CHAPTER 4
SOUTH DAKOTA and WYOMING

The following discusses the existing conditions and potential environmental impacts that could be anticipated to occur along the existing Dakota, Minnesota, and Eastern Railroad Corporation (DM&E) rail line due to the No-Action Alternative (Project Denial), the various Action Alternatives proposed to extend DM&E's existing rail line into the Powder River Basin (PRB), and proposed existing rail line reconstruction in South Dakota. The existing conditions in South Dakota for both the existing DM&E rail line and the area of proposed Extension Alternatives, are described in Section 4.1. The existing conditions in the area of the Extension Alternatives in Wyoming are discussed in Section 4.2. Impacts from reconstruction and subsequent operation of the existing DM&E rail line in South Dakota are discussed in Section 4.3. Impacts from constructing a new extension rail line across South Dakota and Wyoming into the PRB are discussed in Sections 4.4 through 4.8. The impacts, both construction and operation, associated with reconstructing portions of the existing system for which bypass construction has been proposed are discussed in Section 4.9. Impacts from construction and operation of rail yards are presented in Sections 4.10 and 4.11.

4.1 SOUTH DAKOTA - EXISTING CONDITIONS

The proposed project area in South Dakota consists of the counties in which the existing DM&E rail line is present, and areas where new construction alternatives have been proposed. In locations where DM&E currently has railroad tracks, the existing conditions adjacent to these tracks is described in the following Sections. In the area where new construction alternatives have been proposed, the existing conditions in the general area of the alignments is described in general terms. The counties in South Dakota containing existing DM&E rail line are described from east to west: Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley, Jones, Haakon, and Pennington (west to Wall). The remainder of Pennington, Custer, and Fall River Counties are described in general terms.

4.1.1 CLIMATE

The climate for the entire project area in South Dakota is characterized by cold winter periods occurring when arctic air moves in from the north and northwest, alternating with milder periods. Summers are usually warm, but there are frequent hot spells and occasional cool days. The climate is essentially uniform over all of South Dakota. However, the portion of the state east of Pierre has greater amounts of precipitation during the growing season; while the portions of the state west of Pierre, excluding the Black Hills Region, tend to be dryer, particularly during the months of April through September (Table 4.1-1). Average winter temperature in the project area is 24°F, with an average daily minimum temperature of 11°F. Average summer temperature in the project area is 72°F, and the average daily maximum temperature is 87°F. The average annual precipitation in the project area is approximately 22 inches per year. Nearly 75 percent of the annual precipitation in the project area typically falls during the growing season (April to

September). Much of the remaining 5 inches of precipitation falls as snow during the winter months of October through March. Table 4.1-1 provides a summary of climatic conditions for each county. Counties are listed east to west. Brookings, Kingsbury, Beadle, Hand, Hyde and Hughes counties are east of the Missouri River and Stanley, Haakon, Pennington, Custer and Fall River are west of the Missouri River.

Table 4.1-1
Summary of County Climatic Conditions

County	Coldest Month/Average Daily Maximum Temperature (degrees Fahrenheit)	Warmest Month/ Average Daily Maximum Temperature (degrees Fahrenheit)	Average Annual Precipitation (inches)	Average Snowfall (inches)	Wettest/Driest Month
Brookings	January/24.0	July/84.9	21.62	24.6	May/December
Kingsbury	January/22.5	July/86.3	23.63	36.1	June/January
Beadle	January/22.4	July/87.0	19.05	40.2	June/January
Hand	January/26.0	July/89.0	18.9	33.7	June/*
Hyde	January/24.8	July/88.7	19.27	34.6	June/January
Hughes	January/27.0	July/88.0	16.49	31.0	June/January
Stanley	January/25.4	July/89.0	17.9	29.2	June/January
Jones	January/30.4	July/90	17.91	35.5	June/January
Haakon	January/30.0	July/90.4	15.73	27.1	June/January
Pennington/ Custer	January/33.1	July/90.5	15.53	32.1	June/January
Fall River	January/35.5	July/91.4	16.46	42.0	May/January

*January, February and December average monthly precipitations are equal.
USDA NRSC Soil Survey Reports

4.1.2 TOPOGRAPHY

The following descriptions cover the general topography (land surface) in the project area counties.

Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley, Jones and Haakon Counties

Topography of these counties is nearly level to gently sloping terrain with many small depressions carved out by glaciers. Steep slopes occur in drainage areas adjacent to major rivers such as the Big Sioux, James, and Missouri and their tributaries (Borchers, 1980; Faulkner, 1998; Heil, 1979; Smalley, 1975; Westin, 1958; White, 1963; USGS, 1964; Vialle, 1997).

Pennington, Fall River and Custer Counties

The topography of these counties is largely influenced by the Black Hills Uplift, a large dome-like feature located in central Pennington and Custer counties. The topography generally consists of buttes, rolling hills, mountains and plains dissected by streams (Nielsen, 1996; USGS, 1964).

The larger streams that drain Custer and Pennington counties include Battle, Beaver, Boxelder, French, Pass, Pleasant Valley, Spring and Rapid creeks. These streams and numerous small streams drain into the Cheyenne River (from Soil Survey of Custer and Pennington Counties, Black Hills Parts, issued 9/90).

The Cheyenne River and its tributaries drain most of Fall River County. However, the southeast part of the county is drained by tributaries to the White River. Angostura Dam, located on the Cheyenne River south of Hot Springs, impounds water for irrigation. Most of the small drainageways outside the Black Hills are intermittent. Water flows in these drainageways after heavy rains in the spring. The Cheyenne River is the primary perennial drainageway in the project area of these counties

4.1.3 GEOLOGY AND SOILS

Geologic descriptions are divided into counties and presented in an east to west direction. These descriptions cover the general geologic setting in the project area.

Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley, Jones and Haakon Counties

Surface geology consists primarily of glacial deposits varying in depth from several feet to over 450 feet (Schroeder, 1976; Tomhave, 1987; Tomhave,1988).

Bedrock geology of this region is generally Cretaceous dark-colored marine shale overlying white to brown sandstone and shale of terrestrial origin (Black, 1964; Duchossis, 1993; Helgerson, 1987; Lee, 1958; SDGS, 1998).

Pennington, Fall River and Custer Counties

The geology of the Black Hills Uplift is such that older resistive rocks are located in the center of the uplift and younger weaker rocks are found surrounding it. The oldest rocks are located in central and north central Custer County and are Precambrian (> 570 million years old) igneous (formed from molten lava) granites and rhyolites. Precambrian metamorphic (rocks altered by heat and/or pressure) shist, slate and quartzite surround the igneous rocks and are found in central Pennington and central Custer counties. Sedimentary (formed by deposition of solid particles) limestone, shale and sandstones of Paleozoic age lie outside the metamorphic zone and are located in eastern and western Pennington County; eastern, western and southern Custer County; and north central Fall River County. Sedimentary shale and sandstone of Jurassic and Triassic age form the outer zone of the uplift and are located in eastern and western Pennington County, eastern and western Custer County and northern Fall River County. Areas surrounding the Black Hills Uplift are mainly sandstone, chalk and siltstone of Cretaceous age (SDGS 1998).

4.1.3.1 Unique Geological Formations

Unique geologic formations are geological formations considered to be uncommon, unusual and or containing characteristics or qualities that make them of interest to science or the general public. Known geologic features unique to this region are the Badlands National Park in southeastern Pennington County, the Black Hills Uplift in central Pennington and Custer counties and Wind Cave National Park in central Custer County.

4.1.3.2 Soil Types and Characteristics

The following table shows the soil associations along DM&E's existing rail line in South Dakota and for areas of new construction. The table is followed by specific soil information by county.

Table 4.1-2
South Dakota Soil Associations along Existing and Proposed DM&E Rail line

County	Association	Description
Brookings	Lamoure-Solomon-Rauville	Nearly level medium to fine textured deep soils from alluvium. Concerns: Wetness
	Volga	Nearly level medium to fine textured soils in alluvium, moderately deep to gravel. Concerns: Wetness
	Estelline-Athelwold	Nearly level medium textured loess-mantled soils, deep to gravel. Concerns: Droughtiness
	Kranzburg-Brookings-Hidewood	Gently sloping to sloping medium textured soils in loess-mantled till. Concerns: Water erosion
	Poinsett-Waubay	Gently undulating and rolling silty soils. Concerns: Water erosion
Kingsbury	Poinsett-Waubay-Buse	Well-drained and moderately well-drained, dominantly nearly level to gently rolling, silty and loamy soils; on till and moraines. Concerns: Water erosion
	Renshaw-Sioux-Marysland	Somewhat excessively-drained, excessively-drained and poorly-drained, nearly level to strongly sloping, loamy soils; on outwash plains, moraines and floodplains. Concerns: Water erosion
	Clarno-Bon	Well-drained and moderately well-drained, nearly level to moderately sloping, loamy soils; on till plains, moraines and floodplains. Concerns: Conserving moisture on agriculture land

Table 4.1-2
South Dakota Soil Associations along Existing and Proposed DM&E Rail line

County	Association	Description
Beadle	Beadle-Dudley	Deep, well-drained, nearly level to undulating loamy soils; and deep, moderately well - drained, nearly level soils that have a claypan subsoil; all formed in glacial till; on uplands. Concerns: Soil blowing
	Hand-Bonilla	Deep, well-drained and moderately well-drained, nearly level to gently rolling loamy soils formed in glacial drift; on uplands. Concerns: Erosion
	Houdek-Prosper	Deep, well-drained and moderately well-drained, nearly level to gently rolling loamy soils formed in glacial till; on uplands. Concerns: Erosion
	Carthage-Hand	Deep, moderately well-drained and well-drained, nearly level to gently rolling loamy soils formed in glacial outwash and glacial drift; on uplands. Concerns: Soil blowing
Hand	Houdek-Bonilla	Nearly level to gently undulating loamy soils from glacial till. Concerns: Wind erosion
	Houdek-Cavour-Miranda	Nearly level to gently sloping loamy soils from glacial till; some soils contain claypan. Concerns: Wind and water erosion
	Williams-Cavour-Miranda	Nearly level to gently undulating loamy soils from clayey till; some soils contain claypan. Concerns: Erosion

Table 4.1-2
South Dakota Soil Associations along Existing and Proposed DM&E Rail line

County	Association	Description
Hughes	Lowry-Agar	Nearly level to gently sloping, well-drained silty soils that formed in loess; on uplands and terraces. Concerns: Erosion and soil blowing
	Highmore-DeGrey	Nearly level to gently sloping, well-drained silty soils and moderately well-drained soils that have a claypan; all formed in glacial drift; on uplands. Concerns: Erosion and soil blowing
	Cavo-Raber-Demky	Nearly level to gently undulating, moderately well-drained and well-drained loamy and silty soils and soils that have a claypan; all formed in glacial till; on uplands. Concerns: Erosion and soil blowing
	Gettys-Betts	Rolling to steep, well-drained to excessively-drained loamy soils that formed in glacial till; on uplands. Concerns: Erosion
Stanley	Swanboy-Wendte-Nimbro	Deep, well-drained and moderately well-drained, nearly level and gently sloping, clayey and silty soils; on low terraces, alluvial fans and floodplains. Concerns: High shrink-swell potential, restricted permeability and flooding
	Sansarc-Opal	Shallow and moderately deep, well-drained, moderately sloping to steep, clayey soils; on uplands. Concerns: High shrink-swell potential, restricted permeability and limited depth to shale

Table 4.1-2
South Dakota Soil Associations along Existing and Proposed DM&E Rail line

County	Association	Description
Haakon	Nimbro	Very deep, well-drained, nearly level, loamy soils; on floodplains. Concerns: Wind erosion
	Ottumwa-Lakoma	Very deep and moderately deep, well-drained, nearly level to strongly sloping, clayey soils; on undissected and dissected plains. Concerns: Wind erosion, water erosion and slow rate of water infiltration
	Samsil-Pierre	Shallow and moderately deep, well-drained, strongly sloping to very steep, clayey soils; on dissected plains. Concerns: Wind and water erosion
	Kirley-Lakoma-Vivian	Very deep, moderately deep, and deep, well-drained and somewhat excessively-drained, nearly level to steep, loamy and clayey soils; on terraces and dissected plains. Concerns: Water erosion
Pennington/ Custer	Nunn-Satanta	Deep, well-drained, nearly level to strongly sloping, loamy soils; on high terraces. Concerns: Wind and water erosion
	Bankard-Harverson-Lohmiller	Deep, somewhat excessively-drained and well-drained, nearly level and gently undulating, sandy, silty and clayey soils; on floodplains. Concerns: Wind and water erosion
	Orella-Fairburn-Badland	Shallow, well-drained, moderately sloping to steep, clayey and loamy soils and Badland; on dissected plains. Concerns: Erosion
	Samsil-Pierre	Shallow, and moderately deep, well-drained, moderately sloping to very steep, clayey soils; on dissected plains. Concerns: Erosion

Table 4.1-2
South Dakota Soil Associations along Existing and Proposed DM&E Rail line

County	Association	Description
Fall River	Mathias-Butche-Rockoa	Deep and shallow, well-drained, gently sloping to very steep, stony and loamy soils; on mountains and uplands. Concerns: Poorly suited to building site development and septic tank absorption fields because of the stoniness and the slope
	Tilford-Spearfish	Deep and shallow, well-drained, nearly level to steep, silty and loamy soils; on uplands. Concerns: Erosion
	Pierre-Samsil	Moderately deep and shallow, well-drained, gently sloping to steep, clayey soils; on uplands. Concerns: Wind erosion
	Glenberg-Bankard	Deep, well-drained and somewhat excessively-drained, nearly level, loamy soils; on floodplains. Concerns: Flooding

Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley and Haakon Counties

Soils in this region are similar to eastern Minnesota (Section 3.1.3.2) but contain greater amounts of clay. These soils have formed in medium textured to fine textured glacial till and glacial outwash (water from melting glaciers), and are primarily entisols and mollisols. Topography is mostly level with rolling hills, and soil production is exceptional. Soils in this region are classified as: 1) entisols; 2) alfisols; 3) mollisols and; 4) aridisols. Table 4.1-3 provides the characteristics of these soils. Mollisols occupy approximately 80 percent of this region.

Table 4.1-3
General Soil Characteristics

Soil Type	Location	Characteristics
Entisol	steep slopes, alluvial basins	shallow to deep, nearly level to very steep, well-drained, clayey to sandy loam. Concerns: low strength, shrink-swell, frost action
Alfisols	uplands	gently sloping to very steep slopes, shallow to deep, well-drained, sandy loam. Concerns: slope and large stones
Mollisols	uplands and side slopes	nearly level to strongly sloping, deep, well-drained, sandy loam. Concerns: frost action
Aridisols	moderate to steep sloped uplands	moderate to steep slopes, shallow to moderately deep, well-drained, clay, formed from weathered shale and may crack up to two inches wide during dry periods. Concerns: shrink-swell, frost action

Pennington, Fall River and Custer Counties

Soils in this region are indicative of the Black Hills of South Dakota and are formed mostly from weathering of sedimentary rocks. Organic matter is slow to accumulate and fertility is low. Topography ranges from high plateaus and mountains to rolling hills and alluvial valleys. Soils in this region are classified as: 1) entisols; 2) alfisols; 3) mollisols and; 4) aridisols.

4.1.3.3 Geologic Hazards

The United States Geological Survey (USGS) defines seismic data as the level of horizontal shaking that has a 1-in-10 chance of being exceeded in a 50-year period. Shaking is

expressed as a percentage of gravity (g) (acceleration of a falling object due to gravity). For example, a shaking level of 0-2 percent indicates there is a 10 percent (1-in-10) chance of experiencing a shaking force exceeding 0-2 percent of the force of gravity in a 50-year period. Gravitational forces of 2-4 percent could be felt by some people, but would not likely cause any structural damage (USGS Shaking Hazard Maps, 1996).

Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley, Jones and Haakon Counties

Based on the 1996 United States Geological Survey Shaking-Hazard Maps, Brookings County and Kingsbury County show a 1-in-10 chance of experiencing a force of 0-2 percent of g within a 50-year period. Beadle County through the eastern half of Hughes County show a 1-in-10 chance of experiencing a force of 2-4 percent of g within a 50-year period. The western half of Hughes County through Haakon County show a 1-in-10 chance of experiencing a force of 0-2 percent of g within a 50-year period (USGS Shaking Hazard Maps 1996).

Pennington County, Fall River and Custer Counties

Based on the 1996 United States Geological Survey Shaking-Hazard Maps, all of Pennington County, excluding the southwestern corner of the county, shows a 1-in-10 chance of experiencing a force of 0-2 percent of g within a 50 year period. The southwestern corner of Pennington County through Fall River County show a 1-in-10 chance of experiencing a force of 2-4 percent of g within a 50-year period.

The southwest portion of the South Dakota Project area, in Pennington, Fall River, and Custer Counties, contain Pierre Shale formations. Pierre Shale was deposited during the middle Cretaceous times. Pierre Shale formations have a high potential for slumps or landscapes paticularly in areas of steep slopes along rivers, such as the Cheyenne River.

4.1.3.4 Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture (USDA). It is of major importance in meeting the nation's needs for food and fiber. Because prime farmland is limited, the USDA recognizes the importance of wisely using this resource. Prime farmland is defined as land that is best suited for food, feed, forage, fiber and oilseed crops. It may be cultivated land, pasture, woodland or other land. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming this land results in the least damage to the environment.

The State of South Dakota has a total of 6,516,000 acres of land classified as prime farmland. The counties in the portion of the project area east of the Missouri River have a significantly higher percentage of prime farmland than those in the central and western portions of the project area. The percentage of acres of prime farmland per county decreases west of the Missouri River. For example, Kingsbury County, on the eastern side of South Dakota, has approximately 328,648 acres of prime farmland, or nearly 59 percent of the soil in Kingsbury County meets the requirements of prime farmland (USDA 1997). Haakon County in the west central portion of the project area, west of the Missouri River, has approximately 2,120 acres of prime farmland, or less then 1 percent of the soil in this county meets the requirements for prime farmland. (USDA, 1982). The project area within Fall River County has approximately 12,000 acres of soil, or about 1 percent of the county, that meet the requirements of prime farmland only when irrigated, otherwise none of the soils in Fall River are considered prime farmland (NCRS 1999). Table 4.1-4 lists the amount of prime farmland in the counties within the project area.

Table 4.1-4
Prime Farmland

County	Prime Farmland (acres)	Percentage of Prime Farmland Acreage
Brookings	373,833	73
Kingsbury	328,648	59
Beadle	9,060	1
Hand	33,916	3
Hyde	108,635	20
Hughes	26,148	6
Stanley	0	0
Jones	80,516	13
Haakon	2,120	0.18
Pennington	0	0
Custer	0	0
Fall River	12,000*	1*

* Only considered prime farmland when irrigated, NCRS Soil Survey of Fall River County, South Dakota

4.1.3.5 Paleontological Resources

Paleontological resources are extensive in western South Dakota. In this area of the project, geologic formations containing an abundance of fossils and prehistoric resources are present and often at ground surface due to past erosional forces. In eastern South Dakota, conditions and formations conducive to fossil formation were not as common. Paleontological resources are occasionally encountered; however, they are widely scattered. Therefore, the following discussion deals primarily with western South Dakota due to the variety, abundance, and importance of the paleontological resources in this area.

The paleontological resources encountered in South Dakota vary in age and fauna depending on the underlying geologic formation. Geologic formations are broadly categorized as Quaternary (0.01 million years ago (mya) – 1.6 mya), Tertiary (1.6 mya – 66 mya) and Cretaceous (66 mya – 144 mya) in age. Quaternary sediments include a variety of surficial deposits such as alluvium, wind blown material, landslides, colluvium and terraces of multiple ages. These deposits consist of reworked sediments derived from older units and they contain reworked fossils from older units as well as Quaternary fossils. Tertiary formations, in order of increasing age are the Brule, Chadron, Tongue River, Lebo and Tullock. Cretaceous formations in order of increasing age include: the Lance, Fox Hills, Pierre Shale, Niobrara, Carlile Shale, Greenhorn, Belle Fourche Shale, Mowry Shale, Newcastle Sandstone, Skull Creek Shale, Fall River and Lakota.

Quaternary deposits in the proposed project area may contain a broad spectrum of terrestrial fauna and flora, including all Holocene and Pleistocene taxa.

Faunal lists from different Quaternary localities generally reflect the climate and conditions in which the deposit accumulated.

Commonly found paleontological resources within these units include mammals, reptiles, amphibians, birds, fish, and numerous invertebrate and plant species. Faunal lists from these units often include: bison (*Bison)*, horses (*Equus*), camels (*Gigantocamelus*), deer (*Odocoileus*), rabbits (*Lepus, Sylvilagus*), rodents (*Cynomys*, *Spermophilus, Castor, Peromyscus, Microtus*), snakes (*Crotalus, Pituophis*), toads and frogs (*Bufo, Rana*), clams and snails (Pinsof, 1985). Quaternary deposits containing these taxa occur discontinuously along the entire proposed project area.

Tertiary formations also contain a wide variety of fauna and flora. Oligocene and Eocene taxa within the Brule and Chadron formations are terrestrial in origin and commonly include: oreodonts (*Merycoidodon*), horses (*Mesohippus, Miohippus*), camels (*Poebrotherium*),

rhinoceros (*Hyracodon, Subhyracodon, Metamynodon*), pigs (*Archaeotherium, Elotherium, Dinohyus*), titanotheres (*Megacerops, Brontotherium, Titanotherium*), ruminants (*Hypertragulus, Leptomeryx, Hypisodus*), carnivores (*Hyaenodon, Daphoenus, Dinictis, Hoplophoneus*), rabbits (*Palaeolagus, Hypolagus*), rodents (*Ischyromys, Eutypomys, Steneofiber, Eumys*), turtles (*Stylemys, Geochelone*), crocodiles (*Crocodilus*), snails (*Helix*), and plant seeds (*Celtis*). Lacustrine deposits within these terrestrial sediments also contain fish, reptiles and mollusks (O'Harra, 1920). Brule and Chadron exposures containing the above taxa occur at various localities between the eastern flank of the Black Hills and the Missouri River in South Dakota.

Cretaceous formations are primarily shallow and near-shore marine and terrestrial sediments which accumulated as a result of transgressive and regressive marine cycles in the western interior seaway. Faunas within these Cretaceous units commonly include marine reptiles, sharks, fish and a diverse molluscan assemblage. Dinosaurs and other terrestrial reptiles, amphibians, fish, and rare, primitive mammals occur within units such as the Lance and Fox Hills formations. Dinosaur remains and tracks, as well as fish, are also found in the Lakota Formation. Marine fossil assemblages within these units include: Mosasaurs (*Tylosaurus, Clidastes, Plioplatecarpus, Platecarpus*), Plesiosaurs (*Polycotylus, Elasmosaurus*), lizards (*Coniasaurus*), aquatic birds (*Hesperornis*), sharks (*Squalicorax, Ptychodus, Lamna, Cretolamna, Carcharias*), fish (*Enchodus, Xiphactinus, Ichthyodectes, Gillicus, Cimolichthys, Lepidotus*), mollusks (*Baculites, Acanthoceras, Dunveganoceras, Scaphites, Collignoniceras, Prionocyclus, Mytiloides, Pseudoperna*), plants and petrified wood. Lower Cretaceous sandstone of the Fall River and Lakota formations occur through the foothills of the southern Black Hills, as do most of the other Cretaceous shale, marl and limestone units listed above. The Pierre Shale is a widespread unit occurring throughout much of the project area between the Black Hills and the Missouri River. Terrestrial and near-shore sediments of the Fox Hills Formation occur both on the southwestern flank of the Black Hills and at several locations east of the Black Hills.

4.1.4 LAND USE

4.1.4.1 Agriculture

Crop production is an important land use in eastern South Dakota. The primary crops produced include sunflowers, corn, soybeans, grain sorghum, alfalfa, wheat, and oats. The portion of the project area that includes the existing DM&E rail line passes through approximately 170 miles of prime farmland, approximately 303.0 miles of cropland, and approximately 182.3 miles of pasture land in South Dakota.

In the western portion of the project area (particularly Pennington and Custer counties) the conditions are dryer and crop production is less prevalent. Fall River County, in the southwest portion of the proposed project area, has approximately 12,000 acres of land irrigated by the Angostura Unit of the Bureau of Reclamation that is planted mainly in corn and alfalfa. Limited crop production is practiced in the remainder of the western project area with winter wheat and other small grains being grown as well as tame hay and other feed crops.

Ranching is the principal enterprise in the portion of the project area for the Extension Alternaives. As much as 80 percent of the acreage in this portion of the project area is used for raising beef cattle and sheep and much of the cultivated land is used to raise livestock feed.

As shown in Table 4.1-5, between 1982 and 1992, the number of acres of farmland increased in the State of South Dakota. Brookings, Hyde, Hughes, Stanley, Jones, Jackson and Custer counties saw an increase in acreage, while Kingsbury, Beadle, Hand, Haakon, Pennington and Fall River counties saw a decrease in the number of acres of farmland. The number of farms decreased in the state and in Brookings, Kingsbury, Beadle, Hand, Jones, Haakon and Fall River counties, while Hyde, Hughes, Stanley, Jackson, Pennington and Custer counties saw an increase in the number of farms. The average size per farm increased in the state and in Brookings, Kingsbury, Beadle, Hand, Hughes, Jones, Custer and Fall River counties. In Hyde, Stanley, Jackson and Pennington Counties, the average farm size decreased. In Haakon County, average farm size remained the same.

Table 4.1-5
Agricultural Statistics of South Dakota and Potentially Affected Counties

Affected Area	Change in Farmland Acreage (1,000) 1982-1992	Change in Number of Farms 1982-1992	Change in Average Size of Farms (acres) 1982-1992
South Dakota	2.3	-8.3	11.6
Brookings	0.2	-9.5	10.8
Kingsbury	-4.0	-15.0	13.0
Beadle	-1.6	-7.0	5.7
Hand	-0.6	-14.0	15.6
Hyde	0.2	1.3	-1.1
Hughes	6.8	1.6	5.0

Table 4.1-5
Agricultural Statistics of South Dakota and Potentially Affected Counties

Affected Area	Change in Farmland Acreage (1,000) 1982-1992	Change in Number of Farms 1982-1992	Change in Average Size of Farms (acres) 1982-1992
Stanley	5.0	18.6	-11.4
Jones	8.1	-10.8	21.2
Haakon	-0.3	-0.3	NC
Jackson	8.9	16.0	-6.1
Pennington	-0.9	10.2	-10.1
Custer	10.5	7.0	3.4
Fall River	-2.7	-11.3	9.7

1996 County and City Extra, Annual Metro, City and County Data Book
County and City Data Book, 1988

4.1.4.2 Residential

The existing rail line passes through, or very close to, 46 communities (discussed in more detail in Section 4.1.7). Approximately 2.9 miles of residential land is adjacent to the existing DM&E rail line between Brookings County and Pennington County. The larger communities in the project area include Brookings, Huron and Pierre. Residences and ranches are widely scattered throughout the rural areas.

4.1.4.3 Business and Industrial

The existing DM&E rail line passes adjacent to approximately 36.9 miles of business and industrial land from Brookings County to Pennington County. Nearly all of the communities through which the existing rail line passes contain business and/or industrial areas. Some of the major employers in communities along the existing rail line include South Dakota State University, Larson Manufacturing, Daktronics, 3M Company and Brookings Hospital in Brookings; Good Samaritan Nursing Center in De Smet; Huron Public Schools, Huron Regional Medical Center and the U.S. Government in Huron; the Prairie Center in Miller; State Government, St. Mary's Hospital and Pierre School District in Pierre; and KroFam & Subsidiaries in Philip (South Dakota Office of Economic Development 1999).

4.1.4.4 Minerals and Mining

Brookings, Kingsbury, Haakon, Hand, Hughes, Hyde, Jackson, Jones and Beadle Counties

No coal, oil, gas, or mineral resources are known to exist within the project area in South Dakota (USGS, 1996; USGS, 1997). However, sand and gravel deposits are quarried at numerous locations in these counties.

Pennington, Fall River and Custer Counties

Numerous oil and gas wells are known to exist in north central Fall River County and south central Custer County (Bretz, 1981; SDGS Custer County, 1998; SDGS Fall River County). No coal deposits are known to exist in this region (USGS,1996).

4.1.4.5 Public Facilities

Most of the communities in the project area are small. Most communities have only one elementary, middle and senior high school and many of the small communities bus the children to schools in larger communities or to shared rural schools. Many of the communities have clinics and/or doctor and dentist offices. However, most communities do not have hospitals. There are churches in the area as well as recreational facilities. Section 4.1.7 provides a more detailed description of the communities within the South Dakota project area.

4.1.4.6 Federal Lands

4.1.4.6.1 Forest Service Lands

Buffalo Gap National Grassland

The Buffalo Gap National Grasslands is located in southwestern South Dakota. It includes over 595,000 acres, intermingled with private, state, Indian Reservation, and National Park Land. These lands are not a continuous unit but a patchwork of lands throughout the region. The USFS attempts to consolidate these lands into larger continuous parcels through purchase, land exchange, or other means. Much of the Buffalo Gap National Grasslands (BGNG) under the USFS control are permitted to local ranchers for grazing or hay production.

The Buffalo Gap National Grassland can be divided into the "east half" and "west half." The east half extends east and west from near Kadok to the Cheyenne River and north and south from U.S. Highway 14 to the Pine Ridge Indian Reservation. The west half extends east and west between the Cheyenne River and the Wyoming border and extends south to the Nebraska Border.

The vegetation on the Buffalo Gap National Grassland consists of mixed-grass vegetation. The area is a mix of rolling prairie and badland topography. The grassland area is inhabited by pronghorn, mule deer, white-tailed deer and prairie dogs. In addition to these animals, experimental populations of black-footed ferrets were introduced in the Conata Basin/Badlands area in 1996. There are also large beds of agates and vertebrate and invertebrate fossils in the grasslands.

Black Hills National Forest

The Black Hills National Forest is another area managed by the USFS. The forest name is derived from Lakota Indian words, Paha Sapa, meaning "hills that are black." The pine-covered hills cover an area 125 miles long and 65 miles wide. This area includes rugged rock formations, canyons and gulches, open grassland parks, streams, lakes and unique caves (USFS 1998a).

After a series of large forest fires in 1893, President Grover Cleveland established the Black Hills Forest Reserve. This protected the forest against fires, wasteful lumbering and timber fraud. The Black Hills National Forest was established once the reserve was transferred to the USFS (USFS 1998a).

Today this National Forest provides outstanding scenery and a mild climate. These combine to provide excellent surroundings for the over 100 developed recreation sites, including campgrounds, picnic areas, swimming beaches, boat launches and scenic overlooks. There is also much hiking, fishing and boating in the area (USFS 1998b). Most of the over 600 miles of trails are concentrated in the Norbeck Wildlife Preserve. These trails are open to hikers, mountain bikers, cross country skiers, snowmobilers, horseback riders and motorcycle riders (USFS 1997).

The Norbeck Wildlife Preserve was established to protect and to provide a breeding area for game animals and birds. The Preserve covers 35,000 acres and most of the area is located in Custer State Park. Motorized vehicle use is restricted to roadways, no vehicles are allowed on the trails in the preserve. Approximately 25,000 of these acres are managed by the USFS. The 9,824-acre Black Elk Wilderness is in the center of the Preserve. This area was named for Black Elk, an Oglala Lakota holy man (USFS 1998a).

The USFS is required to inventory, evaluate and consider all roadless areas for possible inclusion in the National Wilderness System. In June of 1977, the USFS initiated a comprehensive process to evaluate areas to be designated roadless and undeveloped. The process by which these lands were evaluated is known as the Roadless Area Review and Evaluation or RARE II. A RARE II area is one that has met the following criteria:

- the area must be larger than 5,000 acres or, if smaller, contiguous to a designated wilderness or primitive area;
- the area could not contain improved roads maintained for travel by standard passenger-type vehicles;
- the area must be inventoried by the USFS for possible inclusion in the National Wilderness Preservation System.

Three RARE II areas were identified on the BGNG in South Dakota during the preparation of the 1984 Forest Management Plan: the 24,670 acre Indian Creek Area, the 9,700 acre Red Shirt Area, and the 7,570 acre Cheyenne River Area (PIC Technologies, Inc. 2000). All three of these areas are within the South Dakota project area.

As a result of recent revisions to the USFS grassland management plan, a third roadless desiganation has been instituted. Under this process, areas are designated as Inventoried Roadless areas. The criteria for this designation, while similar to RARE II, has been modified to allow more lands to meet the standards for inclusion in the National Wilderness Preservation System. There are three areas on the BGNG that meet the criteria of Inventoried Roadless Areas that were not designated as RARE II areas. Two of these areas, the Jim Wilson Canyon Inventoried Roadless Area, and the First Black Canyon Inventoried Roadless Area, are in close proximity to the project area. The third, the Red Shirt Inventoried Roadless Area is within the project area. The entire 15,970 acre Red Shirt Area, including the Red Shirt RARE II and Red Shirt Inventoried Roadless Area has been recommended for wilderness classification under the USFS proposed grassland plan. The Sage Creek Wilderness Area is located approximately 6.2 miles from the project area within the Badlands National Park.

4.1.4.6.2 National Park Service Lands

Badlands National Park was designated a national monument in 1939 and redesignated a National Park in 1978. Badlands National Park preserves a diversity of significant resources. These resources include the best known Oligocene fossil deposits contained within archetypical Big Badlands formations, a rich and varied cultural history spanning from paleo-Indian occupation

through the early twentieth century homesteading period, and an expansive mixed grass prairie ecosystem. Other qualities, most notably include the wilderness character, but also include the quiet, solitude, vastness and natural processes observed, opportunities for hiking, camping, wildlife viewing, scenic drives and presence of vistas, research and education, and quiet contemplation. There are approximately 1.3 million visitors per year to Badlands National Park with the highest visitation from mid-June through September; lowest from mid-November through March.

Wind Cave National Park was created on January 3, 1903. It was the 7th National Park and the first created to protect a cave. The park at that time was small. As the park boundaries expanded, herds of bison, elk, and pronghorn were added. One of the world's longest most complex caves and 28,295 acres of mixed-grass prairie, ponderosa pine forest, and associated wildlife are the main features of the park. The cave is well known for its outstanding display of boxwork, an unusual cave formation composed of thin calcite fins resembling honeycombs. The park's mixed grass prairie is home to native wildlife such as bison, elk, pronghorn, mule deer, coyotes, and prairie dogs (GORP No Date).

Jewel Cave, the third longest cave in the world, is approximately 13 miles west of Custer, South Dakota. The Jewel Cave National Monument offers tours, picnic areas and two hiking trails and a United States Forest Service trail. There is also a log cabin ranger station listed on the National Register of Historic Places (NPS 1999).

Mount Rushmore National Memorial is located in the Black Hills National Forest. The memorial and the Sculptor's Studio, built in 1939, are the main attractions. However, a new Visitor Center and the Presidential Trail both opened in the summer of 1998. Guided walks and ranger programs are also available (NPS 1998).

4.1.4.6.3 Bureau of Land Management Lands

After the original 13 colonies ceded lands to the Federal government, laws were set up to provide for surveys and the settlement of these lands. As additional lands were acquired by the United States from other countries, these were also surveyed and settled. Soon the General Land Office was established to oversee the disposition of these lands. By the late 19th century, there was a shift in Federal land management priorities. At this time the first national parks, forest and wildlife refuges were established. These lands were withdrawn from settlement because of their resource values. In the early 20th century, Congress directed the Executive Branch to manage activities on public lands. The U.S. Grazing Service was established to manage the public rangelands. Soon this agency was merged with the General Land Office to form the Bureau of Land Management (BLM) within the Department of the Interior (BLM 1998a).

The BLM is responsible for addressing the needs of a rapidly growing and changing West, balancing the public need with environmental conservation (BLM 1998a). It manages large areas of Federally owned lands and interests in lands (for example, Federally owned mineral estates) that are administered by the Secretary of the Interior for mineral, oil, and gas resources, as well as for rangeland and wildlife habitat. It provides service and maintenance for BLM-owned buildings, recreation facilities, water and sewer systems, roads, trails and bridges that are located on public lands. The BLM also manages and locates abandoned mines on public lands and remedies high-priority hazards (BLM 1998b).

The BLM employs law enforcement officers to protect visitors and the natural resources on public lands. They ensure compliance with Federal laws and land use regulations on BLM land. The BLM also keeps records of current and historical information about land ownership and use (BLM 1998b).

Payments in lieu of taxes are made to tax-exempt Federal lands administered by the BLM as well as other agencies. These funds are based on a formula and are appropriated by Congress. Other revenue is derived from commercial activities on Federal lands, such as oil and gas leasing, livestock grazing and timber harvesting. These lands also represent a large part of the Nation's natural and cultural heritage. The BLM is usually required to inventory, evaluate and protect such features as rare geologic formations; rare and vulnerable plant and animal communities; wild free-roaming horse and burro herds; wilderness areas and Wild and Scenic Rivers; and paleontological, archaeological and historical sites (BLM 1998b).

In South Dakota, BLM lands provide opportunities for livestock grazing, and rights-of-way for other permits and leases. (BLM 1998b). Parcels of BLM lands are scattered throughout the project area, paticularly in the southwest area of South Dakota through which the Extension Alternative projects would pass.

4.1.4.6.4 Bureau of Reclamation Lands

Lands associated with two U.S. Department of the Interior, Bureau of Reclamation (Reclamation) projects occur in the project area. These are discussed below.

Angostura Irrigation Project

The Angostura Unit, which consists of Angostura Dam, Reservoir, and the associated irrigation distribution system, is located nine miles southeast of Hot Springs, just west of the Pine Ridge Indian Reservation. Benefits of the Project include irrigation, flood control, fish and

wildlife conservation, recreation and sediment control. The dam impounds the Cheyenne River near Angostura Canyon. (USBR 1998)

The construction of the dam occurred from 1946-49. Water was first delivered in 1953. By 1956, water was available to 12,218 acres of irrigable lands.

The reservoir currently provides irrigation for 12, 218 acres below the dam along both sides of the Cheyenne River. An additional 184.8 acres, including 139 acres of the Hot Springs airport and 45 acres on private land, are provided irrigation water from the reservoir, but only when the reservoir surface water level is above 3,184.2 feet in elevation (Angostura Unit Water Service Contract Renewal, U.S. Department of Interior, July 1997)

Oahe Unit

The Oahe unit consists of the Oahe Reservoir, and the partially completed 31-mile Pierre Canal. The original plans for the Oahe Unit call for a reservoir near Blunt, and one north of Huron on the James River. Property for the Blunt reservoir has been acquired, but the reservoir has not been constructed.

The Oahe unit is part of the Pick-Sloan Missouri Basin Program. The project was authorized for construction in 1968 for the purpose of furnishing irrigation water to approximately 190,00 acres of land, providing flood control, developing fish and wildlife habitat, and furnishing municipal and industrial water supply.

The Pierre Canal was designed to be approximately 33 miles long and extend from the Oahe Reservoir Dam eastward to the James River north of Huron. The Pierre Canal would supply water to the Blunt Reservoir and eventually supplement the James River Reservoir through a series of pumps and gravity flow structures. At present, the canal is approximately 30 percent complete. At a point approximately 3.5 miles northeast of Canning, South Dakota, the existing DM&E rail line would cross a section of land owned by Reclamation. This strip of land is approximately 200 feet wide and was purchased by Reclamation to construct a water control structure on the Pierre Canal. To date, no structure has been constructed. However, the land remains under ownership of Reclamation. The status of the Oahe Unit is uncertain, and construction of the Pierre Canal and the Blunt Reservoir has been terminated.

4.1.4.6.5 Fish and Wildlife Service Lands

Waterfowl Production Areas

The U.S. Fish and Wildlife Service (USFWS) manages lands within the project area to provide nesting and brood rearing habitat for waterfowl production. These Federal lands include temporary and permanent wetlands and associated upland habitats that are important for waterfowl nesting of waterfowl. They also provide hunting opportunities for waterfowl and other wildlife species. The existing DM&E rail line passes through or within one mile of 12 Federal waterfowl production areas. The locations of the various waterfowl production areas (WPA) are given in Table 4.1-6 below by township, range and section or sections. None of the waterfowl areas occupy an entire section, however some occupy portions of one or more sections.

Table 4.1-6
Waterfowl Production Areas along DM&E's Existing Rail Line in South Dakota

Location	Name	County	Closest City	Rail Line
T110N, R51W, Sec 20		Brookings	2 miles southwest of Volga	< 1 mile north
T110N, R51W, Sec. 18		Brookings	3 miles northwest of Volga	passes through about ½ mile of this area
T110N, 52W, Sec. 10	Dry Lake/ Selken/ Van Moorlehen	Brookings	6 miles northwest of Volga	passes through about 2 miles
T111N, R52W, Sec. 31		Brookings	less than 1 mile north of Arlington	little more than 1 mile south
T111N, R53W, Sec. 35		Kingsbury	1 mile northwest of Arlington	0.1 mile north
T110N, 53W, Secs. 5 and 8	Pickering	Kingsbury	1 mile southeast of Hetland	1.3 miles north
T111N, 55W, Secs. 34 and 27		Kingsbury	2 miles northwest of Lake Preston	0.7 mile south
T111N, R55W, Secs. 29, 31 and 32		Kingsbury	3 miles east of De Smet	immediately adjacent to the south for 0.5 mile
T111N, 56W, Secs. 26, 23, 22, 35 and 36	Halverson	Kingsbury	Just east of De Smet	passes through approximately 1.5 mile

Table 4.1-6
Waterfowl Production Areas along DM&E's Existing Rail Line in South Dakota

Location	Name	County	Closest City	Rail Line
T111N, 59W, Secs. 32 and 29	Beaver	Beadle	3 miles east of Cavour	0.7 mile south
T111N, R63W, Secs. 33 and 34	Maga Ta-Hohpi and Weaver	Beadle	3 miles southeast of Wolsey	0.8 mile north
T111N, R63W, Sec. 21		Beadle	2 miles east of Wolsey	0.15 mile south
T111N, R65W, Sec. 13		Beadle	3.5 miles northwest of Wolsey	1 mile south
SD GF&P 1998a				

In addition to WPA's, the USFWS also maintains easements on privately held wetland areas for the production of waterfowl and wildlife habitat. There are approximately 25 wetland easement areas within one mile of the existing DM&E rail line in Brookings, Kingsbury, Beadle and Hand counties. The rail line passes through 0.6 mile of wetland easement in Brookings County; 3.45 miles in Kingsbury County; and 7.25 miles in Beadle County.

4.1.4.7 Reservation and Treaty Lands

Reservations for Native Amercans, or American Indians, occur throughout the Great Plains. Reservations are lands ceded to various Tribes upon which to live and sustain themselves. Several reservations are located in South Dakota. While the existing DM&E rail line does not pass through any existing reservations, there are 3 reservations that would be within 10 miles of the proposed project. As the existing DM&E rail line passes through Hughes County, it turns sharply westward at Rousseau, South Dakota. At this point the rail line passes less than 3 miles northwest of the Lower Brule Reservation and less than 10 miles northwest of the Crow Creek Reservation.

The Lower Brule Reservation belongs to the Lower Brule Sioux Tribe. It is located in northern Lyman County and the southeast corner of Stanley County.

The Crow Creek Reservation belongs to the Crow Creek Sioux Tribe. It is located in the southeast portion of Hughes County, the southern edge of Hyde County and the western half of Buffalo County.

The Pine Ridge Reservation belongs to the Oglala Sioux Tribe. It is located in Shannon and Jackson counties. The existing DM&E rail line is within one mile of the Pine Ridge Reservation. The Extension Alternatives range from less than one mile west (Alternative B) to over 12 miles west (Alternative D) of the Reservation.

The Treaty of 1851 established all the lands in South Dakota west of the Missouri River as lands of the Sioux Nation. Although the Treaty of 1868 established reservations for the Sioux Tribes, the Treaty of 1851 was never rescinded. Today those Treaty lands, including the counties of Haakon, Stanley, Jackson, Pennington, Custer and Fall River, are disputed by several Tribes as still being the property of the Sioux Nation.

4.1.4.8 State Lands

State Game Production Areas

The State of South Dakota owns and manages lands throughout the state for game production. While USFWS waterfowl production areas are primarily to provide habitat for ducks and geese, game production areas provide habitat for a variety of wildlife including waterfowl, deer, turkey and upland birds. The existing rail line passes through or within 1.0 mile of 7 state wildlife areas or refuges (SDGFP 1998a). These areas are managed by the state to provide wildlife production and public hunting opportunities as follows:

- A state game production area is located just southwest of De Smet in Kingsbury County. This production area is less than 0.5 mile south of the rail line and is located at T111N, R56W, Sec. 34.

- A state game production area at Lake Iroquois is located about 1 mile southeast of Iroquois, in Kingsbury County. This game production area is approximately 1 mile south of the rail line and is located at T110N, 58W, Sec. 8.

- A state game production area is located approximately 3.5 miles northwest of Wolsey. This production area, in Beadle County, is about 1,000 feet south of the rail line. The state game production area is located at T111N, R64W, Sec. 18 and T111N, R65W, Sec. 13.

- The Woodruff Lake State Game Production Area is located in Hughes County about 1.5 miles southwest of Harrold. It is less than one mile south of the rail line and is located at T112N, R75W, sec. 18 and T112N, R76W, Sec. 13.

- As the existing DM&E rail line curves west at Rousseau, Hughes County, approximately 11 miles east of Pierre, it passes along the northern boundary of the Arikara State Game Production Area for approximately 5 miles. This area is located along the north bank of the Missouri River, between the river and existing rail line.

- Less than 0.5 mile south of the rail line, just south of Philip in Haakon County, is a small state game production area. This area is located at T1N, R20E, Sec 24.

- A state game production area is located approximately 1 mile southwest of Wall in Pennington County. This area is less than one mile south of the rail line and is located at T1S, R15E, Sections 1 and 2.

- The existing rail line passes through a small state game production area north of Oral in T7S, R7E, Section 8, approximately 1.5 miles south of Buffalo Gap.

- As the existing DM&E rail line continues south, it intersects the Scherbarth GPA south of Oral, at T8S, R7E, Sections 3 and 2. The Oral GPA is located approximately 2.5 miles east of the existing DM&E rail line at T7S, R7E, Section 36.

State Parks

Oakwood Lakes State Park is located approximately seven miles northwest of Volga, South Dakota, in Brookings County. This park is situated between eight glacial lakes and offers campgrounds, picnic areas, hiking trails, as well as swimming and boating facilities. Three burial mounds are located in the park. The park grounds were historically the summer camp and annual gathering spot for Native American Indians. The park also offers four miles of cross-country ski trails for winter recreation. Oakwood Lakes State Park and the burial mounds are located eight miles north of the existing DM&E rail line.

Lake Thompson State Recreational Area is located about five miles southwest of Lake Preston, South Dakota, in Kingsbury County. The lake is known for its prosperous fishing. By the year 2005, the Lake Thompson Recreation Area will be located on the northeast shore of the lake. Planned facilities include campsites, group campgrounds, cabins, rental lodge, comfort stations, boat ramps, a fish cleaning station, a sewage dump station, swim and ski beaches, picnic shelter, park shop/office, shoreline trails, playgrounds, asphalt roads and parking lots.

Approximately 4 miles east of Pierre, DM&E's existing rail line passes along approximately 2 miles of the northern boundary of Farm Island State Recreation Area. This 1,235 acre state recreation area is situated on the shores of the Missouri River. It provides abundant

boating and fishing opportunities. The park also offers swimming, hiking, cross country skiing trails, campgrounds, campsites, camping cabins, boat ramps, a fish cleaning station, comfort stations, a sewage dump station, a group camping area, picnic shelters, playgrounds, and an amphitheater. The park also has several different wildlife habitats and includes the 500-acre Farm Island Nature Area. The state recreation area is home to many different species of plant and animal life and its trails are listed in the National Registry of Recreation Hiking Trails.

Custer State Park is located over 20 miles northwest of Oral, South Dakota. The park encompasses 73,000 acres in the Black Hills. Activities at the park include hiking, mountain biking, horseback riding, rock climbing, chuckwagon suppers and jeep rides, and shows at the Black Hills Playhouse. There is also Needles Highway scenic drive which provides access through the park. Custer State Park is the home of Sylvan Lake, Legion Lake, Blue Bell and State Game Lodge resorts. Opportunities for scenic camping also exist at the parks seven campgrounds. The park is home to the largest herd of bison in the world. Other wildlife that occur in the park include antelope, mountain goats, bighorn sheep, deer, elk, wild turkeys and burros (South Dakota State Parks 1998). The east boundary of Custer State Park comes within one mile of the existing DM&E rail line north of Buffalo Gap, South Dakota.

Recreation opportunities at the Angostura Recreation Area are currently the responsibility of the South Dakota Department of Game, Fish and Parks (SDGFP). These recreational opportunities include campgrounds, campsites, comfort stations, a fish cleaning station, a fishing pier, picnic shelter, an RV dump station, boat ramps, swimming beach, playgrounds, hiking trails, a floating concession stand, and pontoon, fishing boat, waverunner, paddle boat and cabin rentals.

4.1.4.9 Utility Corridors

Utility corridors occur throughout the project area including natural gas, petroleum, telephone, water, sewer, and electricity. Many cross the existing rail line, while others parallel it. Natural gas needs are met by Northwestern Public Service Company. Electricity needs are met by Otter Tail Power Company, Aurora Utility Company, Western Area Power, Northwestern Public Service, West Central Electric and Black Hills Power and Light Company. Water supply is met by wells in the Big Sioux and Dakota aquifers. Wastewater treatment is handled by lagoons, activated sludge treatment plants and stablilization ponds.

4.1.5 WATER RESOURCES

4.1.5.1 Surface Water

Surface water in the project area occurs as rivers, lakes, streams and ponds. The major rivers in the project area include the Big Sioux, James, Missouri, Bad (including north and south forks) and Cheyenne rivers. Surface water drainage varies throughout the project area. In eastern South Dakota, the Big Sioux and James rivers flow south to the Missouri River. The White and Bad Rivers drain most of the central portion of the project area, with both flowing northeast into the Missouri River. The Cheyenne River also flows northeast into the Missouri River, and along with the White River, drains most of southeastern South Dakota. The Missouri River flows southeast through the center of the project area.

There are many small lakes and ponds in the project area. They are usually found in pastureland and serve to provide watering areas for livestock. As discussed above, the Angostura Reservoir and Irrigation Project is located nine miles southeast of Hot Springs. This impoundment of the Cheyenne River is used to provide water to irrigate crops.

The existing DM&E rail line in South Dakota, between the Minnesota State line and Wall, South Dakota crosses 7 rivers and 16 perennial streams including Deer Creek and the Big Sioux River, the James River, Medicine Creek, the Missouri River, the Bad River, and Cottonwood Creek. In addition it crosses 230 intermittent and unnamed streams. Additional drainages in southwest South Dakota include Rapid Creek, Boxelder Creek, Cheyenne River, Spring Creek, Battle Creek, Antelope Creek, French Creek, Lame Johnny Creek, Horsehead Creek and Hat Creek.

The portion of the project area that would be crossed by the Extension Alternatives contains numerous perennial and intermittent streams in the Cheyenne River drainage.

Surface water withdrawal for South Dakota in 1990 was between zero and 2,000 million gallons per day. Total water withdrawal for South Dakota in 1990 was also between zero and 2,000 million gallons per day.

The streams within the project area are typical for the region, and their flow events are closely reflective of precipitation patterns. Flow events frequently result from snowmelt during the late winter and early spring. Although peak discharges from such events are generally small, the duration, and therefore percentage of annual runoff volume, can be considerable. During the spring, storms increase soil moisture, hence decreasing infiltration capacity, and subsequent rainstorms can result in both large runoff volume and high peak discharges. The surface water

quality varies with the streamflow rate; the higher the flow rate, the lower the total dissolved solids concentration, but the higher the suspended solids concentration.

4.1.5.2 Floodplains

Larger rivers within the project area contain floodplain areas. Rivers with some kind of floodplain development include the Big Sioux, James, White, Bad and Missouri Rivers. The Missouri River has the most developed floodplain in the project area. However, much of it is presently inundated as Lake Sharpe. This helps stabilize the water level in the river and reduce the dramatic fluctuations that may occur during flooding. The other rivers have less developed floodplains. The Cheyenne River is partially impounded by the Angustora Dam, creating Angustora Reservoir. The reservoir has helped stabilize the flow within the downstream stretches of the Cheyenne River. However, with the exception of the Missouri River, other area rivers experience dramatic seasonal fluctuations in water levels due to heavy rains or rapid snow melt, often resulting in flooding throughout the drainage.

4.1.5.3 Wetlands

Wetlands found within the project area are important regional ecosystems. These natural communities provide filtration of sediments and pollutants from surface water runoff, flood water retention, erosion control, resting, foraging, and nesting habitat for waterfowl and mammals, fish spawning, nursery habitat, and amphibian habitat.

Wetlands are defined, for regulatory purposes, in the Clean Water Act. This definition is used by the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (COE) to administer the permit program outlined in Section 404 of the Act. Wetlands under COE jurisdiction are defined as follows:

> "Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987). Wetlands generally include swamps, bogs and similar areas (40 CFR 230.3 and 33 CFR 328.3)."

In order to be classified as a wetland, an area must possess three characteristics, hydric soils, a dominance of hydrophytic vegetation, and wetland hydrology. Sites must meet all criteria before being designated as a jurisdictional wetland.

Wetlands often are found in a transition zone between open water and upland systems. These sites are often inundated or saturated for prolonged periods during the growing season (May through September in the project area). Wetland hydrology in the project area is provided by stream flooding, saturation from the water table, precipitation, and, in the western part of South Dakota, seepage associated with the distribution of irrigation water.

The eastern and central part of the South Dakota project area are within the Prairie Pothole Region. Prairie potholes are shallow, glacially carved depressions that often hold water throughout the year. The potholes range from wet prairies to seasonal marshes to permanent water. These wetlands have regional and national significance in providing nesting and resting areas for waterfowl and shorebirds.

Western South Dakota is more arid and contains less permanent wetlands than the central and eastern part of the state. In this part of the project area, riparian wetlands associated with river systems comprise most of the wetland acreage. In addition, irrigation projects and stock ponds provide wetlands in this region.

Wetlands found in the project area may be classified in three categories based on the dominant vegetation occurring at the site. Forested wetlands are characterized by woody vegetation that is greater than 6.0 meters tall (Cowardin et al. 1979). The dominant trees found in forested wetlands within the project area are cottonwood (*Populus* spp.) and willow (*Salix* spp.). These wetlands occur along major streams and rivers within the project area. In addition, these wetlands are often only seasonally flooded during the spring and during heavy run-off periods .

Scrub/shrub wetlands are characterized by woody vegetation less than 6.0 meters in height. These wetlands consist of a mixture of shrubs and small trees. Common species found in scrub/shrub wetlands include willow (*Salix* spp.), alder (*Alnus* spp.), sedges (*Carex* spp.), rushes (*Juncus* spp.) and jewel-weed (*Impatiens capensis*). Within the project area these wetlands are found along rivers and streams.

Emergent wetlands found within the project area are predominately mixed emergent marsh and cattail marsh. The mixed emergent marsh contains a mixture of bulrushes (*Scirpus* spp.), rushes (*Juncus* spp.), common reed grass (*Phragmites australis*) and umbrella sedges (*Cyperus* spp.). Some common herbs associated with this plant community include broad-leaved arrowhead (*Sagittaria latifolia*), swamp milkweed (*Asclepias incarnata*) and bulb-bearing water-hemlock (*Cicuta bulbifera*). The cattail emergent marsh is dominated by cattails (*Typha latifolia* and *Typha angustifolia*). Other species associated with this community include sedges (*Carex* spp.),

swamp milkweed, marsh skullcap (*Scutellaria galericulata*) and jewel-weed. The cattail marsh has a peaty mat that develops over time, thus allowing the roots to grow without contact with the bottom.

The wetland acreage within the existing DM&E right-of-way in South Dakota, based on National Wetland Inventory (NWI) maps, is approximately 179.4 acres. NWI maps identify wetlands based on aerial photographs. They are intended as a guide in determining wetlands within a particular area. Table 4.1-7 provides the amount of wetlands within the existing DM&E right-of-way for each county.

Table 4.1-7
County Wetland Acreage

COUNTY	WETLAND TYPES (acres)				
	Emergent	Scrub/Shrub	Forested	Other	Total
BROOKING	3.5	0	0.0	0.1	3.6
KINGSBURY	22.4	0	0.2	1.5	24.1
BEADLE	9.5	0	0.1	2.5	12.1
HAND	3.6	0	0	0.1	3.7
HYDE	6.0	0	0	0	6.0
HUGHES	4.7	0	0.2	1.7	6.6
STANLEY	1.9	0	0	0.2	2.1
JONES	3.9	0	0.1	0.4	4.4
HAAKON	21.4	0.8	40.2	0.2	62.6
JACKSON	0.2	0.0	0.0	0.0	0.2
PENNINGTON (Wall east)	3.6	1.5	0.0	2.4	7.5
PENNINGTON* (Wall west)	10.6	1.9	0.1	14.7	27.3
CUSTER*	0.1	0.0	0.4	0.0	0.5

Table 4.1-7
County Wetland Acreage

COUNTY	WETLAND TYPES (acres)				
	Emergent	Scrub/Shrub	Forested	Other	Total
FALL RIVER*	10.9	0.0	0.0	7.8	18.7
TOTAL	**102.3**	**4.2**	**41.3**	**31.6**	**179.4**

* Wetlands along DM&E's existing rail line considered as part of one of the Extension Alternative to extend its rail line into the Powder River Basin.

4.1.5.4 Groundwater and Wells

4.1.5.4.1 Groundwater

Unconsolidated-Deposit aquifers - Brookings, Kingsbury, Beadle, Hand, Hyde and Hughes Counties

Sediments which make up the unconsolidated-deposit aquifers were deposited as outwash from glaciers and as alluvium from streams. Due to the wide variety of the sediments which make up these aquifers, there is a wide range of permeabilities. Sand and gravel deposited as a result of glacial outwash and stream alluvium generally have a high permeability. This high permeability allows surface water to pass downward through this aquifer and into the bedrock aquifers below. This is also a conduit for contamination to travel and pollute other aquifers. Fine-grained lake deposits and till typically have a much lower permeability.

Although some sand and gravel aquifers extend to the surface, many are buried, ancient stream deposits. These sediments were deposited in glacial meltwater streams or in valleys which cut into bedrock. These buried aquifers can be covered by confining units of clay or silt. These confining units, in turn, may be covered with sand and gravel as a result of glacial outwash. Many of the buried valley aquifers have been used as sources of freshwater. Wells screened in the sand and gravel lenses are sufficient for domestic use. Wells that are screened in the clay and silt may provide little or no water.

Lower Cretaceous aquifers

Lower Cretaceous aquifers extend over almost the entire State of South Dakota. These aquifers, however, appear at the land surface in wide to narrow bands. These exposed bands

encircle basins or uplifted areas. These originally flat-lying rocks were warped into these structures by tectonic forces which acted on the earth's crust. Erosion has exposed many of these structures at the surface.

The lower Cretaceous aquifers are composed chiefly of consolidated sandstones. One of the most well known aquifers in the nation is the Dakota aquifer (locally called the Inyan Kara aquifer). This is part of the lower Cretaceous aquifer and is exposed on the flanks of the Black Hills Uplift in Pennington County. The Dakota aquifer extends more than 300 miles to the east under South Dakota. Because the water may move hundreds of miles in the subsurface, it is in contact with aquifer minerals for long periods of time. Water from the Dakota aquifer typically contains high concentrations of dissolved minerals.

Because the sandstones of the Dakota aquifer receive recharge (when water enters the aquifer) at high elevations, the water in the aquifer is under high artesian pressure. There is also upward leakage from deeper aquifers which contributes to the pressure.

Paleozoic aquifers - Hyde, Hughes, Stanley, Haakon, Pennington, and Fall River Counties

The Paleozoic aquifers extend from Hyde County west through Hughes, Stanley, Haakon, Pennington and Fall River counties. These aquifers, however, are exposed only in small areas. Paleozoic aquifers are composed mainly of limestone and dolomite, although some Paleozoic sandstone units produce water. Confining units that separate the aquifers consist of shale and siltstone with some beds of sandstone. Some confining units also contain anhydrite (a mineral used in the production of sulfuric acid) and halite (rock salt).

Recharge areas (locations where water enters the aquifer) of the Paleozoic aquifers are typically at high elevations. Paleozoic aquifers receive recharge where they are exposed at the land surface at the flanks or crests of anticlines (convex-upward folds in rocks or rock layers). Because of the high recharge elevation, the wells are under high artesian pressure and generally flow at the surface. Recharge is also received from shallower aquifers with water at a greater hydraulic head. Where the aquifers are buried at great depths, some limestone formations contain oil, gas and brine. Groundwater that moves near the margins of brines may become highly mineralized.

4.1.5.4.2 Wells

Unconsolidated-deposit aquifers - Brookings, Kingsbury, Beadle, Hand, Hyde and Hughes Counties

Unconsolidated-deposit aquifers in sediments of the Quaternary age are the most productive in central to eastern South Dakota and are the source of water for thousands of shallow wells. These aquifers typically consist of sand and gravel, but may contain local cobbles and boulders. Thickness of the unconsolidated deposits range from 0 to 400 feet. Clay and silt are often mixed with the sand and gravel or clay and silt lenses or beds are often present and may form local confining units. The unconsolidated-deposit aquifers are an important source of water, used for many purposes, in South Dakota.

Lower Cretaceous aquifers - Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley, Haakon, Pennington, Custer and Fall River Counties.

Wells must be drilled to great depths as the lower Cretaceous aquifers are usually deeply buried. Some wells are completed to depths greater than 5,000 feet. Well yields are typically between 5 and 60 gallons per minute. Some wells, however, exceed 500 to 1,000 gallons per minute.

Paleozoic aquifers - Hyde, Hughes, Stanley, Haakon, Pennington and Fall River Counties

The Madison Group consists of limestone altered by partial dissolution in many areas. The dissolution has resulted in many large solution cavities. Wells that penetrate such cavities may produce extremely large quantities of water, especially where several of the cavities are connected.

4.1.6 AIR QUALITY

The air quality in the project area in South Dakota is good. The Environmental Impact Statement for the Newcastle Resource Management Plan (BLM 1998) states that the air quality in east-central Wyoming is generally excellent. Based on similar land and level of development, air quality in the adjacent area of South Dakota would be similar to that of Newcastle, Wyoming.

Existing sources of emissions in the project area include the existing DM&E railroad locomotives, locomotives of the other rail carriers, automobiles, trucks and farm equipment. Vehicle traffic in the project area is responsible for tailpipe emissions including nitrogen oxides (NO_x), carbon monoxide (CO), and sulfur dioxide (SO_2). The primary pollutant produced by

locomotives and farm equipment is NO_x. Farming and ranching activities and vehicles using unpaved roadways are sources of fugitive dust. There are also emissions created from manufacturing, construction and mining operations. However, these are minor in the South Dakota project area.

The Clean Air Act, which was last amended in 1990, requires the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation and buildings.

The EPA, Office of Air Quality Planning and Standards (OAQPS) has set NAAQS for six principle pollutants, which are called "criteria pollutants." They include: sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), lead (Pb) and particulate matter (PM). All South Dakota counties in the project area are in attainment for all criteria pollutants (sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, lead, particulate matter) which means their concentrations are below NAAQS.

4.1.7 NOISE

The project area in South Dakota is primarily rural with rail, automobile and truck traffic, and farm equipment as the primary noise sources in the project area. The existing DM&E rail line is a source of rail noise in the communities where it currently exists and some communities, such as Wosley and Edgemont, also experience rail noise from other rail carriers. The DM&E track averages approximately 2-3 through trains per day, with additional rail traffic occurring irregularly in the form of wayfreight and switching operations. Table 4.1-8 lists the rail segments and approximate number of trains per day.

Table 4.1-8
Existing Rail Line - South Dakota
Train Traffic

Segments	Trains per day* (both ways)
Wall to Midland	1
Midland to Wolsey	2

Table 4.1-8
Existing Rail Line - South Dakota
Train Traffic

Segments	Trains per day* (both ways)
Wolsey to Huron	3
Huron to Arlington	3
Arlington to Brookings	4

* Includes wayfreights picking up and delivering rail cars to shippers.

Within the Extension Alternative portion of the project area are large tracts of land, including public lands such as National Grasslands. The majority of the existing noise that currently exists in these areas is generated from natural sources such as wind, rivers, and wildlife. Natural settings that lack the sounds of human activity are fast becoming a rare resource and one that is difficult to quantify in terms of value. Although there may be only a few permanent noise receptors in these regions, the introduction of noise from human activities such as highways and railroads significantly changes the complexion of the region for those who are attracted to the area to experience the solitude.

The existing DM&E rail line passes through numerous small communities. These communities are exposed to various types and levels of rail noise. Wayside noise includes the noise generated bya passing trains. Locomotive engine noise, rail noise and car noise contribute to wayside noise. Additionally, trains are required to sound a warning horn when approaching a public grade crossing. Horn soundings are required from 0.25 mile prior to a crossing until the locomotive passes through the grade crossing. Horn noise is significantly louder than wayside noise and is designed to provide adequate warning to motorists and pedestrians of an approaching train (Figure 4-1).

Noise sensitive receptors along a rail line may be exposed to one or both types of noise. Because horn noise is significantly louder than wayside noise, it extends further from the rail line and affects a greater number of noise receptors. The Surface Transportation Board (Board) considers residences, schools, libraries, hospitals, retirement and nursing homes as sensitive to noise and therefore considers these as noise sensitive receptors.

The following provides a brief profile for the communities along the existing DM&E rail line in South Dakota. The profiles include the segment of rail line, community, transportation and

noise receptor information. Table 4.1-9 provides the number of noise sensitive receptors currently experiencing average daily noise levels of 65 decibels (dBA) or more (L_{dn} 65 contour) within each county and community. A summary of the public grade crossing information along the existing rail line is provided in Table 4.1-10.

Brookings Country

The existing DM&E rail line passes through approximately 0.5 mile of Elkton. The rail line trends southeast to northwest in the northern part of town. The rail line passes through approximately 4,200 feet of the major concentration of Elkton, including a commercial area. There are rail loading facilities in the community. The 1990 population of Elkton was 602. The public grade crossings in Elkton are Elk Street, North Buffalo Street, Cornell Avenue/County Road 33 and South Dakota Highway 13. The average daily traffic (ADT) of these crossings are 1,400, 250, 300 and 505, respectively. Elkton includes one high school, one middle school, three elementary schools, churches, parks, and a hospital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 71.

The existing DM&E rail line passes through Aurora. The rail line trends southeast to northwest through the center of town. The rail line passes through approximately 0.7 mile of the major concentration of Aurora, passing through both commercial and residential areas. There are rail loading facilities within the community. The 1990 population of Aurora was 619. The public grade crossings in Aurora are Hull Avenue and Broadway Avenue/476th Avenue. The daily ADT of these crossings are 32 and 322, respectively. The community includes one high school, one middle school, three elementary schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 115.

The existing DM&E rail line in Brookings trends from southeast to northwest through the south area of town. The rail line passes through approximately three miles of the major concentration of Brookings, passing through both commercial and residential areas. There are rail loading facilities within the community. The 1990 population of Brookings was 16,270. The public grade crossings and ADTs are listed in Table 4.1-10. The community includes one high school, one middle school, three elementary schools, a college, churches, parks, and a hospital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 736.

The existing DM&E rail line in Volga trends from east to west on the north edge of town. The rail line passes through approximately 4,800 feet of the major concentration of Volga, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Volga was 1,263. The public grade crossings in the community are Caspian Avenue, Hansina Street, Kasan Street and Samara Street. The ADTs of

these crossings are 46, 375, 1,000 and 800, respectively. The community includes high schools, middle schools, elementary schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 99.

Kingsbury County

The existing DM&E rail line in Arlington trends from southeast to northwest through the northeastern half of town. The rail line passes through approximately 3,400 feet of the major concentration of Arlington, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Arlington was 908. The public grade crossings in the community are U.S. Highway 81, Main Street, North 3rd Street and North 4th Street. The ADTs of these crossings are 1,350, 630, 300 and 430, respectively. The community includes high schools, middle schools, elementary schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 93.

The existing DM&E rail line in Hetland trends from east to west through the center of town. The rail line passes through approximately 1,200 feet of the major concentration of Hetland, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Hetland was 53. The public grade crossing in the community is 449th Avenue/Main Street with an ADT of 118. The community includes a school and church. Noise sensitive receptors in the 65 dBA L_{dn} contour number 23.

The existing DM&E rail line in Lake Preston trends from east to west on the north side of town. The rail line passes through approximately 3,400 feet of the major concentration of Lake Preston, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Lake Preston was 663. The public grade crossings in the community are Park Avenue, Lake Avenue, Main Street and Preston Avenue. The ADTs of these crossings are 408, 89, 2,496 and 86, respectively. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 94.

The existing DM&E rail line in De Smet trends from east to west through the northern part of town. The rail line passes through approximately 4,700 feet of the major concentration of De Smet, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of De Smet was 1,172. The public grade crossings in De Smet are Lyle Avenue, Calumet Avenue, State Highway 25, Sherwood, and Harvey Dunn. The ADTs of these crossings are 115, 390, 1,966, 186 and 130, respectively. The community includes schools, churches, parks, and a hospital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 138.

The existing DM&E rail line in Manchester trends from east to west on the north side of town. The rail line passes through approximately 1,000 feet of the major concentration of Manchester, passing through residential areas. There are no rail loading facilities in the community. The 1990 population of Manchester was 136. There are no public grade crossings in the community. This community small includes a church. Noise sensitive receptors in the 65 dBA L_{dn} contour number 19.

The existing DM&E rail line in Iroquois (Kingsbury and Beadle Counties) trends from east to west through the center of town. The rail line passes through approximately 3,000 feet of the major concentration of Iroquois, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Iroquois was 328. The public grade crossings in the community are Ottawa Street, Quapaw Street and 418th Avenue/Sioux Street. The ADTs of these crossings are 63, 230 and 157, respectively. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 20 in Kingsbury County and 20 in Beadle County.

Beadle County

The existing DM&E rail line in Cavour trends from east to west through the center of town. The rail line passes through approximately 2,400 feet of the major concentration of Cavour, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Cavour was 116. The public grade crossings in the community are 409th Avenue and 408th Avenue. The ADTs of these crossings are 188 and 15, respectively. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 20.

The existing DM&E rail line in Huron trends from east to west through the north part of town. The rail line passes through approximately 17,400 feet of the major concentration of Huron, passing through both commercial and residential areas. There are rail loading facilities in the community as well as DM&E's primary maintenance facility. The 1990 population of Huron was 12,448. The public grade crossings in Huron are Custer Avenue, Simons Avenue, Dakota Avenue, Lincoln Avenue, U.S. Highway 14, and West Park Avenue. The ADTs for these crossings are 45, 545, 11,030, 5,290, 2,137, and 125, respectively. The community includes high schools, middle schools, elementary schools, churches, parks, and a hospital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 113.

The existing DM&E rail line in Wolsey trends from southeast to northwest through the north part of town. The rail line passes through approximately 3,200 feet of the major concentration of Wolsey, passing through both commercial and residential areas. There are rail

loading facilities in the community. The 1990 population of Wolsey was 442. The public grade crossings in the community are Commercial Avenue, Highway 281, Highway 14 and 387th Avenue. The ADTs of these crossings are 0, 270, 200 and 0, respectively. This community includes schools and churches. Noise sensitive receptors in the 65 dBA L_{dn} contour number 38.

The existing DM&E rail line in Wessington (Beadle and Hand Counties) trends from southeast to northwest through the center of town. The rail line passes through approximately 3,700 feet of the major concentration of Wessington, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Wessington was 265. The public grade crossings in the community are Wessington Street and 374th Avenue. The ADTs of these crossings are 952 and 464, respectively. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 29 in Beadle County and one in Hand County.

Hand County

The existing DM&E rail line in Vayland trends from southeast to northwest along the northeast side of the community. The rail line passes through approximately 1,200 feet of this residential area. There are no rail loading facilities in the community. Vayland is very small and population information was not available. This community includes a school. Noise sensitive receptors in the 65 dBA L_{dn} contour number 4.

The existing DM&E rail line in St. Lawrence trends from east to west through the south part of town. The rail line passes through approximately 3,000 feet of the major concentration of St. Lawrence, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of St. Lawrence was 223. The public grade crossings in the community are Maple Street and Commercial Avenue. The ADTs of these crossings are 164 and 166, respectively. This community includes a school and a church. Noise sensitive receptors in the 65 dBA L_{dn} contour number 16.

The existing DM&E rail line in Miller trends from east to west through the south part of town. The rail line passes through approximately 4,500 feet of the major concentration of Miller, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Miller was 1,678. The public grade crossings in the community are 3rd Street, Broadway/Highway 47 and 3rd Avenue West. The ADTs of these crossings are 400, 2,505 and 204, respectively. The community includes schools, churches, parks, and a hospital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 75.

The existing DM&E rail line in Ree Heights trends from east to west through the northern part of town. The rail line passes through approximately 2,100 feet of the major concentration of Ree Heights, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Ree Heights was 91. The public grade crossings in the community are Dakota Avenue and Lincoln Avenue. The ADTs of these crossings are 508 and 5, respectively. This community includes a school and a church. Noise sensitive receptors in the 65 dBA L_{dn} contour number 9.

Hyde County

The existing DM&E rail line in Highmore trends from east to west through the northern part of town. The rail line passes through approximately 4,000 feet of the major concentration of Highmore, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Highmore was 835. The public grade crossings in the community are Commercial and Iowa Avenue. The ADTs of these crossings are 272 and 1,543, respectively. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 24.

The existing DM&E rail line in Holabird trends from east to west through the center of this community. The rail line passes through approximately 300 feet of this populated place, passing through both commercial and residential areas. There are no rail loading facilities in the community. Holabird is a very small populated place and population information was not available. The public grade crossings in the community are Oak Street and 328th Avenue/County Road 649. The ADTs of these crossings are 21 and 95, respectively. This community includes a school. There are no noise sensitive receptors in the 65 dBA L_{dn} contour.

Hughes County

The existing DM&E rail line in Harrold trends from east to west through the northern part of town. The rail line passes through approximately 2,700 feet of the major concentration of Harrold, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Harrold was 167. The public grade crossings in the community are Wyman Avenue and 321st Avenue. The ADTs of these crossings are 300 and 151, respectively. This community includes schools and churches. Noise sensitive receptors in the 65 dBA L_{dn} contour number 26.

The existing DM&E rail line in Blunt trends from northeast to the south along the southwestern side of town. The rail line passes through approximately 1,800 feet of the major concentration of Blunt, passing through a commercial area. There are rail loading facilities in the

community. The 1990 population of Blunt was 342. The public grade crossings in the community are 309th Avenue and Canning Road. The ADTs of these crossings are 9 and 153, respectively. Noise sensitive receptors in the 65 dBA L_{dn} contour number 15.

The existing DM&E rail line in Canning trends from northeast to southwest through the center of this community. The rail line passes through approximately 1,200 feet of this community. There are no rail loading facilities in Canning. No population information was available for Canning. Noise sensitive receptors in the 65 dBA L_{dn} contour number 7.

The existing DM&E rail line in Alto trends from east to west through the south part of town. The rail line passes through approximately 1,200 feet of the major concentration of Alto, passing through both commercial and residential areas. There are no rail loading facilities in the community. The 1990 population of Alto was 83. There are no noise sensitive receptors in the 65 dBA L_{dn} contour.

The existing DM&E rail line in Pierre trends from southeast to northwest through the southern part of town. The rail line passes through approximately 26,000 feet of the major concentration of Pierre, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Pierre was 12,906. The public grade crossings and ADTs are listed in Table 4.1-10. The community includes schools, churches, parks, and the state capital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 258.

Stanley County

The existing DM&E rail line in Ft. Pierre trends from north to south through the center of town. The rail line passes through approximately 23,500 feet of the major concentration of Ft. Pierre, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Ft. Pierre was 1,854. The public grade crossings and ADTs are listed in Table 4.1-10. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 96.

The existing DM&E rail line trends generally northeast to southwest through the center of the small community of Wendte in Stanley County. The rail line passes through approximately 600 feet of Wendte. There are not rail loading facilities in this community. This is a very small community and population information was not available. Noise sensitive receptors within the 65 dBA L_{dn} contour in Wendte number 2.

Haakon County

The existing DM&E rail line in Midland trends from east to west along the south side of the town. The rail line passes through approximately 5,000 feet of the major concentration of Midland, passing through a commercial area. There are rail loading facilities in the community. The 1990 population of Midland was 233. The public grade crossing in the community is Highway 63 with an ADT of 280. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 25.

The existing DM&E rail line in Nowlin trends from east to west along the south edge of this community. The rail line passes through approximately 1,100 feet of this populated place. There are no rail loading facilities in the community. Nowlin is a very small populated place and population information was not available. Nowlin has no public grade crossings, and no noise sensitive receptors in the 65 dBA L_{dn} contour.

The existing DM&E rail line in Powell trends from northeast to southwest along the north side of town. There are no rail loading facilities in the community. The 1990 population of Powell was 37. Powell has no public grade crossings, and no noise sensitive receptors in the 65 dBA L_{dn} contour.

The existing DM&E rail line in Philip trends from northeast to southwest through the south part of town. The rail line passes through approximately 4,600 feet of the major concentration of Philip, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Philip was 1,077. The public grade crossing in the community is Highway 73 with an ADT of 615. The community includes schools, churches, parks, and a hospital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 28.

Jackson County

The existing DM&E rail line in Cottonwood trends from east to west through the south part of the town. The rail line passes through approximately 400 feet of the major concentration of Cottonwood. There are no rail loading facilities in the community. The 1990 population of Cottonwood was 12. The public grade crossing in the community is Highway 14 with an ADT of 1,020. Noise sensitive receptors in the 65 dBA L_{dn} contour number 4.

Pennington County

The existing DM&E rail line in Quinn trends from southeast to northwest along the south part of town. The rail line passes through approximately 3,200 feet of the major concentration of Quinn. There are rail loading facilities in the community. The 1990 population of Quinn was 72. Noise sensitive receptors in the 65 dBA L_{dn} contour number 8.

The existing DM&E rail line in Wall trends from northeast to southwest through the eastern part of town. The rail line passes through approximately 3,200 feet of the major concentration of Wall. There are rail loading facilities in the community. The 1990 population of Wall was 834. The public grade crossings in the community are 4th Street and Business Loop East. The ADTs of these crossings are 1,658 and 1,550, respectively. Noise sensitive receptors in the 65 dBA L_{dn} contour number 13.

The existing DM&E rail line in Wasta trends from northeast to southwest through the eastern part of town. The rail line passes through approximately 2,200 feet of the major concentration of Wasta. There are rail loading facilities in the community. The 1990 population of Wasta was 82. There are no public grade crossings in Wasta. Noise sensitive receptors in the 65 dBA L_{dn} contour number 16.

The existing rail line in Owanka trends east to west through the southern part of town. Population information for Owanka was not available. Owanka Road is the only public grade crossing in the community. The ADT for Owanka Road is 100. Noise sensitive receptors in the 65 dBA L_{dn} contour number 3.

The existing rail line in New Underwood trends east to west through the southern part of town. The 1990 population of New Underwood was 565. Underwood South is the only public grade crossing in the community. Underwood South has an ADT of 100. Noise sensitive receptors in the 65 dBA L_{dn} contour number 10.

The existing rail line in Box Elder trends east to west through the center of town. The 1990 population of Box Elder was 2,680. There are 4 public grade crossings in the community. These include Spruce Drive, Cottonwood Drive, Cedar Street, and Cobler Road. The ADTs for all of these crossings are 100. Noise sensitive receptors in the 65 dBA L_{dn} contour number 18.

The existing rail line in Rapid City trends northeast to southwest into the city and then trends northwest to southeast leaving the city. The 1990 population of Rapid City was 54,523. Public grade crossings and their ADTs are listed in Table 4.1-10. Noise sensitive receptors in the 65 dBA L_{dn} contour number 205.

The existing rail line in War Bonnett trends northwest to southeast through town. Population information was not available for War Bonnett. There are no public grade crossings in the community. Noise sensitive receptors in the 65 dBA L_{dn} contour number 8.

The existing rail line in Ajax trends northeast to southwest through town. Population information was not available for Ajax. Daughenbaugh Road is the only public grade crossing in

the community. The ADT for Daughenbaugh Road is 100. Noise sensitive receptors in the 65 dBA L_{dn} contour number 1.

Custer County

The existing rail line in Hermosa trends northeast to southwest on the east side of town. The 1990 population of Hermosa was 242. U.S. Highway 40 and Vilas Road are the only public grade crossings in the community. The ADTs for these crossings are 2,122, and 40 respectively. Noise sensitive receptors in the 65 dBA L_{dn} contour number 10.

The existing rail line in Fairburn trends northeast to southwest in the northern part of town. The 1990 population of Fairburn was 65. There are no public grade crossings in the community. Noise sensitive receptors in the 65 dBA L_{dn} contour number 2.

The existing rail line in Buffalo Gap trends north to south through the eastern part of town. The 1990 population of Buffalo Gap was 173. The only public grade crossing in the community is County Road (CR) 656. Noise sensitive receptors in the 65 dBA L_{dn} contour number 11.

Fall River County

The existing rail line in Oral trends north to south through the eastern part of town. The 1990 population of Oral was 25. CR 2 is the only public grade crossing in the community. This crossing has an ADT of 100. Noise sensitive receptors in the 65 dBA L_{dn} contour number 12.

The existing rail line in Smithwick trends north to south on the west side of town. The 1990 population of Smithwick was 15. CR 1 is the only public grade crossing in the community. This crossing has an ADT of 100. Noise sensitive receptors in the 65 dBA L_{dn} contour number 4.

The existing rail line through Heppner trends northeast to southwest through the community. Population information was not available for Heppner. There are no public grade crossings. Noise sensitive receptors in the 65 dBA L_{dn} contour number 1.

The proposed rail line in Edgemont trends southeast to northwest along the northeast side of the city. The 1990 population of Edgemont was 908. The public grade crossings in the community are County Highway 6E, Old U.S. Highway 18 and Old U.S. Highway 18. No ADT information is available for these crossings. Burlington Northern Santa Fe Railway (BNSF) currently owns and operates trackage through Edgemont.

Table 4.1-9
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors-65 dBA L_{dn}

County and Communites	Wayside	Wayside/horn	Horn	Total
Brookings	**0**	**107**	**949**	**1,056**
Elkton	0	0	71	71
Aurora	0	6	109	115
Brookings	0	100	636	736
Volga	0	0	99	99
RURAL	0	1	34	35
Kingsbury	**0**	**0**	**395**	**395**
Arlington	0	0	93	93
Hetland	0	0	23	23
Lake Preston	0	0	94	94
De Smet	0	0	138	138
Manchester	0	0	19	19
Iroquois	0	0	19	20
RURAL	0	0	9	8
Beadle	**0**	**1**	**229**	**230**
Iroquois	0	0	20	20
Cavour	0	0	20	20
Morningside	0	0	0	0
Huron	0	1	112	113
Wolsey	0	0	38	38
Wessington	0	0	29	29
RURAL	0	0	10	10
Hand	**0**	**3**	**105**	**108**
Wessington	0	0	1	1
Vayland	0	0	4	4
St. Lawrence	0	1	15	16
Miller	0	2	73	75
Ree Heights	0	0	9	9
RURAL	0	0	3	3
Hyde	**0**	**0**	**26**	**26**
Highmore	0	0	24	24
Holabird	0	0	0	0
RURAL	0	0	2	2

Table 4.1-9
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors-65 dBA L_{dn}

County and Communites	Wayside	Wayside/horn	Horn	Total
Hughes	**0**	**0**	**308**	**308**
Harrold	0	0	26	26
Blunt	0	0	15	15
Canning	0	0	7	7
Alto	0	0	0	0
Pierre	0	0	258	258
RURAL	0	0	2	2
Stanley	**0**	**0**	**105**	**105**
Ft. Pierre	0	0	96	96
Wendte	0	0	2	2
RURAL	0	0	7	7
Jones	**0**	**0**	**0**	**0**
Capa	0	0	0	0
RURAL	0	0	0	0
Haakon	**0**	**0**	**53**	**53**
Midland	0	0	25	25
Nowlin	0	0	0	0
Powell	0	0	0	0
Philip	0	0	28	28
Jackson	**0**	**1**	**3**	**4**
Cottonwood	0	1	3	4
Pennington	**0**	**4**	**272**	**276**
Quinn	0	1	8	8
Wall	0	1	12	13
Wasta	0	2	14	16
Owanka	0	0	3	3
New Underwood	0	0	10	10
Box Elder	0	0	19	19
Rapid City	0	0	205	205
War Bonnett	0	0	0	0
Ajax	0	0	1	1
RURAL	0	0	0	0

Table 4.1-9
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors-65 dBA L_{dn}

County and Communites	Wayside	Wayside/horn	Horn	Total
Custer	**0**	**1**	**22**	**23**
Hermosa	0	1	9	10
Fairburn	0	0	2	2
Buffalo Gap	0	0	11	11
Fall River	**0**	**1**	**15**	**16**
Oral	0	1	11	12
Smithwick	0	0	4	4

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Brookings	Elkton	southeast to northwest in the northern part of town	602	Elk Street North Buffalo Street Cornell Avenue/CR 33 SD Highway 13	1,400 250 300 505	71
	Aurora	southeast to northwest through the center of town	619	Hull Avenue Broadway Avenue/476 Avenue	32 322	115
	Brookings	southeast to northwest through the south part of town	16,270	22nd Avenue 17th Avenue Medary Avenue Main Avenue Western Avenue 6th Street West 16th Avenue West	12,703 3,025 6,440 7,988 2,630 206 68	736
	Volga	east to west on the north edge of town	1,263	Caspian Hansina Street Kasan Street Samara Street	46 375 1,000 800	99

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Kingsbury	Arlington	southeast to northwest	908	U.S. Highway 81 Main Street North 3rd Street North 4th Street	1,350 630 300 430	93
	Hetland	east to west through the center of town	53	449th Avenue/Main Street	118	23
	Lake Preston	east to west on the north side of town	663	Park Avenue Lake Avenue Main Street Preston Avenue	408 89 2,496 86	94
	De Smet	east to west through the northern part of town	1,172	Lyle Avenue Calumet Avenue Highway 25 Sherwood Harvey Dunn	115 390 1,966 186 130	138
	Manchester	east to west on the north side of town	136	none		19
Kingsbury/ Beadle	Iroquois	east to west through the center of town	328	Ottawa Street Quapaw Street 418th Avenue/Sioux Street	63 230 157	40

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Beadle	Cavour	east to west through the center of town	116	409th Avenue 408th Avenue	188 15	20
	Huron	east to west through the north part of town	12,448	Custer Avenue Simons Avenue Dakota Avenue Lincoln Avenue U.S. Highway 14 West Park Avenue	45 545 11,030 5,290 2,137 125	113
	Wolsey	southeast to northwest through the north part of town	442	Commercial Avenue/Highway 281/Highway 14 387th Avenue	270 200	38
Beadle/ Hand	Wessington	southeast to northwest through the center of town	265	Wessington Street 374th Avenue	952 464	29
Hyde	Vayland	southeast to northwest along the northeast side of this community	Not available	none		4
	St. Lawrence	east to west through the south part of town	223	Maple Street Commercial Avenue	164 166	16

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Hand	Miller	east to west through the south part of town	1,678	3rd Street Broadway/Highway 47 3rd Avenue West	400 2,505 204	75
	Ree Heights	east to west through the northern part of town	91	Dakota Avenue Lincoln Avenue	508 5	9
Hughes	Harrold	east to west through the northern part of town	167	Wyman Avenue 321st Avenue	300 151	26
	Blunt	northeast to the south along the southwestern side of town	342	309th Avenue Canning Road	9 153	15
	Canning	northeast to southwest through the center of the community	Not available	none		7
	Alto	east to west through the south part of town	83	none		none
	Pierre	southeast to northwest through the southern part of town	12,906	Lowell Road Industrial Harrison Monroe Highway 14/34 Ree Street Highland Avenue Central Street Poplar	213 3,798 100 1,560 19,755 1,020 6,045 6,365 1,149	258

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Stanley	Ft. Pierre	north to south through the center of town	1,854	Highway 14/34 Stanley Road Seventh Avenue Fifth Avenue Second Avenue Main Avenue Park	3,500 50 392 211 756 3,136 406	96
	Wendte	northeast to southwest through the center of the community	Not available	none		2
Haakon	Midland	east to west along the south side of the town	233	Highway 63	280	25
	Nowlin	east to west along the south edge of the community	Not available	none		none
	Powell	northeast to southwest along the north side of town	37	none		none
	Philip	northeast to southwest through the south part of town	1,077	Highway 73	615	28
Jackson	Cottonwood	east to west through the south part of town	12	Highway 14	1,020	4
Pennington	Quinn	southeast to northwest along the south part of town	72	none		8
	Wall	northeast to southwest through the eastern part of town	834	4th Street Business Loop East	1,658 1,550	13
	Wasta	northeast to southwest through the eastern part of town	82	none		16
	Owanka	east to west through southern part of town	N/A	Owanka Road	100	3

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Pennington	New Underwood	east to west through the southern part of town	565	Garrett Road	100	10
	Box Elder	east to west through the center of town	2,680	Spruce Drive Cottonwood Drive Cedar Street Cobler Road	100 100 100 100	18
	Rapid City	northeast to southwest into the city, then northwest to southeast out of city.	54,523	Elgin Street I-16t Century Road North Lacrosse Road Milwaukee Street Maple Avenue East Boulevard, North New York Street Omaha Street 2nd Street 1st Street East Boulevard Maple Avenue Steele Avenue East St. Charles Street East St. Patrick Street	100 100 100 100 100 1,493 100 956 2,600 2,272 4,880 16,500 7,891 516 392 12,734	205
	War Bonnett	northwest to southeast through town	not available	none	n/a	8
	Ajax	northeast to southwest through town	not available	Daughenbaugh Road	100	1

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Custer	Hermosa	northeast to southwest through t0wn	242	U.S. Highway 40 Vilas Road	2,122 40	10
	Fairburn	northeast to southwest in the northern part of town	65	none	n/a	2
	Buffalo Gap	north to south through the eastern part of town	173	County Road 656	65	11
Fall River	Oral	north to south through the eastern part of town	25	County Road 2	100	12
	Smithwick	north to south through the western part of town	15	County Road 1	100	4
	Heppner	northeast to southwest through town	not available	none	n/a	1

[1]Noise sensitive receptors in the 65 dBA L_{dn} contour

4.1.8 BIOLOGICAL RESOURCES

4.1.8.1 Vegetation

The project area of South Dakota is located in the Great Plains Prairie Ecological Region. Most of the project area is dominated by a mixed short and tall grass prairie. However, pockets of short grass prairie are found in eastern South Dakota. The extreme eastern part of the project area is located within the historic range of the tallgrass prairie. Containing some of the most fertile soils in the world, the tallgrass prairie has been heavily converted to agriculture. This has resulted in the loss of native prairie vegetation in many of the eastern South Dakota counties.

From the Missouri River west, in areas where large scale grazing occurs, the grasslands are composed predomimately of short grass species. In areas where land management does not include grazing, medium tall grasses tend to be dominate. These grasses can be found on hilly, medium-textured soils. Wheat (*Elymus smithii*) and needle grass (*Stipa viridula*) are the major cover forming grasses found in this region. Other grass species found in this area include blue grama (*Bouteloua gracilis*), little bluestem *(Andropogon scoparium)*, buffalo grass (*Buchloe dactyloides*) and side-oats grama (*Boutelova curtipendula*). This mixture of short-and mid-grasses makes for a diverse forb community. Some common forbs found in this prairie include pasque flower (*Anemone patens*), prairie golden aster (*Heterotheca villosa*), dotted blazing star (*Liatris punctata*), stiff sunflower (*Helianthus rigidus*), silky aster (*Aster sericeus*), prairie smoke (*Geum triflorum*) and tooth-leaved evening primrose (*Calyophus serrulatus*).

Short grass prairie is dominated by grama and buffalo grass. Forbs found in the short grass prairie include white aster (*Aster ericoides*), beardtongue (*Penstemon* spp.), purple coneflower (*Echinacea angustifolia*), bluebells (*Mertensia* spp.), silver-leaf scurf pea (*Psoralea agrophylla*) and goldenrod (*Solidago* spp.).

In the early 1900's, uncontrolled livestock grazing and drought conditions on mixed- and short-grass prairie contributed to extensive rangeland degradation. Under improper management rangeland can experience a decrail line in native grass species and increased invasion of annuals. Some of the annuals likely to encroach on rangeland due to poor management practices include Russian thistle (*Salsola* spp.), brome (*Bromus* spp.), barley (*Hordeum* spp.) and fescue (*Fetuca* spp.). In addition, weeds such as snakeweed (*Gutierrezia* spp.) and prickly pear (*Opuntia* spp.) will increase in overgrazed prairie. Improved range management techniques have helped reverse the trend of degraded rangeland in South Dakota. Today, grazing conditions on rangeland managed by the USFS and BLM are generally good and in a stable and upward trend.

The practice of fire suppression has also altered the grass species composition of the mixed grass prairie; as grama, buffalograss and dropseed (*Sporobolus heterolepis*) have been replaced by species less tolerant of fire such as wheatgrass, bentgrass (*Argrostis* spp.) and brome.

Central South Dakota, the Missouri River to the James River, is a transition zone between the drier western prairie and the normally wetter eastern part of the state. Grasses found in this region can be characterized by a mixture of short and medium-tall grasses. Wheat grass, little bluestem and needle grass are the dominate grass species found in this geographic area. Other grass species found in this region include porcupine grass (*Stipa spartea*) and sand dropseed (*Sporobolus cryptandrus*). A diverse forb composition is also found in this zone. Some common forbs found in this region include buffalo-bean or ground plum (*Astragalus crassicarpus*), heartleaved alexanders (*Zizia aptera*), purple prairie clover (*Dalea purpurea*), hoary puccon (*Lithospermum canescens*) and prairie larkspur (*Delphinium virescens*).

The eastern part of South Dakota generally receives more moisture, thus tallgrass prairie species are more common. Tallgrass prairie soil is characterized by a rich, dark layer. Grass species that dominate this plant community include big bluestem (*Andropogon gerardii*) and little bluestem, Indian grass (*Sorghastrum nutans*) and switch grass (*Panicum virgatum*). Some common forb species found in this plant community include purple prairie clover, ground plum, smooth rattlesnake root (*Prenanthes racemosa*), purple coneflower, prairie bird-foot violet (*Viola pedatifida*) and prairie larkspur.

Riparian shrub and forest areas occur along floodplains of larger rivers within the South Dakota project area. Native tree and shrub species that occur in these forests include plains cottonwood (*Populus deltoides*), peachleaf willow (*Salix amygdaloides*), sandbar willow (*Salix exigua*), American elm *(Ulmus americana*), American plum (*Prunus americanus*), box elder (*Acer negundo*), common chokecherry (*Prunus virginiana*), green ash (*Fraxinus pennsylvanica*), silver buffaloberry (*Shepherdia argentea*) and western snowberry (*Symphoricarpos occidentalis*). In the western part of the project area, ponderosa pine (*Pinus ponderosa*) and juniper (*Juniperus* spp.) occur in forest habitat. These riparian and forest areas provide habitat for a variety of wildlife species in the project area.

Agriculture and the businesses and industries that support agriculture represent a significant part of the economy in South Dakota. Cultivated crops such as corn, sunflowers, oats, winter wheat, grain sorghum, soybeans, and alfalfa make-up the major crops on agricultural land in the project area. The counties in eastern and central South Dakota produce higher volumes of crops, based on statistics from the South Dakota Department of Agriculture. Western counties in the project area, such as Fall River and Custer, produce lesser amounts of the state's crops. The existing DM&E rail line is adjacent to approximately 303.0 miles of cropland in South Dakota.

Along with crop production, livestock and poultry represent a large portion of the agricultural business in South Dakota. Sections of land in the project area are used for pasture, and holding areas for sheep, cattle, and hogs. Much of the pasture forage is native grasses such as blue gramma grass, western wheatgrass, big sagebrush, needle grasses, June grass as well as many species of forbs. The general conditions of the rangeland in South Dakota is considered good and in an upward trend. This is compared to conditions in the early 1900's where unregulated livestock grazing and drought on range lands had contributed to declining quality of rangeland (PIC Technologies 2000).

4.1.8.2 Wildlife

4.1.8.2.1 Big Game

Mule Deer

Mule deer (*Odocoileus hemionus*) live in a wide variety of prairie, brushland, desert or mountain habitats and may be found in the proposed project area in western and central South Dakota (Stevens 1992b).

White-tailed Deer

White-tailed deer (*Odocoileus virginianus*) are the most common big game animal in North America. White-tailed deer are found in a varaity of habitats including cultivated cropland. They occur throughout South Dakota in the proposed project area (Stevens 1992b).

Pronghorn Antelope

Pronghorn antelope (*Antilocapra americana*) are mainly forb and browse eaters, feeding especially on sagebrush and may be found in the proposed project area in suitable habitat west of the Missouri River (Stevens 1992b).

Wild Turkey

Wild turkeys (*Meleagris gallopavo*) are considered a big game animal in South Dakota. Turkeys prefer wooded habitat with scattered openings. They are found in the south central and and western portions of South Dakota. Wild turkey are hunted in the spring and fall.

4.1.8.2.2 Game Species

Upland Birds

Upland game birds common to South Dakota include: ring-necked pheasant (*Phasianus colchicus*), gray partridge (*Perdix perdix*), sharp-tailed grouse (*Tympanuchus phasianellus*), Greater Prairie-Chicken (Tympanuchus cupido), and mourning dove (*Zenaida macroura*). Ringed-necked pheasant are also found throughout South Dakota. Gray partridges seem to prefer farmed prairies and are found throughout much of South Dakota. Sharp-tailed grouse occur in grasslands with brush or sagebrush, open woodland, cutover areas with low brush, or immature forests and are found throughout South Dakota except for the southeastern corner of the state. In South Dakota, sharp-tailed grouse and prairie chickens are hunted together without distinction between the two species. Mourning doves occur in residential and rural areas and are found throughout South Dakota (Stevens 1992a). The sage prairie in parts of extreme west South Dakota is the eastern limit of several western species, including the sage grouse (Ashton & Dowd).

Waterfowl

The Central Flyway covers southeastern and central South Dakota. In the fall, migrating waterfowl travel across South Dakota to reach suitable wintering grounds. When spring arrives these birds start the same journey back north to their respective breeding grounds. Some common species found using the Central Flyway include: mallards (*Anas platyrhynchus*), Northern pintails (*Anas acuta*), Northern shovelers (*Anas clypeata*), gadwalls (*Anas strepera*), American wigeons (*Anas americana*), blue-winged teals (*Anas discors*), green-winged teal (*Anas crecca*), canvasbacks (*Aythya valis ineria*), redheads (*Aythya americana*), buffleheads (*Bucephala albeola*), common goldeneyes (*Bucephala clangula*), ruddy ducks (*Oxyura jamaicensis*), hooded mergansers (*Lophodytes cucullatus*), common mergansers (*mergus merganser*), trumpeter swans (*Cygnus buccinator*), tundra swans (*Cygnus columbianus*) and Canada geese (*Branta canadensis*) (Braaten 1993). Waterfowl use seasonal and permanent wetlands, streams, ponds and rivers throughout the project area for rearing young, breeding, resting, feeding and roosting. During migrations, they may utilize the forage provided in agricultural fields. Vegetated wetlands and upland grasslands, pastures and agricultural fields are used in the spring for nesting.

Small Game and Furbearers

Cottontail rabbit (*Sylvilagus floridanus*), blacktail jackrabbit (*Lepus californicus*), Eastern fox squirrel (*Sciurus niger*), thirteen-rail lined ground squirrel (*Citellus tridecemrail lineatus*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethica*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), red fox (*Vulpes fulva*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon loter*), badger (*Taxidra taxus*), mink (*Mustela vison*), long-tailed weasel (*Mustela frenata*), short-tailed weasel (*Mustela erminea*) and least weasel (*Mustela rixosa*) are some of the small game and furbearers found in the project area. The cottontail is usually found in suburban areas. Jackrabbits are found in pastures and croplands. Fox squirrels prefer small forest habitats, gray squirrels prefer mature, dense forests and ground squirrels prefer prairie habitats. Beaver and muskrat are found along waterways and in a variety of wetland habitats. Bobcats occur in a variety of habitat types, from forest to desert. Coyote are extremely adaptable and can be found in both rural and suburban areas. Red fox prefer rolling farmlands; grey fox prefer small wooded areas with brush understories and rock outcrops. Raccoon are found in areas where they have ready access to fresh- or salt-water. Badgers are distributed in treeless habitats across the western and northcentral United States. Mink use a variety of wetland habitats, including streams, lakes and marshes. Weasels seem to prefer boreal habitats that may include agricultural land, woodlands, and meadows (McCabe & Williamson 1995).

The mountain lion (*Felis concolor*) is a state threatened species that is found in sparsely populated areas of the Black Hills and western South Dakota. Mountain lion habitat varies from pine forest to rocky badlands. Mountain lions are most abundant in areas where deer populations are plentiful, but their numbers are not high even in these areas. In South Dakota, populations estimates of mountain lions range from 15 to 25 in the Black Hills, and 15 to 25 on the West River Prairie.

The river otter (*Lutra canadensis*) is state threatened and is found in rivers, ponds, lakes and unpolluted waters in wooded areas. Key habitat components are riparian vegetation, temporary den and resting sites and adequate food. In South Dakota, it has been reported from Hughes County along the Missouri River (Ashton & Dowd 1994).

The Swift Fox (*Vulpes velox*) is state threatened and is a candidate for Federal listing. This fox inhabits open prairies, plains and shrubby desert areas away from extensively cultivated land. In South Dakota, swift fox prefer short- to mid-grass prairies. Swift fox have been reported from Stanley and Haakon counties in the proposed project area (Ashton & Dowd 1994). Swift fox are discussed in more detail in Section 4.1.8.4 in the Biological Assessment, Appendix K.

4.1.8.2.3 Non-game Species

Amphibians

South Dakota has few amphibians. The eastern tiger salamander (*Ambystoma tigrinum*) occurs in the eastern corner of the state. The blotched tiger salamander (*Ambystoma tigrinum melanostictum*) occurs in western and central South Dakota. The Western chorus frog (*Pseudacris triseriata*), boreal chorus frog (*Pseudacris triseriata maculata*) and the Northern leopard frog (*Rana pipiens*) may also occur in the proposed project area. Amphibians are generally found associated with wetlands throughout the project area.

Reptiles

The following species of snakes may be found in the proposed project area and are protected in South Dakota or of special concern: the rail lined snake (*Tropidoclonion rail lineatum rail lineatum*) is state endangered, the eastern hognose snake (*Heterodon platyrhinos*) is state threatened, and the red milk (*Lampropeltis triangulum syspila*) and northern redbelly snakes (*Storeria occipitomaculata occipitomaculata*) are species of special concern. Plains garter snake (*Thamnophis radix haydeni*) and common garter snake (*Thamnophis sirtalis*) are found throughout South Dakota in open grassland areas near wetlands. The pale milk snake (*Lampropeltis triangulum multistrata*) is found in the counties adjacent to and west of the Missouri River in open prairies, sand dunes and rocky hillsides near water sources. The redbelly snake (*Storeria occipitomaculata*) is found in extreme eastern South Dakota in the proposed project area in woodland areas and moist grassy meadows. The plains hognose snake (*Heterodon nasicus nasicus*) is found statewide in prairies with sand or gravel and floodplains. The racer (*Coluber constrictor flaviventris*) is found in the counties adjacent to the Missouri River in central South Dakota and all counties in western South Dakota in open grassland, pasture and prairie areas. The bullsnake (*Pituophis melanoleucus sayi*) is found in counties in the western two-thirds of South Dakota in open grasslands. The prairie rattlesnake (*Crotalus viridis viridis*) is found in counties along the eastern side of the Missouri River and all counties in western South Dakota in open prairies, haylands and even croplands.

The Western spiny softshell turtle (*Trionyx spinifer harwegi*) , a state threatened species, is found on mud flats, sandbars and soft, sandy or muddy bottoms with some aquatic vegetation in lakes, reservoirs, fast-flowing rivers, ponds along rivers, and intermittent streams. There are records from Lyman County in the proposed project area (Ashton & Dowd 1994). The false map turtle (*Graptemys pseudogeographica pseudogeographica*) is state threatened and inhabits slow-moving rivers, river sloughs, oxbow lakes, lakes and reservoirs containing abundant aquatic vegetation and basking sites. The turtle may be found in the Missouri River Drainages. South

Dakota is on the northwestern edge of its range, with reports from Hughes County in the proposed project area (Ashton & Dowd 1994).

Songbirds

Since most of South Dakota is in the northern Great Plains, grassland birds are predominant and conspicuous across the state. The most conspicuous species in dry grasslands is the Western meadowlark which breeds in every county of the state. Other widely distributed nesting species throughout the state include the killdeer (*charadrius vociferus*), common nighthawk (*Chordeiles minor*), horned lark (*Eremophila alpestris*), dickcissel (*Spiza americana*), vesper sparrow (*Pooecetes gramineus*), lark sparrow (*Chondestes grammacus*), lark bunting (*Calamospiza melanocorys*), grasshopper sparrow (*Ammodramus savannarum*) and chestnut-collared longspur (*Calcarius ornatus*).

Where trees occur, either naturally in stream bottoms or in planted shelterbelts, the northern flicker (*Colaptes auratus*), Western (*Tyrannus verticalis*) and Eastern kingbirds (*Tyrannus tyrannus*), American crow (*Corvus brachyrhynchos*), black-capped chickadee (*Parus atricapillus*), American robin (*Turdus migratorius*), gray catbird (*Dumetella carorail linensis*), brown thrasher (*Toxostoma rufrum*), yellow warbler (*Dendroica petechis*), American redstart (*Setophaga ruticilla*), rufous-sided towhee (*Pipilo erythrophthalmus*), common grackle (*Quiscalus quiscula*) and orchard oriole (*Icterus spurius*) may be found. Some deciduous forest species that reach their western limit in the eastern part of South Dakota include the American woodcock (*Scolopax minor*), ruby-throated hummingbird (*Archilochus colubris*), yellow-bellied sapsucker (*Sphyrapicus varius*) and yellow-throated vireo (*Vireo flavifrons*). Important nesting species in more urban habitats include the chimney swift (*chaetura pelagica*), red-headed woodpecker (*Melanerpes erythrocephalus*), downy woodpecker (*Picoides pubescens*), Northern flicker (*Colaptes auratus*), purple martin (*Progne subis*) (mostly east of the Missouri River), blue jay (*cyanocitta cristata*), American robin (*Turdus migratorius*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), Northern oriole (*Icterus spurius*), common grackle (*Quiscalus quiscula*), Northern cardinal (*Cardinalis cardinalis*) (east of the Missouri River) and American goldfinch (*Carduelis tristis*). The chalk cliffs on the lower reach of the Missouri River provide nesting sites for the cliff swallow.

A small number of eastern deciduous forest species whose breeding range does not reach South Dakota may also appear as migrants or casual visitors in the east. These include Baird's sparrow which is listed as rare in the state and prefers extensive idle or lightly-grazed mixed grass prairie, wet meadow or tall grass prairie, with abundant nesting cover. It has been reported from Stanley County (Ashton & Dowd1991).

Shorebirds

Shorebirds common to South Dakota include the American avocet *(Recurvirostra americana),* killdeer *(Charadrius vociferus),* marbled godwit *(Limosa fedosa*), longbilled curlew (*Numenius americanus*), willit (*Catoptrophorus semipalmatus*), spotted sandpiper (*Actitis macularia*), upland sandpiper (*Bartramia longicauda*) and Wilson's phalarope (*Phalaropus tricolor*).

The most notable shorebird in South Dakota is the whooping crane (*Grus americana*). The whooping crane is both Federally and state endangered. In South Dakota, the whooping crane is a predictable spring and fall migrant in the Missouri River drainage and in western South Dakota, with only occasional sightings in the eastern part of the state. Whooping cranes are discussed in Section 4.1.8.4 and in the Biological Assessment, Appendix K.

The interior least tern (*Sterna antillarum*) is Federally and state endangered. Piping plovers (*Charadrius melodus*) are Federally and state threatened. The birds are found in the same type of habitat as interior least terns. Interior least terns and piping plovers are discussed in more detail in Section 4.1.8.4 and in the Biological Assessment, Appendix K.

Large bodies of water have been formed by four dams on the Missouri River and have inundated trees, which provide nesting sites for the double-crested cormorant (*Phalacrocorax auritus*) and great blue heron (*Ardea herodias*).

Small Mammals

Small mammals that may occur in the project area include the big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasioncyceteris noctivagens*), little brown myotis (*Myotis lucifuga*), masked shrew (*Sorex cinereus*), short-tailed shrew (*blarina brevicauda*), least shrew (*Cryptotis parva*), deer mouse (*Permomyscus maniculatus*), hispid pocket mouse (*perognathus hispidus*), plains pocket mouse (*Perognathus flavescens*), olive-backed pocket mouse (*Perognathus fasciatus*), thirteen-rail lined ground squirrel (*Spermophilus tridecemrail lineatus*), Franklins's ground squirrel (*Spermophilus franklinii*) and meadow vole (*Miscrotus pennsylvanicus*).

Raptors

The bald eagle (*Haliaeetus albicilla*) is almost always found near water, primarily along river systems, large lakes, reservoirs and coastal areas. The reservoir system on the Missouri River provides large water areas that support large populations of wintering bald eagles. Bald eagles may be found overwintering in the lakes region of northeastern South Dakota and along

the Missouri River, in the Pierre-Fort Pierre/Oahe Dam Area, the Karl Mundt National Wildlife Refuge/Fort Randall Dam Area and portions of the Missouri National Recreational River. The bald eagle is currently listed as Federally threatened and state endangered and is discussed in more detail in Section 4.1.8.4 and the Biological Assessment, Appendix K.

The osprey (*Pandion haliaetus*) is a state threatened bird which inhabitats lakes, large rivers and coastal bays. It feeds on fish and nests at the tops of large living or dead trees, on cliffs, on utility poles or on other tall manmade structures. In South Dakota, it is a historical nester in the southeastern part of the state and an uncommon migrant (Ashton & Dowd 1994).

Where trees occur, either naturally in stream bottoms or in planted shelterbelts, the Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*) and great horned owl (*bubo virginianus*) may be found. The ferruginous hawk (*Buteo regalis*), a ground nesting hawk that prefers dry, open grassland, is widespread west of the Missouri River. A raptor survey on the existing DM&E rail line was completed in April 1999. The results of this survey are provided in Table 4.1-11.

State Listed Wildlife

Table 4.1-12 lists reptiles, mammals, and birds considered by the state to be rare, threatened, or endangered species in the proposed project areas in South Dakota.

Table 4.1-11
Raptor Nests within 0.5-mile of the DM&E Rail Line-South Dakota

Species [2]	1999 Status	County	Legal Location TWP RNG Sec 1/4 1/4 1/4	Coordinate Location Latitude	Longitude	Nest Substrate	Surrounding Habitat	Topographic Quad
RT	active	Brookings	109N 48W 12 SE SW SW	44° 15.31'	96° 32.59'	tree	agriculture-woodlot	White SE
BU	inactive	Brookings	110N 49W 35 NW SE SE	44° 17.03'	96° 40.21'	tree	agriculture-woodrow	Aurora
BU	inactive	Brookings	110N 49W 32 SW SW NW	44° 17.42'	96° 44.80'	tree	riparian-woodrow	Aurora
BU	inactive	Brookings	110N 52W 11 NW SW SW	44° 20.59'	97° 02.73'	tree	agriculture-woodlot	Lake Sinai
SW	occupied	Kingsbury	111N 53W 27 NW SW SW	44° 23.20'	97° 11.25'	tree	agriculture-woodlot	Badger
RT	active	Kingsbury	111N 55W 32 SW SW Sw	44° 22.23'	97° 28.26'	tree	agriculture-woodlot	Lake Preston West
RT	active	Kingsbury	111N 55W 32 SE NW NE	44° 22.80'	97° 27.48'	tree	willow-wetland	Erwin
RT	active	Kingsbury	111N 56W 29 NE SW SE	44° 23.15'	97° 35.27'	tree	cottonwood-wetland	De Smet
RT	active	Kingsbury	111N 57W 25 NE SW SE	44° 23.11'	97° 37.05'	tree	agriculture-woodrow	De Smet
SW	occupied	Kingsbury	111N 57W 33 SE SW SE	44° 22.13'	97° 40.71'	tree	agriculture	Manchester
BU	inactive	Beadle	110N 61W 05 SE NE SW	44° 21.60'	98° 11.21'	tree	agriculture-woodrow	Huron
RT	active	Beadle	111N 62W 32 NE SE NW	44° 22.84'	98° 18.41'	tree	wetland	Broadland
SW	occupied	Beadle	111N 64W 07 SW NE SE	44° 25.93'	98° 33.78'	tree	agriculture-woodlot	Wessington NE
RT	active	Beadle	111N 65W 14 SE NE NW	44° 25.57'	98° 36.58'	tree	cottonwood-wetland	Wessington NE
SW	occupied	Hand	112N 67W 14 NW SW NW	44° 30.69'	98° 51.75'	tree	willow-riparian	Miller SE
RT	active	Hand	112N 67W 10 SE NW SE	44° 31.23'	98° 52.13'	tree	cottonwood-riparian	Miller SE

Table 4.1-11
Raptor Nests within 0.5-mile of the DM&E Rail Line-South Dakota

Species [2]	1999 Status	County	Legal Location TWP RNG Sec 1/4 1/4 1/4	Coordinate Location Latitude	Longitude	Nest Substrate	Surrounding Habitat	Topographic Quad
BU	inactive	Hand	112N 67W 10 SW NE SE	44° 31.28'	98° 51.95	tree	cottonwood-riparian	Miller SE
BU	unknown	Hand	112N 68W 13 SE NE NW	44° 30.74'	98° 57.23'	tree	riparian woodland	Miller
BU	active	Hand	112N 68W 13 NW NE NW	44° 30.87'	98° 57.43'	tree	agriculture-woodrow	Miller
BU	inactive	Hand	112N 68W 15 NW NW SE	44° 30.46'	98° 59.59'	tree	cottonwood-riparian	Miller
BU	inactive	Hyde	112N 71W 09 NW SW SW	44° 31.01'	99° 22.86'	tree	agriculture-woodrow	Highmore
RT	active	Hughes	112N 75W 08 SE NW SW	44° 31.08'	99° 52.90'	tree	cottonwood-riparian	Blunt
RT	active	Hughes	112N 76W 02 NW SE SW	44° 31.81'	99° 56.15'	tree	cottonwood-riparian	Blunt
BU	inactive	Hughes	112N 76W 02 NE SE SW	44° 31.74'	99° 56.17'	tree	cottonwood-riparian	Blunt
BU	inactive	Hughes	112N 76W 02 SE SE SW	44° 31.65'	99° 56.21'	tree	cottonwood-riparian	Blunt
BU	inactive	Hughes	112N 76W 02 NW SW SW	44° 31.75'	99° 56.70'	tree	cottonwood-riparian	Blunt

Table 4.1-11
Raptor Nests within 0.5-mile of the DM&E Rail Line - South Dakota

Species[1]	1999 Status	County	Legal Location Twp Rng Sec ¼ ¼ ¼	Coordinate Location Latitude Longitude	Nest Substrate	Surrounding Habitat	Topographic Quad
RT	active	Hughes	112N 76W 20 NE SW NE	44° 29.62' 99° 59.69'	tree	deciduous riparian	Blunt
GHO	active	Hughes	111N 76W 05 SW NE SE	44° 26.70' 100° 59.42'	tree	grassland	Blunt
BU	inactive	Hughes	111N 76W 18 NE NE NE	44° 25.44' 100° 00.55'	tree	deciduous riparian	Canning
RT	active	Hughes	111N 77W 26 SW NW NE	44° 23.60' 100° 03.30'	tree	grassland	Canning
BU	inactive	Stanley	3N 29E 01 NE NE NW	44° 15.30' 100° 34.70'	tree	cottonwood-riparian	Teton
BU	inactive	Stanley	4N 30E 32 NW NW SW	44° 15.74' 100° 32.47'	tree	cottonwood-riparian	Teton
BU	inactive	Jones	2N 28E 05 NW SW SE	44° 09.41' 100° 46.44'	tree	cottonwood-riparian	Van Metre
RT	active	Jones	2N 28E 07 SW NW NW	44° 09.04' 100° 48.34'	tree	cottonwood-riparian	Van Metre
BU	inactive	Haakon	1N 24E 12 NE NE SW	44° 03.59' 101° 10.63'	tree	cottonwood-riparian	Midland
RT	active	Haakon	1N 24E 09 SE NW SW	44° 03.28' 101° 14.60'	tree	cottonwood-riparian	Midland
BU	inactive	Haakon	1N 22E 19 SE SE NW	44° 01.93' 101° 31.13'	tree	cottonwood-riparian	Phillip SE
RT	active	Haakon	1N 21E 14 NE SW SE	44° 02.46' 101° 33.26'	tree	cottonwood-riparian	Phillip SE
RT	active	Pennington	1S 17E 10 SE SW NW	43° 58.46' 102° 04.47'	tree	cottonwood-riparian	Wall NE
RT	active	Pennington	1N 15E 20 NE SE SW	44° 01.51' 102° 20.28 '	tree	cottonwood-riparian	Wasta SE
RT	active	Pennington	1N 14E 20 NE SW SW	44° 01.62' 102° 27.77'	tree	cottonwood-riparian	Wasta
RT	active	Pennington	1N 14E 10 SW NE SW	44° 02.57' 102° 26.54'	tree	cottonwood-riparian	Wasta
RT	active	Pennington	1S 13E 33 SE NW NW	43° 55.61' 102° 34.51'	tree	cottonwood-riparian	Brennan Flat
RT	active	Custer	3S 11E 01 NE SE SE	43° 48.75' 102° 44.44'	tree	cottonwood-riparian	Scenic SW
BU	inactive	Custer	6S 9E 16 SE NE SW	43° 31.48' 103° 03.33'	tree	cottonwood-riparian	Fairburn SE
BU	inactive	Custer	5S 10E 06 SW SE NE	43° 38.71' 102° 58.03'	tree	cottonwood-riparian	Red Shirt
BU	inactive	Custer	4S 10E 20 NW NE SE	43° 41.17' 102° 56.53'	tree	cottonwood-riparian	Red Shirt
RT	active	Custer	4S 10E 27 NW SW NW	43° 40.51' 102° 55.17'	tree	cottonwood-riparian	Red Shirt
BU	inactive	Custer	3S 11E 16 MW ME SW	43° 47.27' 102° 48.76'	tree	cottonwood-riparian	Folsom

Table 4.1-11
Raptor Nests within 0.5-mile of the DM&E Rail Line - South Dakota

Species[1]	1999 Status	County	Legal Location Twp Rng Sec ¼ ¼ ¼	Coordinate Location Latitude Longitude	Nest Substrate	Surrounding Habitat	Topographic Quad
BU	inactive	Custer	3S 10E 28 SE SW NW	43° 45.61' 102° 48.80'	tree	cottonwood-riparian	Folsom
GE	active	Custer	3S 9E 36 NW NW NW	43° 45.16' 102° 59.84'	powerpole	grasslands	Caputa SW
GHO	active	Custer	3S 9E 26 SW SE SW	43° 45.26' 103° 00.84'	tree	cottonwood-riparian	Hermosa SE
RT	active	Custer	4S 8E 02 SE NW NW	43° 38.90' 103° 08.41'	tree	cottonwood-riparian	Fairburn
GE	active	Custer	5S 9E 07 SW SW NE	43° 37.74' 103° 05.61'	tree	cottonwood-riparian	Fairburn NE
RT	active	Custer	6S 9E 18 NW NW SW	43° 31.61' 103° 06.19'	tree	cottonwood-riparian	Fairburn SE
RT	active	Custer	5S 8E 14 NW NW SW	43° 31.60' 103° 08.57'	tree	cottonwood-riparian	Fairburn SW
RT	active	Fall River	7S 8E 07 NW SW SE	43° 26.38' 103° 13.40'	tree	cottonwood-riparian	Smithwick NW
RT	active	Fall River	7S 7E 34 SW SE SW	43° 23.43' 103° 16.53'	tree	deciduous woodland	Buffalo Gap
BU	inactive	Fall River	8S 7E 24 SE NW SW	43° 20.25' 103° 14.47'	tree	cottonwood-riparian	Smithwick
GHO	active	Fall River	8S 8E 15 NW SE SW	43° 20.95' 103° 09.44'	tree	grassland-riparian	Smithwick
RT	active	Fall River	9S 8E 19 NE NW NE	43° 15.57' 103° 12.78'	tree	grassland-riparian	Smithwick
GHO	active	Fall River	10S 5E 01 NW NW NE	43° 13.00' 103° 28.34'	tree	grassland-riparian	Lone Well Creek West
RT	active	Fall River	9S 6E 31 NE NE SE	43° 13.40' 103° 29.34'	tree	ponderosa-grassland	Lone Well Creek West
RT	active	Fall River	9S 4E 29 NE SE NW	43° 14.45' 103° 40.32'	tree	cottonwood-riparian	Rumford
RT	active	Fall River	9S 4E 31 NW SE SW	43° 13.19' 103° 41.69'	tree	ponderosa pine	Rumford
RT	active	Fall River	8S 2E 26 SW SW NE	43° 19.61' 103° 50.69'	tree	ponderosa pine	Edgemont
BU	inactive	Fall River	8S 2E 27 NE NE NW	43° 19.97' 103° 51.99'	tree	cottonwood-riparian	Edgemont
RT	active	Fall River	8S 2E 07 NW NW NE	43° 22.54' 103° 54.49'	tree	cottonwood-riparian	Burdock

Notes: [1] - Survey conducted April 22-28, 1998.
[2] - Raptor Species Abbreviations are: RT=red-tailed hawk, SW=Swainson's hawk, BU=unknown buteo (PIC Technologies 2000)

Table 4.1-12
State Rare, Threatened, or Endangered Species
in the Proposed and Existing DM&E Corridors across South Dakota

Common Name	State Rank	Dates Observed	County Name
spiny softshell	S2	1994	Pennington
spiny softshell	S2	1987	Pennington
smooth softshell	S2	1993	Hughes
Western box turtle	S2	1986	Hughes
Western box turtle	S2	1992	Hughes
false map turtle	S3	1997	Hughes
Northern river otter	S2	1979	Hughes
plains spotted skunk	S3	1997	Hughes
plains spotted skunk	S3	1996	Hughes
plains spotted skunk	S3	1993	Hughes
plains spotted skunk	S3	No date given	Pennington
silver-haired bat	S4	1994	Stanley
least shrew	S2	1993	Hughes
least shrew	S2	1992	Hughes
least shrew	S2	1954	Jackson
pygmy shrew	S2	1992	Hughes
pygmy shrew	S2	1972	Brookings
dwarf shrew	S1	1993	Hughes
dwarf shrew	S1	1970	Jackson
Le Conte's sparrow	S1S2B, SZN	1968	Beadle
Henslow's sparrow	SUB, SZN	1969	Hand
Henslow's sparrow	SUB, SZN	1965	Brookings

Table 4.1-12
State Rare, Threatened, or Endangered Species
in the Proposed and Existing DM&E Corridors across South Dakota

Common Name	State Rank	Dates Observed	County Name
black-and-white warbler	S2S3B, SZN	1979	Hughes
Sprague's pipit	S2B, SZN	1973	Stanley
Northern mockingbird	S3B, SZN	1992	Hughes
long-eared owl	S3B, S3N	1996	Stanley
long-eared owl	S3B, S3N	1970	Brookings
barn owl	S2B, SZN	1979	Brookings
barn owl	S2B, SZN	1987	Stanley
barn owl	S2B, SZN	1982	Hughes
ferruginous hawk	S4B, SZN	1984	Hyde
ferruginous hawk	S4B, SZN	1983	Hyde
Swainson's hawk	S4B, SZN	1994	Stanley
broad-winged hawk	S2B, SZN	1966	Hughes
Cooper's hawk	S3B, SZN	1983	Hughes
green-backed heron	S2S3B, SZN	1975	Beadle
great egret	S3B, SZN	1979	Brookings
great blue heron	S4B, SZN	1991	Hughes
great blue heron	S4B, SZN	1991	Pennington

Table 4.1-12
State Rare, Threatened, or Endangered Species
in the Proposed and Existing DM&E Corridors across South Dakota

Common Name	State Rank	Dates Observed	County Name

Ranks:
- S1= critically imperiled because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
- S2= Imperiled because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
- S3= Either very rare and local throughout its range, or found locally (even abundantly at some of its locations) in a restricted range, or vulnerable to extinction throughout its range because of other factors; in the range of 21 of 100 occurrences.
- S4= Apparently secure, though it may be quite rare in parts of its range, especially at the periphery. Cause for long term concern.
- SU= Possibly in peril, but status uncertain, more information needed.
- SH= Historically known, may be rediscovered.
- SZ= No definable occurrences for conservation purposes, usually assigned to migrants.

SDNHDB, 1998

4.1.8.3 Aquatics and Fisheries

The existing DM&E rail line in South Dakota crosses and is in close proximity to several rivers, streams and lakes that provide habitat for a diversity of fish species. Major rivers crossed by the rail line include the Big Sioux River west of Brookings, James River east side of Huron, the Missouri River near Pierre, and the Cheyenne River near Wasta and near Oral. In addition, the rail line is also in close proximity to several lakes that contain fish populations.

Some of the common fish species inhabiting the Big Sioux, James, Cheyenne, and Missouri Rivers are provided in Table 4.1-13.

Table 4.1-13
Common Fish-South Dakota

River	Fish Species
Big Sioux	northern pike (*Esox lucius*) walleye (*Stizostedion vitreum*) yellow perch (*Perca flavescens*) white crappie (*pomoxis annularius*) channel catfish (*Ictlurus punctatus*) black bullhead (*Ameiurus melas*) flathead catfish (*Pylodictis olivaris*) smallmouth buffalo (*Ictiobus bubalus*) shorthead redhorse (*Moxostoma macrolepidotum*) common shiner (*Luxilus cornutus*) red shiner (*Cyprinella lutrensis*) sand shiner (*Notropis stramineus*) flathead minnow (*Pimephales promelas*)
James	northern pike walleye yellow perch channel catfish bigmouth buffalo (*Ictiobus cyprinellus*) common carp (*Cyprinus carpio*) golden shiner (*Notemigonus crysoleucas*) creek chub (*Semotilus atromaculatus*) white sucker (*Catostomus commersoni*) golden redhorse (*Moxostoma macrolepidotum*)

Table 4.1-13
Common Fish-South Dakota

River	Fish Species
Missouri	walleye sauger (*Stizostedion canadense*) northern pike channel catfish flathead catfish crappie yellow perch rainbow trout (*Salmo gairdneri*) brown trout (*salmo truuta*) shovelnose sturgeon (*Scaphirhynchus platorynchus*) paddlefish (*Polyodon spathula*) goldeneye (*Hiodon alosoides*) bigmouth buffalo spotfin shiner (*Cyprinella spiloptera*) bigmouth shiner (*Notropis dorsalis*) shortnose gar (*Lepisosteus platostomus*)

Table 4.1-13
Common Fish-South Dakota

River	Fish Species
Cheyenne	white bass (*Morone chrysops*) largemouth bass (*Micropterus salmoides*) smallmouth bass (*Micropterus dolomieui*) northern pike (*Esox lucius)* bluegill (*Lepimis macrochirus*) green sunfish (*Lepimis cyanellus*) orangespotted sunfish (*Lepimis humilis*) sauger (*Stizostedion canadense*) freshwater drum (*Aplodintus grunniens*) yellow bullhead (*Ameiurus natalis*) black bullhead (*Ictalurus melas*) channel catfish (*Ictalurus punctatus*) common carp (*Cyprinus carpio*) creek chub (*Semotilus atromaculatus*) spottail shiner (*Notropis hudsonius*) plains topminnow (*Fundulus sciadicus*) flathead chub (*Platygobio gracilis*) plains minnow (*Hybognathus placitus*) sand shiner (*Notropis stramineus*) shorthead redhorse (*Moxostroma macrolepidotum)* river carpsucker (*Carpiodes carpio*) stonecat (*Noturus flavus*) sturgeon chub (*Machrhybopisis gelida*) white sucker (*Catostomus commersoni*) longnose dace (*Rhinichthys cataractae*) fathead minnow (*Pimephales promelas*) plains killifish (*Fundulus zebribus*) western silvery minnow (*Hybognathus argyitis)* emerald shiner (*Notropis atherinoides*) goldeye (*Hiodon alosoides*) red shiner (*Cyprinella lutrensis*)

South Dakota State University (Big Sioux, James, and Missouri)
Bureau of Reclamation, Draft Environmental Statement Angostura Unit (Cheyenne River)

Lakes in the project area support a number of game fish species including crappie, bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus dolomieui*), yellow perch, northern pike, walleye and black bullhead.

The waterways in the project area have been impacted by agricultural and land use practices. Agricultural runoff contributes to pollution from fertilizer, pesticide and sediment. This pollution has contributed to degradation of project area rivers and lakes. Rivers in the project area have been especially impacted by sediment pollution, as the sand and gravel substrate has changed to a silty substrate in certain locations. However, recent surveys of the Big Sioux River have shown that certain "clean water" species, such as the spottail shiner, have reappeared in the river. In addition, game fish such as walleye and northern pike have increased in population. This may be the result of less silt and improved spawning substrate for certain species (National Biological Service 1993). A change in agricultural practices, with more emphasis on soil conservation, has helped improve the water quality of the Big Sioux.

Dams also appear to restrict the distribution of certain fish species in project area rivers. Surveys conducted of the Big Sioux and James rivers have shown that walleye and channel catfish congregate below the dams; which are probably responsible for blocking their spawning migrations (National Biological Service 1993). Dams have helped contribute to the lack of spawning success, and the decrail line in the young of walleye and other species.

Fisheries management practices within the project area focus on habitat rehabilitation, stream bank and riparian zone protection and fish stocking. The emphasis on these management practices has helped the fisheries in many project area rivers and lakes.

Mussel populations in project area rivers have decrail lined due to agricultural practices that have changed the substrate and water quality. The two most common species found in the riverine systems in South Dakota are the giant floater (*Anodonta grandis*) and the white heel-splitter (*Lasmigona complanata complanata*). The species *Lampsilis* was once abundant in project area rivers, although it has now been eliminated by pollution in many of the watersheds.

Mussels that have managed to thrive in project area rivers have adapted to a variety of substrates, thus allowing their populations to remain stable (National Biological Service). Sediment pollution is the main problem with sustaining mussel populations in project area rivers. Efforts directed at riparian zone management may help mussels in this region recover in the future.

4.1.8.4 Endangered, Threatened and Special Status Species

The U.S. Fish and Wildlife Service (USFWS) was consulted regarding endangered and threatened species in the proposed project area. The USFWS identified nine Federally-listed endangered or threatened wildlife and plant species that could potentially occur in the project area. These are the black-footed ferret (*Mustela nigripes*, endangered), piping plover (*Charadrius melodus circumcintus*, endangered), whooping crane (*Grus americana*, endangered), interior least tern (*Sterna antillarum*, endangered), Topeka shiner (*Notropis topeka*, endangered), pallid sturgeon (*Scaphir hynchus albus*, endangered), American burying beetle (*Nicrophorus americanus*, endangered), Ute ladies' tresses (*Spriranthes diluvialis*, threatened) and bald eagle (*Haliaeetus leucocephalus*, threatened).

Two other species, swift fox (*Vulpes velox*) and sturgeon chub (*Macrhybopsis gelida*) are candidates for listing as endangered or threatened. In addition to these species the USFWS has been petitioned to list the black-tailed prairie dog (*Cynomys ludovicianus*) under the Endangered Species Act and its status is currently being reviewed.

The South Dakota Natural Heritage Program was contacted to obtain more specific information regarding these species. General descriptions of where the species may occur within the proposed project area are presented below. More detailed descriptions of the species, species habitat and occurrences are presented in the Biological Assessment (Appendix K).

4.1.8.4.1 Black-footed Ferret

Black-footed ferrets are members of the weasel family. They live in arid prairies in prairie dog colonies. Black-footed ferrets feed primarily on prairie dogs (90 percent) and utilize their burrows for dens. Black-footed ferrets are nocturnal and spend much of their time underground so their presence in an area is difficult to confirm (Whitaker 1980). According to available information compiled by Clark (1978), the USFWS (Jobman and Anderson 1991), and South Dakota Natural Heritage Database (SDNHDB 1998) the following sightings or physical evidence (1988 or earlier) exist for black-footed ferrets within counties in South Dakota through which the proposed project would pass: three in Custer, two in Fall River, five in Pennington and three in Shannon counties. Black-footed ferrets have been reintroduced into several locations. In 1996 reintroduction began in Conata Basin/Badlands which are within portions of the BGNF and Badlands National Park (USFWS 1998a).

4.1.8.4.2 Piping Plover

Piping plover are one of six belted plovers found in North America. Piping plovers occur in the project area during its breeding and nesting season. They were recorded in the 1980's near Pierre, South Dakota in Hughes County on islands or sandbars in the Missouri River in the proposed project area (South Dakota Natural History Data Base 1998). Surveys for piping plovers along the Cheyenne River and Lake Oahe noted their presence; however, no nesting birds were found on the Cheyenne River during 1986 and 1987 (Dirks et al. 1993a). Surveys were conducted for piping plovers along 20 miles of the Cheyenne River in Custer and Pennington counties in 1994 but no evidence of the species was found (Hetlet 1994). Likewise, no piping plovers were observed during a survey conducted along approximately 28 miles of the Cheyenne River between Spring Creek and Wasta, South Dakota on June 26, 1999.

4.1.8.4.3 Whooping Crane

Whooping cranes are found only in North America. Whooping cranes currently exist in three wild populations and four captive locations, totaling 260 individuals. Most whooping cranes migrate from Wood Buffalo National Park in Canada to Aransas National Wildlife Refuge on the Texas gulf coast. The migration pathway passes through western South Dakota, mainly in the Missouri River basin. From 1957 through 1990, 5 confirmed sightings of whooping cranes were made from Beadle County, 14 sightings from Hughes County, 20 sightings from Stanley County, 2 sightings from Haaken County, 7 sightings from Jackson County and 5 sightings from Pennington County.

During the spring migration in 1988, a small group (4 adults and 1 young) of whooping cranes was observed feeding in a grain field north of Rapid Creek approximately 3 miles from the existing rail line in Pennington Country. A small group (5) of whopping cranes were observed a week later approximately 11 miles southeast of Wall in eastern Pennington Country (South Dakota Natural History Data Base 1999). The following year, 1989, one whooping crane was seen flying 3 miles east of Ellsworth Airforce Base in Pennington County during fall migration (USFWS 1989).

4.1.8.4.4 Interior Least Tern

Interior least tern occur in South Dakota. Successful nesting has been documented on the Missouri and Cheyenne rivers (Dirks et al. 1993b). A survey was conducted along approximately 28 miles of the Cheyenne River between Spring Creek and Wasta, South Dakota on June 26, 1999 with no sightings of interior least terns. Two records of interior least terns on the Missouri River in the vicinity of Pierre, Hughes County (recorded in 1975) and Fort Pierre, Stanley County

(recorded in 1984) in the proposed project area were provided by the South Dakato Natural History Data Base (1998).

4.1.8.4.5 Topeka Shiner

The Topeka shiner was collected in the late 1960's from the Cheyenne River embayment at Lake Oahe. They have been found in South Dakota as recently as 1997 in two streams in Brookings County. Recent collections of Topeka shiners have been made in the Big Sioux River watershed in Brookings County and the James River watershed in Beadle and Kingsbury Counties in eastern South Dakota (USFWS 1998 unpub. data).

4.1.8.4.6 Pallid Sturgeon

Pallid sturgeon are a species that inhabit swift sections of big rivers. The sturgeon has been recorded from the Missouri River in Pierre, Hughes and Stanley counties between 1967 and 1989 within the proposed project area (South Dakata Natural History Data Base 1998). It is native to the Missouri and Mississippi rivers and currently is still present in the impounded portion of the Missouri River known also as Lake Sharpe (Dryer and Sandvol 1993).

4.1.8.4.7 American Burying Beetle

The American burying beetle is the largest North American member of the genus *Nicrophorus* within the family Silphidae. Members of this family include those beetles which utilize carrion as a food source (Anderson & Peck 1985). The beetle has been recorded in Brookings County; probably around 1945, within 1 mile of the existing railroad. Recent survey work across the state indicates that the American burying beetle is extirpated from most of its former range, and is now known only in southern Tripp, southwest Gregory, and eastern Todd counties (South Dakato Natural History Data Base 1998). Given the proximity of collections in Cherry County, Nebraska and that the beetle is a strong flier and can travel long distances in search of carrion, they may be present in suitable habitats with the project area (USFWS 1991). At this time, any habitat in South Dakota with significant humus and/or topsoil suitable for burying carrion is considered potential beetle habitat.

4.1.8.4.8 Ute Ladies' Tresses Orchid

Ute ladies' tresses orchid is a perennial, terrestrial orchid. It occurs in moist soils in wet meadows near springs, lakes or perennial streams. Increased disturbances to stream systems and conversion of land to urban uses has resulted in the decrail line of this orchid species. This species can only be positively identified when in flower. However, it may not flower every year

(Magrath 1973). Therefore, potential habitat is generally considered to contain them. A survey for the orchid was conducted in September 1998. Two sites, one each in Hay Canyon and Dry Creek (Fall River County) were considered potential habitat (Kass 1998). However, no orchids were found during the survey. The results of this survey are included in the Biological Assessment (Appendix K)

4.1.8.4.9 Bald Eagle

Bald eagles have been documented wintering throughout the project area. Observations seem to indicate that the Cheyenne River corridor in South Dakota is important to wintering bald eagles. Communal nocturnal roosts, diurnal perch sites and feeding areas are all key winter habitat components that are near the proposed project. Specific locations of reports of eagles in the proposed project area may be found in the Biological Assessment, Appendix K.

4.1.8.4.10 Swift Fox

The swift fox is a member of the Canidae family and is the smallest of the American foxes. The swift fox occupies short-, mid-, and mixed-grass prairies (Carbyn 1993). The swift fox is unafraid of man, therefore, it has been susceptible to trapping and poisoning efforts aimed at coyotes and wolves. Other factors affecting the decrail line of the swift fox include fragmentation and destruction of suitable habitat, interspecies (coyotes, other fox species) competition, prey reduction due to rodent control measures, hunting and predation (particularly from coyotes). There are records of swift fox in Custer and Fall River counties, South Dakota from 1970 through 1990 (South Dakota Natural History Data Base 1998). Observations in southwestern South Dakota indicate that the species occurs in the proposed project area.

4.1.8.4.11 Sturgeon Chub

Sturgeon chub are members of the minnow family. They inhabit shallow sand or gravel bottom zones in areas with strong currents in warm and highly turbid medium to large rivers (Lee et al. 1980). Alteration of larger rivers through impoundment, channelization and snag removal, reducing the amount of riffle habitat, appear to be some of the causes for the decrail line of the sturgeon chub. The fish occurs throughout the Missouri River drainage and the lower Mississippi River (USFWS 1993c). Sturgeon chub have been repeatedly documented in the Cheyenne River in Pennington County, South Dakota (USFWS 1993a, USFWS 1993b) and in Custer County as recently as 1995 (SDNHDB 1998). More recently in 1996, sturgeon chubs were collected at several sampling sites in the Cheyenne River between Angostura Dam and Lake Oahe by researchers from South Dakota State University (USFS unpub. data).

4.1.8.4.12 Black-tailed Prairie Dog

Black-tailed prairie dogs are social animals that live in large colonies or towns in short- and mid-grass prairie. Since the turn of the century the black-tailed prairie dog population has decrail lined by 98 percent. Less than 1 percent of the original prairie dog habitat remains intact. This decrail line is a result of habitat fragmentation through agriculture and urban development, eradication by ranchers, state and Federally supported animal control programs, recreational shooting, and wildlife disease. Prairie dogs play an important role in their ecosystem. Badgers, coyotes, weasels, golden eagles, hawks, black-footed ferrets, and other predators feed upon the prairie dog. Additionally, several species such as rabbits, a variety of snakes, burrowing owls and black-footed ferrets use prairie dog burrows for habitat. Additionally, mountain plovers, grasshopper sparrows and other ground nesting birds can be found in greater numbers in prairie dog towns. (Nebraska Game and Parks Commision no date-b). The prairie dog's continued survival is imperative to the survival of Federally endangered black-footed ferrets.

Black-tailed prairie dog colonies occur throughout the project area. The current activity status of each prairie dog colony is unknown. Some colonies have been poisoned by county weed and pest control agents and/or private land owners. For most of the colonies that have been mapped there is no additional information about the extent or geographic proximity of other colonies that would form a local colony complex.

4.1.9 TRANSPORTATION

There are two interstate highways in the project area of South Dakota. Interstate 29 (I-29) is a north/south route that crosses over the existing DM&E rail line just east of Brookings. Interstate 90 (I-90) is an east/west route that parallels, south of the project area, the existing DM&E rail line. However in the western portion of the project area, the rail line trends to the south and I-90 trends to the north. These two systems converge near Wall, South Dakota, and parallel each other into Wasta, South Dakota. At Wasta, the DM&E rail line extends southwest and I-90 continues west.

There are numerous state and U.S. highways in the project area. U.S. Highway 14 is an east/west route that generally parallels the existing DM&E rail line from Brookings, South Dakota, to Wall, South Dakota. The existing DM&E rail line crosses U.S. Highway 14 six times in Brookings County, with an average daily traffic (ADT) of 2,962; once in Kingbury County with an ADT of 1,285; two times in Beadle County with ADTs of 2,137 and 2,671; once in Stanley County with an ADT of 3,500; and once in Jackson County with an ADT of 1,020. The remaining major U.S. and state highway routes in the project area are all north/south routes. The U.S. highways in the project area include U.S.Highway 81 (which passes through Arlington), and

U.S. Highway 281 (which passes through Wolsey). U.S. Highway 83 joins U.S. Highway 14 for a short time. The state routes (SR) in the project area include SR-25 (which passes through De Smet), SR-37 through Huron, SR-45 through Miller, SR-47 through Highmore, SR-63 through Midland and SR-73 (which passes through Philip).

Just east of Wall, U.S. Highway 14 joins I-90 westward to Rapid City and on into Wyoming. U.S. Highway 385 is a north/south route that passes west of Rapid City and passes through Custer and Hot Springs. Mount Rushmore Road, also known as U.S. Highway 16, is also a north/south route that heads southward from Rapid City to Custer, South Dakota and then on to Newcastle, Wyoming.

There is an extensive network of county roads in the project area. In eastern South Dakota these roads generally follow section lines forming a grid-like pattern. However, southwest South Dakota does not fit this description. Because of the mountainous topography and numerous rural areas with no roads, the county roads are sporadic and do not form a uniform grid pattern. While some are paved, most are gravel. Around towns and communities, ADTs may be significantly higher than in rural areas. However, ADT's are still generally low due mainly to use by local residents.

The USFS maintains a network of roads within lands under its management. These roads are generally dirt or gravel roads and can be used by the general public. They provide access to public lands as well as for ranchers who lease the lands for grazing and hay production. They have low levels of traffic and these traffic levels vary seasonally. Traffic levels likely decrease in the winter months and become more prevalent in the summer months and in Autumn during big game seasons. Because these are USFS roads, access is controlled by the USFS. While these roads are generally open to the public, they can be closed by the USFS when appropriate, such as during roadwork.

There are many private roads in the project area. They are distributed throughout the project area. These roads consist of driveways and farm roads. Farm roads would primarily be used for slow moving farm equipment, while both types of private roads would be used for a low number of personal vehicles.

The DM&E operates an existing rail line from just north of Winona, Minnesota westward, entering the State of South Dakota just southeast of Brookings. The rail line continues westward across South Dakota, through the communities of Brookings, Huron, Pierre and Philip before splitting to the north and to the south in Rapid City. The north spur travels through Sturgis and Belle Fourche, South Dakota and terminates at Bentonite Spur, Wyoming. The south spur travels through Buffalo Gap and Oelrichs, South Dakota continuing on to Chadron, Nebraska. Other rail

lines in the project area include a Burlington Northern/Santa Fe Railway Company (BNSF) rail line that begins at Yale, South Dakota, just northwest of Huron and continues northward through Vienna, South Dakota. Another BNSF rail line passes north and south through Wolsey, South Dakota. This rail line passes through Tulare to the north and Mitchell to the south.

BNSF also has a rail line extending north that passes through Chadron, Nebraska, Edgemont, South Dakota and continues on to Newcastle and Moorcroft, Wyoming. This rail line splits at Donkey Creek, southeast of Gillette, one end connecting to the north/south rail line operated jointly by BNSF and UP and the other continuing into Gillette and north into Montana.

There are several airports and landing strips in the project area. The airport in Brookings County is the Brookings Municipal Airport. Lake Preston Municipal Airport and the De Smet Airport are in Kingsbury County. The Huron Regional Airport is in Huron. The Miller Municipal Airport is in Hand County and the Highmore Municipal Airport is in Hyde County. The Harrold Municipal Airport and the Pierre Municipal Airport are in Hughes County. The Hayes Airport is in Stanley County and the Philip Municipal Airport is in Haakon County. The Hot Springs Municipal Airport is approximately 5 miles southeast of Hot Springs and is located about 6 miles west of DM&E's existing rail line between Oral and Smithwick. The Edgemont Municipal airport is just southwest of Edgemont. The Rapid City Regional Airport is located approximately three miles east of Rapid City and is within 2 miles of the existing DM&E rail line. Numerous private landing strips are scattered throughout the area.

The Railroad Buttes Management Area, a popular site for off highway vehicles (OHV), is located approximately 3 miles south of Farmingdale, South Dakota. This area is within five miles of the existing DM&E rail line east of Rapid City and includes 50 square miles of land in the Fall River Ranger District of the Buffalo Gap National Grassland. Other trails in the area include the over 600 miles of National Forest, Wind Cave National Park, Jewel Caves trails within USFS, and the Angostura Recreation Area. There are also several bicycle trails in the project area. Additional discussion of trails in the project area is provided in Section 4.1.15, Recreation.

4.1.10 SAFETY

There are approximately 479 grade crossings along the existing DM&E rail line in South Dakota, 262 of which are public crossings. Of these, 5 are protected with flashing lights and gates, 31 are protected with flashing lights and 226 are protected by crossbucks and stop signs. Most crossings are protected by stop signs or crossbucks only. Many of the private or farm crossings do not have any form of crossing protection. There were 23 observed accidents at the DM&E rail line grade crossings in South Dakota between 1993 and 1997.

The existing DM&E rail line in South Dakota passes through 20 school districts. Buses from the surrounding schools operate over the DM&E rail line and road systems in the area. From east to west, the potentially affected school districts are Elkton, Brookings, Sioux Valley, Arlington, Lake Preston, De Smet, Iroquois, Huron, Wolsey, Wessington, Miller, Hyde County (Highmore), Harrold Schools (no crossings), Sully Buttes (Onida), Pierre, Pierre Head Start Program, Stanley (Fort Pierre), Midland and Haakon (Philip). Some school districts have buses that do not cross the existing DM&E rail line, some cross as few as 2 times per day; while other school districts have buses that cross the tracks as many as 109 times per day. Table 4.1-14 shows the number of bus crossings for each school district. Due to the irregularity of school activity bus schedules (such as field trips and sporting events), these crossing are not included in the total crossings per day.

Table 4.1-14
South Dakota School District Bus Crossings of the Existing DM&E Rail Line

School District	Street Name	Number of Crossings/Day*
Elkton Public Schools 5-3	Cornell Ave. Highway 13 475th Ave (Aurora) 478th Ave (E. of Aurora) 485th Ave & 217th St. 483rd Ave & 216th St. 487th Ave & 217th St.	14 6 2 2 2 2 2
Brookings School District 5-1	Medary Avenue 17th Avenue 22nd Avenue Main Street Western Avenue Unnamed street in Aurora	38 29 22 8 6 6
Sioux Valley School District - Volga		
Arlington School District	Main Street Unnamed country road	8 4
Lake Preston Public School, 38-3	441st Avenue 449th Avenue	6 2
De Smet School District 38-2 - De Smet, SD	Highway 25 436th Avenue	10 2

Table 4.1-14
South Dakota School District Bus Crossings of the Existing DM&E Rail Line

School District	Street Name	Number of Crossings/Day*
Iroquois School District	County Line (Sioux Street) Quapaw Street	11 11
Huron School District 2-2 - Huron, SD	Dakota Avenue Lincoln Avenue Custer Avenue 398th Avenue 404th Avenue 409th Avenue† 410th Avenue†	22 8 2 2 4 †occasional, especially during adverse weather, twice daily
Wolsey Public Schools 2-5 - Wolsey, SD	State Highway 281/14 Unnamed road, 2.1 mi. east of 281/14 Unnamed road, 1.2 mi. west of 281/14	12 4 2
Harrold Schools	No crossings	0
Wessington Public School	Main Street	2
Miller School District - Miller, SD	Miller, SD: Main Street 359th Avenue St. Lawrence, SD: 367th Avenue Commercial Avenue 1 block east of Commercial Avenue Ree Heights, SD: Main Street 352nd Avenue	 10 2 4 2 2 6 2
Harrold School District	No crossings	-
Hyde County Schools - Highmore, SD	Main Street	8

Table 4.1-14
South Dakota School District Bus Crossings of the Existing DM&E Rail Line

School District	Street Name	Number of Crossings/Day*
Sully Buttes Schools - Onida, SD	Ash Avenue	2
Pierre - Pierre, SD	Buses operate on every road in town, but two of the main roads that cross the rail line are: Poplar Harrison	4 - approx. 4 - approx. Note: Only two mini-buses only for transporting special education children assigned to other schools. Route varies every day depending on school schedules.
Pierre Head Start Program - Pierre, SD	Highland Lowell Ree Sioux Poplar	4 8 4 4 4
Stanley County Schools - Ft. Pierre, SD	N/A	**
Midland School District - Midland, SD	N/A	**
Haakon School District - Philip, SD	N/A	**

* According to information provided by district and/or bus company representatives.
** Activity buses only (i.e. for extracurricular events such as athletic and music events).

4.1.11 HAZARDOUS MATERIALS

Transportation of Hazardous Materials

During 1997 and 1998 DM&E transported a variety of hazardous materials, many of which are associated with rural agricultural activities. Hazardous materials transported included liquefied petroleum gas (LPG), anhydrous ammonia, phosphoric acid, ferric chloride, fuel oil and ethylene acetyl (flammable gas). DM&E currently transports approximately 200-250 carloads of

these materials, per year, throughout its system. The majority of the carloads contain LPG, phosporic acid and anhydrous ammonia. DM&E operates no key trains.[1]

Hazardous Waste Sites

Railroads transport and utilize a wide variety of hazardous materials. Additionally, they pass through developed, often highly industrialized areas where hazardous materials are stored and used. DM&E is no exception however, the amount of industrial activity along the existing rail line is limited. The presence of hazardous material presents opportunities for contamination, either from improper handling, spills, or accidents. While required precautions may currently be implemented, past incidents may have resulted in contamination. Contamination may be the result of railroad or other, non-railroad related activities adjacent to the rail line. Such contamination may not currently pose a problem or risk. However, construction activities in or through contaminated areas can expose contaminants to the environment and result in negative impacts. Therefore, appropriate precautions are required in such areas.

A records review of various Federal and state databases was conducted to identify areas of potential contamination within the project area. Sites within 1.0 mile of the existing rail line and potential new construction alternatives were considered to be in the project area. Databases reviewed included:

- Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)
- EPA National Priorities List (NPL)
- EPA Resource Conservation and Recovery Information System (RCRIS) Permitted Treatment, Storage and Disposal Facilities (TSD)
- EPA Resource Conservation and Recovery Information System (RCRIS) including RCRIS Large Quantity Generators (LQG)
- EPA Resource Conservation and Recovery Information System (RCRIS) including RCRIS Small Quantity Generators (SQG)
- EPA Emergency Response Notification System - 1999 (ERNS)
- EPA Corrective Action Reports (CORRACTS)
- South Dakota Leaking Underground Storage Tanks (LUST)
- South Dakota State Hazardous Waste Sites (SHWS)

[1] Any train with five or more tank carloads of chemicals classified as a Poison Inhalation Hazard (PIH), or with a total of 20 rail cars with any combination of PIHs, flammable gases, explosives, or environmentally sensitive chemicals.

- South Dakota Underground Storage Tanks (UST)
- South Dakota Solid Waste Facilities/Landfill (LF).

The results of the review are discussed below.

One NPL site, Ellsworth Air Force Base, was identified by the database as being within one-mile of the DM&E rail line. Most of the operable units and areas of concern at Ellsworth Air Force Base are more than two miles north of the existing DM&E rail line.

CERCLIS contains data on potentially hazardous waste sites that have been reported to the U.S. EPA by states, municipalities, private companies and private persons, pursuant to §103 of the Comprehensive Environmental Response, Compensation and liability Act (CERCLA). CERCLIS contains sites which are either proposed to be or are on the NPL and sites which are in the screening and assessment phase for possible inclusion on the NPL.

As of July 1, 1999 40 CERCLIS sites are located in South Dakota. Two of these CERCLIS sites are located within 1-mile of the DMERR alignment. These 2 CERCLIS sites are the Ellsworth Air Force Base, which is also listed on the National Priorities List and the Dakota, Minnesota & Eastern Roundhouse in Huron, South Dakota.

CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. CERCLIS - NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund Action of NPL Consideration. In the latter case, other regulatory mechanisms such as Resource Conservation and Recovery Act (RCRA) Corrective Action or remediation under the auspices of a state-approved program may be used to address contamination at the property. One CERCLIS - NFRAP site, the Edgemont Uranium Mill Tailings, was identified by the database search. This site is immediately east of the town of Edgemont. This site is being addressed by the South Dakota Department of Environment and Natural Resources.

SHWS records are the state's equivalent to CERCLIS. These sites may or may not already be listed on the Federal CERCLIS list. Priority sites planned for cleanup using state funds are identified along with sites where the cleanup will be paid for by potentially responsible parties. The data comes from the South Dakota Department of Environment and Natural Resources. One SHWS was identified by the database search; the Edgemont Uranium Tailings site.

RCRIS Permitted Treatment Storage and Disposal Facilities ((TSD) database includes selected information on facilities that generate, store, treat, or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). The source of this database is the U.S. EPA. No RCRA TSD's are located within 1-mile of the DM&E rail line.

The Solid Waste Facilities/Landfill (SWF/LF) records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data comes from the South Dakota Department of Environment and Natural Resources' Licensed Solid Waste Facilities list. The database was searched to a 0.5-mile radius of the project area. No SWF/LF sites within 0.5-mile of the project area were identified in the database search.

LUST incident reports contain an inventory of reported LUST incidents. The data comes from the South Dakota Department of Environment and Natural Resource's Water Quality Program. The database was searched to a 0.5-mile radius of the proposed DM&E rail line. Table 4.1-15 provides a listing of LUST sites by county along the proposed DM&E rail line.

Table 4.1-15
LUST Sites-South Dakota

COUNTY	NUMBER OF LUST SITES WITHIN 0.5-MILE OF PROJECT AREA
Brookings	17
Kingsbury	4
Beadle	9
Hand	2
Hyde	3
Hughes	9
Stanley	0
Jones	0
Haakon	2
Jackson	0
Pennington	14

Table 4.1-15 LUST Sites-South Dakota	
COUNTY	**NUMBER OF LUST SITES WITHIN 0.5-MILE OF PROJECT AREA**
Custer	7
Fall River	7
Shannon	2

UST database contains registered USTs. USTs are regulated under Subtitle I of RCRA. The data comes from the Department of Environmental Quality. The database was searched to a 0.5-mile radius of the subject property. Over 150 underground storage tank (UST) sites are located within 0.5-mile of the project area. Fifty-seven UST sites are located within 0.25-mile of the existing DM&E right-of-way.

ERNS is a national database that stores information on releases of oil and hazardous substances. The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended - Section 103; Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) - Section 304; the Federal Water Pollution Control Act (Clean Water Act) - Section 311; and the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) - Sections 300.51 and 300.65 have release notification requirements that are supported by ERNS. Seventeen ERNS sites were reported located within 1-mile of the proposed project area. Most of the ERNS reports are related to incidents on U.S. Highway 14. Table 4.1-16 provides a list of railroad-related ERNS in the project area.

Table 4.1-16
Railroad-Related ERNS Sites-South Dakota

COUNTY	CITY	RAILROAD	DATE	MATERIAL(S)
Custer	Dewey	BN	11/04/94	Coal (25 cars)
Custer	Dewey	BN/SF	07/13/99	Locomotive (1) and Coal (4 cars)
Fall River	Edgemont	BN	02/16/93	Coal (22 cars)
Hughes	Pierre	DM&E	11/16/91	Clay (10)
Kingsbury	Lake Preston	DM&E	10/16/95	Locomotives (4) and Lumber (3 cars)
Pennington	Rapid City	DM&E	06/10/96	Clay (6 cars) and Chips (4 cars)

Table 4.1-17 is a list of South Dakota spill notification reports received by the Department of Environment and Natural Resources within a six month period that are within 1-mile of the proposed project area to provide a representation of the types of spills occurring.

Table 4.1-17
South Dakota Spill Notification Reports

County	Town/City	Material
Beadle	Huron	Petroleum
Beadle	Huron	Gasoline
Hand	St. Lawrence	Atrazine
Hughes	Pierre	Triflurilan
Hughes	Pierre	Fertilizer
Kingsbury	Arlington	10-34-0 Fertilizer
Kingsbury	Lake Preston	Transformer Oil
Pennington	Wasta	Diesel Fuel
Pennington	Rapid City	Diesel Fuel

Table 4.1-17
South Dakota Spill Notification Reports

County	Town/City	Material
Pennington	New Underwood	Diesel Fuel
Pennington	Rapid City	Gasoline

CORRACTS is a list of RCRA facilities with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every facility that has had corrective action activity. No RCRA CORRACTS sites were identified.

4.1.12 ENERGY RESOURCES

Transportation of Energy Resources

During 1997 and 1998, DM&E transported a variety of energy resources. Many of which are associated with rural agricultural activities and where not transported in large quantities. Energy resources transported primarily include LPG. Occasionally and irregularly, fuel oil may be transported. However, less than 10 carloads of fuel oil would typically be moved annually.

Utilization of Energy Resources

DM&E currently transports approximately 60,000 carloads of materials annually. The operating limit for each rail car is approximately 263,000 pounds. As discussed in Chapter 1, this is below the present industry standard of 286,000 pounds per carload. However, based on a rail car weight of approximately 60,000 pounds and a loaded truck capacity of approximately 60,000 pounds, each DM&E railcar is the equivalent of approximately 3 trucks. Rail transportation is approximately 3 times more fuel efficient than trucks, making rail transportation, particularly for bulk commodities going long distances, a more energy efficient means of transportation. The ability of DM&E to provide transportation of goods for its existing shippers contributes to the efficient utilization of diesel fuel used both for locomotive and truck fuel. Additionally, DM&E transports a variety of energy resources as mentioned above. Rail transportation of these resources increases the efficiency of the usage of energy resources by reducing the energy required to provide the resources to the end user.

Recyclable Commodities

The only recyclable commodity currently transported by DM&E in South Dakota is scrap steel. Scrap steel is shipped on DM&E's rail line by scrap iron dealers. It is shipped to mills for reuse. In South Dakota, less than 100 carloads per year of scrap steel are typically shipped.

4.1.13 CULTURAL RESOURCES

The cultural history of South Dakota presented in this document provides a brief look at the extensive cultural history of the project area. It is not intended to be a full, comprehensive, and detailed look at the culture history of the area. It is only intended to give some context to the known resources and cultures that may be affected by this project. A short discussion concerning consultation with the Native American's that were known to occupy the project area is also included. Table 4.1-18 summarizes the pertinent portions of the culture history and was prepared from information contained in the *South Dakota State Plan for Archaeological Resources* (Winham and Hannus 1990) and a Plains culture history prepared by Dr. Richard Fox and Linea Sundstrom in an unpublished cultural resources management report (*Results of the 1999-2000 Phase I & II Cultural Resource Evaluation for the Dakota Minnesota and Eastern Corporations's Proposed Powder River Basin Expansion Project in South Dakota and Wyoming 2000*). The possible occupations before 13,000 years ago are presented in Chapter 3. They also apply to South Dakota and therefore will not be repeated here.

Humans have occupied the Great Plains of North America and the area of the proposed project for at least 13,000 years, possibly longer. The cultures occupying the Plains over the millennia can be classified into four categories; (1) nomadic hunter/gatherer, (2) nomadic foragers, (3) semi-sedentary villagers and (4) sedentary villagers.

The most common way of life on the Plains was that of the nomadic hunter/gatherer. They hunted large game animals as a rule but supplemented their subsistence with small mammals, fish and wild plants. The hunters/gatherers lifestyle persisted on the Plains from the earliest times into the Historic Period (Table 4.1-18).

Nomadic foragers primarily hunted small game and gathered fruits and wild plants. They on occasion augmented their subsistence with large game such as bear and deer. This lifestyle was the rarest on the Plains, but was practiced up to historic times.

Semi-sedentary villagers do not appear on the Plains until approximately AD 1. Their subsistence pattern included hunting and gathering that was supplemented by gardening. The

practice of gardening required that for at least a part of the year the semi-sedentary villagers stayed in one general area while during the remainder of the year they were nomadic.

Sedentary villagers are defined as groups whose diet consisted of foods obtained roughly equally from agricultural products and hunting and gathering. These people lived in permanent villages which were normally located in forested river valleys. They would periodically venture onto the Plains to hunt, gather other resources. This lifestyle appeared in limited areas on the Plains around 900 AD and continued until historic times.

The cultural chronology of the northern Plains is nearly exclusively derived from radiocarbon dating techniques. As a general rule, according to this, one cultural period ends and is replaced by another. However, in reality one cultural period declines while another develops producing some overlap.

Table 4.1-18
Cultural Chronology of South Dakota

Period	Dates	Distinguishing Traits
Paleoindian Period	11,200 to 8,500/8,000 radiocarbon years before present (RCYBP)	Mainly recognized by distinctive Projectile point types such as Clovis, Folsom, Goshen, Hell Gap, Meserve, Cody, Agate Basin Scottsbluff, Eden and Dalton.
Archaic Period	8,500 to 1,500 RCYBP	Normally divided into Early, Middle and Late periods.
Early Archaic	8,500 to 7,000 RCYBP	Hawken and Hawken II projectile points. Indication of changes in subsistence strategies with a greater reliance on small game and wild plants to supplement large fauna.
Middle Archaic	7,000 to 2,500 RCYBP	Grinding stones, food preparation pits and round pit houses. McKean, Duncan and Hanna projectile points.
Late Archaic	2,500 to 1,500 RCYBP	A more systematic exploitation of bison than in the Middle Archaic and a tendency to reuse kill sites. Pelican Lake and Yonkee projectile points.

Table 4.1-18
Cultural Chronology of South Dakota

Period	Dates	Distinguishing Traits
Late Prehistoric	1,500 RCYBP to AD 1,600	Increase in population, highly organized and extensive bison kills and a reduction in projectile point size. Projectile points tend to be small and side-notched possibly indicating introduction of the bow.
Woodland	500BC to AD 900/950	Pottery, corner-notched projectile points and burial mounds. Semi-sedentary lifestyle and domesticated crops by as early as AD 250.
Plains Woodland	500BC to AD 900/950	Pottery, side-notched projectile points. Communal bison hunting and the use of a wide spectrum of food sources. Pottery and small scale horticulture (gardening) is developed. Evidence also includes corrals and jumps associated with antelope and bison hunting.
Plains Village	AD 800/900 to Historic (1874)	Permanent villages, intensive gardening, particularly along the forested river valleys. Includes the Middle Missouri Tradition and has been divided into three variants: Initial, Extended and Terminal. Initial variant contains Over, Mill Creek, Great Oasis and Cambria Phases.

Table 4.1-18
Cultural Chronology of South Dakota

Period	Dates	Distinguishing Traits
Protohistoric	AD1600 to 1874	Most of what is known comes from the accounts of EuroAmericans who were colonizing the periphery of the Plains. Some information also comes from Native American naratives and pictographic records. Tribes are for the first time identified. Sedentary tribal villages have been identified in the archaeological record. Protohistoric sites may be identified by the existence of Euro-American trade goods of metal, guns, decorative artifacts and the horse.
Historic Period	1870 to present	Native American sites may be identified by stone circles, villages and later by artifacts in association with EuroAmerican style dwellings. Fur trading posts, military camps as well as the remains of trails can be indicators of early commercial exploitation and military presence. Dugouts, foundations, cabins, outbuildings, cellars, fencing, wells, mining, trails, or family graves may be other indicators of historic archaeological sites.

Cultural resources, both historic and archaeological, are found throughout the project area and have the potential to be impacted by the proposed project. The project has two distinct parts generally described as; (1) reconstruction of existing rail lines and (2) new construction where rail lines currently do not exist. The Area of Potential Effect[2] (APE) differs for each of these parts. In consultation with the agencies and the State Historic Preservation Officers (SHPOs) the APE for the reconstruction portion is the existing DM&E right-of-way while the APE for the new construction portions is one mile either side of the proposed Extension Alternative.

Reconstruction Resources

A review of the site records held at the Archaeological Research Center, Rapid City, South Dakota indicated 11 archaeological sites are within or immediately adjacent to the existing DM&E right-of-way. Five of these sites date to the historic period, while six sites are prehistoric (Table 4.1-20). The oldest of the historic sites plotted near the rail line is the original Fort Sully (39HU52). Two of the remaining historic sites were related to small towns along the railroad corridor. One of the sites is the town of Vayland, South Dakota (39HD76). The other site contains the remains of what may be the depot and rail stop at Canning, South Dakota (39HU262). The function of the remaining historic sites is unclear (39HU134 and 39HU135).

Of the six prehistoric sites recorded along the existing right-of-way, four are village sites and two are of an undetermined site type. At least one of the villages, the Little Pumpkin site (39HU97), is late prehistoric or protohistoric. Two other villages date to the Plains Village stage (A.D. 900-1700), the Mush Creek site (39HU5) and the McClure Ranch site (39HU7). The age of the fourth village (39HU77) was not documented on the site form, but based on the chronology of the area it would likely be Plains Village pattern, similar to those described above. The two prehistoric sites of unknown function and size (39JN4 and 39HU133) also have an unassigned cultural affiliation.

There are 239 bridges and culverts (including 64 iron and steel bridges and stone box culverts, 148 open-deck timber pile spans and one cast concrete slab) along the existing rail line in South Dakota between Minnesota and Wall. Bridge No. 1500, a Pennsylvania through truss over the Missouri river is listed in the National Register (Appendix N). Additionally, there are 7

[2] Area of potential effects means the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. The Area of Potential Efffect for the permitted or licensed alternative is fully described in the Programmatic Agreement and Identification Plan in Appendix J.

buildings that were inventoried (2 are listed in the National Register Nomination form for the Chicago & NorthWestern Roundhouse, Huron, South Dakota. There are 191 bridges that are recommended eligible for the National Register (Appendix N). The portion of the DM&E railroad that is included in the project from Winona, Minnesota to Wasta, South Dakota appears to be eligible for listing in the National Register as a linear historic district.

Table 4.1-19
Known Archaeological Sites in or Abutting the Existing Right-of-Way in South Dakota

Site Number	Site Name	Site Type	Cultural Affiliation	In ROW	Abut ROW	National Register Significance	Other Comments
39HU5	Mush Creek	Village	Middle Missouri	X		Eligible	Intact portions in ROW
39HU7	McClure Ranch	Village	Middle Missouri	X		Eligible	Not in ROW
39HU52	Fort Sully	Historic Fort	Euro-American		X	Eligible	Not in ROW
39HD76	Vayland	Historic	Euro-American	X		Not Eligible	Destroyed
39HU77		Village	Plains Village	X		Eligible	Destroyed in ROW
39HU97	Little Pumpkin	Village	Extended Coalescent	X		Eligible	Intact portions in ROW
39HU133		Lithic Scatter	Unknown Prehistoric		X	Not Eligible	Not in ROW
39HU134		Historic Scatter	Euro-American		X	Not Eligible	Destroyed in ROW
39HU135		Habitation	Euro-American		X	Not Eligible	Not in ROW
39HU262		Historic Scatter	Possible Depot and Whistle Stop in Canning, South Dakota	X		Not Eligible	Destroyed in ROW
39JN4		Lithic Scatter	Unknown Prehistoric		X	Not Eligible	Not in ROW

New Construction

Seventy known archaeological sites are within 1 mile of the proposed right-of-way /construction zone for Extension Alternative B. Fifty-nine of the sites are prehistoric, 9 of the sites are historic and 2 of the sites have both prehistoric and historic components. None of the sites are listed on the National Register. However, 6 of the sites are potentially eligible for listing in the National Register. One prehistoric site (39FA1240), classified as an artifact scatter, is located within the proposed right-of-way/construction zone. National Register of Historic Places (National Register) eligibility of 39FA1240 is undetermined. The information available on the remaining sites indicate that National Register eligibility is undetermined.

The following table is a compilation of the six known sites within one mile of the proposed right-of-way/construction zone that are potentially eligible for the National Register and may therefore be adversely affected.

Table 4.1-20
Known Potentially Eligible National Register
Sites Within One Mile of Alternative B

Site #	Type	Historic/Prehistoric
39FA1248	Artifact Scatter	Prehistoric
39FA1249	Artifact Scatter	Prehistoric
39FA1250	Artifact Scatter	Prehistoric
39FA1251	Artifact Scatter	Prehistoric
39FA1252	Artifact Scatter	Prehistoric
39FA1299	Foundation	Historic

There are 96 known sites within 1 mile of the Modified Proposed Action, Extension Alternative C. Eight-three are prehistoric, 9 are historic and 4 have both prehistoric and historic components. Fifty-two sites are located within the proposed right-of-way/construction zone. Thirty-nine of the sites within the right-of-way/construction zone are prehistoric, 7 are historic, 1 contains both prehistoric and historic components and 6 contain unknown cultural components. Ten of the sites are not eligible for the National Register with 8 being prehistoric, 1 historic and 1 prehistoric/historic. One historic site is listed as potentially eligible for the National Register. The remaining sites are listed as unevaluated. Actions concerning these sites will be in accordance with the PA.

Alternative D has elements of both reconstruction and new construction. The alternative is reconstruction from Wall South, Dakota to Rapid City, South Dakota then to a point approximately 5 miles south of Smithwick, South Dakota. Alternative D then becomes new construction to the South Dakota-Wyoming State line. There are 71 known sites along Extension Alternative D in South Dakota. Of the known sites, 56 are prehistoric, 10 are historic, 2 have both prehistoric and historic, and 3 are of an unknown cultural affiliation. Four of the 71 sites are NRHP eligible. Only 9 of the known sites are within the existing right-of-way. All but one of the these sites are prehistoric and the other is historic, all are unevaluated for the NRHP. There are 130 bridges and culverts along the reconstruction portion of Alternative D, 110 are eligible for the NRHP. The bridges are open deck pile timber (83 total with 69 NRHP eligible), deck plate girder (19 total with 15 NRHP eligible), through plate girder (6 total with 5 NRHP eligible), through truss (2 total with both NRHP eligible), I-beam (4 total with 3 eligible), stone box culverts (all 11 NRHP eligible), stone arch culverts (all 3 are NRHP eligible), concrete arch culvert (1 total, NRHP eligible), and wooden box culvert (1 total, NRHP eligible). It is likely that other railroad related facilities (water stops, depots, freight houses, maintenance yards etc.,) would be considered eligible for the National Register if they are formally evaluated. None of the known archaeological sites are considered eligible for listing on the National Register.

Traditional Cultural Properties (TCP's)[3] are another category of cultural resources. They can be defined generally as properties eligible for inclusion in the National Register because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community (National Register Bulletin 38). Traditional cultural properties include a wide variety of site types. They may include such things as traditional camping or village sites, medicinal and spiritual plant collection areas, religious sites and cemeteries. No traditional cultural properties are known within the project area. However, the long period of occupation by Native Americans and the importance and sacredness of the area, especially the Black Hills, make it highly probable that such sites exist in the area. It is expected that some of the archaeological sites shall be eligible for the National Register as TCPs.

[3] A Traditional Cultural Property can be defined generally as one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community. Examples include: 1) a location associated with the traditional beliefs of a Native American group about its origins, its culture history, or the nature of the world; 2) a location where Native American religious practitioners have historically gone and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural roles of practice; 3) a location where a community has traditionally carried out economic, artistic, or other cutural practices important in maintaining its historic identity.

Some cultural sites served specialized ceremonial functions. Examples include cemeteries, cairns, mounds and petroglyph and pictograph sites. These sites are often considered sacred and may have been important components of the religion of Native Americans. These sites may occur in conjunction with village or other habitation sites or may be isolated. The identification of sacred sites is often difficult archaeologically. According to the Handbook of American Indian Religious Freedom, Native Americans have historically observed the following as sacred sites:

- where the ancestors arose from the earth
- where the clan received its identity
- where one's ancestors are buried
- where the people receive revelation
- where the culture hero left ritual objects for the people
- where the people make pilgrimages and vision quests
- where the gods dwell
- where animals, plants, minerals, or waters with special powers are found (Vecsey 1991:222).

Additional categories for sacred sites have been added by Linea Sundstrom (1996:2), including:

- places frequented by the spirits of one's ancestors
- where esteemed members of a group died or were buried
- where miraculous or mythical events took place
- where ceremonies were held
- places recognized as sacred by other groups

Sacred sites found across the landscape can be of two types, general and specific. These places often included springs, round stones (especially in areas at some distance from streams and other water sources), fossil outcrops, or places with rock art or stone effigies (Sundstrom 1996). Important components of these sites may include the isolated nature of the area, natural uniqueness of the area and/or the vantage and viewshed the site provides. Although none of these sites are recorded within the project area, it is very likely that unknown sacred sites occur throughout the area.

Native American Issues

Native American occupation in the area of the proposed project has been well documented. It extends from prehistoric times to the present. Some of the early inhabitants of the project area were the Arapaho, Cheyenne, Kiowa, and Lakota Indians. Of particular significance to Native American people living in the project area is the Black Hills region. The

Black Hills were and are a sacred place used by Native Americans to purify themselves as well as a sanctuary of Tribal peace. Due to the historic occupation of the project area by various Native American peoples, the area is rich with cultural resources. Because impacts to cultural resources are expected, U.S. government to Tribal government (government to government) consultations with Federally recognized Tribes that have historic, aboriginal or current ties to the project area have been initiated and continue. Since traditional Tribal occupations did not observe current state boundaries, they were not considered when identifying Tribes appropriate for government consultation. Although there are unresolved treaty issues, no currently recognized tribal lands are affected by this project.

With the assistance of the cooperating Federal agencies, State Historic Preservation Officer (SHPO) in South Dakota, the cooperating agencies, Bureau of Indian Affairs and recommendations from individual Tribes, the Federally recognized Native American Indian Tribes with potential interest in the project area where identified. Consultation was initiated with these Tribes. Out of respect for cultural differences, the wisdom of elders and the historically unresolved issue of treaties, several tribal groups/organizations were also invited to participate in the consultation meetings. It is the intent of the consultations that each Tribe is provided a reasonable opportunity to participate with the NEPA process in addressing the potential impacts of the proposed project. To date, these consultations have resulted in the preparation of a Programatic Agreement (PA)[4] for the treatment of cultural resources and a Memorandum of Agreement (MOA) outlining Native American participation in the NEPA process (Appendix I).

In September of 1998 and February 1999, letters were sent to the Chairman (and any known cultural resource contact) of each of the identified potentially interested Tribes. These letters outlined the proposed project and requested their participation in consultation. Only two responses were received. In February and March of 1999, contact was made by telephone with each Tribal government to explain the request for consultation and the issues. Each Tribe was asked to appoint traditional and or cultural representatives to represent the Tribe in the consultation efforts.

The consultations to date have consisted of 1) two inter-Tribal meetings to address Tribal participation in the process; (National Historic Preservation Act (NHPA) Section 106 process and to jointly develop a Memorandum of Agreement between the Tribes, the Surface Transportation Board and DM&E;) 2) several smaller meetings with Tribal representatives; 3) personal appearances before Tribal culture committees, elder groups, council chairman and individual

[4] A programic Agreement means a document that records the terms and conditions agreed upon to resolve the potential adverse effects of a Federal agency program, complex understanding or other situation.

council members; and, 4) treaty commissions. Throughout the process Tribal representatives have been frequently consulted by phone.

The substantive participation of Tribal representatives to address a broad range of Tribal concerns has resulted in a draft Memorandum of Agreement (MOA) developed jointly between the Tribes, the Surface Transportation Board, and DM&E Railroad. For cultural resource issues, a draft Programmatic Agreement (PA) which includes Identification plans (ID Plans) offering Tribes substantive participation in the decision making process under the National Historic Preservation Act (NHPA) Section 106 (Appendix J) has been prepared.

Continuing Tribal consultations include; 1) opportunity for an on-site review of the proposed new construction area; 2) opportunity to discuss the archaeological survey work and offer recommendations; 3) inter-Tribal meeting after release of the Draft EIS to discuss any areas of concern and recommendations on the draft; 4) individual or small group meetings on an as needed or as requested basis.

Indian Trust Assets

Indian Trust Assests (ITA) are properties, interests, or assets of a Native American Tribe or individual over whom the Federal government has an interest through administration or direct control. Examples include lands, minerals, and timber, as well as water rights, hunting rights, fishing rights, and other treaty rights. The sovereignty of Tribes and the trust relationship with the Federal government have been established and validated through treaties, court decisions, legislation, regulations, and policies.

The Native Americans have raised concerns for a number of ITA's. These include wildlife, fisheries, vegetation, paleontological resources, cultural resources, and water quality. Additionally, concerns about culturally important plants have been voiced during consultation meetings with the Tribes. The Tribes are concerned that the planned construction would make changes in or destroy the local abundance and distribution of plants traditionally used by the Tribes. Consultation is continuing over issues the Tribes have concerning culturally important.

4.1.14 SOCIOECONOMICS

The social and economic study area in South Dakota includes the following 13 counties: Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley, Jones, Haakon, Jackson, Pennington, Custer and Fall River.

4.1.14.1 Population and Demographics

The project area is located in primarily rural areas of the above listed counties. The rebuild of the existing DM&E rail line originates in eastern Brookings County, southeast of Elkton at the South Dakota/Minnesota state line. The rebuild in South Dakota terminates in Wall, South Dakota in Pennington County. Table 4.1-21 lists the communities, from east to west, and their populations in the project area.

Table 4.1-21
Potentially Affected Communities and Populations-South Dakota

COMMUNITY	POPULATION	COMMUNITY	POPULATION
Elkton	602	Highmore	835
Aurora	619	Holabird	NA
Brookings	16,270	Harrold	167
Volga	1,263	Blunt	342
Arlington	908	Canning	NA
Hetland	53	Alto	83
Lake Preston	663	Pierre	12,906
De Smet	1,172	Ft. Pierre	1,854
Manchester	136	Wendte	NA
Iroquois	328	Capa	NA
Cavour	116	Midland	233
Huron	12,448	Nowlin	NA
Wolsey	442	Powell	37
Wessington	265	Philip	1,077
Vayland	NA	Cottonwood	12
St. Lawrence	223	Quinn	72

Table 4.1-21
Potentially Affected Communities and Populations-South Dakota

COMMUNITY	POPULATION	COMMUNITY	POPULATION
Miller	1,678	Wall	834
Ree Heights	91	Wasta	82

NA - Information not available
1990 data from United States Census Bureau

Tables 4.1-22 through 4.1-28 show population, income and employment numbers for the affected counties and for the State of South Dakota.

The population of the State of South Dakota increased between 1986 and 1994 by 2.2 percent (Table 4.1-24). The populations of 3 South Dakota counties (Brookings, Hughes and Pennington) also increased during this same time by 7.2 percent, 4.4 percent, and 12.6 percent respectively (Table 4.1-24). The average decrease in the remaining ten counties was 8.4 percent. Between 1984 and 1990, the State saw a 19.5 percent increase in the minority population while Pennington County saw an increase of 55.3 percent (Table 4.1-24). A percent increase could not be calculated for 11 of the 13 counties because of the absence of 1988 minority population information.

4.1.14.2 Employment and Income

Per capita income increased greatly in the short time between 1985 and 1989. The average increase of the affected counties was 44.9 percent, whereas the increase in the entire state was only 24.6 percent (Table 4.1-24). The State of South Dakota saw large changes in median income, ranging from 43.5 percent increase to 90.2 percent increase.
The average increase of median income, at 64.5 percent, was below the State's increase of 71.0 percent (Table 4.1-24).

The percent of persons living below the poverty level decreased in the state between 1979 and 1989. In Kingsbury, Beadle, Hand, Hyde, Stanley, Haakon, Jackson, Custer, and Fall River counties that number also decreased; while Brookings, Hughes, and Pennington counties saw an increase in the percent of persons living below the poverty level. The average increase for these three counties was 27.2 percent (Table 4.1-24).

The unemployment rate decreased in the State of South Dakota in all but one county (Custer County) in the project area between 1986 and 1994. Custer County, had an unemployment rate increase of 11.4 percent (Table 4.1-24).

4.1.14.3 Public Services and Fiscal Condition

There are many public services offered to area residents. Nearly all communities have elementary, middle and senior high schools. Many of the communities have clinics and/or doctor and dentist offices. However, many of the communities do not have hospitals. Nearly all of the communities offer recreational facilities and churches. Some of the smaller communities have volunteer fire departments and rely on county sheriffs for public protection services. Most of the communities provide water and waste water services for their residents.

All of the communities potentially affected by the new construction have small populations. Most communities have only one elementary, middle and senior high schools and many of the small communities bus the children to larger communities or rural schools. There are churches in the area as well.

Table 4.1-22
1996 Statistical Information for Potentially Affected Counties - South Dakota

Affected Area	Population[1]	Percent Minority[2]	Per Capita Income[3]	Median Income[3]	Percent below poverty level[3]	Unemployment Rate[1]	Acreage in Farmland (1,000)[4]	Number of Farms[4]	Average Size of Farms (acres)[4]
South Dakota	723,655	9.2	10,661	22,503	15.9	3.3	44,828	34,057	1,316
Brookings	26,368	2.5	9,926	21,807	17.8	2.7	444	959	463
Kingsbury	5,766	0.4	9,857	20,290	13.5	3.8	460	614	749
Beadle	18,105	2.2	10,373	22,425	13.2	2.6	725	813	891
Hand	4,210	0.8	9,305	19,310	17.6	2.4	861	542	1,589
Hyde	1,660	4.0	9,648	19,907	16.5	2.7	545	240	2,271
Hughes	15,556	8.1	12,263	27,058	10.4	2.2	391	256	1,526
Stanley	2,676	6.8	10,759	22,321	12.4	3.2	904	198	4,566
Jones	1,308	0.7	9,592	21,202	15.1	3.2	584	198	2,951
Haakon	2,528	2.6	10,117	21,166	13.6	3.2	1,204	321	3,752
Jackson	2,888	43.2	6,947	17,246	38.8	5.1	1,361	327	4,162
Pennington	86,585	12.7	12,031	25,340	12.9	3.6	1,066	636	1,676
Custer	6,616	3.6	10,942	22,662	12.4	4.3	462	323	1,431
Fall River	7,108	9.0	10,944	20,483	14.5	3.8	975	298	3,271

1996 County and City Extra, Annual Metro, City and County Data Book. Edited by Courtenay M. Slater and George E. Hall. Berman Press, Lanham, MN, 1996.
[1] 1994 Data; [2] 1990 Data; [3] 1989 Data; [4] 1992 Data

Table 4.1-23
1988 Statistical Information for Potentially Affected Counties - South Dakota (1970's and 1980's data)

Affected Area	Population[1]	Percent Minority[2]	Per Capita Income[3]	Median Income[4]	Percent below poverty level[4]	Unemployment Rate[1]	Acreage in Farmland (1,000)[5]	Number of Farms[5]	Average Size of Farms (acres)[5]
South Dakota	708,000	7.87	8,553	13,156	16.9	4.7	43,811	37,148	1,179
Brookings	24,600	0.9	8,205	13,597	17.4	6.0	443	1,060	418
Kingsbury	6,300	NR	7,983	10,666	20.1	5.1	479	722	663
Beadle	18,300	NR	9,014	13,398	14.0	3.9	737	874	843
Hand	4,700	NR	5,959	10,352	28.4	2.7	866	630	1,375
Hyde	1,900	NR	6,012	11,812	23.2	4.0	544	237	2,297
Hughes	14,900	NR	10,229	17,458	7.1	3.7	366	252	1,453
Stanley	2,700	NR	5,930	14,807	13.0	4.7	861	167	5,154
Jones	1,500	NR	6,689	11,835	18.3	4.1	540	222	2,434
Haakon	2,800	NR	4,938	12,076	20.6	3.9	1,208	322	3,752
Jackson	3,400	NR	3,683	12,172	35.6	4.7	1,250	282	4,432
Pennington	76,900	9.21	10,170	14,890	12.2	4.6	1,076	577	1,865
Custer	6,900	NR	8,336	15,166	13.5	3.7	418	302	1,384
Fall River	7,800	NR	9,147	14,274	18.5	4.2	1,002	336	2,982

1988 County and City Data Book, U.S. Department of Commerce Bureau of the Census. U.S. Government Printing Office, 1988.
[1] 1986; [2] 1984; [3] 1985; [4] 1979; [5] 1982
NR = Not Reported

Table 4.1-24
Comparison of Statistical Information for Potentially Affected Counties - South Dakota

Affected Area	Population Change	Percent Minority Change	Per Capita Income Change	Median Income Change	Percent below poverty level Change	Unemployment Rate Change	Acreage in Farmland (1,000) Change	Number of Farms Change	Average Size of Farms (acres) Change
South Dakota	2.2	19.5	24.6	71.0	-3.8	-28.2	2.3	-8.3	11.6
Brookings	7.2	197.7	21.0	60.4	9.7	-51.8	0.2	-9.5	10.8
Kingsbury	-8.5	NA	23.5	90.2	-38.5	-31.8	-4.0	-15.0	13.0
Beadle	-1.1	NA	15.1	67.4	-6.7	-34.0	-1.6	-7.0	5.7
Hand	-10.4	NA	56.2	86.5	-44.5	-20.4	-0.6	-14.0	15.6
Hyde	-12.6	NA	60.5	68.5	-37.9	-41.0	0.2	1.3	-1.1
Hughes	4.4	NA	19.9	55.0	52.9	-37.9	6.8	1.6	5.0
Stanley	-0.9	NA	81.4	50.7	-5.5	-32.5	5.0	18.6	-11.4
Jones	-12.8	NA	43.4	79.1	-28.0	-31.9	8.1	-10.8	21.2
Haakon	-9.7	NA	104.9	75.3	-40.4	-25.9	-0.3	-0.3	NC
Jackson	-15.1	NA	88.6	41.7	-7.4	-7.8	8.9	16.0	-6.1
Pennington	12.6	37.9	18.3	70.2	19.1	-11.9	-0.9	10.2	-10.1
Custer	-4.1	NA	31.3	49.4	-11.9	11.4	10.5	7.0	3.4
Fall River	-8.9	NA	19.6	43.5	-28.6	-17.6	-2.7	-11.3	9.7

NA - Not Available/NC - No Change

Table 4.1-25
County Assessed Value and Taxes Collected-South Dakota

County	Market Value			Collected Taxes		
	1996 or 1999*	1997	1998	1996 or 1999	1997	1998
Brookings	798,783,081*	731,217,650	758,178,852	18,884,902*	17,667,412	18,692,300
Kingsbury	263,088,716*	236,205,643	262,841,857	1,011,896	1,064,307	1,102,533
Beadle	560,968,012	573,061,756	599,332,717	13,520,893	14,199,907	14,522,048
Hand	239,411,171	232,966,441	269,247,702	4,064,083	4,173,086	4,325,005
Hyde	87,858,279	98,913,675	98,405,097	1,708,168	1,881,410	2,029,048
Hughes	575,650,876	593,558,310	627,024,285	11,516,089	11,841,751	11,848,355
Stanley	194,599,396*	153,462,174	168,218,381	2,575,804	2,764,032	2,682,083
Jones	94,342,166	91,678,038	93,563,851	1,467,164	1,422,769	1,474,117
Haakon	155,570,980	164,299,079	258,698,852	2,290,386	2,317,204	2,172,341
Jackson	108,976,730	119,490,721	121,291,084	1,748,383	1,577,426	N/A
Pennington	2,274,962,043	2,481,299,223	2,651,199,494	10,290,405	12,210,656	12,756,255
Custer	286,000,000*	N/A	260,885,920	5,279,588*	N/A	5,279,588
Fall River/Shannon	185,063,090	204,176,602	217,077,131	5,801,305	6,154,617	6,033,614

4.1.15 ENVIRONMENTAL JUSTICE

Executive Order No.12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, directs individual Federal agencies to develop approaches that address environmental justice concerns. Although the Order does not require independent agencies such as the Board to conduct environmental justice analyses, potential environmental justice issues were raised during the scoping process. SEA conducted an investigation of potential environmental justice issues because:

- the President requested that agencies comply with the Order, particularly during the NEPA process.
- the Council on Environmental Quality (CEQ) guidance and the draft Environmental Protection Agency (EPA) guidance on environmental justice emphasize addressing environmental justice concerns in the NEPA context.
- the Board is responsible for ensuring this project is consistent with the public interest.
- environmental justice concerns were raised during the scoping process.

The purpose of Executive Order No. 12898 is to identify and address disproportionately high and adverse impacts to minority and low-income populations potentially occuring due to agency actions. SEA investigated whether potential environmental justice communities were present within the project area. Census information was obtained for each county within the project area. For organizational purposes, individual counties are divided into census tracts and census tracts into census block groups. Statistical information at the census block level was obtained and reviewed for those census block groups through which the existing rail line passes, are immediately adjacent to the existing rail line, or would be crossed by any of the Extension Alternatives. Individual census block groups were determined to potentially be minority or low income based on criteria developed by the EPA and SEA. These criteria are:

- at least one-half of the census block group is of minority status
- at least one-half of the census block group is of low-income status
- the percentage of minority status for the census block group is at least 10 percentage points higher than for the entire county in which the census block group is located

- the percentage of low-income status for the census block group is at least 10 percentage points higher than for the entire county in which the census block group is located.

Based on an assessment of the rebuild portion of the project, 20census block groups were identified as potential environmental justice communities in South Dakota. Twelve block groups are located in Brookings County, 1 in Beadle County, 1 in Hyde County, 5 in Hughes County, and 1 in Jones County. Of the above census block groups, 19 were identified because their percentage of low income populations exceeded the low income populations in their respective counties by 10 or more percentage points. One of these census block groups in Hughes County was also identified because the percentage of its minority population exceeded the minority population for the county by 10 or more percentage points. The remaining census block in Hughes County met the criteria for environmental justice due to its percentage of low income populations exceeding low income populations in the county by 50 or more percentage points.

Based on an assessment of the new build portion of the project, 12 census block groups were identified as potential environmental justice communities in South Dakota. Ten census blocks identified as environmental justice communities are in Pennington County. Of these, 3 were identified as potential environmental justice communities because the percentage of their low income populations exceeded the low income population for the county by 10 or more percentage points. Three were identified as potential environmental justice communities because the percentage of their minority populations exceeded the minority population for the county by 10 or more percentage points. Four census block groups were identified as potential environmental justice communities because both the percentages of low income and minority populations exceeded the low income and minority populations for the county. One census block group in Shannon County was identified as a potential environmental justice community because at least 50 percent of the population was minority and at least 50 percent meet the criteria for poverty. One census block group in Custer County was identified as a potential environmental justice community because the percentage of its low income population exceeded the low income population for the county by 10 or more percentage points.

4.1.16 RECREATION

Recreational opportunities are abundant within the project area. Many of these opportunities center on the numerous fishing and hunting areas in the project area. Also, state, county and city parks provide numerous opportunities for recreation. A detailed description of these areas is dicussed in Section 4.1.4.8.

In Brookings County there are several parks. There is a "roadside park" approximately two miles north of the rail line and approximately two miles northeast of Aurora. There are four parks within 0.5 mile of the rail line in Brookings. Hillcrest Park is in east Brookings, Sexauer Park is in northwest Brookings, Pioneer Park is in west Brookings and an unnamed park is in southwest Brookings.

There are four unnamed parks within 0.5 mile of the existing DM&E rail line in Kingsbury County. The first park is just southeast of Arlington and the second is just southeast of Lake Preston. The last two are northwest and west of De Smet. Finally, the Lake Iroquois campgrounds are one mile south of the rail line and one mile southeast of the town of Iroquois.

There are five parks in Huron, Beadle County, that are all within 0.5 mile of the existing DM&E rail line. An unnamed park and Winter Park are both in central Huron. Ravine Park is in northeast Huron, Riverside Park is just east of Huron and Prospect Park is in southeast Huron.

A city park in Hand County, is approximately 0.5 mile north of the rail line, on the northwest side of Miller.

In Hughes County there is a "roadside park" just north of the rail line less than 2.5 miles northeast of the town of Blunt. Antelope Creek Recreation Area, approximately six miles southeast of Pierre, is on the south side of the river. West Shore and Tailrace Recreation Areas, near Oahe Dam, are approximately five miles northwest of Pierre.

There is a "roadside park" just south of the rail line and approximately 0.25 mile west of the Pennington-Jackson County line.

There are several hiking and bicycle trails in the project area. The Missouri River Trail at the Farm Island Recreation Area offers 10 miles of paved routes. These routes offer waterfront views from wooded shorelines. The La Framboise Island National Recreation Trail is in Pierre. This trail offers 8 miles of hiking trails and 10 miles of biking trails. These trails are gravel or hard-packed dirt trails on the quiet island. From these trails abundant waterfowl can often be observed. The Cottonwood Path in Ft. Pierre offers 0.4 mile of hiking trails. These trails are level sand and gravel nature trails through the Missouri River wetlands.

4.1.17 AESTHETICS

4.1.17.1 Visual Resources

As discussed in Section 4.4.18 streams and rivers with scenic or wilderness characteristics still in their free-flowing condition may be designated as Wild and Scenic under the National Wild and Scenic Rivers Act of 1968 (P.L. 90-542;16 U.S.C. 1271-1287) to protect the natural qualities they provide. A portion of the project area that would be crossed by the Extension Alternatives contains an eight mile section of the Cheyenne River, between the community of Red Shirt and its confluence with Battle Creek, considered by the USFS to be eligible for designation as Wild and Scenic.

Aesthetic resources, resources that have a pleasing appearance or effect, in the project area are quite variable. The project area contains regions of little or no human disturbance, and areas of urban build-up. Landscapes range from rugged rock formations with canyons and gulches such as is found in Badlands National Park, to the pine covered rolling hills of the Black Hills National Forest, and the open grasslands and prairies of the Buffalo Gap National Grasslands (BGNG). Scenic drives and trails are located within these natural areas. However, views of similar formations and terrain are possible at many locations throughout the area.

The Historic Prairie, including all of South Dakota, consists of a patchwork of farmlands scattered with historic towns and was the home of the Dakota Indians. The area is generally open, with few trees except for along some streams and rivers and where planted for fencerows and windbreaks and as small woodlots around farmsteads. In eastern South Dakota, the green agricultural fields and trees of spring and summer turn to a mix of colors in fall and large areas of open snow fields in the winter. In central South Dakota, the rolling hills and bluffs of the Missouri River area provide scenic beauty with the contrasts of the river, drier open grasslands and tree-covered slopes and bluffs. Western South Dakota consists primarily of grasslands and open rangeland. However, the drainages in the area have cut deep channels and wide floodplains, with steep sideslopes. Slopetops are generally wide, flat tables. High points in the area can provide spectacular views for great distances, often with little or no evidence of human occupation or development. No established scenic overlooks or vantage points are known in the areas outside the Black Hills and Badlands National Park. However, many parts of the project area are considered scenic by residents and area visitors.

Of the areas containing valuable scenic settings, only those under the management of the USFS have visual management objects. Under the current USFS grassland plan lands on the BGNG have been assigned a visual quality management object (VQO). VQO's are used to define acceptable degrees of alteration of the natural landscape. Approximately 80-90 percent of the

USFS land potentially affected by the project have a modification VQO which allows for relatively large changes in the visual contrast. However, facilities constructed in these areas are required to use materials and methods which would minimize their contrast with the surrounding landscape. The remaining 10-20 percent of USFS lands in the project area have a partial retention VQO. Partial retention VQO's are normally reserved for riparian corridors and other bodies of water. Development in areas with a partial retention VQO is restricted to activities which would not attact the attention of the casual observer.

Under the proposed USFS grassland management plan, scenic integrity levels (SIL) ranging from high to low are assigned to all proposed management areas. A high SIL indicates that human activity is not scenically evident, a moderate SIL indicates that valued landscape character appears slightly altered, and a low SIL indicates that valued landscape character appears moderately altered. For the proposed project area, SIL's are are mostly in the moderate to low range. Only approximately 10 percent of the potential project area would have a high SIL rating.

4.1.17.2 Nightlights

Nightlights exist throughout the area, most often associated with farmsteads, in the rural parts of the project area and concentrated in the communities and cities along the rail line. Lighting includes streetlights, dusk to dawn lighting and other security lights for farms, businesses and other facilities to provide security and safety. Due to the rural and undeveloped nature of the area, particularly in western South Dakota, night lights are widely scattered and, in some areas, not visible to the night time observer. Such lack of light pollution contributes to a feeling of seclusion and remoteness, as well as enabling better viewing of the night sky.

* * * * *

4.2 WYOMING - EXISTING CONDITIONS

The proposed project area in Wyoming includes the following counties: Niobrara, Weston, Campbell, Crook and Converse. These five counties are located in the northeast quarter of Wyoming. The following is a general summary of the natural and human resources that currently exist in these counties.

4.2.1 CLIMATE

The project area is in the northeastern portion of Wyoming. The area features four distinct seasons. They are cold winters and mild summers, with spring and fall acting as transitional periods. The climate is essentially uniform for the entire project area, however, differences in vegetation, soil materials and relief can cause variations in the microclimate. Average winter temperatures in the project area are about 25 degrees Fahrenheit, while average summer temperatures are near 70 degrees Fahrenheit. The average low temperatures in the winter are around 12 degrees Fahrenheit and the average high temperatures in the summer is about 80 degrees Fahrenheit. Average precipitation ranges from 11 to 14 inches. Of the average annual precipitation in the project area, 79 percent usually falls during the growing season, April to September. Table 4.2-1 summarizes climatic conditions for the counties in the project area.

Table 4.2-1
Summary of County Climatic Conditions

County	Coldest Month/Average Daily Maximum Temperature (degrees Fahrenheit)	Warmest Month/Average Daily Maximum Temperature (degrees Fahrenheit)	Average Annual Precipitation (inches)	Average Snowfall (inches)	Wettest/ Driest Month
Niobrara	January/20.8	July/72.9	14.32	42.6	May/January
Weston	January/22.9	July/73.0	14.10	37.1	June/January
Campbell	January/21.3	July/70.8	15.61	56.5	June/February
Crook	January/19.1	July/70.4	13.24	35.4	May/January
Converse	January/23.4	July/73.3	12.30	N/A	May/February

N/A - Not Available
University of Wyoming, 1999

4.2.2 TOPOGRAPHY

Nearly all of the project area in Wyoming occurs in the southern part of the northern rolling high plains. The area is at the southern end of the Powder River Basin (PRB) which is between the Casper Arch and the Big Horn Mountains to the west and the Black Hills to the northeast. This area is underlain by interbedded sandstone and shale. The topography generally consists of buttes, rolling hills, mountains and plains dissected by streams (Ensz, 1990; Nieslen, 1996; USGS, 1964).

Drainage in the project area generally runs to the southeast and east. Most surface water drains to numerous streams, creeks or ponds, which in turn drain to rivers. The main rivers these streams and creeks drain into are the Cheyenne River in the northern and eastern part of the project area, the North Platte River in the southern portion and the Powder River in the extreme northwestern corner of the project area. Most of the tributaries to the major rivers are intermittent, flowing only at snow melt or rainfall events.

4.2.3 GEOLOGY AND SOILS

The geology of the region is dominated by a large synclinal structure (folded rock layers forming a concave upward shape) known as the PRB. The PRB runs southeast/northwest and covers most of Campbell and Converse counties and the western parts of Weston and Niobrara counties (Love, 1955).

Due to the synclinal nature of the PRB, stratigraphic units (sedimentary rock layers) also trend southeast/northwest. Bedrock geology of the PRB consists primarily of Tertiary (1.8-65 million year old) and Cretaceous (65-140 million year old) sandstones, shales and coals. Dark-gray marine shale of the Pierre formation is the eastern most unit of the PRB and is located in eastern Weston and Niobrara counties. Light colored sandstone and gray sandy marine shale of the Fox Hills formation, borders the Pierre shale and is also found in eastern Weston and Niobrara counties. Brown and gray sandstone and shale containing thin coal beds of the Lance formation are found in central Weston and Niobrara counties. Light-colored massive sandstone, drab-colored shale and coal of the Fort Union formation is located in western Weston and Niobrara counties and eastern Campbell and Converse counties. Drab-colored claystone and shale, sandstone and numerous coal beds of the Wasatch formation form the center of the PRB and dominate the majority of Campbell and Converse counties (Love 1955).

Bedrock geology east of the PRB, in southeastern Weston and northeastern Niobrara Counties, is a complex interbedding of claystones, shales, siltstones, sandstones and limestone (Love and Christiansen 1985).

4.2.3.1 Unique Geological Formations

Unique geologic formations are considered to be uncommon, unusual and or containing characteristics or qualities that make them of interest to science or the general public. Known geologic features unique to this region include surface outcrops of zeolite (highly absorbent mineral), bentonite (volcanic ash) and gypsum (chalk-like mineral) present in southern areas of Weston County. Surface outcrops of coal are present in central and south-central parts of Campbell County and northern parts of Converse County. A portion of the Lance Creek Fossil Area in Niobrara County is located within the project area. The Lance Creek Fossil Area contains exposed areas of the Lance formation. The late Cretaceous, Lance Creek Formation is known to contain fossil vertebrates such as *Tyrannosaurus rex*, Triceratops, duck-billed dinosaurs, and various fossil fish. The Lance formation also contains a wide variety of fossils including snails, clams, and tropical plants. The Lance Creek Area is considered a highly significant geological area.

4.2.3.2 Soil Types and Characteristics

Niobrara, Weston, Campbell, Crook and Converse

Soils in these counties generally formed from weathered shale, sandstone, siltstone and limestone. Organic matter is slow to accumulate and fertility is low. Soils in this region are classified as: 1) entisols; 2) alfisols; 3) mollisols and; 4) aridisols. Table 4.2-2 provides the characteristics of these soils.

Table 4.2-2
General Soil Characteristics

Soil Type	Location	Characteristics
Entisol	steep slopes, alluvial basins	shallow to deep, nearly-level to very steep, well-drained, clayey to sandy loam. Concerns: low-strength, shrink-swell, frost action
Alfisols	uplands	gently sloping to very steep slopes, shallow to deep, well-drained, sandy loam. Concerns: slope and large stones
Mollisols	uplands and side slopes	nearly-level to strongly sloping, deep, well-drained, sandy loam. Concerns: frost action
Aridisols	moderate to steep sloped uplands	moderate to steep slopes, shallow to moderately deep, well-drained, clay, formed from weathered shale and crack up to two inches wide during dry periods. Concerns: shrink-swell, frost action

Niobrara, Weston, Campbell, Crook and Converse

The following (Table 4.2-3) sumarizes the soil associations and their characteristics found in the proposed project area.

Table 4.2-3
Wyoming Soil Associations Along the DM&E Extension Alternatives

County	Association	Description
Weston	Shingle-Forkwood-Cushman	Shallow to deep, well-drained, nearly level to steep soils; on uplands, alluvial fans and toe slopes. Concerns: Erosion
	Terro-Forkwood-Tassel	Shallow to deep, well-drained, gently sloping to rolling soils; on uplands, alluvial fans and ridgetops. Concerns: Wind erosion
	Savageton-Absted-Bahl	Moderately deep and deep, well-drained, nearly level to moderately sloping soils; on foot slopes and alluvial fans. Concerns: None described
	Haverdad-Bidman-Clarkelen	Deep, well-drained, nearly level to gently sloping soils; on floodplains, low terraces and small alluvial fans. Concerns: Wind erosion
Campbell	Wags-Hilight-Wibaux	Moderately deep and well-drained, fine textured soils that formed on terraces and escarpments. Concerns: Water erosion and droughtiness
	Wibaux-Teckla-Turnercrest	Deep and somewhat excessively-drained, medium to moderately coarse textured soils formed on hills and terrace breaks. Concerns: Erosion and Droughtiness
	Clarkelen-Absted	Very deep and well-drained, moderately coarse textured soils that occur on floodplains. Concerns: Water Erosion

Table 4.2-3
Wyoming Soil Associations Along the DM&E Extension Alternatives

County	Association	Description
Niobrara	Bahl-Petri-Grummit	Shallow and very deep, well-drained, nearly level to very steep on alluvial fans, terraces, hills, ridges and dip slopes. Concerns: Droughtiness and salinity
	Haverdad-Clarkelen-Draknab	Very deep, well-drained, nearly level to gently sloping soils on floodplains and stream terraces. Concerns: None described
	Kishona-Forkwood-Theedle	Moderately deep to very deep, well-drained, nearly level to steep soils on alluvial fans, terraces, hillsides dissected drainageways and ridges. Concerns: None described
Converse	Tassel-Hiland-Vonalee	Shallow and deep, well-drained and somewhat excessively drained, undulating to hilly soils; on uplands. Concerns: Erosion
	Shingle-Cushman-Bowbac	Shallow and moderately deep, well-drained, rolling and hilly soils; on uplands. Concerns: Wind erosion
	Hiland-Shingle-Ulm	Deep and shallow, well-drained, nearly level to hilly soils; on uplands and adjacent foot slopes, toe slopes and alluvial flats. Concerns: Erosion
Crook	Bidman-Razor-Winter	Very Deep to deep, moderately steep loamy and clayely soils formed from shale. Concerns: Erosion
	Shingle-Fort Collins-Cushman	Shallow to deep, gentle sloping to steep, loamy soils formed from sandstone/shale. Concerns: Erosion
	Haverson-Lohmiller-Glenburg	Very deep, nearly level, loamy soils found along floodplains and terraces. Concerns: None described

4.2.3.3 Geologic Hazards

This description covers the seismic activity in the vicinity of the proposed railroad. The United States Geological Survey (USGS) presents seismic data as the level of horizontal shaking that has a 1-in-10 chance of being exceeded in a 50-year period. Shaking is expressed as a percentage of gravity (g) (acceleration of a falling object due to gravity). For example, a shaking level of 0-2percent indicates there is a 10percent (1-in-10) chance of experiencing a shaking force exceeding 0-2percent of the force of gravity in a 50-year period. Gravitational forces of 2-4 percent could be felt by some people, but would not likely cause any structural damage.

Based on the 1996 United States Geological Survey Shaking Hazard Maps, all the counties in the project area have a 1-in-10 chance of experiencing a force of 2-4 percent of g within a 50 year period (USGS Shaking Hazard Maps 1996).

In Wyoming, portions of the Extension Alternatives would cross the Pierre Shale and Fort Union formations. These formations are highly susceptable to landslides (Radbruch-Hall *et al.* 1976). The clay-mineral content of these rocks is moderate to high making them susceptable to slumps, particularly in valleys with steep walls such as along the Cheyenne River and its tributaries.

4.2.3.4 Prime Farmland

Prime farmland is one of several kinds of farmland defined by the U.S. Department of Agriculture (USDA). It is important in meeting the Nation's needs for food and fiber. Because prime farmland is limited, the USDA recognizes the importance of wisely using this resource. Prime farmland is defined as land that is best suited to food, feed, forage, fiber and oilseed crops. It may be cultivated land, pasture, woodland or other land. Prime farmland produces the highest yields with minimal inputs of energy and economic resources and farming this land results in the least damage to the environment.

In general, there is very little prime farmland in the study counties in Wyoming. Furthermore, what is considered prime farmland must be irrigated in order for it to meet that designation. In Weston County, a maximum of 1.5 percent of land would meet the requirements for prime farmland if an adequate and dependable supply of irrigation water were available. Niobrara County has a maximum of 6.4 percent prime farmland. The southern part of Converse County contains a mere 0.1 percent and this must be irrigated. The northern part of Converse County along with Campbell and Crook counties do not contain any prime farmland.

Table 4.2-4
Prime Farmland

Area	Percentage of Acreage
Weston	1.5
Niobrara	6.4
Campbell	0.0
Converse (northern)	0.0
Crook	0.0

NRCS 1999

4.2.3.5 Paleontological Resources

Paleontological resources in the project area of Wyoming are similar to those found in western South Dakota and are described in Section 4.1.3.5. A variety of fossil plants and animals bearing geological formations occur throughout the area.

The Brule and Chadron exposures, described in Section 4.1.3.5, occur at various localities in the western extreme of the project area in Campbell County. *Paleocene* taxa within the Tongue River, Lebo and Tullock formations are terrestrial, lacustrine and marginal marine in origin and are characterized by mammals, sharks, champsosaurs, crocodiles, fish, invertebrates, plants and petrified wood. These Paleocene sedimentary deposits are collectively referred to as the Fort Union Group and they occur in the area through which the Extension Alternatives would extend to reach the Powder River Basin in eastern Wyoming. The Pierre Shale is a widespread unit occurring throughout much of the project area, including northeastern Niobrara County, Wyoming. Terrestrial and near-shore sediments of the Lance Formation occur in eastern Wyoming. The Lance Creek Formation, Sections that occur within Thunder Basin National Grassland, have a high potential to produce a large variety of fossils of excellent research value (Section 4.2.3.1).

4.2.4 LAND USE

Each of the five counties in the project area, Niobrara, Weston, Campbell, Crook and Converse, are generally rural with few cities or towns. The following Section describes the various land uses found through the project counties in Wyoming.

4.2.4.1 Agriculture

The agriculture industry in Wyoming is an important part of the economy and represents a significant use of land. Within the project area, raising livestock is a major use of agricultural land. Based on information from the 1998 Wyoming Agricultural Statistics, livestock raised in Wyoming includes cattle for dairy producers and beef, sheep for wool and meat, hogs, and poultry for eggs and meat. Crop production does not represent a major use of land in the project area; however, barley, oats, and hay are produced to varying extents in all counties within the project area. Census information categorizes all land used for agricultural purposes. However, because livestock and grazing are the primary cultural land use, farms in the area are more commonly referred to as ranches.

According to the 1992 Census of Agriculture, of the affected counties, Campbell has the most farms with 476, followed by Converse County with 305, Niobrara County had 278 farms and Weston County had 231 farms (Table 4.2-5).

Table 4.2-5
Farm Statistics-Wyoming

Area	Number of Farms (1992)	Land in Farms (1992) (1,000 Acres)
State of Wyoming	8,716	32,876.1
Niobrara County	278	1,344.6
Weston County	231	1,484.6
Campbell County	476	2,704.4
Crook County	442	1,542.3
Converse County	305	2,363.2

Between 1982 and 1987 the acres of farmland increased in Wyoming. However, from 1987 to 1996, the acres of farmland in Wyoming have decreased slightly from 34,800 acres to 34,600 acres. The number of farms increased in the State and all counties between 1982 and 1987. However, from 1987 to 1997, the number of farms in all of the project counties decreased. In the State of Wyoming, during this time period, there was also a slight decrease in the size of farms.

4.2.4.2 Residential

The project area in Wyoming is primarily rural and sparsely populated. There are several small communities near the project area (the names and populations are listed in Section 4.2.14.1 Population and Demographics. Outside these communities, residences and ranches are scattered throughout the rural areas. These rural residences commonly include a house, along with several other structures such as barns or sheds. The residences tend to be separated from one another by open space.

4.2.4.3 Business and Industrial

Many of the local businesses in the area center on manufacturing and coal production. The industries in the project area of Wyoming include: Wyoming Refining, Pope & Talbot Sawmill and Weston County Hospital and Nursing Home in Newcastle and the Wyodak Mine, Peabody/Powder River Coal Company and Tri-State Insulating company in Gillette. Coal mines in the PRB are major employers in the region. Eleven of these mines, including Belle Ayr, Caballo, Cordero Rojo, Cordero, Coal Creek, Jacobs Ranch, Black Thunder, Antelope, North Antelope / Rochell Complex, and Antelope are located south of Gillette and would be accessed by this proposed project.

4.2.4.4 Minerals and Mining

The mineral and energy reserves found in this region are among the most productive in the United States (USGS 1996). The Powder River Basin contains large reserves of oil, natural gas and coal (De Bruin 1996). Additionally, zeolite (highly absorbent mineral), bentonite (volcanic ash), gypsum (chalk-like mineral), sandstone, limestone, calcareous shale and uranium are mined in the region (Harris 1996; Hausel et al 1979).

Coal

Wyoming produced almost 210 million tons of coal in 1993 which ranks Wyoming first in the United States in production. Coal from the Powder River Basin occurs in deep veins with comparatively little overburden, or soil, covering the coal. This makes the coal easy and economical to mine, which is done in open pits using draglines, trucks and conveyors. Of the affected counties in the project area, Campbell County produces the most coal. Its 16 active mines produce approximately 85 percent of the coal produced in Wyoming and approximately 18 percent of the total national production. The Powder River Basin in Campbell County is a region of extensive exploration and development of energy resources. The coal from this region tends to have low quantities of sulfur and ash which makes it one of the cleanest coals mined in the United

States (USGS 1996). The economical mining of PRB coal and its clean burning characteristics make this coal highly desirable as a fuel source.

Oil and Gas

Oil and gas have been produced in the project area since the early 1900's. Production and exploration continue today. Numerous oil and gas fields occupy the region (De Bruin 1996). Some of the larger fields are Highland Flats Oil Field which is east of Highland Flats along Walker Creek, between the towns of Bill and Dull Center.

Almost 89 million barrels of crude oil were produced in Wyoming in 1993, ranking it fourth in the country. This oil is used as motor fuel and in the manufacture of medicines, plastics and other products from paints to synthetic rubber.

Wyoming's natural gas production in 1993 amounted to 1,054,699,787 thousand cubic feet, ranking it sixth in the nation in natural gas production. Industrial, commercial and domestic heating are the major markets for this gas. The PRB region is currently experiencing a rapidly expanding coal bed methane industry with hundreds of new wells being constructed each year to utilize this resource.

Bentonite

Wyoming leads the nation in production of bentonite. It produced 2.5 million tons in 1993. Bentonite is primarily used by the oil drilling industry, but it is also used in cosmetics, foods, cement manufacturing, toothpaste, wine clarification, as an animal feed binder, and for water softeners. There are bentonite deposits throughout the PRB.

4.2.4.5 Public Facilities

Many communities in the project area are small. Some communities have elementary, middle and senior high schools. Many of the communities have clinics and/or doctor and dentist offices. However, most of the communities do not have hospitals. Hospitals are found in the major towns such as Gillette and Newcastle. Most of the communities have churches and offer recreational facilities such as city parks. Some of the smaller communities have volunteer fire departments and rely on county sheriffs for public protection services.

4.2.4.6 Federal Lands

4.2.4.6.1 Forest Service Lands

The Thunder Basin National Grassland (TBNG) is located in northeastern Wyoming and is one of the 20 National Grasslands that make up the Northern Great Plains. It occupies approximately 572,000 acres of land forming a mosaic land pattern of Federal, state and private land ownership, together totaling over 1.8 million acres. These lands generally lie between an area bordered by Douglas on the south, Newcastle on the east, Gillette on the north and Wright on the west. The TBNG is administered by the U.S. Forest Service (USFS), Medicine Bow-Routt National Forest, Douglas Ranger District, Wyoming. TBNG are present in all the project area counties.

TBNG appears quiet and empty, dominated by sky and wind, stretching from horizon to horizon. However, it contains a diversity of landforms, vegetation and wildlife. The TBNG is a blend of mixed-grass prairie, sagebrush grassland, cottonwood and ponderosa pine/juniper vegetation, with a variety of wildlife including pronghorn, elk, deer and prairie dogs. It is managed for a variety of resources and uses such as livestock grazing, wildlife habitat, minerals production, and recreation.

TBNG was originally called the Northeastern Wyoming Land Utilization Project. The land was later managed by the U.S. Soil Conservation Service (now the U.S. Natural Resources Conservation Service) from 1938-1953. In 1954, the lands were transferred to the U.S. Department of Agriculture and the USFS for management. In 1960, the Land Utilization Project was renamed the National Grasslands and divided into units, one of which became the TBNG (Schmitzer 1999)

In addition to the TBNG, the USFS manages the Black Hills National Forest. Black Hills National Forest is located on the very eastern edge of the project area in Crook and Weston counties, on the South Dakota border.

The USFS is required to inventory, evaluate and consider all roadless areas for possible inclusion in the National Wilderness System. In June of 1977, the USFS initiated a comprehensive process to evaluate areas to be designated roadless and undeveloped. The process by which these lands were evaluated is known as the Roadless Area Review and Evaluation, or RARE II. A RARE II area is one that has met the following criteria:

- the area must be larger than 5,000 acres or, if smaller, contiguous to a designated wilderness or primitive area;

- the area could not contain improved roads maintained for travel by standard passenger-type vehicles;

- the area must be inventoried by the USFS for possible inclusion in the National Wilderness Preservation System.

Some of the areas that were originally designated as Roadless, were included in RARE II. However, no lands were identified on the TBNG in Wyoming under the RARE II process.

As a result of recent revisions to the USFS grassland management plan, a new roadless designation has been created. Under this process, areas are designated as Inventoried Roadless areas. The criteria for this designation, while similar to RARE II, has been modified to allow more lands to meet the standards for inclusion in the National Wilderness Preservation System. There are 3 Inventoried Roadless Areas of the TBNG. Two of these areas, the 5,060 acre HA Divide Inventoried Roadless Area, and the 6,840 acre Red Hills Inventoried Roadless Area are within 2 miles of the project area. The third, the 10,450 acre Cow Creek Buttes Inventoried Roadless Area is approximately 16.0 miles from the project area.

4.2.4.6.2 Bureau of Land Management Lands

Lands managed by the Bureau of Land Management (BLM) occur throughout the project area. These lands were established to manage public lands for public need and environmental conservation. These lands were established as discussed in Section 4.1.4.6.3. Public lands provide many opportunities for commercial activities from mining of coal, natural gas and oil as well as fertilizer minerals, gold, silver and other metals; timber production; livestock grazing; and rights-of-way for other permits and leases. In Wyoming, the BLM is a major manager of public lands and is responsible for mineral leases, including those for the extraction of coal. Additionally, BLM lands also represent a large part of the Nation's natural and cultural heritage. The BLM is usually required to inventory, evaluate and protect such features as rare geologic formations; rare and vulnerable plant and animal communities; wild free-roaming horse and burro herds; wilderness areas and Wild and Scenic Rivers; and paleontological, archaeological and historical sites. BLM lands also offer many recreational opportunities. The BLM administers many fishable streams, lakes and reservoirs, floatable rivers, boating access points, National Back Country Byways, Watchable Wildlife sites and multiple use trails. (BLM, Communications Directorate).

4.2.4.6.3 Bureau of Reclamation Lands

No Bureau of Reclamation Lands occur in the project area of Wyoming.

4.2.4.6.4 Fish and Wildlife Service Lands

No Fish and Wildlife Service Lands occur in the project area of Wyoming.

4.2.4.7 Reservation and Treaty Lands

No reservation lands occur in the project area of Wyoming. However, Indian trust assets associated with the 1868 Fort Laramie Treaty are included in the project domain.

4.2.4.8 State Lands

There are state lands dispersed throughout the project area. Much of this land is leased to local ranchers for grazing.

The nearest state park is Keyhole State Park which is northeast of Moorcroft in Crook County. Fort Fetterman in Douglas, is the closest State Historic Site, located slightly more than 45 miles south of the project area.

4.2.4.9 Utility Corridors

Public utility power lines, telephone cables, oil, gas and water pipelines and roads exist throughout the area. Many private pipeline facilities, including water pipelines to provide livestock watering and oil and natural gas well collector pipelines crisscross the project area.

4.2.5 WATER RESOURCES

4.2.5.1 Surface Water

Surface waters in the project area include rivers, streams, lakes and ponds. The major rivers in the project area include the Cheyenne, the North Platte and the Belle Fourche Rivers. The Belle Fourche drains the area north and west of the Black Hills and flows northeastward into South Dakota. The Cheyenne River drains the area south of the Black Hills and flows eastward into South Dakota. The North Platte and its tributaries drain most of the southeastern quarter of Wyoming. There are many other minor, intermittent and perennial streams and creeks both

named and unnamed in the project area which flow only as a direct result of runoff from snowmelt and rainfall.

Rivers and tributaries in northeastern Wyoming provide limited sources of water for domestic, commercial, agriculture and industrial uses. The majority of this water has long been appropriated for agriculture use and irrigation.

Lakes and reservoirs in the project area include: Hansen Lakes, Rochelle Lake, Hay Lake, Bill Smith Reservoir, Little Thunder Reservoir, MW Lake, Robb Reservoir, Porcupine Reservoir and Reno Reservoir. In addition, small ponds and intermittent lakes occur throughout the project area. They are usually found in pasture land and serve to provide watering areas for livestock.

4.2.5.2 Floodplains

Larger rivers within the project area contain floodplain areas. Rivers with some kind of floodplain development include the Cheyenne River, Belle Fourche River and North Platte River. The Cheyenne River is partially impounded by the Angustora Dam in South Dakota. However, neither it or the other rivers are impounded within the project area of Wyoming. All these rivers experience dramatic seasonal fluctuations in water levels due to heavy rains or rapid snow melt, often resulting in flooding throughout the drainages.

4.2.5.3 Wetlands

Wetlands found within the project area are important regional ecosystems. These natural communities provide filtration of sediments and pollutants from surface water runoff, flood water retention, erosion control, resting, foraging, and nesting habitat for waterfowl and mammals, fish spawning and nursery, and amphibian habitat.

Wetlands are defined, for regulatory purposes, in the Clean Water Act. This definition is used by the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (COE) to administer the permit program outlined in Section 404 of the Act. Wetlands under COE juridicition are defined as follows:

> "Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987). Wetlands generally include swamps, bogs and similar areas (40 CFR 230.3 and 33 CFR 328.3)."

In order to be classified a wetland, a site must possess three characteristics, hydric soils, a dominance of hydrophytic vegetation, and wetland hydrology.

Wetlands found in the project area may be classified in three categories based on the dominant vegetation occurring at the site. Forested wetlands are characterized by woody vegetation that is greater than 6.0 meters tall (Cowardin et al. 1979). The dominant trees found in forested wetlands within the project area are cottonwood (*Populus* spp.) and willow (*Salix* spp.). These wetlands occur along major streams and rivers within the project area. In addition, these wetlands are often only seasonally flooded during the spring and during heavy run-off periods. These wetlands are the least common of the three wetland categories found in the project area of Wyoming. These wetlands provide valuable wildlife habitat as well as other wetland functions.

Scrub/shrub wetlands are characterized by woody vegetation less than 6.0 meters in height. These wetlands consist of a mixture of shrubs and small trees. Common species found in scrub/shrub wetlands include willow (*Salix* spp.), silver sagebrush (*Artiemisia cana*), and plains cottonwood (*Populus deltoides*). Within the project area these wetlands are found along rivers and perennial streams. Only slightly more common than forested wetlands, shrub/scrub wetlands are also uncommon in the project area and provide important wildlife habitat.

Emergent wetlands found within the project area include wet meadows and aquatic bed wetlands. The wet meadows contain a mixture of bulrushes (*Scirpus* spp.), Baltic rush (*Juncus balticus*), prairie cord grass (*Spartina pectinata*), switch grass (*Panicum virgatum),* and Nebraska sedge (*Carex nelrascensis*). The aquatic bed wetland includes plant species such as cattails (*Typha latifolia* and *Typha angustifolia*), and sedges (*Carex* spp.). Aquatic bed wetlands in the project area are typically associated with stock ponds and river oxbows.

4.2.5.4 Groundwater and Wells

4.2.5.4.1 Groundwater

Lower Cretaceous aquifers

The Lower Cretaceous aquifer, located beneath the upper Cretaceous aquifers, are the most widespread aquifers in the Northern Great Plains aquifer system, but contain little freshwater. They are exposed at the land surface mostly as wide or narrow bands that completely or partly encircle basins or uplifted areas. The lower Cretaceous aquifers commonly contain highly mineralized water where they are deeply buried.

Porosity and permeability are variable in the lower Cretaceous aquifers. Yields of most wells completed in these aquifers range from 5 to 60 gallons per minute, although some wells may yield 500 to 1,000 gallons per minute. Many wells completed in the Lower Cretaceous are drilled to considerable depths. Some wells completed in the aquifers are 5,000 feet deep or more.

Paleozoic aquifers

The Paleozoic aquifers are the deepest aquifers in the project area in Wyoming. They are exposed at the land surface only at small areas. These aquifers consist mostly of limestone and dolomite, but some Paleozoic sandstones also yield water. Confining units that overlie and separate the aquifers consist of shale and siltstone with some beds of anhydrite and halite (rock salt). Except near the mountains, the aquifers in lower Paleozoic rocks are deeply buried and, therefore, are not a major source of water.

The Paleozoic aquifers receive recharge (when water enters the aquifer) where they are exposed at the land surface on the flanks or crests of anticlines or by downward leakage from shallower aquifers in places where the shallower aquifers have higher hydraulic heads. Recharge areas of the Paleozoic aquifers generally are at high altitudes and, in the subsurface, the aquifers are overlain by confining units in most places.

Where they are buried to great depths, the Madison Limestone and older, permeable Paleozoic rocks contain oil, gas and brine in places. Fresh groundwater that moves around the margins of bodies of brine can become highly mineralized as it mixes with the dense brine.

4.2.5.4.2 Wells

Lower Tertiary aquifers

The Lower Tertiary aquifers are the uppermost aquifers and are composed of sandstones interbedded with shale, mudstone, siltstone, lignite and coal. Some of the coal beds produce water, especially if the coal has been fractured. Most of the water in the lower Tertiary aquifers is in pore spaces between individual grains that compose the sandstone aquifer, but some of the aquifers contain fractures, bedding planes and joints that provide large-scale openings which store and transmit most of the water.

Permeability of the lower Tertiary aquifers varies. Yields of most wells completed in the lower Tertiary aquifers range from 1 to 50 gallons per minute in Wyoming. Maximum yields exceed 1,000 gallons per minute in Wyoming. These aquifers are deeply buried or overlain by

fine-grained rocks in many places. Wells completed in the aquifers commonly are 300 to 900 feet deep and locally are 1,000 to 3,000 feet deep.

Upper Cretaceous aquifers

The Upper Cretaceous aquifers are located beneath the lower Tertiary aquifers. Upper Cretaceous aquifers mostly are deeply buried but are exposed locally at the land surface as a narrow to wide band that borders the lower Tertiary aquifers. The upper Cretaceous aquifers consist of consolidated sandstone and are underlain by a thick sequence of shale that forms a confining unit which separates them from aquifers in older rocks. Most of the water in the sandstone aquifers is in pore spaces between individual grains of sand, but some of the aquifers contain fractures, bedding planes and joints that provide large-scale openings which store and transmit most of the water.

Locally, where the shale is fractured or deeply weathered, it may yield sufficient water for domestic supplies. The aquifers are down warped and faulted to depths of several thousand feet in these basins but contain mostly saline water in their deeper parts. The principal water-yielding formations are the Hell Creek Formation and the Fox Hills Sandstone.

4.2.6 AIR QUALITY

Existing sources of emissions in the project area include railroad locomotives, automobiles, trucks and farm equipment. Vehicle traffic in the project area is responsible for tailpipe emissions including nitrogen oxides (NO_x), carbon monoxide (CO), and sulfur dioxide (SO_2). The primary pollutant produced by locomotives and farm equipment is NO_x. Farming and ranching activities and vehicles using unpaved roadways are sources of fugitive dust. There are also emissions created from manufacturing, construction and mining operations, including coal mining and coal bed methane development.

The Clean Air Act, which was last amended in 1990 (CAAA), requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The EPA, Office of Air Quality Planning and Standards (OAQPS) has set NAAQS for six principal pollutants, which are called "criteria pollutants." They include: sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), lead (Pb) and particulate matter (PM). The State of Wyoming has developed its own standards (Wyoming Ambient Air Quality Standards - WAAQS) for these pollutants. Wyoming's standards are at least as stringent as the EPA standards. Air quality for the Wyoming project area is within admissible levels for both standards. The Environmental Impact Statement for the Newcastle Resource Management Plan (Bureau of Land Management) indicates that the air quality in east central Wyoming is generally excellent.

4.2.7 NOISE

The project area in Wyoming is primarily rural. Rail, automobile, truck traffic, and wind are the primary noise sources in the project area. Highways and rail lines throughout the project area contribute to ambient noise levels. Another noise source in Campbell County includes noise generated by blasting, truck and rail traffic, and other activities associated with coal production.

The proposed project area includes several communities. Many of these communities are currently or would potentially as a result of the project, be exposed to various types and levels of rail noise. Wayside noise includes the noise generated by a passing train. Locomotive engine noise, rail noise and car noise contribute to wayside noise. Additionally, trains are required to sound a warning horn when approaching a public grade crossing. Horn soundings are required from approximately 0.25 mile, depending on train speed, prior to a highway/rail grade crossing until the locomotive passes through the crossing. Horn noise is significantly louder than wayside noise and is designed to provide adequate warning to motorists and pedestrians of an approaching train. Noise receptors along a rail line may be exposed to one or both types of noise. Because horn noise is significantly louder than wayside noise, it extends further from the rail line and affects a greater number of noise receptors. The Surface Transportation Board (Board) considers residences, schools, libraries, hospitals, retirement homes, and nursing homes as sensitive to noise.

The following provides a brief profile for the communities in Wyoming within the proposed project area. Included in the profiles are communities which, although they appear on USGS topographical maps and are used as landmarks, likely have no human population and therefore no noise receptors. Table 4.2-6 provides the number of noise sensitive receptors along the existing Burlington Northern Santa Fe (BNFS) rail line or Alternative D currently experiencing average daily noise levels of 65 decibels or more (Ldn 65 contour). A summary of the community profile information is provided in Table 4.2-7.

Weston County

The BNSF rail line trends southeast to northwest through Clifton. Population counts were not available, but are likely below 100. There are no public grade crossings in the community. Noise sensitive receptors in the 65 dBA L_{dn} contour number one.

The BNSF rail line trends south to north through Owens. Population counts were not available, but are likely below 100. There are no public grade crossings in the community. One noise sensitive receptors is within the 65 dBA L_{dn} contour.

The BNSF rail line trends southeast to northwest then west through Newcastle. The 1990 population of Newcastle was 3,240. There are 8 public grade crossings in the community. There are 83 noise sensitive receptors in the 65 dBA L_{dn} contour.

The BNSF rail line trends south to north on the east side of Osage. The 1990 population of Osage was 350. There are 2 public grade crossings in the community. There are 14 noise sensitive receptors in the 65 dBA L_{dn} contour.

The BNSF rail line trends southeast to northwest through Clay Spur. Population counts were not available, but are likely below 100. There is one public grade crossings in the community. One noise sensitive receptors is within the 65 dBA L_{dn} contour.

The BNSF rail line trends southeast to northwest through the south part of Upton. The 1990 population was 985. There are 2 public grade crossings in this community. There are 11 noise sensitive receptors in the 65 dBA L_{dn} contour.

The BNSF rail line trends southeast to northwest through Bentley. Population counts were not available for Bentley, but are likely below 100. There is one public grade crossings in the community. There are no noise sensitive receptors in the 65 dBA L_{dn} contour.

The town of Morrisey occurs in rural Weston County. No population information is available for Morrisey, but it is believed to be zero. No rail lines currently pass through this town

In addition, the towns of Dakoning, Spencer, Jerome, Colloid, and Thorton occur in rural Weston County. However they have no grade crossings and no noise receptors.

Crook County

The existing BNSF rail line trends southeast to northwest through the southern part of Moorcroft. The 1990 population of Moorcroft was 768. There are 2 public grade crossings in the community. There are 5 noise sensitive receptors in the 65 dBA L_{dn} contour.

Campbell County

The existing BNSF rail line trends east to west north of Rozet. Population counts were not available, but are likely below 100. There is one public grade crossings in the community. There are 7 noise sensitive receptors in the 65 dBA L_{dn} contour.

Table 4.2-6
Noise Sensitive Receptors Exceeding 65 dBA L_{dn}
Along Existing BNSF Rail Line - Wyoming

Community	Number of Existing Noise sensitive Receptors			
	Wayside	Wayside/horn	Horn	Total
Dakoming	0	0	0	0
Clifton	0	0	1	1
Owens	1	0	0	1
Spencer	0	0	0	0
Newcastle	0	0	83	83
Osage	0	0	14	14
Clay Spur	0	0	1	1
Jerome	0	0	0	0
Upton	0	0	11	11
Colloid	0	0	0	0
Bentley	0	0	0	0
Thornton	0	0	0	0
Moorcroft	0	0	5	5
Rozet	0	0	7	7

Table 4.2-7
Summary Information for Wyoming Communities Along the Extension Alternatives

County	Community	Rail Line Location	Community Population[1]	Public Grade Crossings	ADT	Noise sensitive Receptors [1]
Weston	Morrisey	east to west south of the town	Not available	Morrisey Road	25	0
	Dakoming	south to north through the town	Not available	None	--	0
	Clifton	southeast to northwest through the town	Not available	None	--	1
	Owens	south to north on the east side of town	Not available	None	--	1
	Spencer	south to north through the east side of town	Not available	None	--	0
	Newcastle	southeast to northwest then west through the city	3,240	US 85 Faye Ave US 16 By-pass W Main Street Walker Ave Williams Ave Grove	100 221 100 4700 652 100 1189	83
	Osage	south to north on the east side of town	Not available	E Railroad St Skull Creek Road	252 480	14

Table 4.2-7
Summary Information for Wyoming Communities Along the Extension Alternatives

County	Community	Rail Line Location	Community Population[1]	Public Grade Crossings	ADT	Noise sensitive Receptors [1]
Weston *(Continued)*	Clay Spur	southeast to northwest through town	Not available	Baroid Road	100	0
	Jerome	south to northwest north of the town	Not available	None	--	0
	Upton	southeast to northwest through the south part of town	985	Highway 116 Pine Street	790 35	11
	Colloid	southeast to northwest on the north side of town	Not available	None	--	0
	Bentley	southeast to northwest through the town	Not available	Thorn Road	100	0
	Thornton	southeast to northwest south of the town	Not available	None	--	0
Crook	Moorcroft	southeast to northwest through the southern part of town	768	Warbonnet Road S. Big Horn Ave	20 33	5
Campbell	Rozet	east to west north of Rozet	Not available	Bishop Road	100	7

[1]1990 Census Data

4.2.8 BIOLOGICAL RESOURCES

4.2.8.1 Vegetation

Vegetation in the project area includes several generalized ecosystems, including short- and mixed- grass prairies, riparian areas, and wetlands. These different plant communities are influenced by several factors such as rainfall, evaporation, and soil characteristics.

Most of the project area consists of grasslands. Some of these grasslands in the Great Plains have been plowed for winter wheat production, but large tracts of grass and shrub-dominated vegetation remain. Wherever grasslands occur, specific plant species composition changes in response to topographic gradients such as from hilltops to valley bottoms. Valley bottoms are generally more fertile and mesic than hilltops.

Shortgrass prairie is dominated by blue grama (*Bouteloua gracilis*) and buffalo grass (*Buchloë dactyloides*). Prickly pear (*Opuntia* spp.), yucca (*Yucca glauca*) and scarlet globemallow (*Sphaeralcea coccinea*) are common forbs found in this plant community.

Mixed-grass prairies can be divided into several types, but are all characterized by needle-and-thread grass (*Stipa comata*), western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis)*, threadleaf sedge (*Carex* spp.), Indian ricegrass (*Oryzopsis hymenoides*), pricklypear cactus, scarlet globemallow, fringed sagewort (*Artemisia campestris)* and various species of milkvetch (*Astragulus* spp.) and locoweed (*Oxytropis* spp.). There may be fifty or more plant species per hectare present within a mixed grass prairie. Mixed-grass prairies in the foothills are typically dominated by bluebunch wheatgrass (*Agropyron spicatum)*, little bluestem (*Andropogon scoparius)* and sideoats grama (*Bouteloua curtipendula).* On sandy soils, Indian ricegrass, prairie sandreed *(Calamovovilfa longifolia)*, sand dropseed *(Sporobolus cryptandrus)*, sand sagebrush *(Artemisia filifolia)*, and yucca may be common. Saline soils lead to an increased abundance of such halophytes as alkali sacaton *(Sporobolus airoides)*, four-wing saltbush *(Atriplex canescens)*, greasewood (*Sarcobatus vermiculatus),* and inland saltgrass (*Distichlis spicata).*

The big sagebrush (*Artemisia tridentata*) Shrub land plant community occurs throughout the project area. Species common to the community on eroded or disturbed sites include silver sagebrush and rabbitbrush (*Chrysothamnus nauseosa*). Greasewood is common in depressions and floodplains. Understory species present include western wheatgrass, blue grama, prairie June grass (*Koeleria macrantha*), needle-and-thread grass, pricklypear cactus and scarlet globe mallow.

The coniferous forest community is dominated by Rocky Mountain juniper (*Juniperus scopulorum*), with ponderosa pine (*Pinus ponderosa*) as an overstory species. Common shrub species found include current (*Ribes cereum*), sumac (*Rhus* spp.) and yucca. Grasses occurring in the forest include needle grass, blue grama, and sideoats grama.

The riparian plant community is found along rivers, streams, wetlands, and lakes within the project area. This plant community is often a transition zone between wetlands and uplands. Riparian areas are often wetter and more nutrient rich than the adjacent uplands. These conditions result in rich soils and lush vegetation growth. Common plant species found include plains cottonwood (*Populus deltoides*), willow (*Salix* spp.), green ash (*Fraxinus pennsylvanica*), chokecherry (*Prunus virginiana* var. *interius*), buffaloberry (*Shepherdia* spp), and skunkbush (*Rhus aromatica* var. *trilobata*). This community provides important wildlife habitat and is heavily utilized by livestock.

A portion of the project area in Wyoming is used for cropland. Wyoming has the second largest average sized farms and ranches in the nation. Typical crops grown in the project area include spring wheat, winter wheat, hay, sunflowers and oats. Land that is not used for crop production is often managed as pasture or rangeland for grazing by sheep, cattle, horses and wildlife. Most pasture forage is native, especially blue grama grass, western wheatgrass, big sagebrush, needle grasses, and June grass.

Livestock grazing is widespread within the project area. The USFS and BLM manage grazing allotments on their properties along the proposed alternatives. TBNG, Douglas Ranger District, manages the Forest Service allotments. BLM allotments are managed by the Newcastle or Buffalo Field Offices.

Cattle are the principal livestock grazed on the allotments. However, sheep, horses, and bison graze on several of the public land allotments. The carrying capacity of the allotments varies from about 1.7 to 11.9 acres/animal use (AUM), with the average of all the allotments being about 4.5 acres per AUM. An AUM is defined as the amount of forage needed to sustain a 1,000 pound animal for 1 month and is equivalent to about 800 pounds of air-dry foliage. The carrying capacity of the allotments varies with soil type, vegetation type (forage production), slope and water availability. The grazing season may begin as early as March and extend to December on some allotments. However, for most allotments the total grazing period on public and private lands is April to November.

Allotments are monitored periodically to determine range condition, production and trend. In the proposed project area, the public lands are typically scattered 40- to 80-acre parcels that

are surrounded by private lands and generally not accessible to the public. Most of the ranchers using these parcels generally have a low percentage of public land in their total operations.

Rangeland is the dominant land-use category within the project area. Rangeland is dominated by naturally occurring grasses, and forbs. Common species occurring in rangeland include bluestems, grama grasses, wheatgrasses, needlegrasses and fescues.

Shrub and brush dominated rangeland occurs in more arid and semi-arid areas. They are characterized by woody stem vegetation. Some of the common species occurring in this rangeland include big sagebrush, shadscale (*Atriplex confertifolia)*, saltbush and greasewood. Part of the project area also crosses mixed rangeland which is classified as being one-third of either shrub/brush or herbaceous plant species. Both of these range types are important for grazing and wildlife habitat within the project area.

Sensitive Species

Table 4.2-8 lists known rare plant species for the study counties in Wyoming.

Table 4.2-8
Known Rare Plants - Wyoming

Common Name	Wyoming Status	Date Observed
Niobrara County		
robust toothcup	S1	1984
long-stalked racemose milkvetch	S1	1979
Weston County		
Barr's milkvetch	S3	1978
Barr's milkvetch	S3	1991
Barr's milkvetch	S3	1993
Campbell County		
Barr's milkvetch	S3	1978
Barr's milkvetch	S3	1985
Barr's milkvetch	S3	1991

Table 4.2-8
Known Rare Plants - Wyoming

Common Name	Wyoming Status	Date Observed
Converse County		
merlin	S2B, SZN	1991
rosy palafoxia	S1	1979

S1 - extremely rare
S3 - rare
S2B - very rare
SZN - species which are not of significant status when migrating through or wintering in Wyoming
(Wyoming Natural Diversity Database 1998)

4.2.8.2 Wildlife

In the project area wildlife is an important resource that provides recreational, aesthetic, and economic benefits.

4.2.8.2.1 Big Game

Big game located in the project area include pronghorn (*Antilocapra americana*), mountain lion (*Felis concolor*), mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*) and white-tailed deer (*Odocoileus virginianus*).

Pronghorn

Pronghorn are found yearlong in the project area. Their general habitat is open, rolling sagebrush/grasslands. Pronghorn-range throughout the project area is considered to be winter/year-long, meaning a portion of the area is used by pronghorn at all times of the year. However, during winter there is a significant influx of animals to this area from other seasonal ranges. Also, a large portion of the Antelope Creek area in northern Converse County serves as severe winter range for the pronghorn. This winter range is used occasionally during extremely severe winters.

Mule Deer

Mule deer are found throughout the project area. The Thunder Basin Mule Deer Herd Unit is located within the project area. This population includes deer in the southeast portion of

Campbell County, northern Niobrara County, and Weston County. The project area also includes the Black Hills Mule Deer Herd Unit. Winter/year-long and year-long seasonal ranges for mule deer occur in the project counties.

White-tailed Deer

White-tailed deer inhabit coniferous forests, cottonwood riparian corridors, and agricultural croplands within the project area. The Thunder Basin White-Tailed Deer Herd Unit, which encompasses Campbell, Weston, Niobrara, and eastern Converse counties and the Black Hills White-Tailed Deer Herd Unit are within the project area. These herd units include both yearlong and winter white-tailed deer seasonal ranges.

Elk

Elk inhabit the Rochelle Hills area which includes southeast Campbell, southwest Weston, and north central Converse counties. This area is characterized by ponderosa pine woodlands and savannah, along with mixed sagebrush and short-grass prairie. The New Rochelle Hills Herd Unit occurs in areas classified as year-long and winter/year-long seasonal range. The project area also contains elk parturition areas where cows congregate to give birth. In addition, portions of the Black Hills Herd Unit can be found within the project area.

Mountain lions

Mountain lions, also known as pumas, cougars, panthers and catamounts, live mostly in the mountains and foothills near the proposed project area. Relatively intolerant of human activity, they seek remote areas with large populations of deer, their preferred food source. Mountain lion are hunted in Wyoming, in very limited numbers, and the project area would cross Mountain Lion Hunt Area 21 in the northeast corner of the State.

4.2.8.2.2 Game Species

Upland Game Birds

Game birds in the project area include sage grouse (*Centrocercus urophasianus*), sharp-tailed grouse (*Tympanuchus phasianellus*), gray or Hungarian partridge (*Perdix perdix*), wild turkey (*Melegris gallopavo*) and mourning dove (*Zenaida macroura*). The sage grouse is the most common game bird within the project area. However, sage grouse numbers in the project area have declined over the past 20 years (Heath *et al.*, 1997). Sage grouse live and feed in areas of sage brush habitat close to water and are generally near a lek or breeding ground. There are

several sage grouse leks within the project area. The habitat of the sharp-tailed grouse is primarily grassland interspersed with shrub- and brush-filled draws. The Hungarian (gray) partridge was introduced into Wyoming in 1938. It lives in a mixture of cultivated and non-cultivated land; grasslands interspersed with wheat fields, weed patches and brushy cover. The wild turkey is located in the eastern and northern parts of the study area. It was introduced into Wyoming beginning in 1935. The wild turkey's habitat includes open ponderosa pine forests in rugged terrain interspersed with grassland and brushy draws.

Waterfowl

Although the project area of Wyoming is dry compared to areas of Minnesota and eastern South Dakota, it is still utilized by a wide variety of waterfowl. During the summer months, a diversity of waterfowl nest throughout the area, utilizing what water is available in stock ponds, irrigation ponds, and streams. Nesting occurs in association with these wetlands and in adjacent uplands, including rangeland and sagebrush areas. While a large variety of ducks use the area, the available habitat limits their numbers. During the spring and fall, the number and variety of waterfowl in the area increases as birds migrating south from more northerly breeding grounds in Montana and Canada move through the area. Species utilizing the area include mallard, pintail, gadwall, green-winged teal, blue-winged teal, shoveler, wigeon, redhead, canvasback, ringneck, wood duck, and Canada goose.

Small Game and Furbearers

Small game and furbearers in the project area in Wyoming include desert cottontail rabbit (*Sylvilagus audoboni*) and whitetail jackrabbit (*Lepus townsendi*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), yellow-bellied marmot (*Marmota flavinentris*), porcupine (*Erethizon dorsatum*), raccoon (*Procyon lotor*) and badger (*Taxidea taxus*). There are also many blacktail prairie dog (*Cynomys ludovicianus*) towns within the project area. These species occur in a diversity of habitats and are found throughout the project area.

4.2.8.2.3 Non-game Species

Amphibians

Amphibians present in the project area include the tiger salamander (*Ambystoma trigrinium*), great plains toad (*Bufo congnatus*), woodhouse's toad (*Bufo woodhousei woodhousei*) and northern leopard frog (*Rana pipiens*). These species are generally restricted to wetland or riparian areas providing water for breeding.

Reptiles

Reptiles present in the project area include the short-horned lizard *(Phrynosoma douglassii)*, sagebrush lizard (*Sceloporus graciosus*) prairie rattlesnake (*Crotalus viridis*), bullsnake (*Pituophis melanoleucas sayi*) and plains hognose snake *(Heterodon nasicus)*. These species occur in a variety of habitats throughout the project area.

Songbirds

Many of the songbird species found in the proposed project area of Wyoming are similar to the South Dakota species. Common grassland birds include the Eastern kingbird (*Tyrannus tyrannus*), Western kingbird (*Tyrannus verticalis*), Western flycatcher (*Empidonax difficilis*), horned lark (*Eremophila alpestris*), warbling vireo (*Vireo gilvus*), vesper sparrow (*Pooecetes gramineus*), song sparrow (*Melospiza melodia*) and lark bunting (*Calamospiza melanocorys*)

In riparian areas the tree swallow (*Tachycineta bicolor*), bank swallow (*Riparia riparia*), cliff swallow (*Hirundo pyrrhonota*), barn swallow (*Hirundo rustica*), gray jay (*Perisoreus canadensis*), black-billed magpie (*Pica pica*), American crow (*Corvus brachyrhynchos*), black-capped chickadee (*Parus atricapillus*), house wren (*Troglodytes aedon*), American robin (*Turdus migratorius*), loggerhead shrike (*Lanius ludovicianus*) and European starling (*Sturnus vulgaris*) may be found.

Shorebirds

Shorebirds utilize habitats in the project area similar to those of waterfowl. Common shorebirds in the project area include Virginia rail (*Rallus limicola*), sora rail (*Porzana carolina*), American coot (*Fulica americana*), common snipe (*Capella gallinago*), killdeer (*Charadrius vociferus*), mountain plover (*Charadrius montanus*), greater yellowlegs (*T. melanoleuca*), lesser yellowlegs (*T. flavipes*) and spotted sandpiper (*Actitis macularia*).

Small Mammals

Small mammals that may occur in the project area include the dwarf shrew (*Sorex namus*), short-tailed shrew (*Blarina brevicauda*), little brown myotis (*Myotis lucifugus*), long-eared myotis (*Myotis evotis*), silver-haired bat (*Lasionycteris noctivagans*), big brown bat (*Eptesicus fuscus*), least chipmunk (*Eutamias minimus*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), northern pocket gopher (*Thomomys talpoides*), olive-backed pocket mouse (*Perognathus fasciatus*), hispid pocket mouse (*Perognathus hispidus*), deer mouse (*Peromyscus maniculatus*) and meadow vole (*Microtus pennsylvanicus*). These species occur in a variety of

habitats throughout the project area. Bat species may utilize road and railroad bridges for daytime roosting.

Raptors

Raptors which have been observed in the project area include golden eagle (*Aquila chrysaetus*), bald eagle (*Haliaeetus leucocephalus*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk (*Buteo regalis*), Swainsons hawk (*Buteo swainsoni*), Prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), Coopers hawk (*Accipiter cooperi*), Sharp-shinned hawk (*Accipiter stratus*), Northern goshawk (*Accipiter gentilis*), barn owl (*Tyto alba*), and great horned owl (*Bubo virginianus*). These species occur throughout the project area, often ranging over large areas when foraging for food. Many of these species also nest in the project area. All raptor species are Federally protected against shooting, harassment, and capture.

4.2.8.3 Aquatic and Fisheries

There are limited opportunities for fishing in the project area due to most streams being intermittent and other waterbodies limited to small stock ponds. The game fish occurring in the larger lakes include channel catfish (*Ictalurus punctatus*), walleye (*Stizostedion vitrion)*, largemouth bass *(Micropterus salmoides*) and rainbow trout (*Salmo gairdheri*).

The following table shows the common fish species occurring in the major river systems in the project area.

Table 4.2-9
Common Fish Species -Wyoming

Upper Cheyenne River	Common Carp (*Cyprinus carpio*)
	Fathead Minnow (*Pimephales promelas*)
	Sand Shiner (*Notropis stramineus*)
	White Sucker (*Catostomus commersoni*)
	Black Bullhead (*Ameirus melas*)

Table 4.2-9 Common Fish Species -Wyoming	
Belle Fourche River	Carp (*Cyprinus* sp.)
	Fathead Minnow (*Pimephales pramelas*)
	Red Shiner (*Cyprinella lutrensis*)
	Sand Shiner (*Notrophis stramineus*)
	White Sucker (*Catostomus commersoni*)
	Black Bullhead (*Ictalurus melas*)

4.2.8.4 Endangered, Threatened and Special Status Species

The U.S. Fish and Wildlife Service (USFWS) was consulted regarding endangered and threatened species in the proposed project area. The USFWS identified four Federally-listed endangered or threatened wildlife and plant species that could potentially occur in the project area. These are the black-footed ferret (*Mustela nigripes*, endangered), whooping crane (*Grus americana*, endangered), Ute ladies' tresses orchid (*Spriranthes diluvialis*, threatened) and bald eagle (*Haliaeetus leucocephalus*, threatened).

Three other species, mountain plover (*Charadrius montanus)*, swift fox (*Vulpes velox*) and sturgeon chub (*Macrhybopsis gelida*), are candidates for listing as endangered or threatened. In addition to these species the USFWS has been petitioned to list the black-tailed prairie dog (*Cynomys ludovicianus*) under the Endangered Species Act and its status is currently being reviewed.

The Wyoming Natural Diversity database was used to obtain more specific information regarding these species. General descriptions of where these species may occur within the proposed project area are presented below. More detailed descriptions of the species, species habitat and occurrences are presented in the Biological Assessment (Appendix K).

4.2.8.4.1 Black-footed Ferret

Black-footed ferrets are members of the weasel family. The animal lives in arid prairies in proximity to prairie dog colonies. Black-footed ferrets feed primarily on prairie dogs (90 percent) and utilize their burrows for dens. Black-footed ferrets are nocturnal and spend much of their time underground so their presence in an area is difficult to confirm (Whitaker 1980). According to available information compiled by Clark (1978), the USFWS (Jobman and Anderson 1991) and

Wyoming Natural Diversity Database (WNDDB 1998) the following sightings or physical evidence (1988 or earlier) exists for black-footed ferrets within study counties in Wyoming: 16 in Campbell; 14 in Converse; 6 in Niobrara; and 6 in Weston. Black-footed ferrets have been proposed for reintroduction into the Rosecrams area on USFS lands in southwestern Weston County.

4.2.8.4.2 Whooping Crane

Whooping cranes are found only in North America. Whooping cranes currently exist as three wild populations and in 4 captive locations, totaling approximately 260 individuals. Most whooping cranes migrate from Wood Buffalo National Park in Canada to Aransas National Wildlife Refuge on the Texas gulf coast (USFWS 1994b). This migration path could take them across eastern Wyoming. Habitats utilized by migrating whooping cranes in Wyoming include marshes, wet meadows and crop fields near water. (Ashton and Dowd 1991). Whooping cranes have not been recorded from the proposed project area.

4.2.8.4.3 Ute Ladies' Tresses Orchid

Ute ladies' tresses orchid is a perennial, terrestrial orchid occurring in moist soils in wet meadows near springs, lakes or perennial streams (England 1992). Increased disturbances to stream systems and conversion of land to urban uses has resulted in the decline of this orchid species. This species can only be positively identified when in flower. However, it may only flower once every 3 to 5 years. Therefore, potential habitat is generally considered to contain them. Surveys for the orchid were conducted in September 1998 (Biological Assessment - Appendix K). Two sites in Weston County were considered potential habitat (Kass 1998). However, no orchids were found during the survey.

4.2.8.4.4 Bald Eagle

Bald eagles have been documented wintering within the project area. Observations seem to indicate that the TBNG in Wyoming is important to wintering bald eagles. Communal, nocturnal roosts, diurnal perch sites and feeding areas are all key winter habitat components that are located within the proposed project. Specific locations of where bald eagles have been reported in the proposed project area may be found in the Biological Assessment, Appendix K.

4.2.8.4.5 Mountain Plover

Mountain plovers have been associated with prairie dog towns where vegetation has been reduced (Knowles *et al.*, 1982; Olson-Edge and Edge, 1987; Knopf and Miller, 1994). They nest

in areas of low herbaceous vegetation, reduced shrub cover and near prominent objects such as cow-manure piles or similar-sized rocks (Graul ,1975; Prellwitz 1993; Knopf and Miller 1994). Results of a study conducted in northeast Wyoming showed that mountain plovers nested at sites with low or absent shrub growth and where grasses and forbs were also short (Parrish *et al.* 1993). In that study, mountain plovers seldom nested on prairie dog colonies but adults with broods were seen on colonies (Parrish *et al.*, 1993).

Surveys for occurrence of mountain plovers on black-tailed prairie dog colonies were conducted on the TBNG in 1997. A total of 26 adults and 20 juvenile plovers were seen within approximately 4,900 acres of prairie dog colonies surveyed (T. Byer Forest Service, TBNG. Unpublished data). Two mountain plovers were seen on one National Biological Survey (NBS) breeding bird survey route (Newcastle) in Wyoming. Mountain plovers have also been documented in annual wildlife monitoring reports on coal mines and in the vicinity of coal mines in Campbell County.

4.2.8.4.6 Swift Fox

The swift fox is a member of the Canidae family and is the smallest of the American foxes. The fox occupies short-, mid- and mixed-grass prairies (Carbyn 1993). The swift fox is unafraid of man, therefore, it has been easily trapped and poisoned by efforts aimed at coyotes and wolves. Other factors affecting the decline of the swift fox include fragmentation or destruction of suitable habitat, interspecies competition, prey reduction by rodent control, hunting and predation. There are records of swift fox in Campbell and Converse counties.

4.2.8.4.7 Sturgeon Chub

Sturgeon chub are members of the minnow family. The fish inhabits shallow, sand or gravel bottom zones in areas with strong currents in warm and highly turbid medium to large rivers (Lee et al. 1980). Alteration of the larger rivers through impoundment, channelization and snag removal, reducing the amount of riffle habitat, appear to be some of the causes for the decline of the sturgeon chub. Sturgeon chub are only known to occur in the Powder River in Campbell County.

4.2.8.4.8 Black-tailed Prairie Dog

Black-tailed prairie dogs are social animals that live in large colonies or towns in short- and mid-grass prairie. Since the turn of the century the black-tailed prairie dog population has declined by 98 percent. Less than 1percent of the original prairie dog habitat remains intact (Johnson 1997). This decline is a result of habitat fragmentation through agriculture and urban development, eradication by ranchers, population reduction through state and Federally supported

animal control programs, recreational shooting and wildlife disease (Johnson 1997). Prairie dogs play an important role in their ecosystem. Badgers, coyotes, weasels, golden eagles, hawks, black-footed ferrets and other predators feed upon prairie dog. Additionally, several species such as rabbits, snakes, burrowing owls and black-footed ferrets use vacant burrows. Additionally, mountain plovers, grasshopper sparrows and other ground nesting birds are found in greater numbers in prairie dog towns. Native grasses are also more abundant (NGPC no date-b). The prairie dogs continued survival is imperative to the survival of Federally endangered black-footed ferrets.

Black-tailed prairie dog colonies occur throughout the project area. The current activity status of each prairie dog colony is unknown. Some colonies have become inactive due to sylvatic plague epizootics (disease that affects many animals of one kind at the same time). Others have been poisoned by county weed and pest control agents and/or private land owners. For most of the colonies that have been mapped there is no additional information about the extent or geographic proximity of other colonies that would form a local colony complex.

4.2.9 TRANSPORTATION

Interstate 90 (I-90) is the only interstate highway in the project area. I-90 travels southwest and then westerly through southern Crook, and central Campbell counties remaining north of the proposed Extension Alternatives. In addition, there are several U.S. Highways in the project area including U.S. Highway 85 which runs north and south near the Wyoming/South Dakota border. It has an average daily traffic (ADT) of 100, and U.S. Highway 18 that runs east and west through the project area. It has an ADT of 2,285.

State Highway 59 travels north and south from Gillette to Douglas. State Highway 450 travels east to west through the southern part of Weston, and Campbell counties. It has an ADT of 430. State Highway 116 travels south to north through the central part of Weston County. It has an ADT of 790. Other state highways that are near the project area include State Highway 51 (14/16) with an ADT of 100, State Highway 387, State Highway 50, State Highway 270, and 272, and State Highway 451.

There are numerous county roads in the project area. These roads tend to connect small towns to each other and to state and Federal highways. Many of these roads are gravel surface.

Both USFS and BLM lands contain a network of roads maintained by the managing agency. These roads are generally dirt or gravel and can generally be used by the public. These roads have low levels of traffic. Traffic levels would likely be seasonally affected. All Terrain Vehicle (ATV) use could contribute to much of the traffic in the winter months and automobile

traffic would become more prevalent in the summer months. These roads contribute to the extensive network of roads throughout the project area.

The project area contains many private roads. These roads consist of driveways and farm roads as well as oil and gas company roads. Farm roads are primarily used by slow moving farm equipment and personal vehicles. Some of these private roads are rough, dirt roads, while others have improved hard surfaces.

There are two rail lines in the project area: one is the line operated jointly by Burlington Northern Santa Fe Railway Company (BNSF) and Union Pacific Railroad Company (UP) (Joint line) that runs south of Gillette through Campbell and Converse counties. This line provides access for the two railroads to the active coal mines south of Gillette. The other rail line is the BNSF rail line that runs southeast from Gillette into Weston County, continuing through Newcastle and south through South Dakota and into Nebraska. Both of these lines are used mainly to transport coal from the PRB.

The closest airport to the study area is a county airport just north of Gillette near State Highway 59. This airport is a limited facilities air field. There is also another limited facilities air field in the project area located northwest of Newcastle along U.S. Highway 16. Private landing strips are scattered throughout the project area and are mostly grassy strips.

4.2.10 SAFETY

There are currently no DM&E rail/highway grade crossings in the Wyoming project area. However, other railroads (BNSF and UP) do have grade crossings on local roads. Grade crossings are primarily limited to local, county, or private roads with low levels of traffic. Other roads with higher vehicle traffic contain grade separated crossings, reducing the number of grade crossings and vehicles potentially using a grade crossing. Another safety consideration in the project area is fire. Fires were a natural occurrence across the Great Plains historically. However, today they threaten lives, homes, livestock, and land. Lightning is the primary cause of fire in the project area. However, fires have been started from locomotive operations and maintenance activities due to carbon embers from locomotive exhaust, sparks occurring during breaking or welding activities.

4.2.11 HAZARDOUS MATERIALS

Transportation of Hazardous Materials

DM&E currently transports no hazardous materials in the project area counties.

Hazardous Waste Sites

A records review of various Federal and state databases was conducted to identify areas of potential contamination within the project. These sites could be a result of industrial development, mining activities, oil and gas extraction, or accidents. Sites within 1.0 mile of the existing rail line and new construction alternatives were considered to be in the project area. Databases reviewed included:

- Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)
- EPA National Priorities List (NPL)
- EPA Resource Conservation and Recovery Information System (RCRIS) Permitted Treatment, Storage and Disposal Facilities (TSD)
- EPA Emergency Response Notification System - 1999 (ERNS)
- EPA Corrective Action Reports (CORRACTS)
- Wyoming Leaking Underground Storage Tanks (LUST)
- Wyoming State Hazardous Waste Sites (SHWS)
- Wyoming Underground Storage Tanks (UST)
- Wyoming Solid Waste Facilities/Landfill (LF).

The results of the review are discussed below.

Also known as Superfund, the NPL database is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund program. The source of this database is the EPA. The database was searched to a 1.0-mile radius of the proposed alternatives. No NPL sites were identified.

CERCLIS contains data on potentially hazardous waste sites that have been reported to the EPA by states, municipalities, private companies and private persons, pursuant to §103 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to be or are on the NPL and sites which are in the screening and assessment phase for possible inclusion on the NPL. As of July 1, 1999, thirty

CERCLIS sites are located in Wyoming. None of these CERCLIS sites are located in the project area.

CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. CERCLIS - NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund Action of NPL Consideration. The database was searched to include the proposed DM&E alternatives through Wyoming and a 1.0-mile band of land on either side of the proposed alternatives. No CERCLIS - NFRAP sites were identified.

The SHWS records are the State of Wyoming's equivalent to CERCLIS. These sites may or may not already be listed on the Federal CERCLIS list. Priority sites planned for cleanup using state funds are identified along with sites where the cleanup will be paid for by potentially responsible parties. The data comes from the Wyoming Department of Environmental Quality. The database was searched for SHWS within 1.0-mile of the proposed alternatives. No SHWS were identified.

RCRIS database includes selected information on facilities that generate, store, treat, or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). This database was searched to a 1.0-mile radius of the proposed alternatives. No RCRA Treatment, Storage and Disposal Facilities (TSDFs) were identified.

The Solid Waste Facilities/Landfill Sites (SWF/LF) records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data comes from the Wyoming Department of Environment and Natural Resources Protection Agency's Licensed Solid Waste Facilities list. The database was searched to a 0.5-mile radius of the proposed alternatives. No SWF/LF sites were identified in the database search.

The LUST incident reports contain an inventory of reported LUST incidents. The data comes from the Wyoming Department of Environmental Quality. The database was searched to a 0.5-mile radius of the proposed DM&E alignments. Table 4.2-10 provides a listing of LUST sites identified by county.

Table 4.2-10
LUST Sites Identified in the Project Area - Wyoming

COUNTY	SITE NAME	TOWN
Crook	Crook County Shop	Hulett
Crook	Aladdin General Store	Aladdin
Crook	Keyhole Kounty Store	Moorcroft
Crook	Amoco Service Station 9624	Moorcroft
Crook	Nelson's - 6th & Cleveland	Sundance
Crook	Leslie's Standard Service	Sundance
Niobrara	Lusk Kwik Stop	Lusk
Niobrara	3 Sisters Truck Stop	Manville
Weston	Frank's Service	Newcastle
Weston	Black Hills Plumbing	Newcastle
Weston	Gas & Go	Newcastle
Weston	Newcastle Kwik Stop	Newcastle

The UST database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data comes from the Wyoming Department of Environmental Quality. The database was searched to a 0.5-mile radius of the proposed alternatives. Over 100 underground storage tank (UST) sites are located within 0.5-mile of the proposed alternatives. Twenty-five UST sites are located within a 0.25-mile radius of the proposed alternatives.

ERNS is a national database that stores information on releases of oil and hazardous substances. The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended - Section 103; Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) - Section 304; the Federal Water Pollution Control Act (Clean Water Act) - Section 311; and the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) - Sections 300.51 and 300.65 have release notification requirements that are supported by ERNS. No ERNS sites were reported located within 1.0-mile of the proposed alternatives.

CORRACTS is a list of RCRA facilities with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every facility that has had corrective action activity. This database was searched for CORRACTS facilities within 1.0-mile of the proposed alternatives. No CORRACTS sites were identified.

4.2.12 ENERGY RESOURCES

Transportation of Energy Resources

Coal from the Powder River Basin is currently being transported by both BNSF and UP. Over 200 million tons of coal is transported annually by these railroads. Natural gas and petroleum recovered from the area is transported by pipeline out of the area.

Utilization of Energy Resources

Coal from the Powder River Basin is some of the lowest sulphur content coal mined in the United States today. This coal is used by utilities and industries throughout the county to meet air quality regulations aimed at reducing sulfur emissions. Sulfur emissions have been implicated in acid rain formation. The current regulatory environment for electrical utilities and generation of electrical power, discussed in detail in Chapter 1, has resulted in an increasing demand for PRB coal. Additionally, the low cost to mine PRB coal results in the coal being cheaper for the user, increasing its use and demand. The quantity of coal obtained from this region and its distance from the users requires this coal be transported by rail. Transportation by any other means, primarily truck, would be impractical due to the number of trucks required (200 million tons would require over 6.6 million trucks with a capacity of 60,000 pounds).

As discussed in Chapter 1, demand for PRB coal is anticipated to increase. However, problems currently exist at time with sufficient rail capacity being unavailable to meet the demand, thereby limiting the utilization, of PRB coal.

4.2.13 CULTURAL RESOURCES

Humans have occupied the Great Plains of North America and the area of the proposed project from at least 13,000 years ago and possibly before. Occupation in the project area of Wyoming would be similar to that described in Section 4.1.13.

The cultural history of eastern Wyoming presented in this document provides a brief look at the extensive cultural history of the area. The culture history of eastern Wyoming closely parallels that of western South Dakota. Table 4.2-11 summarizes the culture history derived from

the cultural history prepared by Scott F. Anfinson for southwestern Minnesota, Clark A. Dobbs' *Outline of Historic Contexts for the Prehistoric Period (ca. 12,000 BP – AD 1700)* and a Plains culture history prepared by Richard Fox and Linea Sundstrom in an unpublished cultural resource management report (*Results of the 1999 Phase I & II Cultural Resource Evaluation for the Dakota Minnesota and Eastern Corporation's Proposed Powder River Basin Expansion Project in South Dakota and Wyoming* 1999). The possible occupations before 13,000 years ago were presented earlier in Section 4.1.13.

Table 4.2-11
Cultural Chronology - Eastern Wyoming

Period	Dates	Distinguishing Traits
Paleoindian Period	11,200 to 8,500/8,000 RCYBP	Mainly recognized by distinctive projectile point types such as Clovis, Folsom, Goshen, Hell Gap, Meserve, Cody, Agate Basin Scottsbluff, Eden and Dalton.
Archaic Period	8,500 to 1,500 RCYBP	Normally divided into Early, Middle and Late periods.
Early Archaic	8,500 to 7,000 RCYBP	Hawken and Hawken II projectile points. Indication of changes in subsistence strategies with a greater reliance on small game and wild plants to supplement large fauna.
Middle Archaic	7,000 to 2,500 RCYBP	Grinding stones, food preparation pits and round pit houses. McKean, Duncan and Hanna projectile points.
Late Archaic	2,500 to 1,500 RCYBP	A more systematic exploitation of bison than in the Middle Archaic and a tendency to reuse kill sites. Pelican Lake and Yonkee projectile points.

Table 4.2-11
Cultural Chronology - Eastern Wyoming

Period	Dates	Distinguishing Traits
Late Prehistoric	1,500 RCYBP to AD 1,600	Increase in population, highly organized and extensive bison kills, and a reduction in projectile point size. Projectile points tend to be small and side-notched possibly indicating introduction of the bow.
Plains Woodland	500BC to AD 900/950	Pottery, side-notched projectile points. Communal bison hunting, and the use of wide spectrum of food sources. Pottery is developed and small scale horticulture (gardening). Evidence also includes corrals and jumps associated with antelope and bison hunting.
Protohistoric	AD1600 to 1874	Most of what is known comes from the accounts of EuroAmericans who were colonizing the periphery of the Plains. Some information also comes from Native American Tribes narratives and some pictographic records. Tribes are for the first time identified. Protohistoric sites may be identified by the existence of EuroAmerican trade goods of metal, guns, decorative artifacts and the horse.

Table 4.2-11
Cultural Chronology - Eastern Wyoming

Period	Dates	Distinguishing Traits
Historic Period	1874 to present	Native American sites may be identified by stone circles along with other continuing Late Prehistoric patterns. Later in the period these sites may be identified by artifacts in association with EuroAmerican style dwellings. Fur trading posts, military camps as well as the remains of trails can be indicators of early commercial exploitation and military presence. Dugouts, foundations, cabins, outbuildings, mining, cellars, fencing, wells, trails, or family graves may be other indicators of historic archaeological sites.

Cultural resources are found throughout the project area. The Area of Potential Effect[1] (APE) for comparison purposes in this draft EIS is an area 1 mile either side of the proposed alternative. The APE for the preferred or selected alternative is discussed in the Identification (ID) plan in Appendix J. SEA conducted a review of the Wyoming State Historic Preservation Offic (SHPO) site files for the areas within the APE for each Extension Alternative alignment. However, because much of the project area has not been surveyed, little information is available concerning the presence of cultural resource sites throughout the entire area. The following summarizes the results of SEA's review.

Alternative B (Proposed Action)

A total of 228 known cultural resource sites are within 1.0 mile of Alternative B. Of the known sites, 169 are prehistoric, 49 are historic, 3 have both prehistoric and historic components,

[1] Area of potential effects means the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

and 9 are of unknown cultural affiliation. Fifty-one of the sites are eligible for or listed on the National Register of Historic Places (NRHP).

There are 32 sites within the right-of-way for Alternative B. Twenty-three of the sites are prehistoric, 8 are historic and one is of unknown cultural affiliation. Six of the sites, 2 historic and 4 prehistoric, are eligible for the NRHP.

Some cultural sites served specialized ceremonial functions as previously discussed in Section 4.1.13. Although none of these types of sites are recorded within the project area, it is very likely that unknown sacred sites and Traditional Cultural Places (TCPs) occur throughout the area.

Alternative C (Modified Proposed Action)

There are 312 known sites within 1.0 mile of the proposed Alternative C. These include 217 prehistoric, 48 historic, 4 with both prehistoric and historic components and 43 with unknown cultural affiliation. Of these, 49 are eligible for or potentially eligible for the NRHP, 134 have been determined ineligible or destroyed, and 129 have not been evaluated.

A total of 34 known sites would be located within the right-of-way for Alternative C. Of these, 4 are eligible for the NRHP, 10 are not eligible and 20 have not been evaluated.

Alternative D

There are 229 known sites and 59 known isolated finds within one mile of the proposed alignment for Alternative D. Of the known sites, 88 are prehistoric and 42 are historic. The cultural affiliation of 91 of the sites is unknown, and 8 have both historic and prehistoric components. Of the known sites, 2 are listed on the NRHP, 34 are eligible for the NRHP and 117 are not eligible. The remaining 76 sites have not been evaluated.

Of the known sites, 36 would be within the proposed right-of-way. Five of the 36 sites within the proposed right-of-way are eligible for the NRHP and 1 is on the NRHP. Of the remaining 31 sites, 15 are not eligible for the NRHP and 16 have not been evalutated. Based on the known site density it is expected that additional cultural resources would be discovered that would be eligible for the NRHP. It is also expected that some of the cultural resources shall be eligible for the NRHP as TCP's.

Native American Issues

With the assistance of the cooperating Federal agencies, Wyoming SHPO, the cooperating agencies, Bureau of Indian Affairs and recommendations from individual Tribes, the Federally recognized Tribes with potential interest in the project area where identified. Consultation was initiated with these Tribes. Out of respect for cultural differences, the wisdom of elders and the historically unresolved issue of treaties, several Tribal groups/organizations were also invited to participate in the consultation meetings. It is the intent of the consultations that each Tribe is provided a reasonable opportunity to participate with the NEPA process in addressing the potential impacts of the proposed project (See Appendix I for MOA and Appendix J for PA). Consultation with Tribal entities in Wyoming would be similar to those discussed in Section 4.1.13.

Indian Trust Assets

ITA's (Indian Trust Assets) are properties, interests, or assets of an Indian Tribe or individual Indian over whom the Federal government has an interest through administration or direct control. Examples include lands, minerals, and timber, as well as water rights, hunting rights, fishing right, and other treaty rights. The sovereignty of Tribes and the trust relationship with the Federal government have been established and validated through treaties, court decisions, legislation, regulations, and policies.

Native Americans have raised concerns for a number of ITA's. These include wildlife, fisheries, vegetation, paleontological resources, cultural resources, and water quality. Additionally concerns about culturally important plants have been voiced during consultation meetings with the Tribes. The Tribes are concerned that the planned construction would make changes in or destroy the local abundance and distribution of plants traditionally used by the Tribes. Consultation is continuing concerning issues the Tribes have concerning culturally important plants.

4.2.14 SOCIOECONOMICS

The project area in Wyoming consists of the following five counties: Niobrara, Weston, Campbell, Crook and Converse.

4.2.14.1 Population and Demographics

The project area in Wyoming is primarily rural. Small towns and large ranches occur widely scattered throughout the study area counties. Table 4.2-12 lists the communities in the project area for which population information is available.

Table 4.2-12
Potentially Affected Communities and Populations

Community	Population
Newcastle	3,240
Upton	985
Moorcroft	768

Tables 4.2-13 through 4.2-15 show population, income and employment numbers for the affected counties and for the State of Wyoming.

4.2.14.2 Employment and Income

In the project area, the foundation of the economy in this region includes coal mining, uranium mining, oil and natural gas production, and agriculture. While these basic industries are still important to the economy, other sectors including services and retail have grown as the other industries have grown.

Agriculture, including crop farming and livestock production, has been a moderately stable component of the economy. However, the percentage of persons employed in agriculture has steadily declined through the years. For example, in Campbell County there has been a decrease from about 38 percent of the population employed in agriculture in 1960 to only 4 percent in 1990.

Per capita income increased significantly between 1985 and 1989. The average increase of the affected counties was 35.9 percent; whereas the increase for the State of Wyoming was 25.9 percent. The average increase of the median household income in the affected counties, between 1979 and 1989, at 39.6 percent, was above the State's increase of 35.5 percent.

The percent of people living below the poverty level increased by 41.4 percent in the State of Wyoming between 1979 and 1989. During the same time the number of people living below the poverty level in Niobrara County decreased 12.5 percent. Converse County it increased 56.6

percent, in Weston County it increased 10.0 percent and in Campbell County the number of people living below the poverty level increased 47.3 percent (Table 4.2-15).

Between 1986 and 1994, the unemployment rate decreased in the State of Wyoming. In each of the four affected counties, unemployment decreased from 44.7 percent to 68.4 percent (Table 4.2-29).

4.2.14.3 Public Services and Fiscal Condition

Public services are offered to the residents of most area communities. Nearly all larger communities have newspapers, elementary, middle and senior high schools in their community. Many of the communities have clinics and/or doctor and dentist offices. However, many of the communities do not have hospitals. Hospitals are found in the major cities (Gillette, Newcastle). Nearly all of the communities offer recreational facilities and churches. Some of the smaller communities have volunteer fire departments and rely on county sheriffs for public protection services.

County taxes are collected in all counties throughout the state of Wyoming. Tax revenue is derived from the assessed value of property located within each county. Revenue is distributed among county, cities and townships to provide additional funding for public services. Funding is used to help support schools, social services, road and bridge maintenance, fire departments and criminal justice services including county and local courts, jails and police. Other services include libraries, zoning and planning and publication of county related documents. Table 4.2-16 provides a summary of tax data for each county.

Table 4.2-13
1996 Statistical Information for the Counties Potentially Affected by the New Construction of the DM&E Rail line and for the State of Wyoming

Affected Area	Population[1]	Percent Minority[2]	Per Capita Income[3]	Median Income[3]	Percent below poverty level[3]	Unemployment Rate[1]	Acreage in Farmland (1,000)[4]	Number of Farms[4]	Average Size of Farms (acres)[4]
State of Wyoming	475,991	11.5	12,311	27,096	11.9	5.3	32,876	8,716	3,772
Niobrara County	2,554	3.4	11,816	20,947	17.0	3.6	1,345	278	4,837
Weston County	6,560	3.2	11,263	26,213	9.8	5.9	1,485	231	6,427
Campbell County	30,891	5.4	13,596	37,055	8.4	5.4	2,704	476	5,681
Crook County	5,612	0.7	10,322	20,936	13.5	4.3	1,542	442	3,489
Converse County	11,704	8.8	12,023	27,713	11.9	5.4	2,363	305	7,748

1996 County and City Extra, Annual Metro, City and County Data Book. Edited by Courtenay M. Slater and George E. Hall. Berman Press, Lanham, MN, 1996.
[1] 1994 Data; [2] 1990 Data; [3] 1989 Data; [4] 1992 Data

Table 4.2-14
1988 Statistical Information for the Counties Potentially Affected by the New Construction of the DM&E Rail line and for the State of Wyoming

Affected Area	Population[1]	Percent Minority[2]	Per Capita Income[3]	Median Income[4]	Percent below poverty level[4]	Unemployment Rate[1]	Acreage in Farmland (1,000)[5]	Number of Farms[5]	Average Size of Farms (acres)[5]
State of Wyoming	507,000	2.87	9,782	19,994	7.9	9.0	33,500	8,861	3,781
Niobrara County	3,100	NR	6,749	12,830	16.0	9.4	1,335	260	5,136
Weston County	7,900	NR	9,043	20,021	7.4	9.0	1,488	226	6,584
Campbell County	36,700	1.25	12,057	26,060	4.8	9.9	2,843	444	6,404
Crook County	6,000	NR	7,988	16,557	9.9	8.1	1,549	442	3,503
Converse County	13,900	NR	9,157	22,693	6.4	11.1	2,395	306	7,825

1988 County and City Data Book, U.S. Department of Commerce Bureau of the Census. U.S. Government Printing Office, 1988.
[1] 1986; [2] 1984; [3] 1985; [4] 1979; [5] 1982
NR = Not Reported

Table 4.2-15
Comparison of Statistical Information for the Counties Potentially Affected by the New Construction of the DM&E Rail line and for the State of Wyoming

Affected Area	Population (86-94)	Percent Minority (84-90)	Per Capita Income (85-89)	Median Income (79-89)	Percent below poverty level (79-89)	Unemployment Rate (86-94)	Acreage in Farmland (1,000) (82 - 92)	Number of Farms (82 - 92)	Average Size of Farms (acres) (82 - 92)
Wyoming	-6.1	300.7	25.9	35.5	50.6	-41.1	-1.9	-1.6	-0.2
Niobrara	-17.6	NA	75.1	63.3	6.3	-61.7	0.7	6.9	-5.8
Weston	-17.0	NA	24.5	30.9	32.4	-34.4	-0.2	2.2	-2.4
Campbell	-15.8	332.0	12.8	42.2	75.0	-45.5	-4.9	7.2	-11.3
Crook	-6.4	NA	29.2	26.4	27.6	-50.4	-0.4	No Change	-0.4
Converse	-15.8	NA	31.3	22.12	85.9	-51.4	-1.3	-0.3	-1.0

Table 4.2-16
County Assessed Value and Taxes Collected - Wyoming

County	Market Value			Collected Taxes		
	1996 or 1999*	**1997**	**1998**	**1996 or 1999***	**1997**	**1998**
Niobrara	27,701,695*	34,321,052	33,275,890	1,895,326*	2,306,706	2,254,170
Weston	53,241,594*	65,770,476	61,148,238	3,761,474*	4,869,750	4,221,198
Campbell	1,435,820,219*	1,587,776,214	1,495,260,165	87,412,881*	98,904,057	90,579,407
Crook	63,806,553*	91,122,589	86,103,328	4,354,961*	6,397,434	5,851,442
Converse	272,678,786	279,346,685	286,990,621	16,373,093	18,346,282	17,232,158
Total	**1,854,248,847**	**2,058,328,061**	**1,962,778,242**	**113,797,735**	**130,824,229**	**120,138,375**

4.2.15 ENVIRONMENTAL JUSTICE

Executive Order No.12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (Order), directs individual Federal agencies to develop approaches that address environmental justice concerns. Although the Order does not require independent agencies such as the Board to conduct environmental justice analyses, potential environmental justice issues were raised during the scoping process. SEA conducted an investigation of potential environmental justice issues because:

- the President requested agencies to comply with the Order, particularly during the NEPA process.
- the Council on Environmental Quality (CEQ) guidance and the draft Environmental Protection Agency (EPA) guidance on environmental justice emphasize addressing environmental justice concerns in the NEPA context.
- the Board is responsible for ensuring this project is consistent with the public interest.
- environmental justice concerns were raised during the scoping process.

The purpose of Executive Order No. 12898 is to identify and address disproportionately high and adverse impacts to minority and low-income populations potentially occurring due to agency actions. SEA investigated whether potential environmental justice communities were present within the project area. Census information was obtained for each county within the project area. For organizational purposes, individual counties are divided into census tracts and census tracts into census block groups. Statistical information at the census block level was obtained and reviewed for those census block groups that would be crossed by any of the Extension Alternatives. Individual census block groups were determined to potentially be minority or low income based on criteria developed by the EPA and SEA. These criteria are:

- At least one-half of the census block group population is of minority status.
- At least one-half of the census block group population is of low-income status.
- The percentage of minority population in the census block group is at least 10 percentage points higher than the minority population percentage for the county in which the census block group is located.

- The percentage of low-income population in the census block group is at least 10 percentage points higher than the low-income population percentage for the county in which the census block group is located.

In Wyoming, two census block groups, one in Weston County and one in Niobrara County, were identified as potential environmental justice communities because the percentage of their low income populations exceeded the low income percentage for their respective counties by 10 or more percentage points.

4.2.16 RECREATION

Much of the recreation in the study area involves outdoor game activities. Lakes and reservoirs in the area that are fished include the Black Hills Power/Light Reservoir, Gillette Lake, LAK Lake and Glendo Reservoir. The Gillette Fishing Lake, a 25-acre reservoir on Donkey Creek located within the City of Gillette, is heavily fished. The Wyoming Game and Fish Department stocks the lake with game fish. In addition, some game fish are found in the Powder, Cheyenne, Little Powder and Belle Fourche Rivers. Also, many small stock ponds and reservoirs are fished lightly, however, the precise number of ponds producing game fish is unknown.

Another outdoor recreational activity is hunting. There are year-round hunting opportunities in the project area. Pronghorn, antelope, mule deer, whitetail deer, elk, sage grouse, sharptail grouse, waterfowl, dove and small game are hunted in the fall. Bobcat, mountain lion, and small game are hunted in the winter. In the spring and fall, turkeys provide hunting opportunities. There is year-round hunting for coyotes, red fox, jack rabbits, prairie dogs and animals classified as predators.

Other outdoor recreational activities that are predominant in the project area in Wyoming are camping, skiing, horseback riding and wildlife observation.

There are not many parks within project area due to the rural nature of the area, since parks tend to be located close to towns and cities. There is one roadside park located just north of Riverview in Niobrara County.

Some of the recreation facilities in the project area include ballfields, tennis courts, playgrounds, soccer fields, basketball courts, picnic shelters, swimming pools, skating facilities and volleyball courts. Campbell County has a multi-event facility, CAM-PLEX, that hosts horse racing, rodeos, livestock shows, fairs and concerts.

4.2.17 AESTHETICS

4.2.17.1 Visual Resources

There are no wild and scenic rivers in the project area of Wyoming.

The project area in northeastern Wyoming has gentle rolling plains, wide open prairies, mountains, sunsets and a variety of wildlife. Northeast Wyoming consists primarily of grasslands and open rangeland. Drainages in the area have cut deep channels and wide floodplains, with steep sideslopes. Badlands-type formations occur scattered throughout the area. Slopetops are generally wide, flat tables. High points in the area can provide spectacular views, not necessarily of unique or scenic areas, but for great distances, often with little or no evidence of human occupation or development. These viewsheds provide the observer a feeling of vastness and opportunity to view an area likely similar to what was present prior to Euro-American development. No established scenic overlooks or vantage points are known in the area. However, many parts of the project area are considered scenic by the residents and area visitors.

Of the areas containing valuable scenic settings, only those under the management of the USFS have visual management objects. Under the current USFS grassland plan, lands on the TBNG have been assigned a visual quality management object (VQO). VQO's are used to define acceptable degrees of alteration of the natural landscape. Approximately 85 percent of the USFS land potentially crossed by project alternatives have a modification VQO which allows for relatively large changes in the visual contrast. However, facilities constructed in these areas are required to use materials and methods which minimize their contrast with the surrounding landscape. The remaining 15 percent of USFS lands in the project area have a partial retention VQO. Partial retention VQO's are normally reserved for riparian corridors and other bodies of water. Development in areas with a partial retention VQO is restricted to activities which would not attact the attention of the casual observer.

Under the proposed USFS grassland management plan, scenic integrity levels (SIL) ranging from high to low are assigned to all proposed management areas. A high SIL indicates that human activity is not scenically evident, a moderate SIL indicates that valued landscape character appears slightly altered, and a low SIL indicates that valued landscape character appears moderately altered. For the proposed project area, SIL's are are mostly in the moderate to low range. Only approximately 10 percent of the potential project area would have a high SIL rating.

4.2.17.2 Nightlights

The project area contains widely scattered development, whether it be small communities, residences, or industrial sites. There are few sources of night lights. What lights are present are associated with rural residences in the form of house lights and other security lighting. Communities have street lights, residential, commercial and industrial facilities lighting and security lighting. However, the rural nature of the area provides numerous opportunities where the observer would see few if any lights when viewing in all directions. This lack of light pollution provides clear views of stars and other features in the night sky as well as providing the viewer a perception of isolation.

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4.3 RAIL LINE RECONSTRUCTION IMPACTS

Approval of the proposed Powder River Basin (PRB) Extension Project would require the reconstruction of the existing DM&E rail line in South Dakota. The potential impacts related to reconstruction and operation of the existing rail line are discussed in this Section. These impacts include those anticipated to occur along the portions of the existing rail line for which corresponding alternative alignments (bypasses) are not being evaluated. In South Dakota, this includes all portions of the existing rail line except for the portion of the existing rail line from 3.5 miles east of Brookings to 8.0 miles west of Brookings. The potential impacts associated with the proposed alternatives for Brookings are discussed in Section 4.9.

4.3.1 NO-ACTION ALTERNATIVE

The No-Action Alternative would result from the Board denying DM&E the authority to construct a rail line extension into the PRB. For DM&E's existing rail line in South Dakota, the No-Action Alternative would result in no reconstruction activities related to system wide rehabilitation of the existing rail line and no operational changes in existing train activity or related to the transport of PRB coal.[1] None of the following impacts associated with reconstruction of the existing rail line would occur:

- disruption to adjacent land uses,
- disturbance to and erosion of soil,
- discovery and recovery, or possible damage or destruction of archaeological, historical, and paleontological resources,
- clearing and trimming of vegetation,
- disturbance to and loss of wildlife and their habitat,
- air emissions from construction vehicles and fugitive dust,
- increases in noise from construction equipment,
- disruption of traffic flow and potentially increased accidents at grade crossings, and
- increased economic activity due to construction workers.

[1] The Board's approval authority does not generally extend to changes or improvements in rail infrastructure or operations that are limited to existing railroad right-of-way. As such, DM&E could rehabilitate its existing rail line and increase rail traffic on its existing rail line at any time, even should the Board deny the PRB Extension Project. However, while DM&E has indicated such system-wide renovations are necessary, it stated in its Application to the Board, reconstruction of the existing rail line would not be possible without the revenues generated by the PRB Extension Project.

Additionally, none of the operational impacts would occur. Operational impacts associated with the anticipated increase in rail traffic would occur such as:

- increased noise levels from passing trains and whistle soundings,
- increased air emissions from locomotives,
- increased opportunities for vehicle delays at grade crossings,
- safety concerns for trains, vehicles, and pedestrians,
- disturbance and mortality to wildlife,
- improvement of DM&E's safety record due to improved rail line condition, and
- additional jobs and tax revenues generated by increased railroad activity and improved railroad facilities

Although the No-Action Alternative would not result in any changes to the existing environment, it is likely the No-Action Alternative would result in continued deterioration of DM&E's existing system. DM&E's safety record could be expected to remain among the worst in the nation (Tables 1-1 to 1-3) and potentially worsen as the condition of the existing rail line deteriorates. Service and reliability concerns of existing shippers discussed in Chapter 1, would continue, reducing the competitiveness of shippers in their respective markets. This lack of competitiveness and rail service reliability would likely result in a greater reliance of shippers on truck transportation, resulting in potentially hundreds of trucks being added to local roadways. Increased truck numbers would increase wear on area roads and reduce vehicle safety. Impacts to wildlife, including disturbance and mortality from passing trains, would continue at present levels. In summary, the present condition of the DM&E system has impacts on rail service efficiency and reliability, and both rail and vehicle safety in South Dakota (Tables 1-1 to 1-3).

The Board, in its December 10, 1998 decision, indicated that absent the funds generated by DM&E's proposal, DM&E could cease to exist as a viable railroad. Moreover, it appears unlikely that another rail carrier would acquire the DM&E system given its deteriorated condition and limited revenue base. Therefore, rail service along the existing system would likely cease. The existing shippers along the rail line, accounting for approximately 60,000 rail cars per year, would lose rail service. Because one rail car transports the equivalent of four trucks, a significant number of additional trucks could be added to local roads. Other shippers would be unable to competitively convert to truck transport and would be required to relocate to areas with rail service or cease to operate. These shippers include grain elevators serving the local agricultural communities. Loss of rail service and shippers would require local farmers to transport grain and other products greater distances for shipment, increasing operating costs for an already stressed agricultural economy. Increased reliance on trucks would increase air emissions from vehicles due to truck transport being less fuel efficient than rail transport. Wear on local roads would increase. Vehicle safety at grade crossings would not be an issue as trains would no longer

operate at these locations. However, increased levels of truck traffic would reduce the safety of area roads. Numerous jobs associated with railroad operation and maintenance would be lost as well as jobs provided by shippers forced to relocate or close. Revenue generated to the counties through taxes and employee spending would be lost. Other businesses used by employees would experience reductions in revenue. Loss of rail service throughout the project area could result in economic hardship to those whose livelihood depends on the railroad, such as DM&E employees, shippers, and farmers.

4.3.2 EXISTING RAIL LINE RECONSTRUCTION

The following discusses the potential impacts associated with the reconstruction of the existing DM&E rail line in South Dakota on the natural and human environment of the project area. Rail line reconstruction would generally involve only replacement of rail bed ballast, ties, and rail. In some locations, earthmoving and excavation may be required to repair the rail bed.[2] The majority of existing bridges and culverts would either be replaced or upgraded. A detailed description of rail line reconstruction is provided in Chapter 1. Both potential reconstruction and operational impacts resulting from rail line upgrading are presented.

4.3.3 CLIMATE

The climate of the project area would not be impacted by the reconstruction of the existing DM&E rail line.

4.3.4 TOPOGRAPHY

When the existing DM&E rail line was constructed across South Dakota, alterations in the topography immediately adjacent to the rail line were necessary. Low areas and valleys were filled, hill and high points were cut-through in order to provide a rail bed grade suitable for train operations. These cuts and fills likely altered local drainage patterns, and in some cases, streams may have been channelized or realigned to accommodate the rail line. Most of these changes took place over 100 years ago. No additional cuts or fills, modifying the topography of adjacent areas are anticipated. However, in some areas, the existing rail line grade may be raised or flattened to

[2] DM&E has indicated that in an attempt to resolve rail bed stability problems along the Bad River, it will be rebuilding the existing rail bed adjacent to the existing rail bed on the side away from the river. This new rail bed would involve approximately 30 miles of construction but DM&E has indicated construction along the Bad River would be confined to its existing rail line right-of-way. SEA has conservatively considered that all the area within DM&E's existing right-of-way would be disturbed by reconstruction activities. Additionally, construction of an off-set rail bed and rail line in the Bad River area would be similar to construction of rail line siding. Therefore, SEA's analysis includes the potential impacts that could be expected from construction of the off-set alignment.

provide a more efficient operating grade. Adjustments in grade are expected to be minimal and accomplished within the existing rail line right-of-way. Drainage patterns and topographic conditions have been re-established along the existing rail line, with the rail bed being a significant feature. As part of this project, culverts and bridges would be replaced and the rail line reconstructed. Installation of new bridges and culverts would be done in a manner that would not alter the drainage pattern of area streams and rivers. Some minimal channelization or relocation of drainages may be necessary for installation of bridges and culverts. This would occur only in the immediate vicinity of the crossing structure and would not be expected to significantly alter stream drainage.

4.3.5 GEOLOGY AND SOILS

4.3.5.1 Unique Geological Formations

No unique geological formations, as defined in Section 4.1.3.1 would be impacted by reconstruction or operation of the existing DM&E rail line.

4.3.5.2 Geologic Hazards

Chapter 4, Section 4.1.3.3 gives a detailed description of the geological hazards associated with the project. It is unlikely that the process of rebuilding the existing DM&E rail line would change the current probability of a hazardous geological episode. No potentially hazardous geological areas, such as slumps, landslides, or karst topography would be affected by reconstruction or operation of the existing rail line.

4.3.5.3 Soil Impacts

Approximately 7,684.8 acres of soil could be disturbed within the existing right-of-way during reconstruction. Soil impacts from the reconstruction of the existing DM&E rail line in South Dakota could include soil loss through erosion and handling, decreases in favorable physical properties, and reduction of biological activity. Increases in soil erosion due to wind and water runoff could occur during reconstruction along the existing rail line. Erosion rates are expected to be moderate in the eastern project area (generally east of Pierre) due to soils being less susceptible to erosion, generally flatter terrain, but a greater amount of precipitation. Erosion would be most likely from wind and water in this region, as these soils are composed of glacial till, outwash, and clay. Areas cleared of topsoil, denuded or disturbed during construction, would be susceptible to erosion because subsoils tend to absorb water more slowly than topsoils, increasing the potential for runoff. Reduced absorption could be aggravated by compaction from

equipment operation making soils even less permeable to water infiltration. Reduced absorption would lead to increased runoff volumes and speeds capable of scouring surface soils.

The soils in western South Dakota (west of Pierre) would be more prone to erosion due to soils being low in organic matter and the terrain being steeper. Erosion would occur primarily from wind and water in this region.

The physical properties of soils in disturbed areas could be changed from the conditions prior to reconstruction. Excavation of soils could result in the loss of the natural soil profile, destruction of soil structure, and loss of organic matter due to mixing and dilution. These changes could adversely affect soil productivity due to decreased soil-water holding capacity and aeration. However, along the majority of the right-of-way, soils were subject to previous disturbance and excavation during initial construction of the rail line. These soils have since recovered and developed organic matter and topsoil and would be expected to so so again following reconstruction. Recuction in soil productivity would not be significant because soils within the right-of-way would only be required to support grassy vegetation for ground cover. Any disturbance to soils within the existing rail line right-of-way would not be expected to have significant long-term impacts to soil resources.

The existing rail line would be adjacent to approximately 207.1 miles of land designated as prime farmland. Because reconstruction activities would be limited to an existing, disturbed rail line right-of-way which is not available for agricultural use, impacts to prime farmland would be unlikely. However, in the unlikely event reconstruction activities would be required outside the right-of-way, prime farmland could be impacted. Prime farmland is abundant in South Dakota and any areas where it might be impacted by this project would be small and localized. No operational impacts to prime farmland are expected.

Missouri River Bridge

Soil contamination could occur during rehabilitation of the existing bridge or construction of a new bridge in the event of an accidental spill of hazardous materials such as fuel and lubricants associated with construction acitivities. New construction would require realignment of the existing rail line and construction of new piles and footings for the bridge. Soil disturbance associated with these activities would contribute to increased soil loss and erosion during bridge activities. Potential contamination could also occur during operation in the event of an accidental spill or derailment. If removal of the existing bridge is required after construction of a new bridge, soil disturbance and erosion would occur during salvage activities.

4.3.5.4 Paleontological Resources

Paleontological resources, as described in Section 4.1.3.5 are present throughout South Dakota and could be encountered in the project area. Only minimal excavation is anticipated during reconstruction and excavation and would largely include surface earthwork within previously disturbed areas. The reconstruction and operation of the existing rail line is not anticipated to have any impact on paleontological resources.

Missouri River Bridge

No impacts to paleontological resources are anticipated during rehabilitation of the existing bridge. Construction of a new bridge, or removal of the existing bridge could potentially encounter paleontological resources during excavation activities along the Missouri River. However, the likelihood of such an encounter is considered low.

4.3.6 LAND USE

The potential impacts to the land use along the existing rail line related to the rebuilding of the existing DM&E rail line and the proposed increase in traffic were evaluated. The land uses evaluated included agricultural, residential and business/industrial, minerals and mining, public facilities, Federal, state and reservation/treaty lands, and utility corridors. The potential impacts to each of these land use categories are discussed below for rail line reconstruction and operation.

4.3.6.1 Agriculture

Agricultural lands potentially affected by the project include cropland and pasture land. The existing rail line is adjacent to approximately 293.0 miles of cropland and approximately 176.7 miles of pasture land for a total of 469.7 miles of agricultural land. Reconstruction activities would primarily be limited to the existing right-of-way. Therefore, reconstruction related impacts to agricultural lands would be minimal, limited to any small scattered areas where reconstruction activities may be required outside the existing rail line right-of-way. Following reconstruction, the rail line right-of-way would be fenced and other land uses prohibited within the right-of-way.

In some cases, agricultural practices have encroached on the right-of-way. In these small areas there could be loss of crops, hay, or livestock forage, soil compaction, and fence damage. Future use of the lands within the right-of-way would be prohibited, resulting in these areas being permanently converted to rail use. This small conversion of agricultural land to railroad right-of-

way would not be significant, although it may have an impact on the overall crop production of the individual farmers who have encroached on the existing right-of-way.

4.3.6.2 Residential

Reconstruction of the existing DM&E rail line would be limited to the existing right-of-way and would pass adjacent to approximately 1.0 mile of land classified as residential. Reconstruction activities in or near residential areas could result in temporary impacts, including general ground disturbance, inconvenience from noise, dust, traffic congestion, and emissions generated from construction equipment.

Noise disturbance during reconstruction would be the primary impact to adjacent residences. Although reconstruction activities are expected to occur during daytime hours, the use of two-shifts would extend the reconstruction day into the later hours of the evening. Construction noise and lighting between the hours of 8 p.m. and 11 p.m. may be sufficient to impact the ability of adjacent residences to enjoy their evenings at home, both inside and out, and enjoy their usual sleep patterns. Equipment maintenance activities are anticipated to occur between midnight and 7 a.m. The associated noise and lighting may disturb adjacent residences. However, these impacts would be limited to the period of reconstruction in the vicinity of these residential areas, estimated to be from a few days to a few weeks.

The presence of construction equipment and materials would likely be a draw to children in residential areas, potentially posing a safety hazard. Adequate site security and lighting in these areas should be provided to minimize any safety hazards.

Long-term impacts associated with the operation of increased train traffic over the rail line would include increases in wayside and horn noise and locomotive emissions, increases in accident frequency at grade crossings, and traffic congestion. The number of noise sensitive receptors experiencing potentially adverse noise levels is discussed in greater detail in Section 4.3.7. Additionally, real estate values may be affected by the increased number of trains resulting in residences adjacent to the rail line becoming less desirable to potential buyers. Impacts to real estate values may occur. However, some of the impacts would be off-set by the potential increases in population resulting from the influx of construction workers requiring lodging and the long-term increase in the number of railroad related jobs. The increase in population and employment would result in individuals relocating to the area and acquiring housing. This influx of workers and their families would likely result in a stabilizing effect on the real estate market in the larger communities along the rail line as these would be where most of the workers would be expected to relocate due to the services they provide. In smaller, more rural communities, real estate values are likely already depressed due to struggling agricultural economies. Increased rail

traffic could make these residential areas even less desirable, further reducing residential real estate values. Specific impacts are difficult to quantify as they may be significant in some areas but not in others, or to one home owner and not another, depending on the overall real estate market of the area and the concerns of the buyer. Overall, some impact is expected. However, while the impact is expected to be negative, it is unknown to SEA if it would be significant.

Missouri River Bridge Impacts

During reconstruction of the existing bridge, or the building of a new bridge, short-term and long-term impacts could occur to the six residences within 500 feet of the bridge. Short-term impacts would result from noise, increased traffic on area roads, and a decrease in air quality from construction activities and equipment. These impacts would be temporary, lasting only for the duration of the bridge construction, which, however, could last for two to three years. During bridge operation, these residences would be exposed to increased noise and air emissions from trains using the bridge. These residences could experience significant increases in noise levels (see Section 4.3.9.1 for SEA's detailed noise analysis). In addition, the real estate values of the residences close to the bridge may decline as a result of the decrease in the quality of life that could result from increased rail traffic, as previously discussed.

4.3.6.3 Business and Industrial

The project would be adjacent to approximately 33.1 miles of business and industrial land. Reconstruction activities in or near the business or industrial areas could result in temporary impacts related to inconvenience to employees and patrons from accessability problems, noise, dust, and congestion generated by reconstruction equipment, vehicles, and workers. These impacts would be short-term, occurring only while reconstruction is occurring in the vicinity of the business, ranging from a few days to a few weeks. Some temporary reductions in patronage may occur due to patrons selecting to do business at other establishments rather than cope with any reconstruction related inconveniences. However, following reconstruction, patrons would be expected to return. Additionally, if similar businesses are located elsewhere along the rail line in the same area, patrons of that business may do business at locations formerly impacted by reconstruction activities when such activities are impacting their usual places to do business. Because impacts would be temporary, no significant impacts to business and industrial land use due to reconstruction are anticipated.

Long-term impacts to business and industrial land use associated with operation of increased train traffic would include noise, traffic delays and congestion associated with reduced access from blocked crossings, and the potential reduction in patronage associated with these impacts. SEA does not consider commercial or industrial facilities as noise sensitive receptors as

they are places of business with high levels of activity and are only subject to noise impacts during business hours. Additionally, rail operations are considered an industrial use and are considered compatible with other industrial land uses. Therefore, they are not included as noise sensitive receptors in the discussion of noise impacts in Section 4.3.7.

Noise generated by passing trains could cause disturbances to nearby businesses. However, numerous disturbances and other sources of noise currently impact these businesses, resulting in higher, normal noise levels and regular disturbances. Additionally, trains would only impact businesses during normal business hours during the work-week and individual disturbances would be brief, limited to 2.1 to 2.4 minutes required for an individual train of 115 cars or 135 cars, respectively, to pass. The inconvenience associated with patrons trying to converse with proprietors and access the businesses across grade crossings occasionally blocked by trains may cause some patrons to take their business elsewhere. Business in close proximity to the rail line, particularly those with increased sensitivity to noise such as hotels like the Best Western Ramkota in Pierre, movie theaters, or restaurants would be most at risk of being inconveinienced.

The general level of background noise within businesses such as theaters and restaurants would reduce the potential disturbance from noise created by passing trains. In theaters, the volume of sound produced during the movie would make it unlikely for patrons to be disturbed by a train passing event. In restaurants, conversations between patrons and staff as well as general noise from restaurant activities, such as stacking dishes and background music, would also reduce the level of disturbance in these establishments. Hotels, however, lack the presence of background noise. Patrons are generally provided with a quiet environment within the hotel. Noise abatement measures used in the construction of these facilities reduce disturbance due to noise generated outside the business premises. The businesses in areas adjacent to the rail line which do not currently have noise abatement measures incorporated as part of their construction, particularly older buildings, would be more susceptible to higher noise levels than those that have abatement measures.

The incidence of noise disturbance would increase according to the amount of time patrons are present in the business. Generally, customers spend an average of two hours at a time in restauraunts and theaters. Based on an even distribution of train passing events over a 24-hour period at the 100 MNT level of operations (37 trains per day), patrons would potentially experience two train passing events during the time they are on the premises. However, hotel patrons would potentially experience 10 train passing events (based on 8 hours of sleep and 2 hours of leisure and preparation time). Disturbance would most likely occur to patrons whose rooms have exterior walls on the rail line side of the hotel. Disturbance during nighttime hours could be a significant impact for hotels located in proximity to the rail line if noise abatement measures are not utilized and patrons are disturbed to the point of selecting other lodging. In

some cases, patrons would have no choice but to use the existing lodging facilities due to no other available services in the area.

For those businesses and industries that are currently served by DM&E, improved rail service should improve their ability to compete in the marketplace. Improved rail service and a better ability to compete may enable these businesses and industries to increase their profit margins and expand their operations. The value of these operations would be increased, as well as the real estate they occupy. Additionally, efficient rail service in the project area may make the region attractive to new business and industry, particularly in agricultural processes and services. Properties suitable for industrial development along the existing rail line could expect to increase in value.

Operational impacts to business and industrial facilities are expected to vary. Commercial businesses, particularly those susceptible to noise disturbance, may be negatively impacted, if significant measures are necessary to minimize noise impacts or by loss of patronage. However, facilities served by the rail line may see significant positive impacts due to improved marketplace competition. Land suitable for industrial development may increase in value. Therefore, overall impacts to business and industrial land use are expected to be positive. However, negative impacts, potentially significant, may occur to isolated businesses adjacent to the rail line.

4.3.6.4 Minerals and Mining

The existing DM&E rail line in South Dakota would pass 2.1 miles of strip mines, quarries, and gravel pits. The reconstruction of the existing rail line may lead to expansion of these operations if the materials they contain are suitable for rail construction. Their proximity to the rail line makes them a sensible choice for construction materials and the project would be expected to have a positive impact on them. Additionally, during operation and maintenance of the project, these facilities could continue to be used to provide materials for the rail line. Impacts to these land uses is expected to be positive.

4.3.6.5 Public Facilities

A variety of public facilities occur in close proximity to the existing rail line, such as schools, churches, medical facilities, parks, and recreational areas, as described in Section 4.1.4.5. During reconstruction of the existing rail line, these facilities would potentially be exposed to increased noise, dust, and vehicle emissions from reconstruction equipment. These impacts may reduce public use of some of the facilities or change use patterns, such as time of day or increased weekend usage when reconstruction is not occurring. The presence of reconstruction equipment and workers may result in congestions on local highways, affecting access to public facilities.

Additionally, traffic delays and detours may occur during reconstruction activities at grade crossings. Increased use of public facilities, including parks, churches, and medical facilities may occur due to use by construction workers. These impacts would be temporary and short-term, occurring only during the period of reconstruction in the particular region of the state served by any particular facilities. Delays or disruptions to movement of traffic could be locally significant. However, they would only occur for short periods of time along the rail line, primarily only for the few hours or days reconstruction activities would be taking place at any particular grade crossing. No property associated with public facilities would be required for reconstruction of the existing rail line.

Operation of the reconstructed DM&E rail line, with an increased number of trains operating at higher speeds has the potential to impact public facilities. General impacts to public facilities could include reduced access due to road crossings being blocked, increased noise, and traffic congestion, and reduced grade crossing safety. These impacts are discussed in greater detail in later Sections.

4.3.6.6 Federal Lands

4.3.6.6.1 Forest Service Lands

There are no Forest Service lands along the existing rail line to be reconstructed in South Dakota. Therefore, no impacts would occur to these lands along the existing DM&E rail line.

4.3.6.6.2 Bureau of Land Management Lands

There are no Bureau of Land Management lands along the existing rail line to be reconstructed in South Dakota. Therefore, no impacts would occur to these lands along the existing DM&E rail line.

4.3.6.6.3 Bureau of Reclamation Lands

The existing DM&E rail line in South Dakota, north of Canning passes through approximately 200 feet of land owned by Reclamation (Section 4.1.4.6.4). The land was purchased by Reclamation as part of the Oahe Unit, Pierre Canal project for the construction of a water syphon to allow water in the Pierre Canal to flow under the existing rail line. Construction of the Pierre Canal has been terminated indefinitely, and the syphon has not been constructed. However, any reconstruction activities necessary outside the existing railroad right-of-way would require coordination with Reclamation.

4.3.6.6.4 Fish and Wildlife Service Lands

The existing DM&E rail line in South Dakota passes within 1.0 mile of 12 Federal Waterfowl Production Areas. Table 4.1-6 lists these areas and their locations. Five of these areas are adjacent to the existing rail line and would be most likely affected by reconstruction and operational activities. Impacts to these areas would include increased noise resulting in disturbance to nesting waterfowl, mortality to nesting hens and chicks along the right-of-way, loss of wetland and upland habitats, and disturbance from human activity. These impacts are discussed in greater detail in Section 4.3.10.2.

Missouri River Bridge

Rehabilitation of the Missouri River Bridge could cause potential disturbance to land and facilities owned by the COE, such as temporary trail closures or disturbance necessary to realign existing trails. Construction of a new bridge would require more extensive activities along the river banks in proximity to bridge construction. Along the east bank, the proposed bridge would require the direct use of approximately 0.4 acre of COE recreation area. A two-acre public recreational area, owned by the COE, is located along the west bank of the bridge. Construction of a new bridge would require direct use of approximately 0.7 acre of the recreational area on the west bank. Following completion of the new bridge, ownership of the existing bridge would be transferred to another party, or the bridge would have to be removed according to U.S. Coast Guard (Coast Guard) regulations. Both rehabilitation of the existing bridge and construction of a new bridge would require a permit from both the COE and the Coast Guard. According to Coast Guard regulation, "The taking of any public recreation or historic place, facilities, structures, etc., will require preperation of Section 303 [formerly Section 4(f)] statements in accordance with the DOT Act of 1966".

4.3.6.7 Reservation and Treaty Lands

The existing rail line is within 10.0 miles of three Reservations (Section 4.1.4.7). Yet, it crosses no Reservations. As stated in Section 4.1.4.7, the Treaty of 1851 established all lands west of the Missouri River in South Dakota, for the Sioux Nation. Today the rights to these treaty lands, including the counties Haakon, Stanley, Jackson, and Pennington in the project area are disputed by several Tribes. The portions of the existing DM&E rail line in these counties currently cross these disputed lands.

4.3.6.8 State Lands

State lands within or near the project area include State Parks and State Game Production Areas. These areas occuring along the existing rail line are described in Chapter 4, Section 4.1.4.8.

State Parks

No state park land is crossed by or adjacenty to the existing rail line. However, state park land located in close proximity to the rail line would experience short-term and long-term impacts associated with the reconstruction and operation of the rail line. Impacts to state lands could include increased noise and dust, potential fire hazards, and increased air emissions.

State Game Production Areas

The existing rail line is within 1.0 mile of seven State Game Production Areas (GPA). The existing rail line is immediately adjacent to or passes through two (Bracken Slough GPA in Beadle Co. and Arikara GPA in Hughes Co.) such areas. Reconstruction of the rail line through these areas would be restricted to the existing right-of-way. No additional lands would be required, therefore no reductions in their size would result. Reconstruction noise and human activity would likely disturb local wildlife, resulting in animals seeking more secluded habitat. Reconstruction activity in these areas during periods of high public use, such as during fall and winter hunting seasons, would reduce their appeal to the public. However, most reconstruction activities would occur during the summer and for only a short period, ranging from several days to several weeks for each area. Summer activities such as hiking and fishing would be those activities primarily affected. These properties are generally small (1,200 acres or less) and the limited numbers of users could easily go to other properties during the reconstruction phase. Reconstruction should have little impact to these properties.

During operation of the project, the increased train traffic could make GPA areas less desirable to wildlife and the public due to increased disturbance to a natural setting. However, these areas are exposed to rail activities associated with current rail line operation and maintenance. Users of these areas have adapted to accept current disturbance. If adequate wildlife habitat is available, some wildlife would continue to use these areas. Increased train activity could delay vehicles attempting to access these areas as well as increase concerns for vehicle and pedestrian safety. Although some decline in area usage and decrease in habitat value could occur, impacts from increased operations are not expected to be significant.

4.3.6.9 Utility Corridors

Numerous utilities of all types are crossed by the existing rail line or utilize the existing right-of-way. Reconstruction and operation of the existing rail line has the potential to damage these utilities, resulting in loss of product, customer service, and in the case of natural gas or petroleum products, create potentially dangerous situations. DM&E would need to identify all utilities within the right-of-way and coordinate with the owners of those utilities to insure they are properly protected during reconstruction, and determine if they would require relocation or reconstruction to prevent future damage from rail operations. Provided this is done, the project would have no significant impacts on utilities.

4.3.7 WATER RESOURCES

4.3.7.1 Surface Water

The existing DM&E rail line in South Dakota crosses 7 rivers (Section 4.1.5.1), 230 intermittent streams and 16 perennial streams. Installation of bridges and culverts has the potential to increase erosion into surface waters and disturb bottom sediments. These impacts would result in increased total suspended solids (TSS) in surface waters, increasing stream sedimentation, changing sediment loading and deposition patterns in the stream, and reducing surface water quality. Reconstruction activities on either side of the water crossing may disturb vegetation adjacent to the stream, increasing the potential for erosion. Soil-disturbing activities and excavation, should they be required at or adjacent to water crossings, would have similar affects. In-stream work, particularly if vehicles are required to move into or across streams, would disturb bottom sediments and stream banks, also contributing to sediment in the water. Bank stabilization and channelization may be necessary for some crossings. These activities have the potential to change stream hydrology, altering water flow velocities and sediment loading and deposition patterns. Increased water temperatures, stream bank erosion, incising of stream channels, and reduction in stream meanders could result. Spills of fuel, lubricants, solvents, or other hazardous materials during reconstruction at stream crossings could introduce contaminants into the water, reducing water quality. However, any contaminants are expected to be present in small amounts, consisting of that amount necessary for operation of equipment, insufficient to cause significant impacts to surface water quality beyond the immediate crossing location.

The potential for these reconstruction impacts would be limited to the short period required for crossing reconstruction, indicated by DM&E to be approximately 14 days for bridge reconstruction (except for work related to the Missouri River bridge which is expected to take two construction seasons) and 1 to 2 days for culverts. Surface water impacts would be of highest concern during reconstruction of crossings of perennial streams, as water would be

present in the stream bed, and during high water periods. Due to the short period necessary of crossing installation, it is likely many of the intermittent stream crossings would be installed and reclamation measures implemented without water ever being present in the stream channel, particularly in the drier areas of western South Dakota. In these instances, should a spill of hazardous substances occur, it could be contained and cleaned up without impacting surface water resources.

During rail line operation, surface waters could be impacted in the event of a derailment. Should diesel fuel or lubricants be released from locomotives or rail cars involved in a derailment, they could reduce water quality. Severe spills of fuel could degrade water quality for a substantial distance downstream of the spill until the spill is contained or diluted. Additionally, increased TSS would likely result if a derailment resulted in coal being spilled into the water. While these impacts could occur, they are considered unlikely due to the rail line being maintained in good condition and the derailment needing to occur at a stream crossing. The infrequent (necessary only once every several years) disturbance to bottom sediments and stream banks associated with bridge and culvert maintenance activities would be the most likely impacted during rail line operation. Such disturbances would be minor because they would involve little in-stream work or site disturbance. Additionally, during railroad operation, herbicide application within the rail line right-of-way to control vegetation could reduce water quality if herbicides are improperly applied or allowed to enter surface waters.

Missouri River Bridge

Rehabilitation of the Missouri River Bridge or construction of a new bridge across the Missouri River, between Pierre and Fort Pierre, South Dakota would cause an increase in TSS in waters of the Missouri River. Increased sediment and turbidity would result due to river bank disturbance and in-stream activities. New bridge construction would require the placement of 27 new piers within the river. This disturbance of the river bank on both sides of the river would contribute to increased erosion. Although reductions in water quality during new bridge construction would be limited to the period of pier installation, they would be greater than those expected to occur from rehabilitation of the existing bridge.

4.3.7.2 Wetlands

Impacts to wetlands are considered by the U.S. Army, Corps of Engineers (COE) to be temporary, long-term, or permanent, depending on the amount of time it would take for the

reestablishment of a functional wetland.[3] Reestablishment within three years after reconstruction is considered a temporary impact. However, any reestablishment that takes longer than three years is considered long-term. The non-recoverable loss of a particular wetland or riparian area function is considered permanent. Rail line reconstruction would have the following impacts on wetland and riparian resources within the existing right-of-way:

- Permanent loss or alteration, due to placement of fill or dredging of substrate during reconstruction, resulting in a change in hydrology, soils, or the composition of vegetation which could be both temporary, limited to the reconstruction period, or permanent throughout operation of the rail line.

- Permanent or temporary degradation of the functions of wetland or riparian resources.

Wetlands located within the existing rail line right-of-way would be lost during reconstruction of the rail line. A variety of wetland types would be lost. Section 4.1.5.3 describe the various types of wetlands found throughout the project area and potentially lost.

To quantify potential impacts to wetlands along each alternative, the wetland acres were determined based on USFWS National Wetland Inventory (NWI) mapping.[4] The reconstruction activities have the potential to impact 197.0 acres of wetlands within the existing DM&E right-of-way. Section 4.1.5.3 and Table 4.1-12 provide a county breakdown of wetland acreage within the rail line right-of-way. These wetlands are expected to be lost due to reconstruction activities and construction of sidings.

Clearing of vegetation, excavation, grading, and placement of fill to create a raised rail bed for sidings or to repair the existing rail bed would likely result in a loss of any wetlands present. Reconstruction activities associated with rebuilding the existing rail line could require reconstruction equipment to work within or travel through wetlands. These activities would

[3] A reestablished wetland would be considered to be a functional wetland at such a time as it is capable of providing the functions performed by the original wetland. Such functions could include surface water retention, nutrient uptake, and wildlife habitat.

[4] National Wetlands Inventory (NWI) mapping is performed by the U.S. Fish and Wildlife Service (USFWS). Aerial photography is used to identify potential wetland areas, based on observations of water or vegetation in the photographs. NWI maps provide a useful guide as to the potential for wetlands. However, they may indicate wetlands where they do not actually exist, and may also indicate uplands in areas where wetlands do exist. Additionally, indicated wetlands are not based on criteria established by the U.S. Army Corps of Engineers for wetlands under its jurisdiction as per the Clean Water Act. Use of NWI maps does however, provide a useful means of comparing the potential wetland impacts of the alternatives.

result in damage to wetland vegetation, mixing and compaction of wetland soils, and potential alterations in site hydrology. If wetlands occur in areas where sidings would be constructed, portions of these wetlands within the right-of-way would be filled to provide rail bed for the sidings. Additionally, wetlands adjacent to a rail bed are generally undesirable to rail operators as they contribute to saturated soil conditions that may destabilize the rail bed. These areas would likely be filled or drained.

Additionally, if wetlands extend outward from the right-of-way, adjacent areas of wetlands may also be lost due to changes in surface water drainage flow, erosion, and sedimentation. Installation of rail line drainage structures may result in adjacent wetlands being drained. These indirect impacts are difficult to quantify due to lack of final design information. However, it is likely some wetlands would re-establish within the rail line right-of-way. These wetlands would likely be similar to those lost but smaller in size and of less value.

During project operation and maintenance, wetlands re-established in the right-of-way may be subject to impacts similar to those of reconstruction should maintenance activities require work in wetlands. These impacts would be sporadic and in confined areas. Contaminants, such as fuel, lubricants and herbicides could enter wetlands, damaging vegetation and contaminating water or soil due to improper handling, use, or in the unlikely event of a derailment. During project operation and maintenance, impacts to adjacent wetlands may also occur. However, impacts to these adjacent areas would be restricted to potential degradation of wetlands from maintenance activities and the potential introduction of contaminants in the event of a derailment or a spill.

Indirect impacts to wetlands could also result from reconstruction of the rail line. Soil disturbance in the right-of-way could increase sedimentation in adjacent wetlands. Increased sedimentation could reduce the size, water depth, or quality of the wetland. Installation of drainage structures may drain wetlands outside the right-of-way, resulting in additional wetland losses.

4.3.7.3 Groundwater and Wells

Possible contamination of surface aquifers in South Dakota could result from a fuel or contaminant spill during reconstruction or operation of the rail line. If a fuel or chemical spill occurred during reconstruction or operation of the rail line, it could cause contamination of groundwater aquifers. Any aquifer or well contamination resulting from use of the DM&E rail line would be considered significant. However, impacts to groundwater are unlikely due to the limited quantity of fuel and contaminants present during reconstruction and operation of the railroad. In

addition, the rebuilt rail line is expected by DM&E to be safer than the current track in operation, and therefore less likely to experience derailments.

4.3.8 AIR QUALITY

Reconstruction and operation of the existing DM&E rail line would result in changes to the air quality of the project area. While emissions during both reconstruction and operation of the project would generally be consistent with the types of emissions currently present in the project area, increases in emissions would be expected.

Reconstruction related impacts to air quality would generally be localized around the area of reconstruction activity. However, some impacts would likely occur throughout the project area. Local air quality impacts related to reconstruction activity would be short-term and occur at several isolated, scattered locations at any given time during the two to three year reconstruction period. The primary reconstruction impact to air quality would be an increase in fugitive dust. These increases would occur from a variety of reconstruction activities. Increased traffic from construction workers and equipment on local gravel roads would stir dust from these roadways. Any excavation or earthmoving activities would also contribute to dust. As noted in Section 4.3.5.3, many of the project area soils are susceptible to wind erosion. Clearing of the right-of-way and earthmoving activities would expose these soils to increased opportunity for both wind and water erosion. Transport of fill material in uncovered trucks could also contribute to fugitive dust. Following completion of reconstruction and reclamation of the right-of-way, these impacts would no longer be expected to continue.

Emissions from reconstruction vehicles and equipment would also impact air quality. These impacts would primarily be confined to the right-of-way where reconstruction activities would be most concentrated. As noted above, the scattered nature of reconstruction and the short time periods that it may occur would spread equipment emission over a large area. Additionally, emissions would be dispersed by wind, preventing them from becoming concentrated. Vehicle and diesel emissions are common and widespread throughout the project area, although they occur at very low levels due to generally low traffic levels and only short, periodic times of high agricultural activity (planting, harvesting) spread over the growing season. Air emissions during reconstruction are not anticipated to reduce air quality in the overall project area due to their temporary and scattered nature.

During rail line operation, in-transit loss of coal from rail cars is expected to occur, potentially increasing fugitive dust along the rail line. However, fugitive dust emissions from these coal losses are intermittent and difficult to quantify. PRB coal has a high moisture content,

averaging about 30 percent moisture.[5] The moisture in the coal tends to reduce fugitive dust compared to drier eastern coals that average about 10 percent moisture.[6] Also, the cooler climate of South Dakota and Wyoming tends to cause the coal to freeze together during colder times of the year, further limiting fugitive coal losses during these periods. During the warmer months, rain mixing with the clay in the PRB coal tends to crust the coal pile and may serve to reduce fugitive coal emissions during transport. Some coal losses would be expected during the drier part of the summer months. SEA identified no detailed studies that provided information on the amount of coal dust lost from rail transportation or the potential problems it could create. SEA contacted numerous state air quality and pollution control agencies to obtain input on the coal dust-loss issue. SEA contacted the South Dakota Department of Environment and Natural Resources (which also provided information on contacts with the North Dakota and Nebraska Departments of Natural Resources), Wyoming Department of Environmental Quality, Minnesota Pollution Control Agency, Colorado Department of Public Health & Environment, and the Missouri Department of Natural Resources. These states were contacted due to their inclusion in the project area, being known to have rail lines over which PRB coal is transported, or both. It was the opinion of these agencies that loss of coal dust does not represent a significant environmental hazard, and that in their experience, loss of coal in the size range to become airborne is an infrequent event. This position is largely based on lack of complaints about coal dust from persons along the coal transportation rail routes and the agencies' field personnel not observing coal dust blowing from open rail cars or settled along the rail lines. Based on this anecdotal evidence, SEA does not believe fugitive coal dust poses a significant environmental concern. However, it does acknowledge that some fugitive coal dust may be noticed along the rail line, potentially causing inconvenience to adjacent residents and businesses by requiring periodic washing of buildings, vehicles, and other outside surfaces.

SEA determined that the increases in rail traffic at each analyzed level of operation (20 MNT equal to 8 coal trains per day, 50 MNT equal to 18 coal trains per day, and 100 MNT equal to 34 coal trains per day) would exceed the Board's thresholds, found at 49 CFR 1105.7, for environmental analysis of air quality impacts. These thresholds require SEA to conduct detailed analysis of potential air quality impacts from reconstruction projects that result in an increase of eight or more trains per day in areas classified as attainment for all criteria pollutants. As all counties in the project area are classified as attainment, this threshold applies to SEA's analysis for this project. Additionally, the Board's regulations require SEA to evaluate potential air quality impacts on other portions of DM&E's rail system where rail traffic would exceed this

[5] Lick, Robert. 1991. 1991 Keystone Coal Industry Manual. Robert Lick Publisher. Maclean Hunter Publications. Chicago, Illinois. 1991.

[6] Ibid.

threshold due to the proposed reconstruction project. Therefore, SEA conducted a detailed analysis of potential air quality impacts along the existing DM&E rail line to be reconstructed in South Dakota.

DM&E indicated in its Application that it intends to transport up to 100 MNT of coal per year and that interchanges with other rail carriers are available to route the coal to the users. However, because contracts for coal transportation have not yet been obtained by DM&E, SEA cannot reasonably determine the exact routes over which DM&E coal would be transported. Therefore, SEA cannot determine the rail lines which would exceed the Board's thresholds. SEA determined it reasonable for all the increases in rail traffic to occur along the existing DM&E rail line. Thus, SEA performed a system-wide analysis to determine the potential impacts for each of the proposed project Extension Alternatives on air quality that would occur as a result of this project along the entire DM&E rail line SEA's analysis included proposed emissions increases along the new Extension Alternatives and DM&E's existing rail line across South Dakota and Minnesota. SEA's analysis of air quality impacts along the existing rail line in South Dakota is contained in this Section. Air quality impacts from rail yards along the existing rail line in South Dakota are included at Section 4.10. The results of the air quality analysis for Minnesota are found in Chapter 3, Sections 3.2.8 and 3.4, and for the new Extension Alternatives at Sections 4.4 through 4.8 and 4.11.

SEA analyzed emissions (in tons per year) for sulfur dioxide (SO_2), hydrocarbons (HC),[7] particulate matter of less than 10 microns in diameter (PM_{10}), oxides of nitrogen (NO_X), carbon monoxide (CO), and lead (Pb). Emissions from DM&E locomotives along the existing rail line would represent an increase in the emissions observed for the counties through which the rail line passes. The project emissions due to increased rail line operations include those from diesel locomotives along the rail line and within rail yards. Emissions in rail yards that would be located along the existing rail line in South Dakota would be due primarily to locomotives idling while crews are changed, locomotives and rail cars are inspected, and potentially during minor maintenance and fueling activities. These rail yard emissions are included in Section 4.10.

[7] Hydrocarbons are a category of chemical substances containing the elements carbon and hydrogen. A variety of different hydrocarbon compounds are emitted by locomotives. EPA's locomotive emission factors were used to calculate the hydrocarbon emissions resulting from this project. Hydrocarbon emissions are a consideration in this analysis as many of them compose a subgroup of compounds known as volatile organic compounds (VOCs). VOCs can easily combine with other chemicals, including those in the air, to form ozone, one of EPA's criteria pollutants. Generally, one ton of VOC emissions will react to produce one ton of ozone. Therefore, VOC emissions provide a surrogate for potential ozone production. However, EPA's emission factors for locomotives do not include VOC emissions, only hydrocarbons. Therefore, SEA's use of hydrocarbon emissions as a surrogate for VOCs is overly conservative as only the VOC component of hydrocarbons would produce ozone.

The emission changes SEA calculated for the existing rail line in South Dakota are given in the following Section on a county-wide basis. The methodology SEA used for these calculations is provided in Appendix E, Air Quality Analysis Methodology. SEA compared the results of its analysis to the Environmental Protection Agency's (EPA) major source thresholds for stationary sources. EPA's major source thresholds for stationary sources provide the emissions level for each criteria pollutant at which a stationary source of that air pollutant would be required to apply for a major construction or operating permit. The use of threshold screening levels is consistent with previous SEA environmental analyses, as no thresholds are currently established for mobile emission sources, such as locomotives. Therefore SEA used the EPA stationary sources as screening values for emissions. If the projected county-wide emission levels exceeded the air quality screening levels shown in Table 4.3-1, then SEA performed a more detailed air dispersion modeling to determine if locomotive emissions would pose a potentially significant impact to air quality.

STB thresholds of eight trains or more per day would be exceeded in all South Dakota counties through which the existing DM&E rail line passes. SEA identified 11 counties in South Dakota that would be affected by increased locomotive emissions from this project. For each county, SEA summed air emissions increases from changes due to increased locomotive activity and compared them to the air emission screening thresholds shown in Table 4.3-1.

Table 4.3-1
County Emissions Screening Levels

Pollutant	Area Designation	Emissions Screening Levels (tons/year)
Nitrogen Oxides (NO_X)	1. Attainment/Maintenance for NO_2 2. Marginal/Moderate Ozone 3. Ozone Attainment	100
	Ozone Serious Non-attainment	50
	Ozone Severe Non-attainment	25

Table 4.3-1
County Emissions Screening Levels

Pollutant	Area Designation	Emissions Screening Levels (tons/year)
Volatile Organic Compounds (VOCs)	1. Attainment/Maintenance for Ozone 2. Marginal/Moderate Ozone non-attainment	100
	Ozone Serious Non-attainment	50
	Ozone Severe Non-attainment	25
Carbon Monoxide (CO)	1. Attainment/Maintenance for CO 2. Marginal/Moderate Ozone non-attainment	100
	CO Serious Non-Attainment	50
Particulate Matter less than 10 microns (PM_{10})	1. PM_{10} Attainment or Maintenance 2. PM_{10} Moderate Non-attainment	100
	PM_{10} Serious Non-attainment	70
Sulfur Dioxide (SO_2)	SO_2 Attainment or Non-attainment	100
Lead (Pb)	Pb Attainment or Non-attainment	0.6

A summary of the emission increases for the 20 million annual tons level of operation is shown in Table 4.3-2.

Table 4.3-2
Comparison of Emission Increases in South Dakota to EPA Thresholds for the 20 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Brookings	**174**	100	12	100	33	100	8	100	21	100	0.001	0.6
Kingsbury	**183**	100	13	100	35	100	9	100	22	100	0.001	0.6
Beadle	**213**	100	15	100	41	100	10	100	25	100	0.001	0.6
Hand	**151**	100	11	100	29	100	7	100	18	100	0.001	0.6
Hyde	89	100	6	100	17	100	4	100	11	100	0.001	0.6
Hughes	**232**	100	16	100	44	100	11	100	28	100	0.001	0.6
Stanley	**144**	100	10	100	28	100	7	100	17	100	0.001	0.6
Jones	79	100	5	100	15	100	4	100	9	100	0.001	0.6
Haakon	**190**	100	13	100	36	100	9	100	23	100	0.001	0.6
Jackson	67	100	5	100	13	100	3	100	8	100	0.001	0.6
Pennington*	131	100	8	100	22	100	14	100	14	100	0.0004	0.6

* Includes only those emissions along DM&E's existing rail line from Wall eastward.

A comparison of the emission increases for the 50 million annual tons level of operation is shown in Table 4.3-3.

Table 4.3-3
Comparison of Emission Increases in South Dakota to EPA Thresholds for the 50 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Brookings	**389**	100	27	100	75	100	19	100	47	100	0.002	0.6
Kingsbury	**408**	100	29	100	78	100	20	100	49	100	0.002	0.6
Beadle	**475**	100	33	100	91	100	23	100	57	100	0.002	0.6
Hand	**338**	100	24	100	65	100	16	100	40	100	0.001	0.6
Hyde	**199**	100	14	100	38	100	10	100	24	100	0.001	0.6
Hughes	**517**	100	36	100	99	100	25	100	62	100	0.002	0.6
Stanley	**321**	100	23	100	61	100	15	100	38	100	0.001	0.6
Jones	**169**	100	12	100	32	100	8	100	20	100	0.001	0.6
Haakon	**424**	100	30	100	81	100	20	100	51	100	0.002	0.6
Jackson	**148**	100	10	100	23	100	7	100	18	100	0.001	0.6
Pennington*	313	100	19	100	52	100	13	100	33	100	0.001	0.6

* Includes only those emissions along DM&E's existing rail line from Wall eastward.

A comparison of the emission increases for the 100 million annual tons level of operation is shown in Table 4.3-4.

Table 4.3-4
Comparison of Emission Increases in South Dakota to EPA Thresholds for the 100 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Brookings	**744**	100	52	100	**142**	100	36	100	89	100	0.003	0.6
Kingsbury	**779**	100	55	100	**149**	100	38	100	93	100	0.003	0.6
Beadle	**907**	100	64	100	**173**	100	44	100	**108**	100	0.004	0.6
Hand	**646**	100	46	100	**124**	100	31	100	77	100	0.003	0.6
Hyde	**380**	100	27	100	73	100	18	100	45	100	0.001	0.6
Hughes	**986**	100	70	100	**189**	100	48	100	**118**	100	0.004	0.6
Stanley	**613**	100	43	100	**117**	100	30	100	73	100	0.002	0.6
Jones	**323**	100	23	100	62	100	16	100	39	100	0.001	0.6
Haakon	**810**	100	57	100	**155**	100	39	100	97	100	0.003	0.6
Jackson	**283**	100	20	100	54	100	14	100	34	100	0.001	0.6
Pennington*	610	100	38	100	102	100	26	100	64	100	0.002	0.6

* Includes only those emissions along DM&E's existing rail line from Wall eastward.

For the 20 and 50 million ton per year options, NO_X, CO and SO_2 emissions are predicted to exceed EPA's major source thresholds in several counties. For the 100 million ton per year option,NO_X, VOCs, CO, PM and SO_2 emissions are expected to exceed the major source thresholds in several counties. Therefore, SEA reviewed the results of the CALPUFF air dispersion modeling performed as part of the air quality and visibility analysis for the new Extension Alternatives to determine if the impacts from the increased rail traffic would be expected to exceed the National Ambient Air Quality Standards (NAAQS) or Prevention of Significant Deterioration (PSD) Class II increments.[8]

[8] HC is a photo reactive pollutant which could form Ozone. In lieu of modeling, the HC impacts were estimated using the Chaffee methodology (see Appendix E).

The NAAQS are an air quality standard established by EPA for the protection of human health and welfare. They provide the maximum allowable concentrations for a pollutant in a particular county, and take into consideration emissions inside and outside the county that could affect the county. The NAAQS air concentrations for the various pollutants are:

· NOx -100 microgram/cubic meter (annual average),
· CO - 40,000 micrograms/cubic meter (1 hour average),
· CO - 10,000 micrograms/cubic meter (8 hour average),
· PM_{10} -50 microgram/cubic meter (annual average),
· PM_{10} -150 micrograms/cubic meter (24 hour average)
· SO_2 - 80 microgram/cubic meter (annual average),
· SO_2 - 365 micrograms/cubic meter (24 hour average),
· SO_2 - 1,300 micrograms/cubic meter (3 hour average - secondary standard).

PSD Class II increments are established by the EPA. They are the amount emissions of a particular pollutant can be increased above the existing emission level for that pollutant in a particular county. However, they do not enable emissions for a particular pollutant to exceed the NAAQS standards. For example, the NAAQS for NO_X is 100 microgram/cubic meter. If the existing NO_X level is 25 microgram/cubic meter, a new emissions source would have 75 microgram/cubic meter of emissions before it would reach the NAAQS level. However, PSD Class II increments would only allow the emissions to increase by 25 micrograms/cubic meters. Should the existing emissions be 80 micrograms/cubic meters for NO_X, while PSD Class II increments would allow it to be increased by 25 micrograms/cubic meters, NAAQS standards would only allow an increase of 20 micrograms/cubic metesrs. PSD Class II standards have been identified for NO_X, SO_2, and PM_{10} and are:

· NO_x - 25 micrograms/cubic meter (annual average),
· SO_2 - 20 micrograms/cubic meter (annual average),
· SO_2 - 91 micrograms/cubic meter (24 hour average),
· SO_2 - 512 micrograms/cubic meter (3 hour average),
· PM_{10} - 17 micrograms/cubic meter (annual average),
· PM_{10} - 30 micrograms/cubic meter (24 hour average).

SEA modeled air emissions using the CALPUFF model to obtain locomotive emission concentrations near the rail line. Locomotive emissions along the rail line ("near-field") would represent the maximum anticipated concentrations of the various pollutants because they would not have been diluted by wind or other atmospheric conditions. SEA then compared the concentrations obtained from the model for those pollutants that exceeded the major source thresholds to the NAAQS and PSD Class II increments. SEA performed this analysis to

determine if the emissions increases along the existing rail line could cause or contribute to a violation of the NAAQS standards or PSD Class II increments. SEA's analysis showed that maximum projected ambient concentrations would be significantly lower than the NAAQS standards and PSD Class II increments. The modeling methodology and results are included in Appendix E (reference *Attachment 1: CALPUFF Technical Support Document*).

As trains pass through highway/rail grade intersections, automobiles and other on-road vehicles are required to stop and hold short of the intersection on either side of the crossing. While these vehicles are delayed, their engines are typically idling until the train passes. If a significant number of vehicles idle for a sufficient length of time, it is possible that concentrations of CO could be elevated in the vicinity of the crossing.

As part of the environmental analysis, delay times at highway/rail crossings were reviewed to determine numbers of vehicles that could potentially be queued (lines up) at any given time waiting to cross the rail line and the average vehicle delay that would be experienced by these vehicles. Vehicle queues and average delay times experienced under the pre-construction condition were compared with projected vehicle queues and average delay times for the post-construction condition. The results of this analysis show that the number of vehicles that would be queued at any given time, and the average delay time experienced by each of these vehicles, would decrease due to increased train speeds. The average number of vehicles queued at any given time before construction ranges from 12.5 to 44.7 vehicles, while the number of vehicles queued at any given time after construction ranges from 6.3 to 25.6. Similarly, the average pre-construction delay time per vehicle ranges from 1.6 to 2.4 seconds per vehicle, while the average post-construction delay time per vehicle is approximately 1.5 seconds. This results in a reduction, depending on the intersection, of 0.1 to 0.9 seconds per vehicle. Section 4.3.12 presents the data for the vehicle delays at public highway/grade crossings.

Although more trains would pass through the intersections on a daily basis, each train would spend a shorter period of time crossing each intersection due to its increased speed. Therefore, fewer cars would be queued at any given time. Additionally, the average delay time for each of these queued vehicles would be shorter since the trains would pass through the intersections in a shorter period of time than in the pre-construction scenario. As such, emissions from idling vehicles would occur on a more frequent basis but would have less chance of accumulating in the vicinity of the crossing due to the reduced time vehicles would be stopped at the crossing. It is therefore concluded that the potential for increased concentrations of CO in the vicinity of the rail crossings once reconstruction is complete would be minimal.

4.3.9 NOISE and VIBRATION

4.3.9.1 Noise

The reconstruction and operation of the proposed project would result in increased noise levels along the existing rail line. During reconstruction, portions of the rail line would be taken out of service for short periods, ranging from several hours to a few days. During this time, rail traffic and the associated noise from operating locomotives and trains would cease. Temporary noise would be generated from operation of vehicles and heavy equipment used for clearing, rail, tie, and ballast removal, and any rail bed work. These impacts would occur only during the short period required to reconstruct the existing rail line in a particular area. As reconstruction is estimated to occur a the rate of approximately one mile per day, most areas would likely experience increased noise from reconstruction activities for only a day or two. However, in those few scattered areas where the rail bed may require rehabilitation, earthmoving and excavation activities could result in reconstruction taking several days. Once a particular section of rail line is reconstructed, another section of rail line would be taken out of service and reconstruction activities relocated to the new area. Therefore, reconstruction noise would be moved along the rail line, with only short periods of increased noise occurring at a particular location. Normally, construction would occur in two shifts, from 6 a.m. to 11 p.m., with equipment maintenance, some of which may occur to equipment within the right-of-way, occurring between 11 p.m. and 6 a.m.

DM&E would continue to operate a fully functioning rail line during the reconstruction period. Therefore, breaks in reconstruction could occur to allow movement of trains. In addition, where siding would not be constructed, reconstruction could be suspended for short periods to allow train movement. These sections of rail line would experience near normal levels of rail traffic noise. However, on days when reconstruction activities would be occurring, only construction related noise would be experienced by noise sensitive receptors.

In areas where siding would be constructed along the existing rail line, construction of siding would occur adjacent to the rail line without the rail line being taken out of service, allowing trains to continue to operate. Areas adjacent to these sections of rail line would be exposed to increased noise due to both rail operations and reconstruction occurring simultaneously. Following completion of siding construction, trains could operate over the siding, allowing reconstruction of the rail line. Noise in these areas would be generated by both construction activities and existing levels of train traffic for the duration of the reconstruction period estimated by DM&E to be approximately one day per mile of rail line.

Following reconstruction, operation of the existing DM&E rail line would result in an increase in rail traffic over the rebuilt portion of the existing DM&E system. At the level of rail traffic anticipated during the initial operation of the project (20 MNT, which would be equal to 8 trains per day, 4 loaded and 4 empty), SEA determined that the entire existing system would meet the Board's environmental analysis thresholds for noise at 49 CFR 1105.7(e)(6). The Board's thresholds for noise analysis are:

- all rail lines where rail traffic would increase by eight or more trains per day, or
- all rail lines for which the gross ton-miles transported annually increases by 100 percent or more.

As the levels of traffic increase, these thresholds would continue to be exceeded. Therefore, SEA conducted a detailed evaluation of potential noise impacts from operation of the proposed project. Based on information provided in DM&E's Application to the Board indicating a monetary break-even level of rail traffic equal to 8 coal trains per day increasing over time to as many as 34 coal trains per day, SEA determined a detailed analysis of noise impacts was appropriate for the existing rail line.

SEA performed an analysis of the entire length of the existing DM&E rail line in South Dakota to determine the potential noise impacts of the proposed increases in rail traffic. SEA calculated the distance (contour) at which the average daily noise level (L_{dn}) would be equal to 65 decibels (dB) on an A-weighted scale (A),[9] or would experience an increase of 3 dBA L_{dn} or greater, as specified in the Board's rules. Distances less than the 65 dBA L_{dn} contour would experience average daily noise levels greater than 65 dBA. Federal agencies, including the Federal Aviation Administration and Department of Housing and Urban Development, consider noise levels up to 65 dBA L_{dn} to be compatible with most noise sensitive receptors. These agencies, as well as the Board, agree that noise levels at or above 65 dBA L_{dn} are adverse. Figure 4-1 provides a comparison of common noise levels with rail wayside and horn noise. SEA also calculated the 70 dBA L_{dn} contour. The 70 dBA L_{dn} noise level was established by SEA in the Conrail Acquisition, Finance Docket No. 33388, as the noise level at which mitigation for noise impacts would be considered for that case. It is applied here as a comparison to the number of noise sensitive receptors calculated to experience noise levels of 65 dBA L_{dn} or greater. Additionally, SEA considers noise levels at and above 70 dBA L_{dn} to be significantly adverse.

[9] A-weighted scale considers only those frequencies of noise that are audible to the human ear.

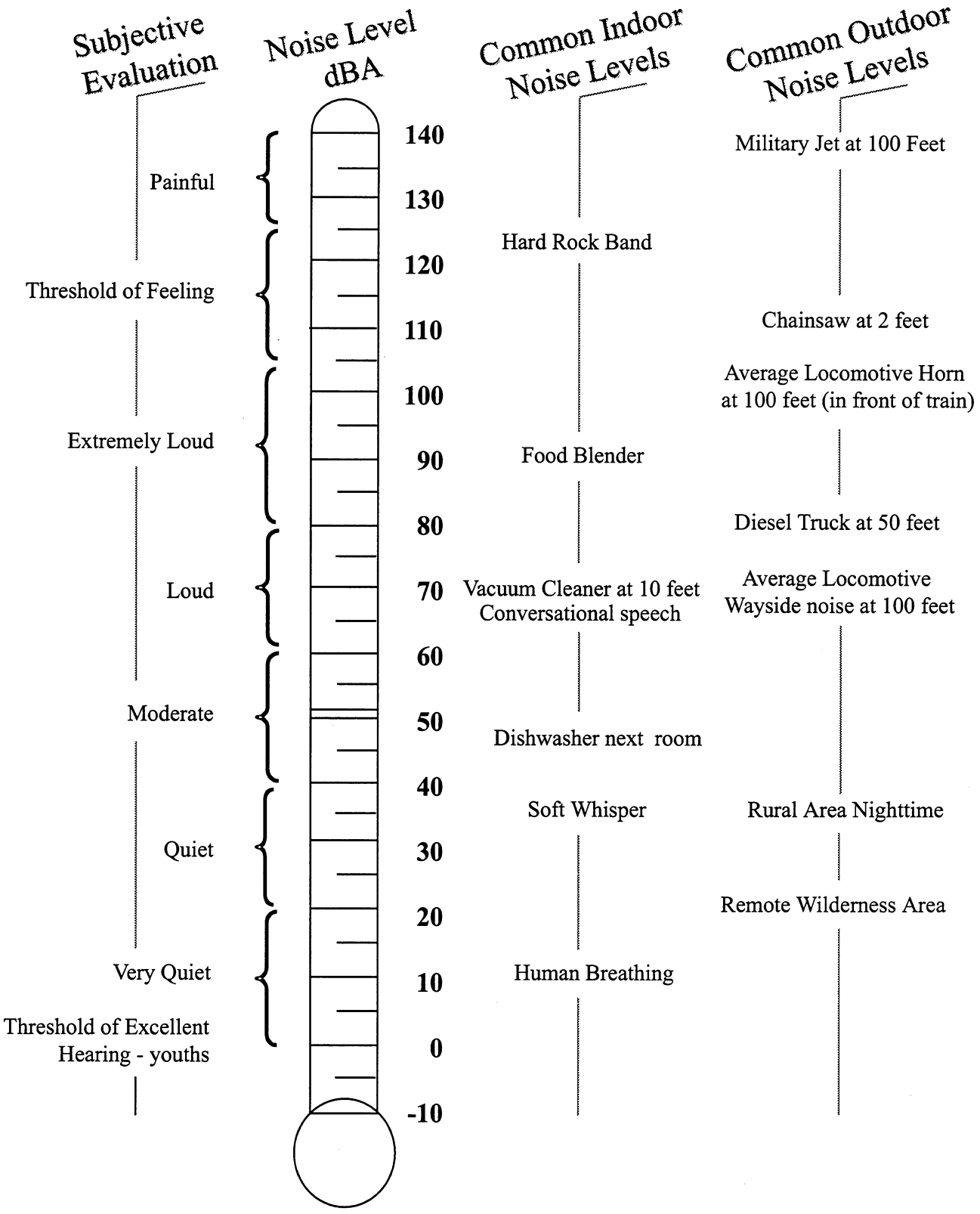

Figure 4-1
POWDER RIVER BASIN EXPANSION PROJECT
SAMPLE NOISE LEVELS

Noise contours were calculated for both the existing and proposed operating conditions, at proposed annual coal transportation levels of 20 MNT, 50 MNT, and 100 MNT. These levels of operation were selected by SEA because the exact levels of train traffic are dependent upon DM&E securing contracts for coal transportation. The 20 MNT level is roughly the break-even level for the project and therefore represents the minimum level of rail traffic. DM&E projected in its Application to the Board a level equivalent to 50 MNT shortly after beginning operation, potentially expanding to 100 MNT within 7 years. As 50 MNT appears to be a reasonably foreseeable level of operation and 100 MNT was indicated by DM&E as the maximum level its system could accommodate, these levels of operation were also evaluated. Additionally, DM&E indicated it would have approximately 3 trains per day due to its existing rail traffic. Contours were calculated for 11 (20 MNT), 21 (50 MNT), and 37 (100 MNT) trains per day, of which 3 would be existing rail traffic and the remaining would be unit coal trains. SEA counted noise sensitive receptors (e.g. schools, hospitals, churches, and residences) within the noise contours for the current condition and under each of the proposed annual operating scenarios.

Operational noise sources include the diesel locomotive engine, wheel/rail interaction noise (or wayside noise), and horn noise. Wayside noise affects all locations in the vicinity of the rail facility. Horn noise is an additional noise source at grade crossings where trains are required by law to sound a horn for safety. Both types of noise diminish with distance.

The area along the DM&E rail line and affected communities that would experience increases in traffic or activity meeting the Board's environmental analysis threshold for South Dakota are listed in Tables 4.3-5 through 4.3-17. Tables 4.3-5 through 4.3-8 show the communities, within their respective counties, with the number of noise sensitive receptors expected to experience noise levels exceeding 65 dBA L_{dn}. County totals are in bold and include both the sensitive receptors within and outside the communities. Noise sensitive receptors within this noise level due to wayside noise, wayside and horn noise, and horn noise only are presented. Tables 4.3-9 through 4.3-12 show the communities, within their respective counties, with the number of noise sensitive receptors exceeding 70 dBA L_{dn}. A comparison of the existing conditions at both the 65 dBA and 70 dBA is shown in Tables 4.3-13 through 4.3-18. Negative numbers reflect a reduction in the number of noise sensitive receptors within a given noise impact category. These reductions only occur for the horn noise category. Where these reductions occur, they are due to some noise sensitive receptors in the existing condition that are within a noise contour (either 65 or 70 dBA L_{dn}) due to horn noise being within a contour for either wayside or wayside and horn noise under a future operating scenario. Generally, noise sensitive receptor density along the rail line in South Dakota is such that SEA found the existing condition accounted for many of the noise sensitive receptors affected by the project. That is, many of the noise sensitive receptors anticipated to experience adverse noise levels due to this project currently are exposed to such noise levels due to horn sounding. Increasing the level of train

traffic did increased the number of receptors, as well as changed the category in which many were counted. In some instances, such as for Wendte in Stanley County (Table 4.3-15), the entire community was affected by horn noise. Increased rail noise levels did not result in any additional noise sensitive receptors being affected, however it changed the category of noise to which they were exposed.

Missouri River Bridge Impacts

Six residences are located within 500 feet of the existing DM&E railroad bridge. Noise disturbance during rehabilitation of the existing bridge would occur during reconstruction. New bridge construction would result in a greater increase in noise exposure due to the increase in construction activity and increased amount of construction equipment required. Rehabilitation or construction would last for a period of approximately 2 to 3 years. The potential removal of the existing bridge, following the potential construction of a new bridge, would extend noise disturbance for a period necessary for bridge removal. During operation, noise sensitive receptors would be exposed to a greater level of noise. However, the number of noise sensitive receptors affected by the rehabilitation of the existing bridge would be similar to that for new bridge construction due to the minimal change in distance (34 feet) from the existing bridge location.

Table 4.3-5
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors - 65 dBA L_{dn}

County and Communities	Wayside	Wayside/horn	Horn	Total
Brookings	**0**	**6**	**179**	**185**
Elkton	0	0	71	71
Aurora	0	6	109	115
Arlington	0	0	1	1
Kingsbury	**0**	**0**	**395**	**395**
Arlington	0	0	93	93
Hetland	0	0	23	23
Lake Preston	0	0	94	94
De Smet	0	0	138	138
Manchester	0	0	17	17
Iroquois	0	0	19	20

Table 4.3-5
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors - 65 dBA L_{dn}

County and Communities	Wayside	Wayside/horn	Horn	Total
Beadle	**0**	**1**	**229**	**230**
Iroquois	0	0	20	20
Cavour	0	0	20	20
Morningside	0	0	0	0
Huron	0	1	112	113
Wolsey	0	0	38	38
Wessington	0	0	29	29
Hand	**0**	**3**	**105**	**108**
Wessington	0	0	1	1
Vayland	0	0	4	4
St. Lawrence	0	1	15	16
Miller	0	2	73	75
Ree Heights	0	0	9	9
Hyde	**0**	**0**	**26**	**26**
Highmore	0	0	24	24
Holabird	0	0	0	0
Hughes	**0**	**0**	**308**	**308**
Harrold	0	0	26	26
Blunt	0	0	15	15
Canning	0	0	7	7
Alto	0	0	0	0
Pierre	0	0	258	258
Stanley	**0**	**0**	**183**	**183**
Ft. Pierre	0	0	177	177
Wendte	0	0	2	2
Jones	**0**	**0**	**0**	**0**
Capa	0	0	0	0
Haakon	**0**	**0**	**53**	**53**
Midland	0	0	25	25
Nowlin	0	0	0	0
Powell	0	0	0	0
Philip	0	0	28	28

Table 4.3-5
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors - 65 dBA L_{dn}

County and Communities	Wayside	Wayside/horn	Horn	Total
Jackson	**0**	**1**	**3**	**4**
Cottonwood	0	1	3	4
Pennington (Wall east only)	**0**	**3**	**20**	**23**
Quinn	0	0	8	8
Wall	0	1	12	13

Table 4.3-6
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 20 MNT

County and Communities	Number of Noise Sensitive Receptors for 11 Trains			
	Wayside	Wayside/horn	Horn	Total
Brookings	**2**	**27**	**215**	**244**
Elkton	0	2	83	85
Aurora	2	24	117	143
Arlington	0	1	1	2
Kingsbury	**0**	**36**	**612**	**648**
Arlington	0	2	142	144
Hetland	0	0	34	34
Lake Preston	0	8	123	131
De Smet	0	27	251	278
Manchester	0	0	17	17
Iroquois	0	0	45	45
Beadle	**0**	**17**	**450**	**467**
Iroquois	0	0	25	25
Cavour	0	0	42	42
Morningside	0	0	0	0
Huron	0	7	213	220
Wolsey	0	2	75	77
Wessington	0	7	75	82

Table 4.3-6
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 20 MNT

County and Communities	Number of Noise Sensitive Receptors for 11 Trains			
	Wayside	Wayside/horn	Horn	Total
Hand	**0**	**21**	**278**	**299**
Wessington	0	0	3	3
Vayland	0	0	9	9
St. Lawrence	0	2	62	64
Miller	0	19	178	197
Ree Heights	0	0	21	21
Hyde	**0**	**0**	**113**	**113**
Highmore	0	0	109	109
Holabird	0	0	2	2
Hughes	**8**	**37**	**781**	**826**
Harrold	0	1	50	51
Blunt	2	0	34	36
Canning	0	0	9	9
Alto	0	0	0	0
Pierre	6	36	684	726
Stanley	**3**	**33**	**253**	**289**
Ft. Pierre	3	33	246	282
Wendte	0	0	2	2
Jones	**2**	**0**	**0**	**2**
Capa	2	0	0	2
Haakon	**10**	**17**	**177**	**204**
Midland	0	4	51	55
Nowlin	1	0	1	1
Powell	0	0	3	3
Philip	6	13	117	136
Jackson	**0**	**2**	**10**	**12**
Cottonwood	0	2	10	12
Pennington (Wall east only)	**0**	**3**	**110**	**113**
Quinn	0	0	22	22
Wall	0	3	88	91

Table 4.3-7
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Communities	Number of Noise Sensitive Receptors for 21 Trains			
	Wayside	Wayside/horn	Horn	Total
Brookings	**2**	**47**	**278**	**327**
Elkton	0	10	122	132
Aurora	2	34	139	175
Arlington	0	1	1	2
Kingsbury	**2**	**113**	**750**	**865**
Arlington	0	17	208	225
Hetland	0	5	30	35
Lake Preston	0	22	149	171
De Smet	0	57	317	374
Manchester	0	9	9	18
Iroquois	0	3	26	29
Beadle	**0**	**31**	**818**	**849**
Iroquois	0	1	84	85
Cavour	0	2	65	67
Morningside	0	0	0	0
Huron	0	10	426	436
Wolsey	0	4	121	125
Wessington	0	12	100	112
Hand	**2**	**47**	**422**	**471**
Wessington	0	0	6	6
Vayland	0	1	9	10
St. Lawrence	0	9	92	101
Miller	1	35	264	300
Ree Heights	0	2	35	37
Hyde	**0**	**9**	**196**	**205**
Highmore	0	8	185	193
Holabird	0	0	8	8

Table 4.3-7
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Communities	Number of Noise Sensitive Receptors for 21 Trains			
	Wayside	Wayside/horn	Horn	Total
Hughes	**15**	**92**	**1,321**	**1,428**
Harrold	0	5	62	67
Blunt	2	0	66	68
Canning	1	0	9	10
Alto	0	0	0	0
Pierre	9	85	1,178	1,272
Stanley	**6**	**51**	**444**	**501**
Ft. Pierre	3	50	433	486
Wendte	0	1	1	2
Jones	**2**	**0**	**0**	**2**
Capa	2	0	0	2
Haakon	**12**	**37**	**325**	**374**
Midland	0	15	74	89
Nowlin	0	2	4	6
Powell	0	1	2	3
Philip	6	19	246	271
Jackson	**0**	**4**	**15**	**19**
Cottonwood	0	4	14	18
Pennington (Wall east only)	**0**	**24**	**229**	**253**
Quinn	0	3	35	38
Wall	0	4	151	155

Table 4.3-8
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 100 MNT

County and Communities	Number of Noise Sensitive Receptors for 37 Trains			
	Wayside	Wayside/horn	Horn	Total
Brookings	**6**	**73**	**307**	**386**
Elkton	0	22	159	181
Aurora	4	47	125	176
Arlington	0	1	3	4
Kingsbury	**3**	**171**	**971**	**1,145**
Arlington	0	41	256	297
Hetland	0	10	25	35
Lake Preston	0	39	206	245
De Smet	0	63	347	410
Manchester	0	13	5	18
Iroquois	0	5	24	29
Beadle	**0**	**94**	**1,228**	**1,322**
Iroquois	0	7	101	108
Cavour	0	11	56	67
Morningside	0	0	1	1
Huron	0	32	850	882
Wolsey	0	11	138	149
Wessington	0	26	86	112
Hand	**2**	**86**	**543**	**631**
Wessington	0	0	12	12
Vayland	0	4	6	10
St. Lawrence	0	17	91	108
Miller	1	59	371	431
Ree Heights	0	4	44	48

Table 4.3-8
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 100 MNT

County and Communities	Number of Noise Sensitive Receptors for 37 Trains			
	Wayside	Wayside/horn	Horn	Total
Hyde	**3**	**11**	**290**	**304**
Highmore	0	11	274	285
Holabird	0	0	11	11
Hughes	**49**	**202**	**1,764**	**2,015**
Harrold	0	10	60	70
Blunt	2	4	128	134
Canning	1	4	7	12
Alto	0	0	0	0
Pierre	16	180	1,563	1,759
Stanley	**10**	**110**	**483**	**603**
Ft. Pierre	4	106	471	581
Wendte	0	1	1	2
Jones	**2**	**0**	**0**	**2**
Capa	1	0	0	1
Haakon	**15**	**59**	**381**	**455**
Midland	0	18	77	95
Nowlin	0	4	4	8
Powell	0	1	2	3
Philip	7	36	298	341
Jackson	**0**	**4**	**18**	**22**
Cottonwood	0	4	14	18
Pennington (Wall east only)	**1**	**52**	**307**	**360**
Quinn	1	13	24	38
Wall	0	16	245	261

Table 4.3-9
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors - 70 dBA L_{dn}

County and Communities	Wayside	Wayside/horn	Horn	Total
Brookings	**0**	**2**	**73**	**75**
Elkton	0	0	26	26
Aurora	0	2	43	45
Arlington	0	0	1	1
Kingsbury	**0**	**0**	**124**	**124**
Arlington	0	0	17	17
Hetland	0	0	6	6
Lake Preston	0	0	31	31
De Smet	0	0	54	54
Manchester	0	0	10	10
Iroquois	0	0	6	6
Beadle	**0**	**1**	**37**	**38**
Iroquois	0	0	3	3
Cavour	0	0	3	3
Morningside	0	0	0	0
Huron	0	1	16	17
Wolsey	0	0	10	10
Wessington	0	0	3	3
Hand	**0**	**0**	**35**	**35**
Wessington	0	0	5	5
Vayland	0	0	1	1
St. Lawrence	0	0	1	1
Miller	0	0	27	27
Ree Heights	0	0	0	0
Hyde	**0**	**0**	**7**	**7**
Highmore	0	0	6	6
Holabird	0	0	0	0
Hughes	**0**	**0**	**155**	**155**
Harrold	0	0	3	3
Blunt	0	0	3	3
Canning	0	0	0	0
Alto	0	0	0	0
Pierre	0	0	148	148

Table 4.3-9
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors - 70 dBA L_{dn}

County and Communities	Wayside	Wayside/horn	Horn	Total
Stanley	**0**	**0**	**57**	**57**
Ft. Pierre	0	0	56	56
Wendte	0	0	1	1
Jones	**0**	**0**	**0**	**0**
Capa	0	0	0	0
Haakon	**0**	**0**	**24**	**24**
Midland	0	0	12	12
Nowlin	0	0	0	0
Powell	0	0	0	0
Philip	0	0	12	12
Jackson	**0**	**0**	**1**	**1**
Cottonwood	0	0	1	1
Pennington (Wall east only)	**0**	**0**	**8**	**8**
Quinn	0	0	0	0
Wall	0	0	8	8

Table 4.3-10
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Communities	Number of Noise Sensitive Receptors for 11 Trains			
	Wayside	Wayside/horn	Horn	Total
Brookings	**0**	**3**	**87**	**90**
Elkton	0	0	34	34
Aurora	0	3	45	48
Arlington	0	0	2	2

Table 4.3-10
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Communities	Number of Noise Sensitive Receptors for 11 Trains			
	Wayside	Wayside/horn	Horn	Total
Kingsbury	**0**	**0**	**209**	**209**
Arlington	0	0	53	53
Hetland	0	0	14	14
Lake Preston	0	0	58	58
De Smet	0	0	79	79
Manchester	0	0	14	14
Iroquois	0	0	13	13
Beadle	**0**	**1**	**116**	**117**
Iroquois	0	0	8	8
Cavour	0	0	14	14
Morningside	0	0	0	0
Huron	0	1	49	50
Wolsey	0	0	15	15
Wessington	0	0	24	24
Hand	**0**	**2**	**129**	**131**
Wessington	0	0	5	5
Vayland	0	0	4	4
St. Lawrence	0	0	26	26
Miller	0	2	87	89
Ree Heights	0	0	7	7
Hyde	**0**	**0**	**27**	**27**
Highmore	0	0	25	25
Holabird	0	0	1	1
Hughes	**0**	**0**	**279**	**279**
Harrold	0	0	28	28
Blunt	0	0	5	5
Canning	0	0	0	0
Alto	0	0	0	0
Pierre	0	0	241	241
Stanley	**0**	**6**	**77**	**83**
Ft. Pierre	0	6	70	76
Wendte	0	0	4	4

Table 4.3-10
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Communities	Number of Noise Sensitive Receptors for 11 Trains			
	Wayside	Wayside/horn	Horn	Total
Jones	**0**	**0**	**0**	**0**
Capa	0	0	0	0
Haakon	**0**	**0**	**78**	**78**
Midland	0	0	24	24
Nowlin	0	0	1	1
Powell	0	0	0	0
Philip	0	0	53	53
Jackson	**0**	**0**	**3**	**3**
Cottonwood	0	0	3	3
Pennington (Wall east only)	**0**	**0**	**58**	**58**
Quinn	0	0	15	15
Wall	0	0	43	43

Table 4.3-11
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 50 MNT

County and Communities	Number of Noise Sensitive Receptors for 21 Trains			
	Wayside	Wayside/horn	Horn	Total
Brookings	**0**	**7**	**146**	**153**
Elkton	0	0	64	64
Aurora	0	7	73	80
Arlington	0	0	2	2
Kingsbury	**0**	**16**	**412**	**428**
Arlington	0	1	76	77
Hetland	0	0	28	28
Lake Preston	0	1	101	102
De Smet	0	14	143	157
Manchester	0	0	26	26
Iroquois	0	0	20	20

Table 4.3-11
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 50 MNT

County and Communities	Number of Noise Sensitive Receptors for 21 Trains			
	Wayside	Wayside/horn	Horn	Total
Beadle	**0**	**5**	**251**	**256**
Iroquois	0	0	15	15
Cavour	0	0	34	34
Morningside	0	0	0	0
Huron	0	3	151	154
Wolsey	0	1	48	49
Wessington	0	1	54	55
Hand	**0**	**8**	**282**	**290**
Wessington	0	0	9	9
Vayland	0	0	8	8
St. Lawrence	0	0	48	48
Miller	0	6	129	135
Ree Heights	0	0	17	17
Hyde	**0**	**0**	**64**	**64**
Highmore	0	0	62	62
Holabird	0	0	1	1
Hughes	**0**	**15**	**591**	**606**
Harrold	0	1	40	41
Blunt	0	1	13	14
Canning	0	0	0	0
Alto	0	0	0	0
Pierre	0	13	530	543
Stanley	**4**	**9**	**182**	**195**
Ft. Pierre	3	9	176	188
Wendte	0	0	5	5
Jones	**0**	**0**	**0**	**0**
Capa	0	0	0	0

Table 4.3-11
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 50 MNT

County and Communities	Number of Noise Sensitive Receptors for 21 Trains			
	Wayside	Wayside/horn	Horn	Total
Haakon	**2**	**15**	**148**	**165**
Midland	0	4	37	41
Nowlin	0	0	4	4
Powell	0	0	0	0
Philip	0	11	102	113
Jackson	**0**	**1**	**4**	**5**
Cottonwood	0	1	4	5
Pennington (Wall east only)	**0**	**6**	**111**	**117**
Quinn	0	0	30	30
Wall	0	6	81	87

Table 4.3-12
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Communities	Number of Noise Sensitive Receptors for 37 Trains			
	Wayside	Wayside/horn	Horn	Total
Brookings	**0**	**22**	**171**	**193**
Elkton	0	0	74	74
Aurora	0	20	81	101
Arlington	0	1	1	2
Kingsbury	**0**	**43**	**625**	**668**
Arlington	0	1	102	103
Hetland	0	0	33	33
Lake Preston	0	8	131	139
De Smet	0	32	285	317
Manchester	0	2	14	16
Iroquois	0	0	60	60

Table 4.3-12
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Communities	Number of Noise Sensitive Receptors for 37 Trains			
	Wayside	Wayside/horn	Horn	Total
Beadle	**0**	**13**	**514**	**527**
Iroquois	0	1	25	26
Cavour	0	0	52	52
Morningside	0	0	0	0
Huron	0	6	262	268
Wolsey	0	2	88	90
Wessington	0	3	81	84
Hand	**0**	**27**	**319**	**346**
Wessington	0	0	9	9
Vayland	0	0	8	8
St. Lawrence	0	2	74	76
Miller	0	25	193	218
Ree Heights	0	0	22	22
Hyde	**1**	**0**	**125**	**126**
Highmore	0	0	123	123
Holabird	0	0	2	2
Hughes	**7**	**39**	**1,565**	**1,611**
Harrold	0	1	58	59
Blunt	1	1	36	38
Canning	0	0	9	9
Alto	0	0	0	0
Pierre	5	37	1,462	1,504
Stanley	**4**	**19**	**324**	**347**
Ft. Pierre	3	17	314	334
Wendte	0	2	4	6
Jones	**0**	**0**	**0**	**0**
Capa	0	0	0	0

Table 4.3-12
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Communities	Number of Noise Sensitive Receptors for 37 Trains			
	Wayside	Wayside/horn	Horn	Total
Haakon	**8**	**20**	**172**	**200**
Midland	0	6	46	52
Nowlin	0	0	5	5
Powell	0	0	0	0
Philip	6	14	120	140
Jackson	**0**	**2**	**10**	**12**
Cottonwood	0	2	10	12
Pennington (Wall east only)	**0**	**3**	**120**	**123**
Quinn	0	0	30	30
Wall	0	3	90	93

Table 4.3-13
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 20 MNT - 65 dBA L_{dn}

County and Communities	Existing and 11 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Brookings	**0**	**2**	**2**	**0**	**27**	**27**	**179**	**215**	**36**
Elkton	0	0	0	0	2	2	71	83	11
Aurora	0	2	2	6	24	18	109	117	8
Arlington	0	0	0	0	1	1	1	1	0
Kingsbury	**0**	**0**	**0**	**0**	**36**	**36**	**395**	**612**	**217**
Arlington	0	0	0	0	2	2	93	142	49
Hetland	0	0	0	0	0	0	23	34	11
Lake Preston	0	0	0	0	8	8	94	123	29
De Smet	0	0	0	0	27	27	138	251	113
Manchester	0	0	0	0	0	0	17	17	0
Iroquois	0	0	0	0	0	0	19	45	26

Table 4.3-13
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 20 MNT - 65 dBA L_{dn}

County and Communities	Existing and 11 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Beadle	**0**	**0**	**0**	**1**	**17**	**16**	**229**	**450**	**221**
Iroquois	0	0	0	0	0	0	22	25	3
Cavour	0	0	0	0	0	0	20	42	22
Morningside	0	0	0	0	0	0	0	0	0
Huron	0	0	0	1	7	6	112	213	101
Wolsey	0	0	0	0	2	2	38	75	37
Wessington	0	0	0	0	7	7	29	75	46
Hand	**0**	**0**	**0**	**3**	**21**	**18**	**105**	**278**	**173**
Wessington	0	0	0	0	0	0	1	3	2
Vayland	0	0	0	0	0	0	4	9	5
St. Lawrence	0	0	0	1	2	1	15	62	47
Miller	0	0	0	2	19	17	73	178	105
Ree Heights	0	0	0	0	0	0	9	21	12
Hyde	**0**	**0**	**0**	**0**	**0**	**0**	**26**	**113**	**87**
Highmore	0	0	0	0	0	0	24	109	85
Holabird	0	0	0	0	0	0	0	2	2
Hughes	**0**	**8**	**8**	**0**	**37**	**37**	**308**	**781**	**473**
Harrold	0	0	0	0	1	1	26	50	24
Blunt	0	2	2	0	0	0	15	34	19
Canning	0	0	0	0	0	0	7	9	2
Alto	0	0	0	0	0	0	0	0	0
Pierre	0	6	6	0	36	36	258	684	426
Stanley	**0**	**3**	**3**	**0**	**33**	**33**	**183**	**253**	**70**
Ft. Pierre	0	3	3	0	33	33	177	246	69
Wendte	0	0	0	0	0	0	2	2	0
Jones	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**
Capa	0	2	2	0	0	0	0	0	0

Table 4.3-13
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 20 MNT - 65 dBA L_{dn}

County and Communities	Existing and 11 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Haakon	**0**	**10**	**10**	**0**	**17**	**17**	**53**	**177**	**124**
Midland	0	0	0	0	4	4	25	51	26
Nowlin	0	1	1	0	0	0	0	1	1
Powell	0	0	0	0	0	0	0	3	0
Philip	0	6	6	0	13	13	28	117	89
Jackson	**0**	**0**	**0**	**1**	**2**	**1**	**3**	**10**	**7**
Cottonwood	0	0	0	1	2	1	3	10	7
Pennington	**0**	**0**	**0**	**3**	**3**	**0**	**20**	**110**	**90**
Quinn	0	0	0	0	0	0	8	22	14
Wall	0	0	0	1	3	2	12	88	76

[1] - E=existing P=proposed I=increase

Table 4.3-14
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 50 MNT - 65 dBA L_{dn}

County and Communities	Existing and 21 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Brookings	**0**	**2**	**2**	**6**	**47**	**41**	**179**	**278**	**99**
Elkton	0	0	0	0	10	10	71	122	51
Aurora	0	2	2	6	34	28	109	139	30
Arlington	0	0	0	0	1	1	1	1	0
Kingsbury	**0**	**2**	**2**	**0**	**113**	**113**	**395**	**750**	**355**
Arlington	0	0	0	0	17	17	93	208	115
Hetland	0	0	0	0	5	5	23	30	7
Lake Preston	0	0	0	0	22	22	94	149	55
De Smet	0	0	0	0	57	57	138	317	179
Manchester	0	0	0	0	9	9	17	9	8
Iroquois	0	0	0	0	3	3	19	26	7
Beadle	**0**	**0**	**0**	**1**	**31**	**30**	**229**	**818**	**589**
Iroquois	0	0	0	0	1	1	22	84	62
Cavour	0	0	0	0	2	2	20	65	45
Morningside	0	0	0	0	0	0	0	0	0
Huron	0	0	0	1	10	9	112	426	314
Wolsey	0	0	0	0	4	4	38	121	83
Wessington	0	0	0	0	12	12	29	100	71
Hand	**0**	**2**	**2**	**3**	**47**	**44**	**105**	**422**	**317**
Wessington	0	0	0	0	0	0	1	6	5
Vayland	0	0	0	0	1	1	4	9	5
St. Lawrence	0	0	0	1	9	8	15	92	77
Miller	0	1	1	2	35	33	73	264	191
Ree Heights	0	0	0	0	2	2	9	35	26
Hyde	**0**	**0**	**0**	**0**	**9**	**9**	**26**	**196**	**170**
Highmore	0	0	0	0	8	8	24	185	161
Holabird	0	0	0	0	0	0	0	8	8

Table 4.3-14
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 50 MNT - 65 dBA L_{dn}

County and Communities	Existing and 21 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Hughes	**0**	**15**	**15**	**0**	**92**	**92**	**308**	**1,321**	**1,013**
Harrold	0	0	0	0	5	5	26	62	36
Blunt	0	2	2	0	0	0	15	66	51
Canning	0	1	1	0	0	0	7	9	2
Alto	0	0	0	0	0	0	0	0	0
Pierre	0	9	9	0	85	85	258	1,178	920
Stanley	**0**	**6**	**6**	**0**	**51**	**51**	**183**	**444**	**261**
Ft. Pierre	0	3	3	0	50	50	177	433	256
Wendte	0	0	0	0	1	1	2	1	-1
Jones	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**
Capa	0	2	2	0	0	0	0	0	0
Haakon	**0**	**12**	**12**	**0**	**37**	**37**	**53**	**325**	**272**
Midland	0	0	0	0	15	15	25	74	49
Nowlin	0	0	0	0	2	2	0	4	4
Powell	0	0	0	0	1	1	0	2	2
Philip	0	6	6	0	19	19	28	246	218
Jackson	**0**	**0**	**0**	**1**	**4**	**3**	**3**	**15**	**12**
Cottonwood	0	0	0	1	4	3	3	14	11
Pennington	**0**	**0**	**0**	**3**	**24**	**21**	**20**	**229**	**209**
Quinn	0	0	0	0	3	3	8	35	27
Wall	0	0	0	1	4	3	12	151	139

[1] - E=existing P=proposed I=increase

Table 4.3-15
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison for Existing
Proposed Conditions at 100 MNT - 65 dBA L_{dn}

County and Communities	Existing and 37 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Brookings	**0**	**6**	**6**	**6**	**73**	**67**	**179**	**307**	**128**
Elkton	0	0	0	0	22	22	71	159	88
Aurora	0	4	4	6	47	41	109	125	16
Arlington	0	0	0	0	1	1	1	3	2
Kingsbury	**0**	**3**	**3**	**0**	**171**	**171**	**395**	**974**	**579**
Arlington	0	0	0	0	41	41	93	256	163
Hetland	0	0	0	0	10	10	23	25	2
Lake Preston	0	0	0	0	39	39	94	206	112
De Smet	0	0	0	0	63	63	138	347	209
Manchester	0	0	0	0	13	13	17	5	-12
Iroquois	0	0	0	0	5	5	19	24	5
Beadle	**0**	**0**	**0**	**1**	**94**	**93**	**229**	**1,228**	**999**
Iroquois	0	0	0	0	7	7	20	101	81
Cavour	0	0	0	0	11	11	20	56	36
Morningside	0	0	0	0	0	0	0	1	1
Huron	0	0	0	1	32	31	112	850	738
Wolsey	0	0	0	0	11	11	38	138	100
Wessington	0	0	0	0	26	26	29	86	57
Hand	**0**	**2**	**0**	**3**	**86**	**83**	**105**	**543**	**438**
Wessington	0	0	0	0	0	0	1	12	11
Vayland	0	0	0	0	4	4	4	6	2
St. Lawrence	0	0	0	1	17	16	15	91	76
Miller	0	1	0	2	59	57	73	371	298
Ree Heights	0	0	0	0	4	4	9	44	35
Hyde	**0**	**3**	**3**	**0**	**11**	**11**	**26**	**290**	**264**
Highmore	0	0	0	0	11	11	24	274	250
Holabird	0	0	0	0	0	0	0	11	11

Table 4.3-15
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison for Existing
Proposed Conditions at 100 MNT - 65 dBA L_{dn}

County and Communities	Existing and 37 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Hughes	**0**	**49**	**49**	**0**	**202**	**202**	**308**	**1,764**	**1,456**
Harrold	0	0	0	0	10	10	26	60	34
Blunt	0	2	2	0	4	4	15	128	113
Canning	0	1	1	0	4	4	7	7	0
Alto	0	0	0	0	0	0	0	0	0
Pierre	0	16	16	0	180	180	258	1,563	1,305
Stanley	**0**	**10**	**10**	**0**	**110**	**110**	**183**	**483**	**300**
Ft. Pierre	0	4	4	0	106	106	177	471	294
Wendte	0	0	0	0	1	1	2	1	-1
Jones	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**
Capa	0	1	1	0	0	0	0	0	0
Haakon	**0**	**15**	**15**	**0**	**59**	**59**	**53**	**381**	**328**
Midland	0	0	0	0	18	18	25	77	52
Nowlin	0	0	0	0	4	4	0	4	4
Powell	0	0	0	0	1	1	0	2	2
Philip	0	7	7	0	36	36	28	298	270
Jackson	**0**	**0**	**0**	**1**	**4**	**3**	**3**	**18**	**15**
Cottonwood	0	0	0	1	4	3	3	14	11
Pennington	**0**	**1**	**1**	**3**	**29**	**26**	**20**	**269**	**249**
Quinn	0	1	1	0	13	13	8	24	16
Wall	0	0	0	1	16	15	12	245	133

[1] - E=existing P=proposed I=increase

Table 4.3-16
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 20 MNT - 70 dBA L_{dn}

County and Communities	Existing and 11 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Brookings	**0**	**0**	**0**	**2**	**3**	**1**	**73**	**87**	**14**
Elkton	0	0	0	0	0	0	26	34	8
Aurora	0	0	0	2	3	1	43	45	2
Arlington	0	0	0	0	0	0	1	2	1
Kingsbury	**0**	**0**	**0**	**0**	**0**	**0**	**124**	**209**	**85**
Arlington	0	0	0	0	0	0	17	53	36
Hetland	0	0	0	0	0	0	6	14	8
Lake Preston	0	0	0	0	0	0	31	58	27
De Smet	0	0	0	0	0	0	54	79	25
Manchester	0	0	0	0	0	0	10	14	4
Iroquois	0	0	0	0	0	0	6	13	7
Beadle	**0**	**0**	**0**	**1**	**1**	**0**	**37**	**116**	**79**
Iroquois	0	0	0	0	0	0	3	8	5
Cavour	0	0	0	0	0	0	3	14	11
Morningside	0	0	0	0	0	0	0	0	0
Huron	0	0	0	1	1	0	16	49	33
Wolsey	0	0	0	0	0	0	10	15	5
Wessington	0	0	0	0	0	0	3	24	21
Hand	**0**	**0**	**0**	**0**	**2**	**2**	**35**	**129**	**98**
Wessington	0	0	0	0	0	0	5	5	0
Vayland	0	0	0	0	0	0	1	4	3
St. Lawrence	0	0	0	0	0	0	1	26	25
Miller	0	0	0	0	2	2	27	87	60
Ree Heights	0	0	0	0	0	0	0	7	7
Hyde	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**27**	**20**
Highmore	0	0	0	0	0	0	6	25	19
Holabird	0	0	0	0	0	0	0	1	1