be consistent with this guideline. All trees within the construction right-of-way would be cleared.

As part of the plans revision the Forest Service inventoried TBNG and BGNG under a new Scenery Management System. Appropriate scenic integrity levels (SIL) were selected for each management area based on the intent of the management area prescription. SIL class assigned to each management area which would be crossed by the alternatives are listed on Table 1-4.

The alternatives would cross a range of SIL classes. Alternatives B and C would cross areas designated in the proposed grassland plans as high SIL class. Management objectives are based on retention. This level refers to landscapes where the valued landscape character appears intact. Deviations may be present but must repeat the form, line, color, texture and pattern common to the landscape character so completely and at such scale that they are not evident. Alternatives B and C would be inconsistent with this SIL class.

All the alternatives would cross areas with a moderate SIL class. This level refers to landscapes where the valued landscape character appears slightly altered. Management objectives are based on partial retention. Noticeable deviations must remain visually subordinate to the landscape character being viewed. As was discussed previously, the operating railroad is not expected to subordinate to the natural landscape, especially in the foreground and middleground. The alternatives would be inconsistent with the moderate SIL class.

The majority of the NFS lands that would be crossed by the alternatives are designated as low SIL class. The management objective for this SIL class is modification. This level refers to landscapes where the valued landscape character appears moderately altered. Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, vegetative type changes or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed but compatible or compli-

**Table 1-4
Proposed Management Area Prescription Scenic Integrity Level Classification**

Management Prescription Area	SIL Class
1.2- Recommended for Wilderness	High
2.1 - Special Interest Areas	High
3.63 - Black-footed Ferret Reintroduction Habitat	Low
3.64 - Special Plant and Wildlife Habitat	Moderate
3.65 - Rangelands with Diverse Natural-Appearing Landscapes	Moderate in foreground and middleground, Low in background of scenic classes 1-2; Low in all areas scenic classes 3-7
3.68 - Big Game Range	Moderate in foreground and middleground, Low in background of scenic classes 1-2; Low in all areas scenic classes 3-7
4.32 - Dispersed Recreation: High Use	Moderate
5.12 - General Forest and Rangelands: Range Vegetation Emphasis	Moderate in foreground and middleground, Low in background of scenic classes 1-2; Low in all areas scenic classes 3-7
6.1 - Rangeland with Broad Resource Emphasis	Low
8.4 - Mineral Production and Development	Low

mentary to the character within. The alternatives would be consistent with this SIL class

Geographic Area Direction. In addition to the grassland wide standards and guidelines, the proposed grassland plans also provide direction by geographic areas. Geographic areas include management direction that is too specific to apply across an entire national grassland or several national grasslands.

All of the NFS lands which would be crossed by the alternatives on BGNG are within the Fall River Northeast Geographic Area. One of the objectives for this geographic area in the proposed grassland plan is to increase average pasture size over the decade by 10 percent. The alternatives may not be consistent with this objective. The railroad would be fenced on both sides to prevent livestock from gaining access to the tracks.

Where pastures are crossed by the railroad, it may be necessary to provide access under the tracks so that livestock can utilize each side of the pasture split by the tracks. However, in some pastures remnants will be created. Even if these remnants are incorporated into adjacent pastures on the same side of the track, the average pasture size could decrease.

On TBNG, Alternatives B and C would cross the Broken Hills, Cellar Rosecrans, Fairview Clareton, and Highlight Bill geographic areas. Alternative D would cross the Broken Hills, Highlight Bill and Upton Osage geographic areas. The alternatives would be consistent with the direction in the proposed TBNG Grassland Plan for the Fairview Clareton and Highlight Bill geographic areas. However, the Broken Hills, Cellar Rosecrans and Upton Osage geographic areas all contain direction to increase pasture size. Increased pasture size is an objective for the Upton Osage and Broken Hills

geographic areas. The Cellars Rosecrans Geographic Area direction contains a standard that precludes a net decrease in average pasture size. Increased pasture size may be difficult to achieve for the reasons described above for the Fall River Northeast Geographic Area.

Proposed Management Area Prescriptions. The proposed grassland plans redefine management areas for TBNG and BGNG. The management areas are defined as parts of the grassland that are managed for a particular emphasis or theme. Each management area has a prescription that outlines the theme, the desired conditions, and the standards and guidelines that apply to it. These management area standards and guidelines are applied in addition to the grassland wide and geographic area standards and guidelines discussed above.

The proposed grassland plans provide 8 major categories of management prescriptions based on a continuum from least evidence of human disturbance to most. The categories of management prescriptions which would be affected by the alternatives are listed below.

Prescription Category 1. Category 1 includes wilderness areas and the various prescriptions used within them, and the backcountry recreation settings. Ecological processes, such as fire, insects, and disease, are essentially allowed to operate relatively free from the influence of humans. Diversity resulting from natural succession and disturbances predominates, and non-native vegetation is rare. Users must be self-reliant and should expect little contact with other people. Few, if any, human-made facilities are present. With rare exceptions, travel is non-motorized.

Prescription Category 2. Category 2 areas are intended to conserve representative (or particularly rare and narrowly distributed) ecological settings or components.

They help protect ecosystems or ecosystem components that may have important functions, ensuring the overall sustainability of larger landscapes. Human influences on ecological processes are limited as much as possible, but are sometimes evident. Types of human use vary, but generally are not intensive. Travel is generally non-motorized. They help play an important role under an adaptive-management philosophy by serving as a "natural" reference for areas that are intensively managed for a particular objective.

Prescription Category 3. Ecological values in Category 3 areas are in balance with human occupancy, and consideration is given to both. Resource management activities may occur, but natural ecological processes and resulting patterns normally predominate. Although these areas are characterized by predominately natural-appearing landscapes, an array of management tools may be used to restore or maintain relatively natural patterns of ecological process. This results in some evidence of human activities. Users expect to experience some isolation from the sights and sounds of people, in a setting that offers some challenge and risk.

Prescription Category 4. The ecological values in Category 4 areas are managed to be compatible with recreation use, but are maintained within the levels necessary to maintain overall ecological systems. Resource use for other values is not emphasized and has little impact on ecological structure, function, or composition. Sights and sounds of people are expected, and may even be desired. Motorized transportation is common.

Prescription Category 5. Category 5 areas are forested areas managed for a mix of forest products, forage, and wildlife habitat, while protecting scenery and offering recreation opportunities. Ecological sustainability is protected, while selected biological structures and compositions which consider the range of natural variability are emphasized. These lands often display high levels of investment, use, and activity; density of facilities; and evidence of vegetative treatment. Users expect to see other people and evidence of human activities. Facilities supporting the various resource uses are common. Motorized transportation is common.

Prescription Category 6. Category 6 areas are primarily non-forested ecosystems that are managed to meet a variety of ecological and human needs. Ecological conditions will be maintained while emphasizing selected biological (grasses and other vegetation) structures and compositions which consider the range of natural variability. These lands often display high levels of investment, use, and activity; density of facilities; and evidence of vegetative manipulation. Users expect to see other people and evidence of human activities. Facilities

supporting the various resource uses are common. Motorized transportation is common.

Prescription Category 8. Ecological conditions, including processes, within Category 8 areas are likely to be permanently altered by human activities, beyond the level needed to maintain natural-appearing landscapes and ecological processes. These areas are generally small. Ecological values are protected where they affect the health and welfare of humans. Human activities are generally commercial in nature, directly or indirectly providing jobs and income. Motorized transportation is common.

Table 1-2 lists the proposed management area prescriptions that would be crossed by the alternatives. The following describes the consistency of the alternatives with the proposed management prescription themes, desired conditions, goals and standards and guidelines.

Proposed Management Area Prescription 1.2 - Recommended for Wilderness

Only Alternative B would cross this management area prescription. This management area prescription includes RARE II and inventoried roadless areas on BGNG. These are areas that the Forest Service has or will recommend to Congress for inclusion in the Wilderness System. The areas are managed to protect wilderness characteristics until Congressional action is taken. Non-conforming activities may be limited or restricted. Alternative B would be inconsistent with both the goals and standards and guidelines proposed for this management prescription area (see Table 14 in Appendix A).

The management prescription contains a standard that allows uses and activities only if they do not degrade the characteristics for which the area was identified. The operating railroad would not be consistent with this standard. The railroad would degrade the wilderness characteristics of the areas. Direct impacts on NFS lands would be limited to Alternative B. However, Alternative C would introduce noise and potentially visual impacts to this proposed management area where it is routed on private lands adjacent to NFS lands on BGNG.

Motorized use in this management area is limited to administrative purposes such as grazing administration, noxious weed control, and fire suppression. Operation of locomotives in this management area and support traffic necessary for inspection, maintenance and repair of the railroad, would be inconsistent with this standard. The management prescription also prohibits a net gain in fences and prohibits new utilities and special use facilities. Alternative B would be inconsistent with these standards

and guidelines. Finally, the operating railroad would not be subordinate to the landscape which is a guideline for this management area.

Proposed Management Area Prescription 2.1 - Special Interest Areas

Alternatives B and C would cross the Thunder Basin Paleontological SIA on TBNG. The desired condition and standards and guidelines for this management area are listed on Table 15 in Appendix A. The Thunder Basin SIA is a 5,140-acre site that features a high concentration of fossil remains from the late Cretaceous Period ending about 65 million years ago. The site is within the Lance Formation, which is composed of 2,600 feet of dull-gray sandy shales alternating with lenticular, light-colored sandstones and thin lignite beds. The Lance Formation has a very good potential to produce a large variety of fossils of excellent research value. This is the most productive fossil-bearing site on TBNG. Management emphasis is on interpretation and education of geology and paleontology.

Construction of the railroad through this SIA would be consistent with the management emphasis. Construction of the railroad would offer a unique opportunity to discover geologic and paleontological resources. Important discoveries could be made as a result of excavation activities associated with construction of the alternatives. If Alternative B or C is selected, DM&E and the Forest Service will prepare a plan that addresses how impacts to this site would be mitigated and how the public can benefit from both education and interpretation of resources unearthed during construction of the alternatives. The alternatives are consistent with the desired conditions for this SIA.

Proposed Management Area Prescription 3.63 - Black-footed Ferret Reintroduction Habitat

Only Alternative B (on TBNG) would cross this proposed management prescription area. Under this proposed management prescription, black-tailed prairie dog colony complexes and intermingled public grasslands are actively and intensively managed for reintroduction of black-footed ferrets. Prairie dog colony complexes large enough for black-footed ferret reintroduction are established and maintained. Desired conditions and standards and guidelines for this management prescription area are listed on Table 16 in Appendix A.

The desired condition for this management area is to have prairie dog complexes and compatible land uses maintained for black-footed ferret reintroduction. However, without proper mitigation, Alternative B may preclude the successful reintroduction of ferrets into portions of this management area. The management prescription allows uses and activities (e.g. recreation, grazing, mineral leasing, road construction) only if they

contribute to the protection or enhancement of the characteristics for which the area was designated. Alternative B would not contribute to the protection or enhancement of this site for black-footed ferret reintroduction. The railroad would fragment habitat (prairie dog towns) and could present a barrier to the ferret's ability to use large blocks of prairie dog towns. It is uncertain what impacts noise and ground vibrations may have on ferrets. These impacts could adversely affect the ability of ferrets to reproduce. Train traffic could result in direct mortality to ferrets. Alternative B would be inconsistent with this standard.

Proposed Management Area Prescription 3.64 - Special Plant and Wildlife Habitat

This management area would only be affected by Alternative C, although Alternative B would be constructed directly adjacent to the management area. The management area would be crossed on BGNG near Creston. The proposed management prescription requires the area to be managed to emphasize specific plant and wildlife species and communities (see Appendix A, Table 17).

The crossing of this management area would occur in the Fall River Northeast Geographic Area. The geographic area direction contains objectives that address only sharp-tailed grouse habitat. Those objectives include:

- provide diverse and quality grassland habitat at levels that, in combination with habitat on adjoining lands, helps support stable to increasing sharp-tailed grouse populations (long-term trends) across this geographic area;
- establish and maintain quality nesting and brooding habitat for sharp-tailed grouse and associated wildlife by meeting vegetation objectives for high structure within 10 years; and
- establish and maintain quality winter foraging habitat for sharp-tailed grouse and associated wildlife by enhancing and/or maintaining regeneration of shrub patches and the shrub component of wooded draws and riparian habitats.

Construction of Alternative C is not expected to adversely effect the habitats listed above. It is anticipated that Alternative C would be consistent with these objectives and the proposed management prescription.

Proposed Management Area Prescription 3.65 - Rangelands with Diverse Natural-Appearing Landscapes

Management emphasis is on maintaining or restoring a diversity of native plants and animals, and ecological processes and functions, while providing for a mix of other rangeland values and uses with limits on facilities to

support livestock grazing. Desired conditions and standards and guidelines are listed on Table 18 in Appendix A. All of the alternatives would cross this management area. The desired condition for this management area is a naturally-appearing landscape. Facilities are anticipated to be subordinate to the landscape. The alternatives would be inconsistent with this desired condition. Where the railroad alternatives are located, they would dominate the landscape. The operating railroad would not be subordinate to the landscape.

The management prescription contains a standard that requires the average size of fenced grazing units to be maintained or increased. The alternatives would not be consistent with this standard. The railroad would cross through a number of fenced grazing units on both TBNG and BGNG. The railroad would be fenced on both sides to prevent livestock from gaining access to the railroad right-of-way. In some cases, access will be installed to allow livestock to move under the tracks to access both sides of the grazing unit. However, where small remnants of the fenced grazing units remain, it is anticipated that tunnels would not be provided and the grazing unit size would be reduced. These isolated remnant grazing units may be combined with other grazing units on the same side of the track. However, the net effect would still result in reduced grazing unit size.

Proposed Management Area Prescription 3.68 - Big Game Range

These areas are managed to emphasize deer, elk and pronghorn habitat. All alternatives would cross this management area on TBNG. Table 19 in Appendix A lists the desired conditions and standards and guidelines proposed for this management area. Activities and uses are managed so that big game can effectively use the area. High levels of suitability and habitat effectiveness are maintained for big game. Conflicts that cannot be mitigated are resolved in favor of big game. Two seasonal restrictions are incorporated as guidelines into the management prescription for this area: 1) limit activities during big game wintering from December 15 through March 15 if they would reduce habitat effectiveness; and 2) limit activities during elk parturition from May 1 through June 30 if they would reduce habitat effectiveness. It would not be feasible to economically operate the alternatives and comply with these seasonal restrictions. The alternatives would not be consistent with the management prescription for this area.

Proposed Management Area Prescription 4.32 - Dispersed Recreation: High Use

Only Alternative D would cross this proposed management area. The entire route for Alternative D through this management area would be directly adjacent to the existing BNSF railroad. Table 20 in Appendix A lists the desired conditions and standards and guidelines

contained in the proposed grassland plan for this management area. These areas are managed for recreational opportunities and scenic qualities and are usually adjacent to developed recreation sites and bodies of water. Visitors recreate in a relatively natural environment, while pursuing a variety of unstructured recreational activities, such as camping, picnicking, fishing, and off-highway vehicle use. Because the impact of an operating, heavy-haul railroad is already present and Alternative D would be constructed directly adjacent to the existing railroad, it was concluded that Alternative D would be consistent with the management area prescription.

Proposed Management Area Prescription 5.12 - General Forest and Rangelands: Range Vegetation Emphasis

These areas are managed for the sustainability of physical, biological and scenic values associated with woody vegetation and open grassland. Management emphasis is on a balance of resource uses and opportunities. All the alternatives, except Alternative D, would cross this proposed management area. Appendix A, Table 21 contains the goals for this proposed management area. The alternatives would be consistent with the proposed goals. The proposed grassland plans do not contain standards and guidelines for this management area.

Proposed Management Area Prescription 6.1 - Rangeland with Broad Resource Emphasis

Management emphasizes a diversity of native plants and animals and ecological functions and processes, while providing for livestock forage, a mix of other rangeland values and uses, minerals and energy development, and recreation opportunities. All alternatives, except Alternative D, would cross this proposed management area. The alternatives would be consistent with the theme and desired conditions (see Appendix A, Table 22) for this management area. The proposed grassland plans do not provide standards and guidelines for this prescription.

Proposed Management Area Prescription 8.4 - Mineral Production and Development

All the alternatives would cross this proposed management area. In addition, the Black Thunder North and South mine loop options would be constructed in this area. The management area's theme and desired conditions are listed on Table 23 in Appendix A. These areas are managed for solid mineral operations. Mineral operations of all types are emphasized to effectively and efficiently remove available commercial mineral resources, concurrent with other ongoing resource uses and activities. The alternatives would be consistent with the prescription.

