3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

The purpose of this chapter is to provide a description of the existing biological, physical, and socioeconomic characteristics of the project area, including human uses that could be affected as a result of implementing the proposed action and alternatives for this environmental impact statement (EIS), as described in Chapter 2.

Information from both broad-scale and fine-scale assessments were used to help set the context for the project area. The information resources and resource uses have been further broken down into fine-scale assessments and information. Specific aspects of each resource discussed in this section (e.g., air quality, water, wildlife, land use) were raised during the public and agency scoping process and/or are subject to regulatory or statutory compliance requirements. The level of information presented in this chapter is commensurate with and sufficient to assess potential effects discussed in Chapter 4 based on the alternatives presented in Chapter 2 of this EIS.

3.2 RESOURCES

This section contains a description of the existing biological, physical, and socioeconomic resources of the project area and the resource elements addressed, listed in order, are:

- Soils, Geology, and Minerals;
- Water;
  - Surface Water;
  - Groundwater;
- Air Quality;
- Acoustic Environment (Noise);
- Biological Resources;
  - Vegetation;
  - Wetlands and Riparian Areas;
  - Wildlife Resources;
  - Fisheries and Aquatic Resources;
  - Federally Listed Endangered or Threatened Species, and Species of Concern;
- Land Resources
  - Land Use and Zoning;
  - Prime and Unique Farmlands;
  - Livestock Grazing and Agriculture
- Recreation, Wilderness and Areas of Critical Environmental Concern;
- Visual Resources;
- Transportation and Traffic;
- Cultural Resources;
- Paleontological Resources;
- Solid Waste and Hazardous Materials Management;
- Public Health and Safety;
- Socioeconomics;
  - Population and Demographics;
  - Housing;
  - Economic Conditions;
  - Government Revenues;
  - Community Structure and Resources; and
- Environmental Justice and Protection of Children.

3.3 SOILS, GEOLOGY, AND MINERALS

The proposed and alternative Dry Fork Station Power Plant sites as well as the proposed and alternative transmission line alignments are located in eastern Wyoming, within the Powder River Basin (PRB). The PRB spans the border between northeastern Wyoming and southern Montana and covers an area of roughly 120 miles east to west and 200 miles north to south, or approximately 24,000 square miles. The PRB is not a physiographic province, but a geographic area that overlies a thick geologic structural basin composed predominately of marine and fluvial-deltaic facies. This sequence was deposited on a large downwarp over the Precambrian basement during the Cretaceous and Tertiary periods and has an extraordinary accumulation of coal and other hydrocarbons.

Facies: An assemblage of physical or paleontological characteristics of a rock formation that is specific to the depositional environment in which it was formed, and that grade laterally into other sedimentary accumulations that were formed at the same time but exhibit different characteristics.

The PRB lies partially within the greater Yellowstone River Basin and is bounded by the Black Hills Uplift to the east, Big Horn Uplift and Casper Arch to the west, Laramie Mountains and Hartville Uplift to the south, and Miles City Arch and Cedar Creek Anticline to the north. The PRB is drained by the Powder and Tongue Rivers that run south to north with minor changes in elevation. The PRB is largely characterized by rolling grasslands and sagebrush and an arid climate. Slopes generally range from 0 to 15 percent throughout the project area.

The PRB has been the site of oil and gas exploration for over 100 years, and is one of the richest hydrocarbon provinces in the Rocky Mountains. From the 1970s through approximately 1997, the PRB was explored primarily for oil and conventional natural gas. There are approximately 500 producing oil and natural gas fields within the PRB. While wells typically reach productive strata at locations between 4,000 and 13,500 feet (ft) below ground surface (bgs), at a few sites wells can reach productive strata at depths of less than 500 feet.

Since the late 1990s, the region has experienced intensive coal bed methane (CBM) production and has become the most active area in the country for such gas development. CBM wells have depths that range from 250 to 2,500 ft and are typically spaced on 80-acre or 160-acre grids. In 2004, the PRB produced 382.5 billion cubic feet of CBM, 17 percent of the total natural gas produced in Wyoming (Basin Electric 2006a, 2006b).

3.3.1 Soils

The geomorphology of the PRB includes gently rolling to steep dissected plains on the Missouri Plateau. Wide belts of steeply sloping badlands border a few of the larger river valleys. In places, flat-topped, steep-sided buttes rise sharply above the surrounding plains. Elevation ranges from 3,000 to 6,000 ft (915 to 1,830 meters). Soil types vary in this large area but, in general, soils are mostly medium to fine textured and range from shallow to deep.

The data for this section came from the following reports and surveys:

- Soil Survey of Sheridan County Area, Wyoming, 1998 data, updated 2002-2004;

- Soil Survey of Campbell County Area, Northern Part, Wyoming, 1980-1981, updated 2003-2004;
- Natural Resources Conservation Service (NRCS) Major Land Resource Area (MLRA) reports applicable to the project area are:
  - MLRA 46, Northern Rocky Mountain Foothills; and
  - MLRA 58B, Northern Rolling High Plains, Southern Part.

3.3.1.1 *Power Plant*

Proposed Site
On a macro scale, the two major soil series encountered in the proposed project area include the Kishona-Shingle-Theedle (WY127) and the Hiland-Vonalee-Maysdorf (WY126) which covers the westernmost portion of the proposed power plant site (Figure 3.3-1). The Kishona-Shingle-Theedle (WY127) major soil series is characterized by loam to clay-loam soils that have slope ranges from 0 to 15 percent (Kishona), 0 to 75 percent (Shingle), and 0 to 40 percent (Theedle). The Hiland-Vonalee-Maysdorf (WY126) soil series is characterized by sandy loam soils with slope ranges from 0 to 15 percent.

For the proposed site, which is immediately north of the Dry Fork Mine permit area (Figure 3.3-2), the NRCS Soil Survey Geographic (SSURGO) database for Campbell County and State Soil Geographic (STATSGO) database were used to analyze soils.

Soil surveys conducted as part of the Dry Fork Mine permit application also include the proposed and alternative sites and reveal soil depths within the area from moderately deep to deep. Deep soil profiles are found primarily along the lowlands of Dry Fork Creek and are characterized by colluvial and some fluvial deposits. In general, soils to the west of Dry Fork Creek are predominantly deep to moderately deep, while those to the east of Dry Fork Creek are moderately deep to shallow.

Appendix C contains a table of general soil characteristics obtained from the NRCS SSURGO database for the proposed power plant site, and correlates with Figure 3.3-1. Each soil map unit listed in Appendix C provides information on the major soil series that make up that map unit and also includes a description of soil texture, slope, wind and water erosion hazard potential (Figure 3.3-3 and 3.3-4), salinity, prime agricultural soil features, and revegetation potential.

Alternative Site
Soil analysis of the alternative site and the proposed ash landfill site were based on information obtained from the Dry Fork Mine permit application because both locations fall within the boundaries of the mine permit area. In 1981, detailed soil surveys were conducted as part of the Dry Fork Mine permitting process.

The Kishona-Shingle-Theedle (WY127) covers the entire area of the alternative site. The general soil map unit (WY 127) for the alternative site is the same as described for the proposed site and is further described in Appendix C.

Figure 3.3–1 – Soil Map Units within the Proposed and Alternative Power Plant

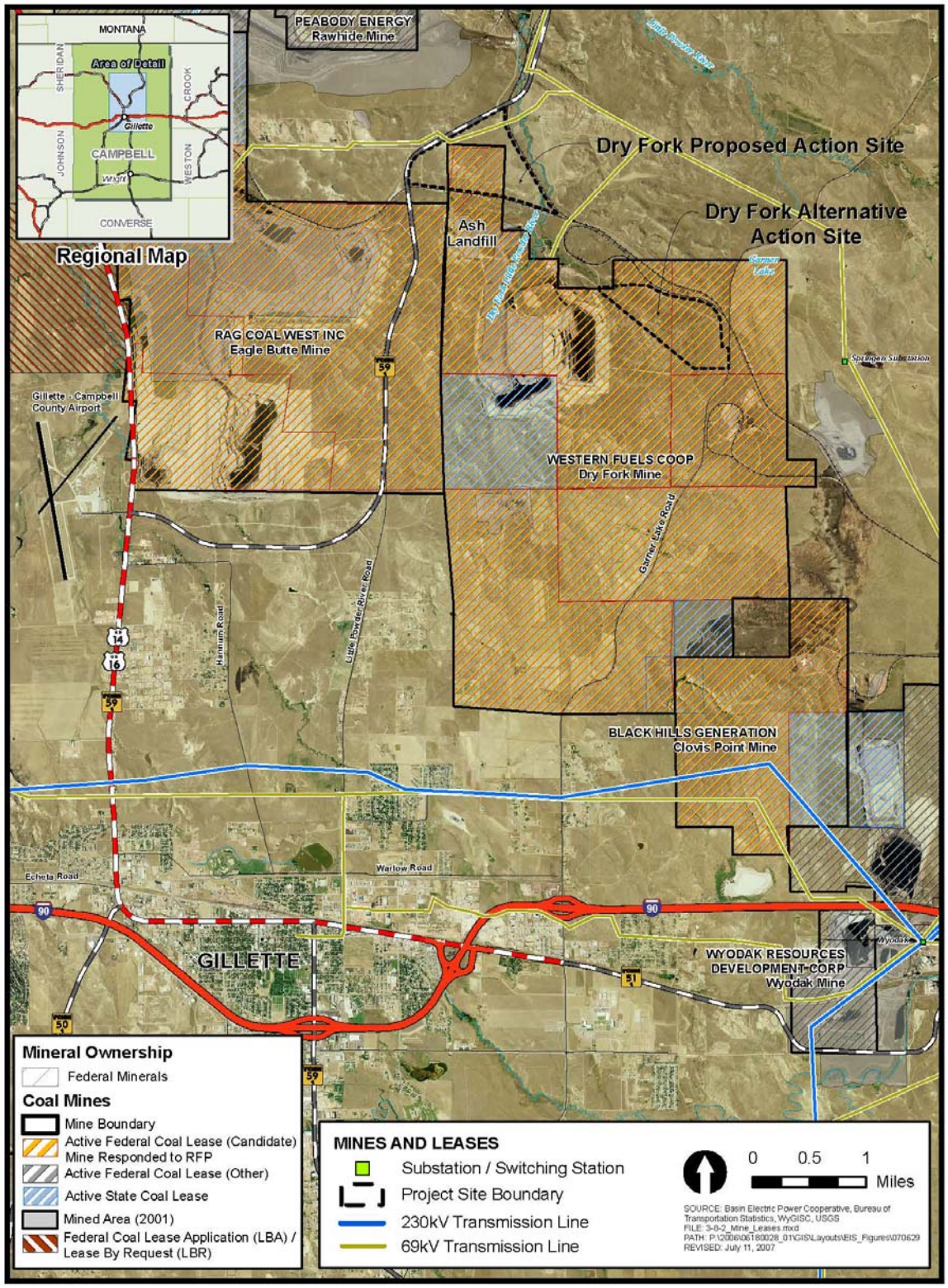


Figure 3.3-2 – Dry Fork Mine Permit Area

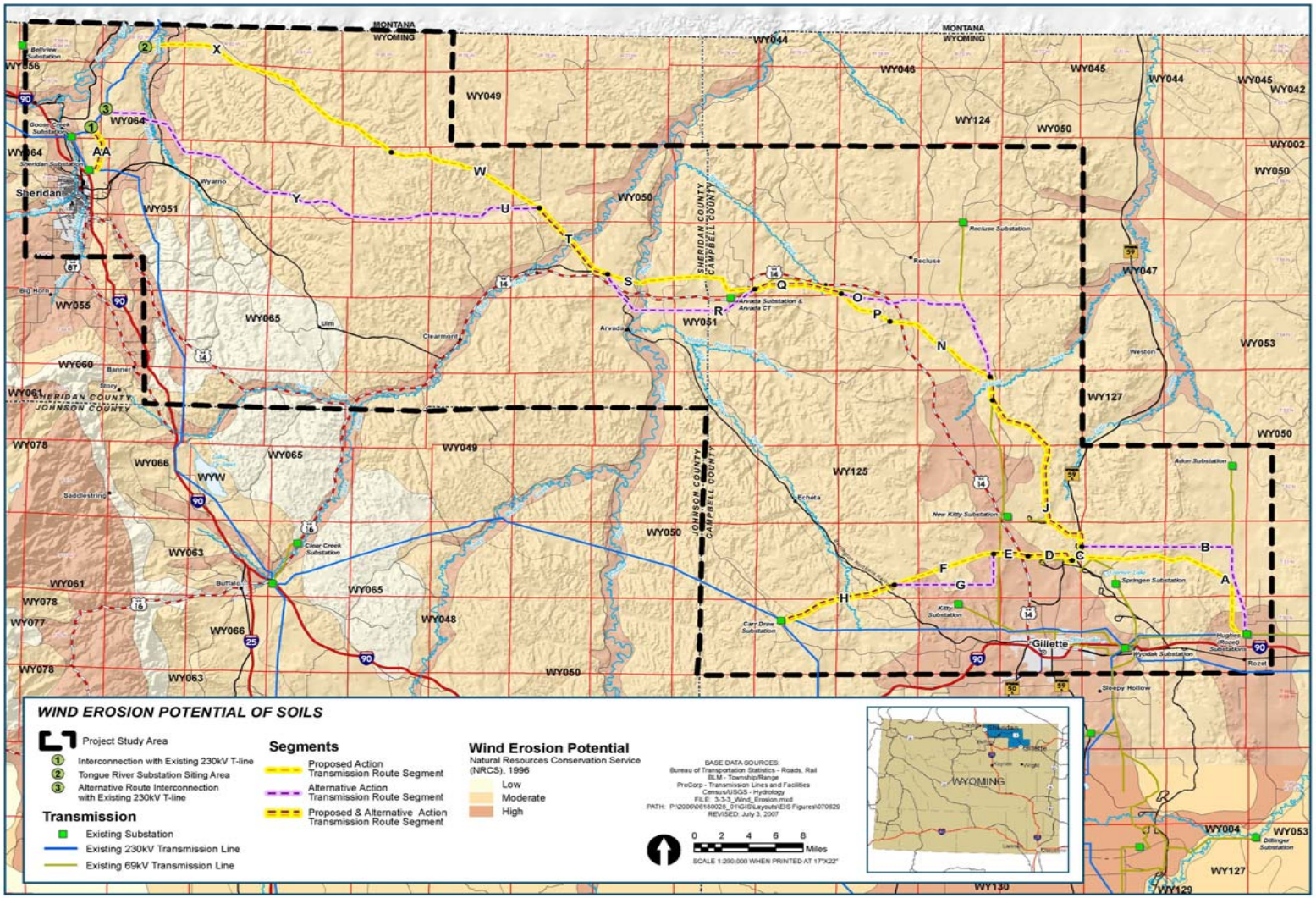


Figure 3.3-3 – Soil Map Units and Wind Erodible Soils in the Hughes Transmission Line Study Area

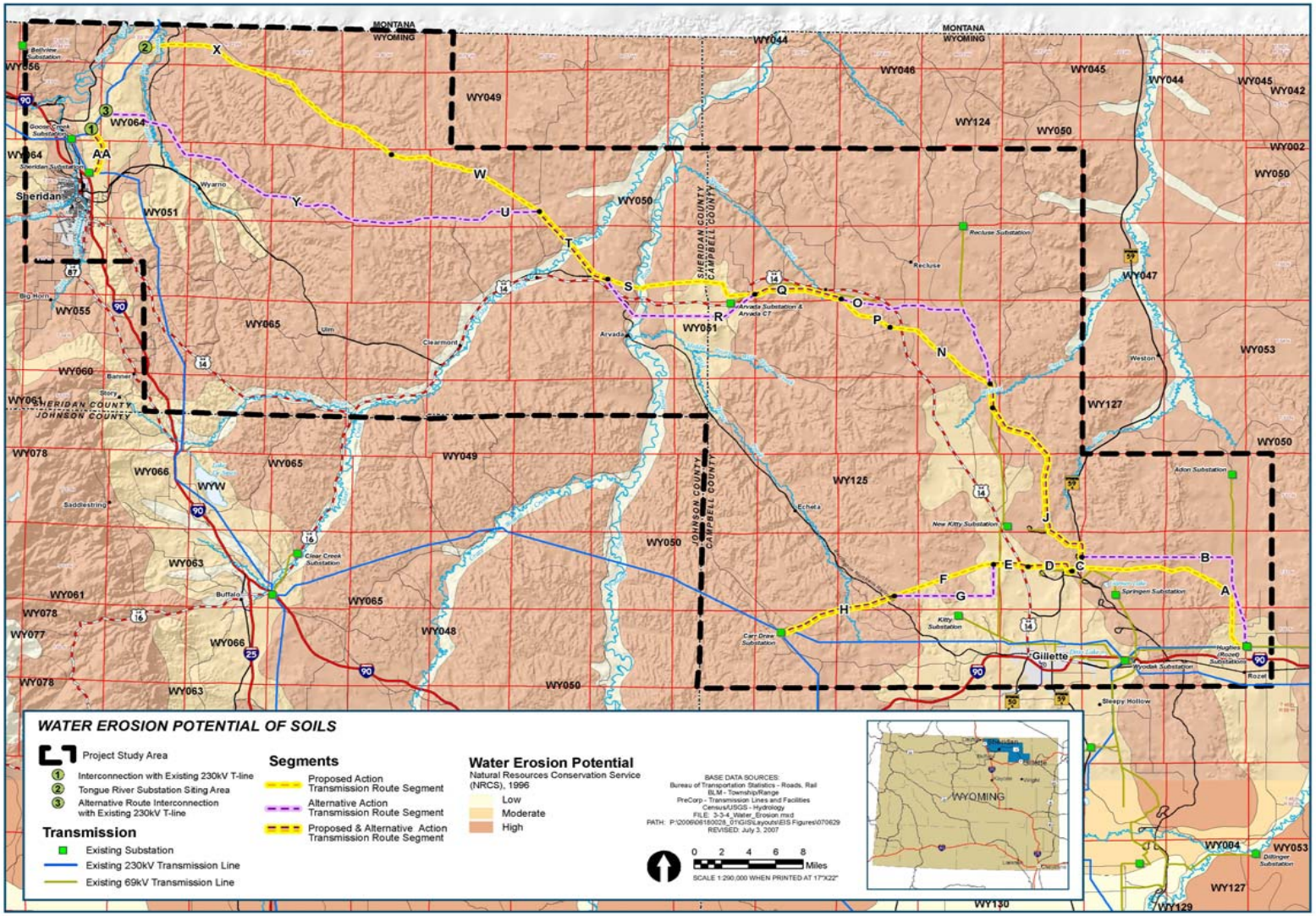


Figure 3.3-4 – Soil Map Units and Water Erodible Soils in the Hughes Transmission Line Study Area

3.3.1.2 *Transmission Line*

The predominant soil map units in the general area of the proposed and alternative transmission line alignment include loamy Aridisols, Entisols, and Mollisols. Aridisols are soils with limited soil moisture available for the growth of most plants. In these areas, plants have adapted to grow with water provided by precipitation and from soil moisture available for short periods of time. Because evapotranspiration and precipitation are not in balance, many Aridisols contain salts, leading to high salinity or sodium content. Entisols are soils that have little or no evidence of the development of differing horizons. This soil type is formed on steep and actively eroding slopes where the soil is not in place long enough for natural processes to form distinctive horizons. Alternatively, this soil type also forms on floodplains or glacial outwash plains, and the deposition of new alluvium materials prevents the formation of horizons. Mollisols are generally very dark-colored, mineral soils that may have distinctive horizons. Many of these soils developed under grass at some time or from very calcareous (calcium-rich) rocks. Mollisols have higher levels of organic matter and nutrients and are very fertile.

The general characteristics of the major soil series in the area of the proposed and alternative power plant sites and proposed and alternative transmission line alignments are presented in Appendix C. These characteristics include slope range, severity of wind and water erosion hazards, salinity, prime agricultural soils, and identification of soils with poor revegetation potential. The potential soils with poor revegetation potential include Shingle, Taluce, and Wibaux types. However, localized conditions lead to variations in the physical and chemical properties of the soils, which may or may not allow for successful revegetation where these soils are disturbed.

Table 3.3-1 shows the different soil types that would be traversed by each segment of both the proposed and the alternative transmission line alignments.

Table 3.3-1 – Soil Types along the Transmission Line Segments

Transmission Line Segment	Soil Type
Segment A, B	Hiland, Vonalee, and Maysdorf (WY126) Shingle, Cushman, and Taluce (WY053) Kishona, Shingle, and Theedle (WY127)
Segment C, D	Kishona, Shingle, and Theedle (WY127)
Segment E	Hiland, Vonalee, and Maysdorf (WY126)
Segment F. G	Hiland, Vonalee, and Maysdorf (WY126) Shingle, Theedle, and Wibaux (WY125)
Segment H	Shingle, Theedle, and Wibaux (WY125) Renohill, Cushman, and Cambria (WY128) Shingle, Taluce, and Kishona (WY050
Segment J	Kishona, Shingle, and Theedle (WY127) Shingle, Taluce, and Kishona (WY050)
Segment L	Shingle, Taluce, and Kishona (WY050)
Segment N, O	Shingle, Taluce, and Kishona (WY050) Platsher, Kishona, and Hiland (WY124)
Segment P, Q	Platsher, Kishona, and Hiland (WY124)

Table 3.3-1 – Soil Types along the Transmission Line Segments (Continued)

Transmission Line Segment	Soil Type
Segment R, S	Wyamo, Hargreave, and Moskee (WY051) Shingle, Taluce, and Kishona (WY050) Riverwash, Haverdad, and Clarkelen (WY048) Shingle, Renohill, and Forkwood (WY049)
Segment T	Shingle, Renohill, and Forkwood (WY049) Riverwash, Haverdad, and Clarkelen (WY048)
Segment U, W	Shingle, Renohill, and Forkwood (WY049)
Segment X, Y	Platsher, Recluse, and Parmleed (WY064) Shingle, Renohill, and Forkwood (WY049)
Segment AA	Platsher, Recluse, and Parmleed (WY064)

Proposed Alignment

The majority of soils in this portion of the project area are moderately susceptible to wind erosion and include the Hiland-Vonalee-Maysdorf (WY126), Draknab-Arvada-Bidman, Riverwash-Haverdad-Clarkelen (WY048), and Haverdad-Havre-Zigweid types (Appendix C, and Figure 3.3-3). Soils with the highest wind-erosion potential occur primarily along waterways, such as the Powder River and Clear Creek, beneath the Hughes Substation, as well as along US Highway 14, Wildcat Creek, and Little Powder River in the eastern portion of the project area. Wind-erodible soils also occur along the western portion of the project area. In the southwest portion of the project area, soils are only slightly susceptible to wind erosion.

Soils susceptible to water erosion were determined by soil type, surface cover, and slope, and occur over most of proposed transmission line alignment area and therefore cannot be completely avoided (Table 3.3-2 and Figure 3.3-4). Water-erodible soils found in the project area include the Haverdad-Havre-Zigweid, Baux-Bauxson-Harlan, Shingle-Renohill-Forkwood (WY049), Shingle-Taluce-Kishona (WY050), Renohill-Bidman-Ulm, Kishona-Shingle-Theedle (WY127), Hiland-Vonalee-Maysdorf (WY126), Bidman-Parmleed-Renohill, and Shingle-Cushman-Taluce (WY053) types (Figure 3.3-4). More than 90 percent of the proposed transmission line alignment has a high potential for water erosion. Soils that are moderately susceptible to water erosion were mapped beneath the Hughes Substation and along U.S. 14 in the same areas as soils that are severely susceptible to wind erosion.

In addition, soils that are moderately susceptible to water erosion occur in small areas in the middle of the project area, as well as in two sections near the western border. Soils that are slightly susceptible to water erosion occur along Powder River, Crazy Woman Creek, Clear Creek, and Piney Creek in the middle of the project area and along portions of Wildcat Creek and Little Powder River in the east.

Table 3.3-2 – Erosion Potential of Soils Crossed by the Proposed Transmission Line

Proposed Transmission Line		
Hughes Substation to Dry Fork Station Switchyard Corridor	Segment A	Slopes along Segment A do not exceed 15 percent. The westernmost portion of the segment crosses soils with a moderate potential for severe wind erosion and the easternmost portion crosses soils with a high potential for severe water erosion.
Dry Fork Station Switchyard to Carr Draw Substation Corridor	Segments D, E, F, and H	Approximately one mile of the entire segment would cross slopes exceeding 15 percent. Soils with high potential for severe wind and water erosion occur across the entire length of these segments.
Dry Fork Station Switchyard to Sheridan Corridor	Segments C, J, L, N, P, Q, S, T, W, X, AA	Segments W and X would traverse approximately three miles of the project area, where slopes exceed 15 percent. Soils with high or moderate potential for severe wind and water erosion would be crossed by Segments C, J, and L. Segments N, P, Q, S, T, W, and X would generally cross soils with a moderate potential for wind erosion and a high potential for water erosion. The entire length of Segment AA would occur in an area with soils that have a high potential for wind and water erosion. Segment L would cross Willow Creek, where soils have a high potential for wind erosion and high water erosion. Segment S also crosses the Powder River, where the soils have a high potential for severe wind erosion and a low potential for severe water erosion. Similar conditions occur where Segment S crosses the Powder River, Segment T crosses Clear Creek, and Segment X crosses Little Prairie Dog Creek.

Alternative Alignment

The Alternative Transmission Line alignment is formed by segments B, C, D, E, G, H, J, L, O, Q, R, T, U, Y and AA. The erosion potential of soils in these segments is shown in Table 3.3-3.

Table 3.3-3 – Erosion Potential of Soils Crossed by the Alternative Transmission Line

Alternative Transmission Line		
Hughes Substation to Dry Fork Station Switchyard Corridor	Segment B	Slopes along Segment B exceed 15 percent for a total of one mile. The westernmost portion of the segment would cross soils with a moderate potential for severe wind erosion and most of the segment would cross soils with a high potential for severe water erosion.
Dry Fork Station Switchyard to Carr Draw Substation Corridor	Segments G, D, E, H	Soils along approximately the entire length of Segment G have a moderate wind and water erosion potential. Soils with high potential for severe wind and water erosion occur across the entire length of the segments D, E, H.
Dry Fork Station Switchyard to Sheridan Corridor	Segments O, R, U, Y, C, J, L, Q, T, AA.	Segments O, R, U, and Y cross soils with a moderate potential for severe wind erosion and high potential for severe water erosion. Segment R also crosses a short span with moderate potential for severe erosion potential. In addition, Segment R would cross the Powder River, Segments U and Y would traverse approximately four miles with slopes exceeding 15 percent. Segment C would generally cross soils with a moderate potential for wind erosion and a high potential for water erosion. Soils with high or moderate potential for severe wind and water erosion would be crossed by Segments C, J, and L. Segments Q and T would generally cross soils with a moderate potential for wind erosion and a high potential for water erosion. Segment T crosses Clear Creek. The entire length of Segment AA would occur in an area with soils that have a high potential for wind and water erosion.

3.3.2 Geologic Setting

The Wasatch Formation is the surficial formation throughout much of the PRB in Wyoming, including the project area. The Wasatch Formation consists primarily of fine to coarse-grained lenticular, discontinuous sandstone beds interbedded with fine-grained sediments such as shale, siltstone, claystone, and mudstone.

Clinker is fused or partly fused coal ash, a byproduct of the natural combustion of coal beds.

The Wasatch Formation is of Eocene age and contains many coal beds, with the thickest beds in the western and central parts of the PRB outside the study area, particularly near Lake De Smet.

Clinker is present in the Wasatch Formation in many locations and frequently forms caprocks because it is more resistant to weathering than surrounding rock. The eastern portion of the Dry Fork Mine, as well as areas to the east and south of the EIS Study Area, has large clinker deposits, which represent an important groundwater recharge zone.

3.3.2.1 *Power Plant*

Proposed Site
The geologic setting of the proposed power plant site consists primarily of fan and piedmont sediments and the Wasatch Formation, residuum, and slopewash deposits. There is a small outcrop of clinker deposits in the southwestern portion of the site. Quaternary terraces border the easternmost portion of the site.

The proposed ash landfill site consists primarily of the Wasatch Formation, residuum, and slopewash deposits and slopewash sediments. There are two small outcrops of clinker deposits in the northern and western portions of the proposed site.

Alternative Site
The geologic setting at the alternative site is the same as that described for the proposed site, but in addition, large clinker deposits occur in the general area of the alternative power plant site. Large deposits of slopewash and channel alluvium occur in the western portion of the site. Slopewash sediments occur at the northwestern border of the site, near two wetlands.

3.3.2.2 *Transmission Line*

Proposed Alignment
Geologic features and minerals along the proposed transmission line alignment are similar to those described for the proposed and alternative Dry Fork Station Power Plant site. CBM extraction wells found near the proposed transmission line alignment are concentrated in areas near Gillette and Sheridan (Basin Electric 2006b). Thirty-six (36) CBM wells are within 250 feet of the proposed transmission line alignment (see Table 3.8-4).

Alternative Alignment
Geologic features and minerals along the alternative alignment are similar to those described for

the proposed alignment. Thirty-three (33) CBM wells are within 250 feet of the proposed transmission line (see Table 3.8-4).

3.3.3 Minerals

The PRB contains the single largest source of coal mined in the United States, which is also one of the largest deposits of coal in the world. Fifteen coal mines can be found along a 75-mile belt that extends immediately north of Gillette southward to the limits of Campbell and Converse Counties. PRB coal deposits are estimated to contain over 800 billion tons of coal. The thickness of the coal seams in the region ranges up to 200 feet and averages nearly 80 feet (University of Wyoming 2002).

The low sulfur (0.06 to 0.4 percent) and ash content of the coal in the region makes it very desirable (Basin Electric 2005a). Much of the output of the basin's mines is used to fire power plants that generate electricity east of the Rocky Mountains. In recent years production has increased to over 350 million tons of coal mined annually, more than 25 percent of the total U.S. production. Of the 395.7 million short tons of coal produced in Wyoming in 2004, approximately 381.6 million short tons (98 percent) were produced within the PRB. More than eighty train loads of coal, which vary in size from 125 to 150 cars, are shipped from PRB mines each day (University of Wyoming 2002).

Major uranium deposits are also found within the PRB. These deposits are found primarily in the Tertiary Wasatch Formation (Basin Electric 2006b). Uranium mines are located in the Pumpkin Buttes, Southern Powder River, and Kaycee uranium districts. Deposits in the Pumpkin Buttes and Kaycee districts have either already been mined or extraction is not economically feasible. The Smith Ranch and Highland/Morton Ranch uranium mining sites within the Southern Powder River district are active.

Average Ground Acceleration: The horizontal acceleration measured at ground level caused by the movement of the soil due to an earthquake usually expressed as a percentage of gravity (9.81 m/s^2).

Portions of the federal minerals under the proposed power plant site are subject to current coal leases held by Western Fuels Corporation as part of its Dry Fork Mine holdings. No mineral development is expected as part of the proposed power plant site, and the remaining coal is not economically recoverable because the coal seams have been severed from the main coal deposits at the Dry Fork Mine. No other mining or minerals claims exist on the proposed power plant site.

There are no active oil and gas wells within the proposed power plant site.

3.3.4 Seismicity

The Wyoming Uniform Building Code (UBC) classifies Campbell and Sheridan Counties as falling in the range of seismic zones 0 and 1 respectively. More specifically, the city of Gillette is located on a UBC zone 0 which means that there is a 90% probability that seismic events located around that city would not cause average peak ground accelerations greater than 5 percent of gravity (g).

The city of Sheridan (UBC zone 1) has a 90% probability that the average peak accelerations felt due to earthquakes in the area range between 5 percent g and 10 percent g (Case et. al 2002).

UBC: The **Uniform Building Code** classifies earthquake hazard on a scale from 0 (least hazard) to 4 (most hazard). These values are used to determine the strengths of various components of a building required to resist earthquake damage. The UBC is one of three major codes used by state jurisdictions throughout the United States to regulate building constructions. In jurisdictions where UBC is formally adopted, architects and engineers are legally required to comply with the minimum standards established in the code.

Several exposed active fault systems occur in western Wyoming and a few also occur in the central portion of the state, around the margins of the Wind River Basin. In areas where active fault systems have surficial exposure, earthquakes can have magnitudes greater than 6.5 on the Richter scale, which can cause significant damage. Information obtained from the Basic Seismological Characterization for Campbell County (Basin Electric 2006a) indicates that no known exposed active faults with a surficial expression occur within Campbell County.

The seismic activity in the state of Wyoming is centered around the northwest corner of the state on the Yellowstone area and on the Idaho border, just south of Idaho Falls; other earthquakes have been recorded on central and eastern Wyoming but all of them can be considered shallow (<33 km depth) and not associated with volcanic activity. The most recent activity registered in the state is a shallow, magnitude 2.9 earthquake that occurred on March 21, 2007, with an epicenter located 25 miles south of Jackson, WY, on the Idaho border. The seismic activity in and around Campbell County is the result of the tectonic stress regime present in the region and is expressed as isolated shallow earthquakes. According to the United States Geologic Survey (USGS), only seven earthquakes have been recorded in the county, the highest magnitude was 5.1, which occurred on September 7, 1984. The epicenter was approximately 27 miles west of Gillette and was felt throughout northeastern Wyoming, including in the cities of Buffalo, Casper, Kaycee, Linch, and Midwest, and parts of southeastern Montana. No significant damage was reported due to the low magnitude of this event. In Sheridan County, there have been only four events with magnitudes greater than 3 ever recorded in the past. The most recent was a magnitude 3.9 event that occurred on February 1993 with an epicenter located 19 miles north-northeast of Arvada, WY (Case et. al 2002).

3.4 WATER RESOURCES

This section describes the surface and groundwater resources at and surrounding the proposed and alternative power plant sites and transmission line alignments. Sheridan and Campbell Counties are located within the Yellowstone River Basin (YRB).

The YRB is a hydrologic unit that extends from central Wyoming north to include most of southeastern Montana and a small part of western North Dakota. The entire Yellowstone River watershed includes all of the Wind/Bighorn, Powder, Tongue, and Clarks Fork Yellowstone tributary watersheds.

Streamflow in all the major watersheds is affected by diversions. While there are no reservoirs on the mainstem Yellowstone River, several reservoirs regulate flow in the Wind/Bighorn and Tongue River watersheds.

The YRB lies within the Rocky Mountain System and Interior Plains physiographic divisions. Topography of the YRB in the Rocky Mountain System division varies from mountain ranges and high plateaus, including the Wind River Range, Bighorn Mountains, and Absaroka Plateau, to intermontane basins, such as the Wind River and Bighorn Basins.

3.4.1 Surface Water

3.4.1.1 *Power Plant*

The proposed and alternative Dry Fork Station sites are located within the plains area of the Powder River drainage basin, specifically within the Dry Fork of the Little Powder River drainage basin. The Little Powder River Basin is divided into several sub-basins, which drain an area of approximately 1,380 square miles. This area is characterized by plains, tablelands, and badlands of moderate relief, with surface elevations between 4,130 to 4,500 feet above sea level. Streams in this area typically have a dendritic drainage pattern with meanders common along the stream course.

Proposed Site
The Dry Fork of the Little Powder River (Dry Fork) originates approximately 0.5 mile south of the proposed power plant site and flows north across the southeastern corner of the site. The North Draw also occurs in the same vicinity and flows northeast into the Dry Fork. Moyer Springs Creek, the major tributary of the Dry Fork, runs northwestward from the northwestern corner of the alternative Dry Fork Station site and intersects Dry Fork just south of the proposed power plant boundary. In addition to these main tributaries, there are numerous intermittent draws within the Dry Fork drainage. East Draw, West Draw, North Draw, Moyer Springs Creek above Moyer Springs, and Dry Fork above the mouth of Moyer Springs Creek are intermittent. Data from the 2004 Dry Fork Mine Annual Report show that with the exception of Moyer Springs Creek, the other tributaries had zero flow recorded for several months in 2004. The average annual flows within the Dry Fork River Basin for 2003 range from about 0.7 cubic feet per second (cfs) in Dry Fork to 1.3 cfs in Moyer Springs Creek. The increase in flow at the mouth of Moyer Springs Creek is due to groundwater inflow.

Wetland surveys were conducted at the proposed and alternative power plants. Wetlands exist in the easternmost portion of the proposed power plant. Wetlands are discussed in Section 3.7

There are no perennial streams within 300 feet of the proposed and alternative Dry Fork Station sites, and facilities would not be located within the 100-year floodplain. The drainage and existing pond near the proposed landfill boundary were created during reclamation of the mine pit that was previously in this location.

Alternative Site
There are no surface water bodies on or in the immediate vicinity of the alternative Dry Fork

Station site; general surface water conditions described for the proposed site also apply to the alternative site.

3.4.1.2 *Transmission Line*

The proposed and alternative transmission line alignments would traverse a number of riparian drainages that convey water to the larger creeks and rivers of the greater PRB watershed. Tables 3.4-1 and 3.4-2 present the major surface waters crossed by the proposed and alternative transmission line alignments; numerous smaller creeks not included in these tables would be spanned.

Table 3.4-1 – Drainages Crossed by the Proposed Alignment

Proposed Transmission Line		
Hughes Substation to Dry Fork Station Switchyard Corridor	Segments A, C	The western end of Segment A would cross the Little Powder River and no other surface waters. Segment C would cross a fork of the Little Powder River near State Highway (SH) 59.
Dry Fork Station Switchyard to Carr Draw Substation Corridor	Segments D, E, F, and H	Segment H would cross the main stem of Wild Horse Creek about seven miles north-northeast of the Carr Draw Substation.
Dry Fork Station Switchyard to Sheridan Corridor	Segments J, L, N, P, Q, S, T, W, X, AA	Segment L would cross Wildcat Creek, Segment Q would cross the upper portion of Spotted Horse Creek, Segment S would cross the Powder River, Segment T would cross Clear Creek, and Segment X would cross Prairie Dog Creek just east of the new substation.

Table 3.4-2 – Drainages Crossed by the Alternative Alignment

Alternative Transmission Line		
Hughes Substation to Dry Fork Station Switchyard Corridor	Segment B, C	Segment B would cross the Little Powder River north of the proposed. Segment C would cross a fork of the Little Powder River near SH 59.
Dry Fork Station Switchyard to Carr Draw Substation Corridor	Segments D, G, E, H	Segment H would cross the main stem of Wild Horse Creek about seven miles north-northeast of the Carr Draw Substation.
Dry Fork Station Switchyard to Sheridan Corridor	Segments O, R, U, Y, J, L, Q, T, AA.	Segment L would cross Wildcat Creek, Segment Q would cross the upper portion of Spotted Horse Creek, and Segment R would cross the Powder River south of the proposed transmission line. Segment Y would cross Prairie Dog Creek. Segment T would cross Clear Creek.

3.4.2 Surface Water Quality

Section 303(d) of the Clean Water Act requires that states identify portions of surface water bodies in which the water quality does not support the designated beneficial uses for the water body. Lakes and streams in which the water quality consistently does not meet criteria are identified as impaired. Impaired stream segments must then be studied to identify the sources of contamination and to develop quantitative total maximum daily loads (TMDLs) that represent the amount of a pollutant that can enter the stream segment without reducing the designated beneficial uses.

Updated Section 303(d) lists are issued every two years, and the 2002 list is the one most recently approved by the U.S. Environmental Protection Agency (EPA); however, the Wyoming Department of Environmental Quality (WDEQ) issued an impaired stream update in 2006, along with the associated TMDLs.

Wyoming Game and Fish Department Stream Classification System*

Class 1: Outstanding Waters. Class 1 waters are those surface waters in which no further water quality degradation by point source discharges other than from dams will be allowed.
Class 2: Fisheries and Drinking Water. Class 2 waters are waters, other than those designated as Class 1, that are known to support fish or drinking water supplies or where those uses are attainable.
Class 3: Aquatic Life Other than Fish. Class 3 waters are waters, other than those designated as Class 1, that are intermittent, ephemeral or isolated waters and because of natural habitat conditions, do not support nor have the potential to support fish populations or spawning, or certain perennial waters which lack the natural water quality to support fish.

* This is only a partial list.
Source: WDEQ, 2007.

According to the Wyoming Game and Fish Department (WGFD) stream classification system, Moyer Springs Creek is classified as Class 2 Surface Water. Dry Fork, below Moyer Springs Creek, is classified as Class 3 Surface Water. Within the general area of the proposed power plant they are the only two streams classified by the WGFD since they are the only perennial streams. The others streams are assumed to be Class 4 (that is, they do not have the hydrologic or natural water quality to support fish).

3.4.3 Groundwater

The following briefly summarize the aquifers within the PRB. The shallow aquifer system of the PRB is composed of five mappable hydrogeologic units located stratigraphically above the Upper Cretaceous Bearpaw Shale.

Quaternary and Tertiary Hydrogeologic Units
The uppermost hydrogeologic unit in the shallow aquifer system is the Wasatch-Tongue River aquifer. This aquifer is up to 1,190 (meters) thick and is exposed at the land surface in most of the basin. The depositional environments of the geologic units included in the aquifer are generally terrestrial.

The Lebo confining layer is up to 920 m thick and extends over most of the basin and underlies the Wasatch-Tongue River aquifer (Zelt et al, 1999). Based on the sand content (31%) it is estimated that this unit generally acts as a confining layer.

The Tullock aquifer is up to 600 m thick and underlies the Lebo confining layer except near outcrop areas. With average sand content of 53 percent the unit is considered an aquifer in most of the basin.

Mesozoic and Paleozoic Hydrogeologic Units (Lance-Fox Hills Aquifer)
The Cretaceous Upper Hell Creek confining layer underlies the Tullock aquifer (Zelt et al, 1999). The unit is a major confining layer throughout the basin, is up to 610 m thick, and has a mean sand content of 35 percent.

The Upper Cretaceous Fox Hills-Lower Hell Creek aquifer underlies the Upper Hell Creek confining layer except at outcrop areas (Zelt et al, 1999). The aquifer is up to 780 m thick, has a mean sand content of 50 percent, and yields water to wells in most areas. The base of the aquifer is the top of the Bearpaw Shale.

Several formations of the Lower Cretaceous Series in the basin consist of shales that are not usable as aquifers. However, the Cloverly, Fall River, and Lakota Formations contain sandstone aquifers, but are too deeply buried to be useful, except at the basin margins.

3.4.3.1 *Power Plant*

The description of the groundwater resources for the proposed and alternative Dry Fork Station power plant includes the aquifer described above. Local characteristics and variances are discussed below.

Proposed Site

Wasatch-Tongue River Aquifer
Due to the discontinuous nature of water bearing units within the Wasatch-Tongue River aquifer it is not considered a regional aquifer (Basin Electric 2006a, 2006b). However, this aquifer system is locally important because where saturated sandstone and thin coal seams yield well water, a source of water for livestock is present.

Clinker deposits are found in abundance in the area of the proposed and alternative Dry Fork Station sites and constitute important geologic strata within the Wasatch Formation. Clinker deposits can be very porous and serve as good local aquifers because they can extend for miles. The clinker deposits are capable of acting as a source of recharge for the surrounding overburden within the Wasatch Formation and the Wyodak coal seam. However, the contact layer between the clinker deposits and underlying formations is characterized by low permeability potentially impeding groundwater recharge to underlying formations. Springs are also associated with clinker deposits. Recharge to the Wasatch-Tongue River aquifer is primarily from infiltration and percolation of precipitation. Clinker deposits are believed to enhance infiltration to the Wasatch-Tongue River aquifer in the project study area (Basin Electric 2006a, 2006b).

Wyodak-Anderson Coal Seam
The Wyodak-Anderson coal seam forms a relatively continuous unit and is considered a regional aquifer within the PRB, even though it breaks up into two mineable seams. The Wyodak-

Anderson coal seam is mined at the Dry Fork Mine and it is considered the primary shallow aquifer in the vicinity of the Dry Fork Mine (WWC Engineering 2004). Moyer Springs is a precipitation-dependent perennial spring that issues water from scoria (lava fragments) deposits associated with the Wyodak-Anderson coal seam. This spring is the headwaters of Moyer Spring Creek and is located at the western edge of the Dry Fork Mine, about one mile south of the proposed Dry Fork Station power plant site.

Depth to water in the Dry Fork Mine permit area varies according to topography, with the water table surface deeper at higher elevations (50-70 feet below the ground surface) and very shallow (near the surface to several feet below) near main drainages.

Tullock Aquifer
The Tullock aquifer was deposited in a system of stream channels and the sands are therefore discontinuous and lenticular. As a result, yields from the Tullock aquifer are inconsistent and it is a better aquifer where large channel deposits are present (WWC Engineering 2005). The average calculated transmissivity within the Tullock aquifer is 290 square feet per day, which is much higher than those encountered in the Tongue River or Lebo members.

Transmissivity is a characteristic of an aquifer that quantifies the amount of water that can be transmitted horizontally through the saturated thickness of the aquifer.

Lance-Fox Hills Aquifer
The Lance-Fox Hills aquifer is an important and reliable aquifer in the area. Its thickness is variable; it is estimated to be approximately 900 feet in the Gillette area (Basin Electric 2006a, 2006b). In the project study area, the Lance-Fox Hills aquifer occurs at approximately 3,700 feet below the ground surface. The Lance-Fox Hills aquifer is proposed as the source of water for the Dry Fork Station. Site-specific aquifer testing shows that transmissivity is approximately 2,000 to 2,300 gallons per day per foot.

Alternative Site
Groundwater conditions for the alternative power plant site are the same as those discussed for the proposed site.

3.4.3.2 *Transmission Line*

General regional groundwater characteristics for all segments of the proposed and alternative alignments are the same as those summarized for the proposed power plant with the exception of the localized Wyodak-Anderson coal seam and associated scoria deposits that are not present along the proposed and alternative transmission line alignments.

3.4.4 Groundwater Use

Groundwater use in the general vicinity of the proposed and alternative power plants is associated with coal mining, conventional oil and gas extraction, CBM exploration and production, livestock production, irrigation, industrial and domestic supply. Information obtained from the Dry Fork Mine permit application indicates the presence of approximately 350 wells within a three-mile radius of the mine. Because of the coal mining and CBM activities in the

general area of the proposed power plant, a large percentage of the existing groundwater wells are for groundwater monitoring or dewatering.

Livestock watering and domestic wells are generally less than 500 feet deep. For those completed in sandstone lenses of the Wasatch Formation, yields average approximately 10 to 50 gallons per minute (Basin Electric 2006a, 2006b).

The entire population of almost 40,000 people in Campbell County is served by groundwater. Specifically, the City of Gillette supplied the 4.4 (million gallons per day) demanded by its 26,000 inhabitants during the year 2006 with the production of 26 wells screened in the Lance Fox-Hills, the Fort Union and the Madison Formations (City of Gillette Water Division 2007). Water extracted from the Madison aquifer is piped for 45 miles from the extraction point in the Black Hills near the South Dakota border.

3.5 AIR QUALITY

The proposed power plant, alternative power plant, and immediate vicinity of the proposed project areas are located in Class II air quality areas. Three designated federal Class I air quality areas exist within 155 miles of the proposed and alternative power plants (see box). The proposed and alternative transmission lines are in portions of Campbell and Sheridan Counties in northeastern Wyoming, crossing air quality Class II areas. The overall area is characterized by a semi-arid climate and gentle topography. The discussion of air quality provided in this section would pertain to, and incorporates in one discussion, the area of the proposed and alternative power plant sites, as well as the area of the proposed and alternative transmission line alignments.

Air Quality Areas

Class I areas:
Class I air quality areas are designated pristine places such as Wilderness Areas and National Parks that are specially protected relative to air quality impacts. Class I areas in the vicinity include Wind Cave National Park, located about 110 miles East-Southeast and Badlands National Park located about 140 miles East-Southeast. The State of Montana also treats the Northern Cheyenne Indian Reservation, located about 80 miles Northwest, as a Class I area. All three of these areas were evaluated for Class I type impacts in the impact analyses conducted for the proposed power plant.

Class II areas:
All areas of the country are protected by air quality regulations. Class II air quality areas are all other areas that are not designated by regulatory agencies as having special Class I protections. Strict air quality regulations are still enforced to protect the air quality in Class II areas, but not in as stringent a manner as the pristine Class I areas. The entire Dry Fork/Hughes Study Area is within a Class II air quality area. However, Class I type analyses were conducted at the Class II Devils Tower National Monument, located 40 miles northeast.

3.5.1 Local Meteorology

Key factors controlling the climate in the project area are elevation, mountainous moisture barriers to the west, and the flow of moisture from the south and southwest. The project area is on broad, gently rolling plains, from the foothills of the Big Horn Mountains near Sheridan on the west end and approximately 130 miles east-southeast to a point just east of Gillette, about midway to the Black Hills to the east. The elevation in the project area is approximately 4,250 feet above mean sea level and generally trends upward toward the south (CH2M Hill 2005a). The land surrounding the project area in all directions is open terrain, which permits free movement of winds and weather systems through the area which can result in rapid and extreme

weather changes. The Big Horn Mountains, about 70 miles to the west, greatly influence climatic conditions in the region (Basin Electric 2006a).

The climate in the project area is semiarid with long cold winters, short hot summers, and wide variations in daily and seasonal temperatures and seasonal precipitation. In nearby Gillette, precipitation averages approximately 16 inches per year and can vary from about 10 to 23 inches per year. Approximately half of the precipitation occurs in April, May, and June. Most rain in the area occurs as thundershowers, which typically form over the Big Horn Mountains to the west in late morning and early afternoon and move eastward over the plains in late afternoon and early evening. Thunderstorms decrease in middle and late summer (Basin Electric 2006a).

Mean annual snowfall in the Gillette area is approximately 67 inches, representing about one-third of the total annual precipitation. Snow occurs primarily from November through April. Winter blizzards bring high winds, drifting snow, and very cold temperatures to the region. Temperatures in the area average approximately 45°F annually, with record lows and highs varying from about -40°F to 107°F. Average monthly temperatures range from 20°F in January to 71°F in July. The average frost-free season is 129 days long. Average monthly relative humidity ranges from about 40 percent in August to nearly 70 percent in January and February. Average monthly evaporation rates vary from zero inches from December through March to about 10 inches in July (Basin Electric 2006a).

Severe weather in the region can include blizzards, thunderstorms, and extended dry spells. Annually, five or more blizzards, lasting several hours to several days, may occur in Gillette. Strong winds can cause extensive drifting of snow and limited visibility. Annually, five or more severe thunderstorms may occur in late spring or early summer, accompanied by heavy rains, hail, and winds that exceed 45 mph. Annually, Gillette averages about four days of hailstorms, which can be accompanied by local flooding. On average, only two tornadoes, generally minor in nature, occur per year in eastern Wyoming, and the chance of a tornado striking the project area is very remote. Extended dry spells lasting a month or more are very common. Periods of steady winds and low relative humidity (as low as five percent) can generate severe dryness (Basin Electric 2006a).

Figures 3.5-1 and 3.5-2 present wind roses 10 meters (33 feet) and 100 meters (328 feet) above the ground, as measured at a meteorological tower southeast of Gillette. The wind roses depict a plot of one year (2002) of hourly wind speed and vector recordings and should be representative of overall annual observations for any year in the project area. At the 10-meter level, the average wind speed is 5.5 meters per second (m/s) (12 miles per hour [mph]), and the highest frequency of wind direction is from the southwest about 14 percent of the time. At the 100-meter level, the average wind speed is 7.6 m/s (17 mph), and the highest frequencies of wind directions are from the northwest and southwest (each about 11 percent of the time). Winds are calm less than 0.2 percent of the time at both the 10- and 100-meter levels (CH2M Hill 2005a).

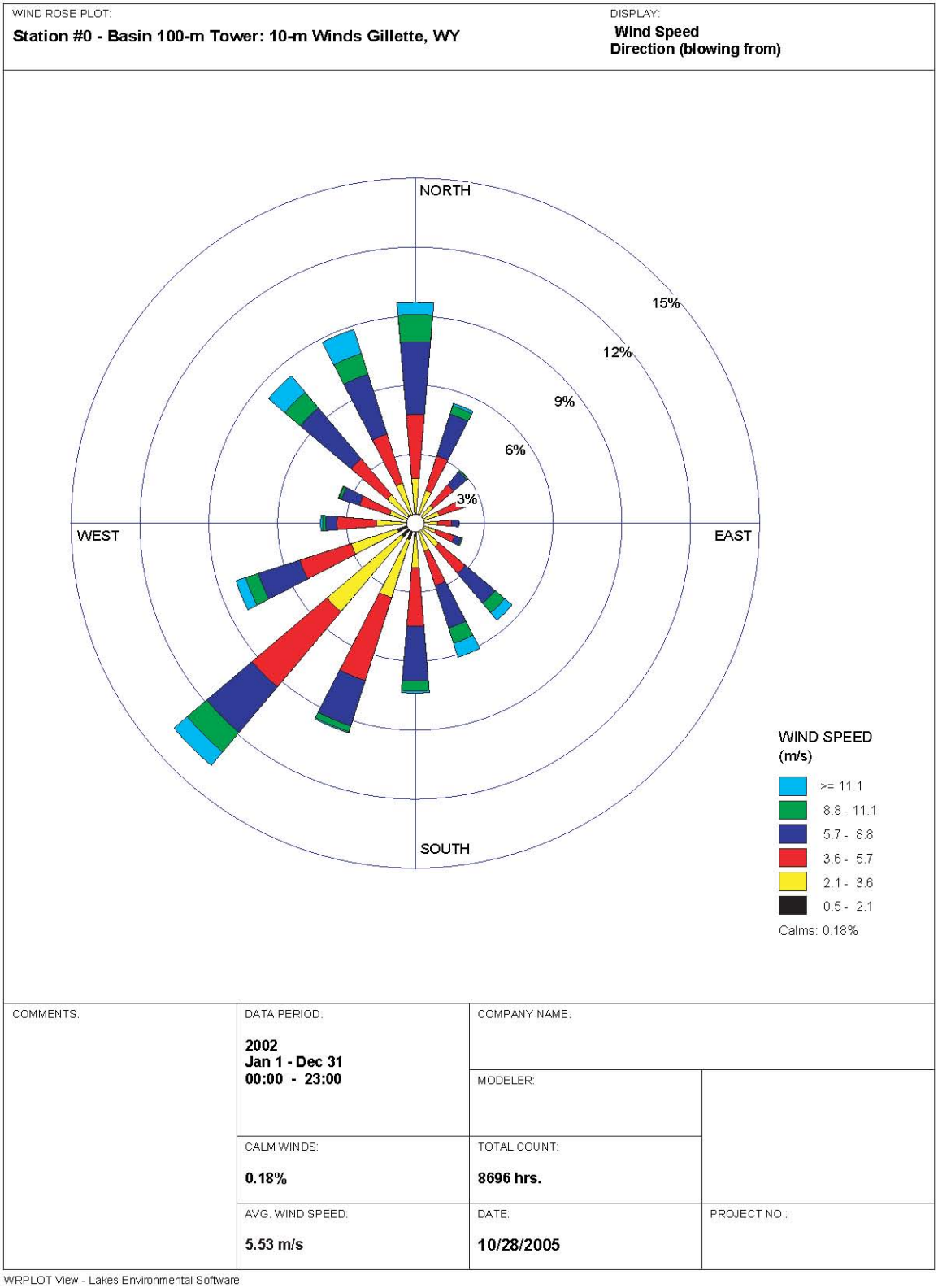


Figure 3.5-1 – Wind Rose for 10-M Meteorological Input File

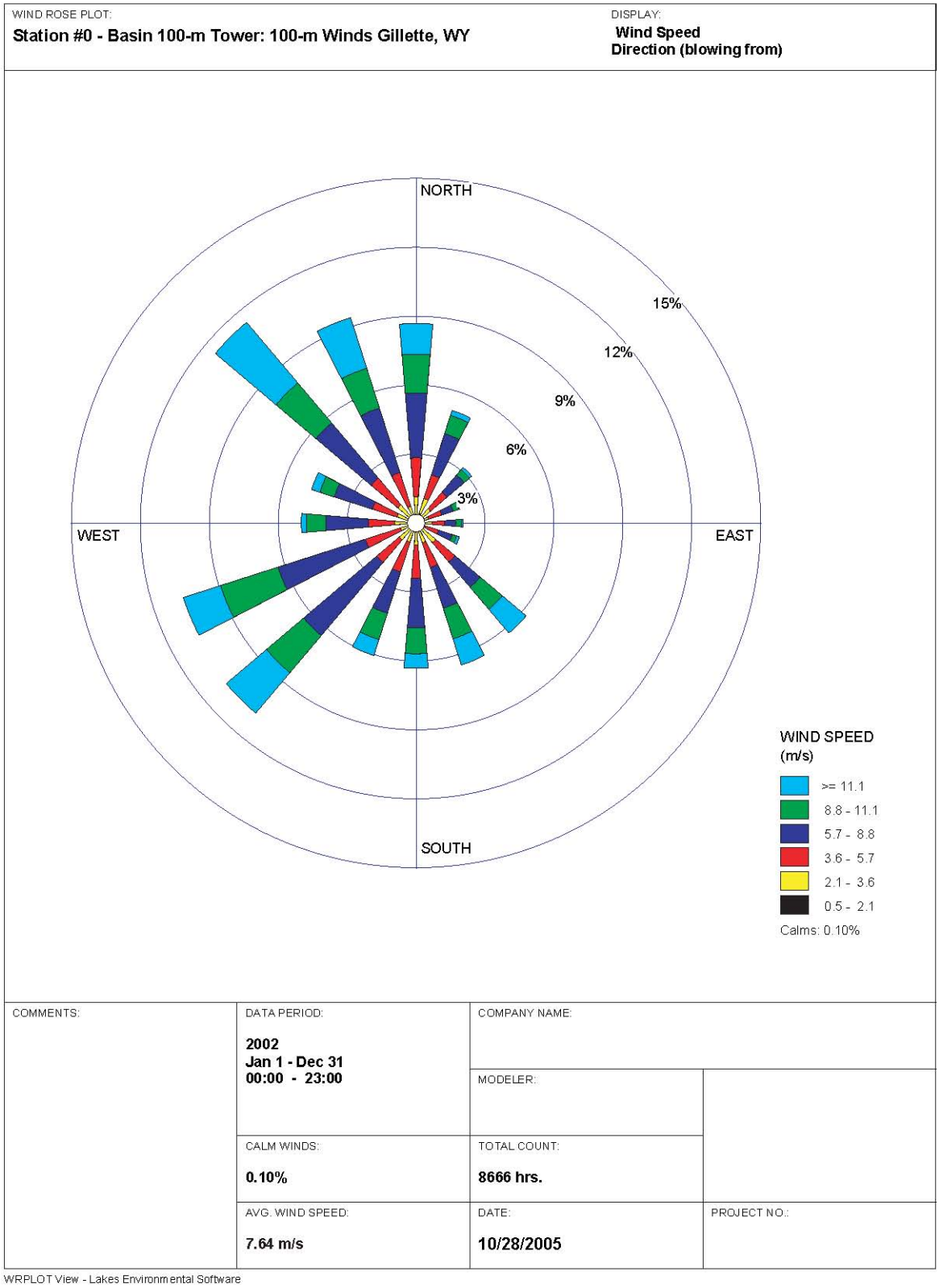


Figure 3.5-2 – Wind Rose for 100-M Meteorological Input File

3.5.2 Terminology and Federal/State Regulation of Air Pollutants

The Clean Air Act (CAA), as amended, requires the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment (40 CFR Part 50). The six criteria pollutants established by this regulation are particulate matter (PM), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), and lead (Pb). Various air quality regulations cover total PM, PM_{10} (PM less than 10 microns in equivalent aerodynamic diameter), $PM_{2.5}$ (PM less than 2.5 microns in equivalent aerodynamic diameter), and nitrogen oxides (NO_x), composed primarily of NO_2 and nitric oxide (NO).

The EPA has established the NAAQS to represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare with a reasonable margin of safety. The WDEQ Division of Air Quality has also established the ambient standards shown in Table 3.5-1. The federal Prevention of Significant Deterioration (PSD) program establishes increments that are maximum allowable increases in air contaminant concentrations. No Class II scenic vistas have been established by the WDEQ near the proposed power plant site (CH2M Hill 2005a).

Areas surrounding the proposed power plant site are designated as Class II areas for PSD permitting.

Table 3.5-1 – Air Quality Standards Applicable to the Proposed Project

Pollutant (Averaging Period)	Class II Modeling Significance Level ($\mu g/m^3$)[1]	Class II PSD Increment ($\mu g/m^3$)[1]	NAAQS ($\mu g/m^3$)[1]	Wyoming Ambient Air Quality Standard ($\mu g/m^3$)[1]
CO (1 hour)	2,000	NS	40,000[2]	40,000[2]
CO (8 hour)	500	NS	10,000[2]	10,000[2]
NO_2 (annual)	1	25	100	100
SO_2 (3 hour)	25	512	1,300[2]	1,300[2]
SO_2 (24 hour)	5	91	365[2]	260[2]
SO_2 (annual)	1	20	80	60
PM_{10} (24 hour)	5	30[a]	150[2]	150[2]
PM_{10} (annual)	1	17	50	50
Ozone (1 hour)	NS	NS	0.12	0.12
Ozone (8 hour)	NS	NS	0.08	0.08
Lead (quarterly)	NS	NS	1.5	1.5
24-hour Beryllium	NS	NS	NS	NS
24-hour Mercury	NS	NS	NS	NS
12-hour Fluorides	NS	NS	NS	3.0E+06
24-hour Fluorides	NS	NS	NS	1.8E+06
7-day Fluorides	NS	NS	NS	0.5E+06
30-day Fluorides	NS	NS	NS	0.4E+06

[1] $\mu g/m^3$ = micrograms per cubic meter
[2] Not to be exceeded more than once per year
NS = no standard currently exists

In addition to the six criteria pollutants regulated under the CAA, other substances are potentially emitted by the proposed and alternative power plants. Two primary issues related to potential emissions of other substances from the proposed project include mercury impacts and global climate change, which are discussed in sections 3.5.5 and 3.5.6.

Carbon Monoxide

Carbon monoxide is a colorless, odorless gas formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust and that of other engines and off road vehicles. Other sources of CO emissions include industrial processes, residential wood burning, and natural sources, such as forest fires. The highest levels of CO in the outside air typically occur during the colder months when inversion conditions are more frequent. The air pollution becomes trapped near the ground beneath a layer of warm air.

Carbon monoxide can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues. The health threat from lower levels of CO is most serious for those who suffer from heart disease, but even healthy people can be affected by high levels of CO. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn reduced manual dexterity, and difficulty performing complex tasks (EPA 2006a).

Nitrogen Dioxide

Nitrogen dioxide along with particles in the air can often be seen as a reddish-brown layer over many urban areas. NO_2 is one of the common NO_x gases (see box at right). NO_2 forms when fuel is burned at high temperatures, as in a combustion process. The primary manmade sources of NO_2 are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. NO_2 can also be formed naturally.

Nitrogen oxides (NO_x)

NO_x is a group of highly reactive gases containing nitrogen and oxygen. NO_2 is one of the common NO_X gases. NO_X compounds contribute to a wide variety of health and environmental impacts, including:

- Ground-level ozone formation.
- Acid rain formation
- Nitrate particle formation
- Water quality deterioration
- Climate change
- Toxic chemical formation
- Visibility Impairment

(EPA 2006a).

Sulfur Dioxide

Sulfur is prevalent in raw materials, including crude oil, coal, and ore that contains common metals like aluminum, copper, zinc, lead, and iron. SO_2 is formed when fuel containing sulfur, such as coal and oil, is burned, when gasoline is extracted from oil, or metals are extracted from ore. SO_2 dissolves in water vapor to form acid and interacts with other gases and particles in the air to form sulfates and other products that can be harmful to people and their environment.

Sulfur oxides (SO_X)

SO_x is a group of highly reactive gases containing sulfur and oxygen. SO_2 belongs to the family of SO_X gases which contribute to a wide variety of health and environmental impacts including:

- SO2 respiratory effects
- Sulfate particle respiratory effects
- Visibility Impairment
- Acid Rain formation
- Plant and Water Damage
- Aesthetic Damage

(EPA 2006a).

Particulate Matter

PM is a complex mixture of extremely small particles and liquid droplets. Total PM emissions are made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles (see box at left) is directly linked to their potential for causing health issues. The smaller PM_{10} and $PM_{2.5}$ particles pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause or contribute to various health effects.

Ozone

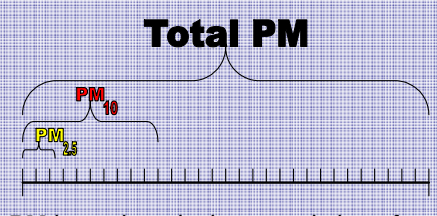
Ozone is a gas composed of three oxygen atoms. O_3 occurs naturally in the stratosphere approximately 10 to 30 miles above the earth's surface and forms a layer that filters some of the harmful ultraviolet wavelengths in sunlight. O_3 can be created in the troposphere (lowest level of atmosphere) at or near ground-level from the chemical reaction between NO_x and Volatile Organic Compounds (VOC) in the presence of sunlight. Tropospheric and stratospheric ozone have the same chemical structure, but tropospheric ozone is considered a pollutant.

Ground-level O_3 is considered harmful at higher concentrations. Sources of NO_x and VOC include motor vehicle exhaust, industrial emissions, gasoline vapors, and chemical solvents, as well as natural sources. Ground-level O_3 is a primary constituent of urban and industrial smog. Sunlight and hot weather catalyze the ozone forming reaction.

Breathing O_3 can trigger a variety of health problems, including chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, and asthma. Ground-level O_3 also can reduce lung function and inflame the linings of the lungs. Repeated exposure may permanently scar lung tissue. Ground level O_3 also damages vegetation and ecosystems (EPA 2006a).

Particulate Matter

PM consists of total PM as well as the subcategories PM_{10} and $PM_{2.5}$. The larger PM categories include the smaller subcategories of PM.



PM is total particulate consisting of $PM_{2.5}$, PM_{10} and larger particles. The part of PM larger than PM_{10} is not a direct health concern since it is not inhalable, but can have environmental effects. PM from fugitive sources such as open material handling, soil disturbance, and wind erosion typically includes particles greater than 10 microns.

PM_{10} is considered inhalable and includes PM such as that from dusty industries, representing the PM fraction 10 microns in diameter and smaller. PM_{10} includes $PM_{2.5}$.

$PM_{2.5}$ is referred to as fine particles, such as those found in smoke and haze, representing the PM fraction 2.5 microns in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air (EPA 2006a).

Lead

Lead is a metal found naturally in the environment and in manufactured products. The major sources of lead emissions have historically been motor vehicles and industrial sources. Due to the phaseout of leaded gasoline, metals processing is now the major source of lead emissions to the air. The highest levels of lead in air are generally found near lead smelters. Other stationary sources of lead are waste incinerators, utilities, and lead-acid battery manufacturers.

People, animals, and fish are mainly exposed to lead by breathing and ingesting it in food, water, soil, or dust. Lead typically slowly accumulates in the blood, bones, muscles, and fat from long-term exposure to low levels. Infants and young children are especially sensitive to even low levels of lead.

Applicable Regulations

Whenever a new, fossil fuel-powered, stationary pollution source (also referred to as an emission source) is proposed, a review must be performed to ensure the fuel, equipment, and emissions

comply with state and federal regulations. This review is generally done though a pre-construction air permits application to the state. Accordingly, an air permit for the proposed Dry Fork Station was submitted to the WDEQ in November 2005. The air quality analysis in this EIS is largely based on the information in the air permit.

The proposed project would be a major stationary source of air emissions. State and local air pollution control agencies adopt federally approved control strategies to minimize air pollution. The State of Wyoming has approval authority to implement and enforce the federal CAA, pursuant to the state implementation plan (SIP) review and approval process. Federal PSD air-permitting requirements are embodied within the state rules. SIPs generally establish limits or work practice standards to minimize emissions of the criteria air pollutants or their precursors. The proposed and alternative power plant must meet the requirements of the Wyoming SIP.

The discussion below describes the applicable federal and state regulations, and the permits that must be submitted to ensure compliance with these regulations. Threshold levels for the applicable permits are described first, followed by a discussion of WDEQ air regulations. Additional discussion is then provided to identify other applicable requirements.

PSD Thresholds

Federal PSD regulations, codified in Title I of the CAA, identify 28 specific types of stationary emission sources, or source categories. If the emissions for a regulated pollutant from one of these 28 source categories exceed the PSD threshold of 100 tons per year (tpy), the source is designated as a major source for that pollutant. The proposed Dry Fork Station would be one of the 28 source categories, specifically, a fossil fuel-fired steam electric plant with a heat input of more than 250 million British thermal units per hour (Btu/hr). Based on data from the Air Permit Application, the Dry Fork Station would have an output greater than 100 tpy for SO_x, NO_2, PM, PM_{10}, and CO, and would therefore be considered a major source with respect to these pollutants for the purpose of the PSD permit.

Title IV Thresholds

Title IV of the CAA requires electric generation units greater than 25 megawatts (MW) to obtain a Phase II Acid Rain Permit and to satisfy the objectives of the program, which are achieved through a system of marketable allowances. An Acid Rain Permit must be granted prior to the start of operations, and a continuous emissions monitoring system (CEM) must be designed, fabricated, installed, and certified on the new unit.

Title V Thresholds

Title V of the CAA identifies federal requirements for an operations permit. With respect to a Title V permit, the major source threshold for regulated pollutants in an attainment area is 100 tpy. The proposed project would exceed this threshold for SO_x, NO_2, PM, PM_{10}, and CO, and would therefore be required to obtain a Title V permit through the WDEQ. This permit must be obtained within one year after facility operations begin.

Wyoming Air Quality Standards and Regulations

Fourteen chapters comprise the Wyoming Air Quality Standards and Regulations (WAQS&R).

A brief discussion of these chapters, and their applicability to the proposed Dry Fork Station, are shown in Table 3.5-2.

National Emissions Standards for Hazardous Air Pollutants

National Emissions Standards for Hazardous Air Pollutants (NESHAPs) applicable to the project are identified in Basin Electric's air permit application. An equipment-level NESHAPs evaluation is presented in Table 3.5-3.

Table 3.5-2 – Applicability of Wyoming Air Quality Standards and Regulations

Chapter	Title	Discussion	Applicable
Chapter 1	Common Provisions	Chapter 1 includes general provisions and definitions.	Yes
Chapter 2	Ambient Standards	Chapter 2 specifies ambient air standards for particulate matter, nitrogen oxides, sulfur oxides, carbon monoxide, ozone, hydrogen sulfide, suspended sulfates, fluorides, lead, and odors.	Yes
Chapter 3	General Emission Standards	Chapter 3 specifies emission rate limits for particulate matter, nitrogen oxides, sulfur oxides, carbon monoxide, VOCs, and hydrogen sulfide.	Yes
Chapter 4	State Performance Standards for Specific Existing Sources	Chapter 4 applies only to existing sources.	No
Chapter 5	National Emission Standards	Chapter 5 pertains to implementation of federal NSPS and NESHAP Programs.	Yes
Chapter 6	Permitting Requirements	Chapter 6 specifies permit requirements for construction, modification, and operation, including PSD requirements.	Yes
Chapter 7	Monitoring Regulations	Chapter 7 specifies requirements for CEM and compliance assurance monitoring of source emissions.	Yes
Chapter 8	Non-attainment Area Regulations	Chapter 8 specifies requirements for sources in nonattainment areas. The proposed project would be located in an attainment area.	No
Chapter 9	Visibility Impairment/PM Fine Control	Chapter 9 specifies requirements for visibility impacts in Class I areas.	Yes
Chapter 10	Smoke Management	Chapter 10 requirements are targeted at open combustion and wood waste burners.	No
Chapter 11	National Acid Rain Program	Chapter 11 adopts the acid rain provisions of 40 CFR 72 through 40 CFR 78 as state requirements.	Yes
Chapter 12	Emergency Controls	Chapter 12 specifies requirements that are targeted to prevent the excessive accumulation of air pollutants during emergency pollution episodes.	Yes
Chapter 13	Mobile Sources	Chapter 13 establishes minimum requirements for motor vehicle pollution control.	No
Chapter 14	Emission Trading Program Regulations	Chapter 14 establishes budgets, trading programs, and monitoring protocols for mercury and SO2 emissions.	Yes

New Source Performance Standards

Most of the New Source Performance Standards (NSPS) codified in 40 CFR 60 apply to industrial activities that are not associated with the proposed Project; however, several of the NSPS would apply. In general, applicable NSPS establish requirements for equipment performance, maintenance, calibration, and tests, and specify limits on pollutant emission rates, requirements to continuously monitor emissions and opacity, and requirements to report the performance results to the regulatory authority. Table 3.5-4 shows the applicable NSPS based on the Air Permit Application.

Table 3.5-3 – Applicability of NESHAPs

NESHAP	Source	Determination	Discussion
40 CFR 63, Subpart DDDDD, Industrial Commercial, and Institutional Boilers and Process Heaters	Unit 1	Not Applicable	Unit 1 is an electric utility steam generation unit that is a fossil fuel-fired combustion unit of more than 25 MW that serves a generator that produces electricity for sale.
	Auxiliary Boiler	Applicable	The Auxiliary boiler is considered a new large gaseous fuel boiler and is subject to the emission limitations, work practice standards, performance tests, monitoring, startup shutdown malfunction plan, and notification requirements. A 30-day average is applied to evaluate emissions compliance, and a CO emissions performance test is required annually. A CEM must also be installed because the Auxiliary Boiler heat input exceeds 100 million BTU per hour.
	Inlet Heater	Not Applicable	The inlet heater is defined as a new small gaseous boiler or process heater, with less than 10 million BTU/hour heat input.
40 CFR 63 Subpart ZZZZ, Stationary Reciprocating Internal Combustion Engine (RICE)	Diesel Fire Pump	Not Applicable	The site rated horsepower of the diesel fire pump is less than 500 hp, and the unit meets the definition of an emergency stationary RICE because its purpose is to pump water in case of fire.
	Diesel Emergency Generator	Not Applicable	Although the emergency diesel generator would have a site-rated horsepower greater than 500 hp and would be located at a major hazardous air pollutant emissions source, it satisfies the definition of an emergency stationary RICE because its purpose is to produce power when electrical power from the local utility is interrupted

Table 3.5-4 – Applicable NSPS

Subpart	Title	Affected Equipment
Subpart A	General Provisions	Unit 1, Auxiliary Boiler, Coal Handling Equipment
Subpart D	Fossil Fuel-Fired Steam Generators For Which Construction is Commenced After August 17, 1971	Unit 1
Subpart Da	Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978	Unit 1
Subpart Db	Industrial-Commercial-Institutional Steam Generating Units	Auxiliary Boiler
Subpart Y	Coal Preparation Plants	Coal handling equipment (crusher and conveyor)

Accidental Release Program

Regulations at 40 CFR 68 require sources to develop a Risk Management Plan (RMP) for any chemicals stored onsite above threshold quantities defined in 40 CFR 68. The proposed project would use anhydrous ammonia in quantities above the threshold, thus an RMP would be required.

3.5.3 Air Quality in Class II Areas

The project area is in Campbell and Sheridan Counties, Wyoming, in an area designated as an attainment area for all criteria pollutants. Thus, existing background concentrations for all criteria pollutants are less than the maximum allowable ambient concentrations under federal and state regulations. Existing air quality at the proposed and alternative power plant sites is presumed to be similar. The nearest non-attainment area is near Sheridan. This area was once designated as a non-attainment area for PM_{10}, but has since applied for redesignation for attainment status. The Sheridan area is beyond the potential impact area of the power plant. Surrounding areas are designated as Class II areas for PSD permitting. The Class II designation allows moderate growth or degradation of air quality within certain limits above baseline air quality. Industrial sources proposing construction or modifications must demonstrate that proposed emissions would not cause significant deterioration of air quality in all areas.

The significance of a pollutant concentration is determined by comparing the concentration in the atmosphere to applicable national or state air quality standards. Table 3.5-1 summarizes Wyoming and national ambient air quality standards that apply to criteria pollutant emissions from the proposed project and lists Class II significance levels, together with Class II PSD increments.

A summary of monitoring data collected in Campbell County from 2000 through 2005 is shown in Table 3.5-5. Ambient monitoring data are being collected at several monitoring stations within Gillette and in the surrounding area. PM_{10} data is summarized in Table 3.5-6 for the monitoring stations in and around Gillette from 2000 through 2005.

Table 3.5-5 – Campbell County, Wyoming, Ambient Monitoring Data Summary

Year	Annual Mean value for NO_2 (ppm)	2nd Maximum 1-hr value for O_3 (ppm)	4th Maximum 8-hr value for O_3 (ppm)	2nd Maximum 24-hr value for SO_2 (ppm)	Annual Mean value for SO_2 (ppm)	98th Percentile value for $PM_{2.5}$ ($\mu g/m^3$)	Annual Mean value for $PM_{2.5}$ ($\mu g/m^3$)
2000	NA	NA	NA	NA[3]	NA	23	6.2
2001	0.003	0.08	0.069	NA	NA	18	6.5
2002	0.003	0.085	0.071	0.023	0.005	18	6.2
2003	0.007	0.087	0.077	0.019	0.003	21	6.8
2004	0.007	0.076	0.065	0.017	0.003	17	5.7
2005	0.008	0.074	0.063	0.026	0.004	19	6.4
	0.053	**0.12**	**0.08**	**0.14**	**0.03**	**65**	**15**

Source: EPA 2006b
ppm = part per million
$\mu g/m^3$= micrograms per cubic meter
NA = not available

As shown in the "Readings Exceeding – Actual" column in Table 3.5-6, values greater than the EPA ambient air quality standard of 150 $\mu g/m^3$ for 24-hour average PM_{10} were measured once per year at three of the stations listed. However, the standard was not violated because it is based on the second highest value measured at each station in a year, shown in the "2nd Maximum (24-Hour)" column of the table. Annual average values measured at each of the stations did not exceed the annual standard of 50 g/m^3.

Table 3.5-6 – PM_{10} Monitoring Data for the Gillette, Wyoming, Region

Site ID	Site Address	Monitoring Year	2nd Maximum[1] (24-Hour) (g/m^3)	Readings Exceeding-Actual (24-Hour)	Annual Mean[2] (g/m^3)	Annual # Exceed
560050896	Dry Fork Coal Co	2005	27	0	8	0
		2004	24	0	11	0
		2003	33	0	12	0
		2002	34	0	12	0
		2001	42	0	13	0
		2000	32	0	11	0
560050826	Rawhide Hilltop Site	2005	70	0	21	0
		2004	39	0	19	0
560050900	Amax Eagle Butte Mine Eb-5 Rural	2005	48	0	10	0
		2004	33	0	11	0
		2003	34	0	13	0
		2002	36	0	13	0
		2001	61	0	15	0
		2000	48	0	15	0
560050906	Eagle Butte Eb-2 Rel'D	2005	53	0	16	0
		2004	61	0	19	0
		2003	61	0	21	0
		2002	66	0	21	0
		2001	72	0	45	0

Table 3.5-6 – PM_{10} Monitoring Data for the Gillette, Wyoming, Region (continued)

Site ID	Site Address	Monitoring Year	2nd Maximum[1] (24-Hour) (g/m^3)	Readings Exceeding-Actual (24-Hour)	Annual Mean[2] (g/m^3)	Annual # Exceed
560050808	Eagle Butte Eb-3	2005	85	0	19	0
		2004	64	0	19	0
		2003	76	0	20	0
		2002	66	0	21	0
560050895	Rawhide North Site	2005	59	0	20	0
		2004	42	0	19	0
560050884	Triton Coal Buckskin Mine Gillette	2005	57	0	16	0
		2004	47	0	15	0
		2003	139	1	17	0
		2002	61	0	16	0
		2001	73	0	19	0
		2000	53	0	18	0
560050899	Triton Coal Gillette	2005	69	0	17	0
		2004	54	0	17	0
		2003	76	0	18	0
		2002	96	1	18	0
		2001	80	0	21	0
		2000	54	0	19	0
560051002	1000 West 8th St	2005	39	0	15	0
		2004	32	0	15	0
		2003	39	0	18	0
		2002	42	0	17	0
560051002	1000 West 8th St	2001	47	0	21	0
		2000	60	0	21	0
560050857	Wyodak Site 4	2005	126	1	20	0
		2004	92	0	19	0
560050901	Kerr-Mcgee Clovis Point Mine Gillette	2005	69	0	18	0
		2004	62	0	16	0
		2003	50	0	17	0
		2002	48	0	18	0
		2001	46	0	29	0
560050456	Approx 15 Miles SSW of Gillette	2005	35	0	13	0
		2004	26	0	10	0
		2003	31	0	14	0
560050908	Caballo C-9	2005	62	0	17	0
		2004	70	0	17	0
		2003	69	0	18	0
		2002	76	0	19	0

Source: EPA 2006b

[1] The 2nd maximum monitored value is the value upon which the EPA Ambient Monitoring standard is based. The EPA Ambient Monitoring standard for 24-hour average PM_{10} is 150 $\mu g/m^3$.

[2] The EPA Ambient Monitoring standard for annual PM_{10} is 50 $\mu g/m^3$.

Existing emissions sources in the study area include the mines in the northern PRB, oil, conventional gas, and CBM wells, natural gas compression stations, railroad locomotives, and vehicular and air traffic in Gillette and Sheridan; vehicular traffic along US Highway 14 and Interstate 90 and other local roads; and vehicular traffic and fugitive dust associated with the CBM wells throughout the study area. Table 3.5-7 contains a list of the top 12 major industrial sources in the Gillette area along with the reported 1999 emissions.

Preliminary modeling required cumulative SO_2 modeling for the Basin Electric Dry Fork Station Air Permit Application (CH2M Hill 2005a). For that analysis, 2004 data for sources within 250 kilometers (155 miles) of the proposed station were obtained from the appropriate state agencies for inclusion. A list of these sources is shown in Table 3.5-8.

Table 3.5-7 – Major Emission Sources for the Gillette, Wyoming, Region

Facility Name	Facility Location	SIC – Industry Type	Pollutant	Emission Rate (tpy)
Powder River_ North Antelope/Rochelle	Caller Box 3032, Gillette, WY 82717-3032	1221 - Bituminous Coal and Lignite – Surface	PM_{10}	2132
			$PM_{2.5}$	1980
Powder River Coal_Cabello Mine	2298 Bishop Road, Gillette, WY 82718-0000	1221 - Bituminous Coal and Lignite – Surface	PM_{10}	1288
			$PM_{2.5}$	1149
Thunder Basin Coal_Black Thunder	Black Thunder Mine, Gillette, WY 82716-0000	1221 - Bituminous Coal and Lignite – Surface	PM_{10}	891
			$PM_{2.5}$	814
			NO_X	15
			SO_2	24
			CO	38
			VOC	4
Pacificorp_Wyodak	3 Mi E Of Gillette, WY 82716-0000	4911 - Electric Services	$PM_{2.5}$	609
			NO_X	5565
			SO_2	9082
			CO	521
			VOC	62
Cordero Mine	South Of Gillette, WY 82716-0000	1221 - Bituminous Coal and Lignite - Surface	PM_{10}	717
			$PM_{2.5}$	615
			NO_X	5
			SO_2	1
			CO	1
			VOC	>1
Rag Coal West_Belle Ayr Mine	PO Box 3039, Gillette, WY 82717-3039	1221 - Bituminous Coal and Lignite - Surface	PM_{10}	710
			$PM_{2.5}$	661
Caballo Rojo, Inc_Caballo Rojo Mine	PO Box 3021, Gillette, WY 82716-0000		PM_{10}	619
			$PM_{2.5}$	576
Rag Coal West_Eagle Butte Mine	Seven Miles North Of Gillette, WY 82716-0000	1221 - Bituminous Coal and Lignite - Surface	PM_{10}	445
			$PM_{2.5}$	399
Triton Coal Company Llc_Buckskin Mine	Buckskin Coal Mine, Gillette, WY 82717-0000	1221 - Bituminous Coal and Lignite - Surface	PM_{10}	270
			$PM_{2.5}$	229
Black Hills Power and Lgt_Simpson 2	3 Miles NE of Gillette, WY 82718-9716	4911 - Electric Services	PM_{10}	176
			$PM_{2.5}$	143
			NO_X	815
			SO_2	641
			CO	201
			VOC	5

Table 3.5-7 – Major Emission Sources for the Gillette, Wyoming, Region (continued)

Facility Name	Facility Location	SIC – Industry Type	Pollutant	Emission Rate (tpy)
Black Hills Power and Light Simpson 1	3 Miles NE of Gillette, WY 82718-9716	4911 - Electric Services	PM_{10}	33
			$PM_{2.5}$	26
			NO_X	521
			SO_2	1008
			CO	31
			VOC	4
Western Gas Resources _ Kitty Plant	209 N. Works, Gillette, WY 82716-0000	1321 - Natural Gas Liquids	NO_X	570
			CO	329
			VOC	114

Source: EPA 2006b
[1]tpy – tons per year

Table 3.5-8 – Cumulative SO_2 Emission Sources modeled for the Basin Electric Dry Fork Station Permit Application

Facility Name	General Location	Permitted Emission Levels (lb/hr[1] SO_2)	
		3-hour	24-hour
Black Hills Wygen1 Boiler	Wyoming	202.8	202.8
Black Hills Wygen2 Boiler	Wyoming	156.0	156.0
Neil Simpson Unit 1 Boiler	Wyoming	351.6	351.6
Neil Simpson Unit 2 Boiler	Wyoming	203.0	203.0
Wyodak Boiler 1	Wyoming	2052.0	2052.0
KFX Source #1	Wyoming	51.7	51.7
KFX Source #2	Wyoming	51.7	51.7
Colstrip Unit 3	Southeast Montana	2069.97	1362.98
Colstrip Unit 4	Southeast Montana	2069.97	1362.98
Rocky Mountain Power (Hardin)	Southeast Montana	182.60[2]	182.60[2]
Rocky Mountain Ethanol	Southeast Montana	48.13	48.13
Colstrip Energy Limited Partnership	Southeast Montana	42.01	42.01
Roundup Power Project MP1	Southeast Montana	602.00[2]	482.00[3]
Roundup Power Project MP2	Southeast Montana	602.00[2]	482.00[3]
Gascoyne	North Dakota	169.3	139.4

Source: CH2M Hill 2005a
[1] lb/hr – pounds per hour
[2] 1-hour average limit
[3] based on 3182-00

3.5.4 Air Quality in Class I Areas

In accordance with applicable requirements of the federal CAA and the WDEQ, potential impacts on the PSD Class I increments in all Class I areas and Air Quality Related Values (AQRVs) in federal mandatory Class I areas are required to be assessed for PSD projects. Applicable air quality standards in Class I areas are presented in Table 3.5-9.

Table 3.5-9 – Class I Modeling Significance Levels and Increments

Averaging Period/ Pollutant	Class I Modeling Significance Level ($\mu g/m^3$)[1]	Class I PSD Increment ($\mu g/m^3$)
Annual NO_2	0.1	2.5
3-hour SO_2	1.0	25[2]
24-hour SO_2	0.2	5[2]
Annual SO_2	0.1	2
24-hour PM_{10}	0.3	8[2]
Annual PM_{10}	0.2	4

Source: CH2M Hill 2005a
[1] Proposed by EPA, Federal Register, July 1996 (Vol. 61, Number 142), Proposed Rules, pp. 38249-344.
[2] Not to be exceeded more than once per year.

Three designated federal Class I air quality areas exist within 155 miles of the proposed and alternative power plants. These are Wind Cave National Park and Badlands National Park in South Dakota, and the Northern Cheyenne Indian Reservation in southern Montana.

Figure 3.5-3 displays the Class I locations on a map of the project area and surrounding locations.

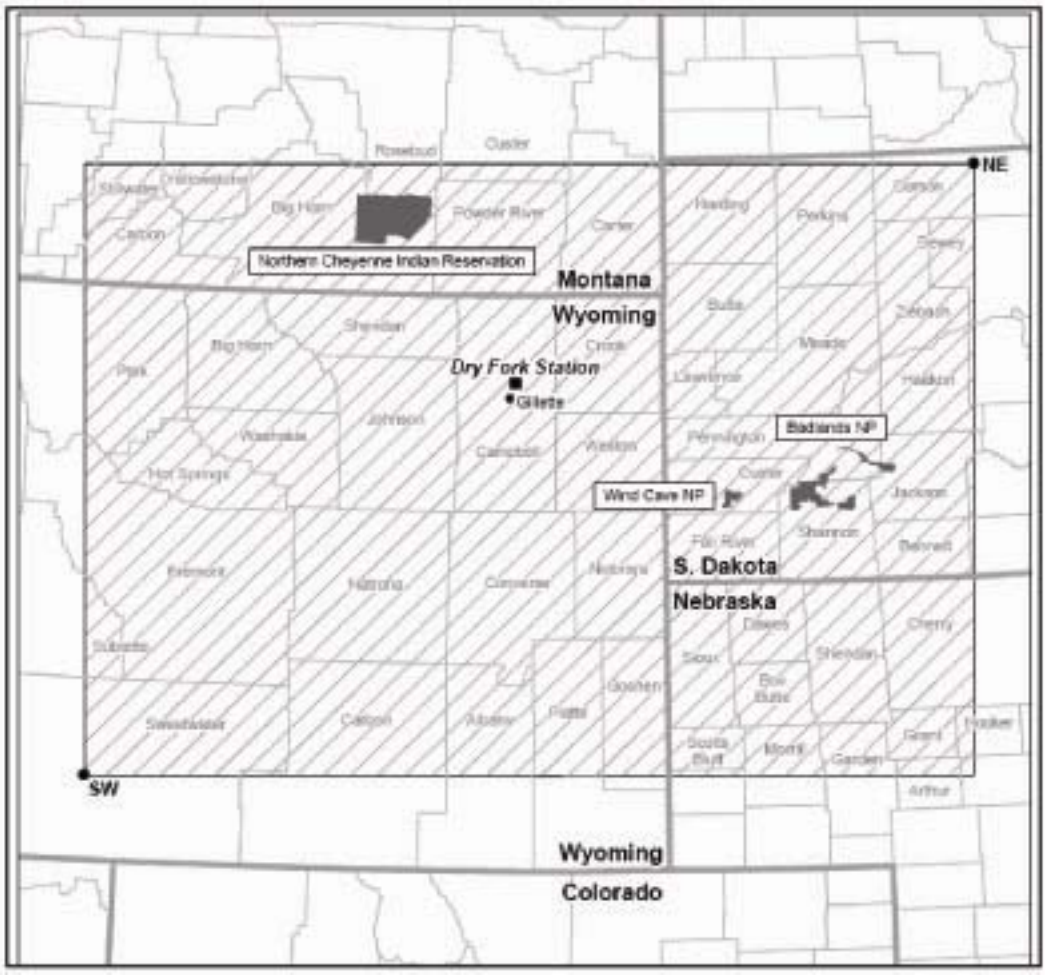


Figure 3.5-3 – Class I Area Locations and Modeling Domain

AQRV's are resources, as identified by the Federal Land Managers (FLMs) for one or more federal mandatory Class I areas, which may be adversely affected by a change in air quality. AQRVs that must be evaluated for the federal mandatory Class I areas within a 250-kilometer (155-mile) radius of the proposed site include:

- Visibility – Visual Plume;
- Visibility – Regional Haze; and
- Acid Deposition.

Visibility can be affected by plume impairment or regional haze. Plume impairment results from a contrast or color difference between a plume and a viewed background such as the sky or a terrain feature. Regional haze occurs at distances where the plume has become evenly dispersed in the atmosphere and is not definable. The primary causes of regional haze are sulfates and nitrates, which are formed from SO_2 and NO_X through chemical reactions in the atmosphere.

3.5.5 Mercury in the Environment

Mercury is a naturally occurring element that is found in air, water, and soil. It exists in several forms: elemental or metallic mercury, inorganic mercury compounds, and organic mercury compounds.

3.5.5.1 *Sources and Transport of Mercury*

Mercury is an element in the earth's crust. Pure mercury is a liquid metal that volatilizes readily. It has traditionally been used to make products such as thermometers, switches, and some light bulbs. Mercury is found in many minerals including coal. When coal is burned, mercury is released into the environment. Mercury is also released by burning hazardous wastes, producing chlorine, breaking mercury products, spilling mercury, and improperly treating and disposing of products or wastes containing mercury.

Coal-burning power plants are the largest human-caused source of mercury emissions to the air in the United States, accounting for over 40 percent of all domestic human-caused mercury emissions. The EPA, however, has estimated that about one quarter of US emissions from coal-burning power plants are deposited within the contiguous states and the remainder enters the global cycle (EPA 2007).

Combustion of coal produces mercury emissions in three main forms: elemental, reactive gases, and as a particulate. The elemental form has a low solubility and is removed slowly from the atmosphere by wet and dry deposition and thus has a long atmospheric lifetime. A large portion of the elemental mercury emissions will therefore join the global ambient mercury pool with long range deposition impacts. The particulate and reactive gas forms of mercury are rapidly removed from the atmosphere because of their high solubility and reactivity with surfaces. These forms therefore tend to deposit at nearby or intermediate distances from the source. It is difficult to quantify how much mercury will be deposited over short, intermediate, and long range distances, and the dynamics are very complex. The transport behaviors depend on many factors, such as the stack parameters of the source, the rate of mercury emissions, the meteorology and

topography of the region, and other factors including the concentration of mercury in the coal (RSAS 2007). The proposed power plant would use sub-bituminous PRB coal with a typical mercury content of 0.05 to 0.08 µg/g .This is on the low end for U.S. coals, which have a median mercury content of about 0.17 µg/g.

3.5.5.2 *Exposure to Mercury*

Mercury in the air eventually settles into water or onto land where it can be washed into water. Once mercury is deposited, certain microorganisms can change it into methylmercury, a highly toxic form that builds up in fish, shellfish, and animals that eat fish. Fish and shellfish are the main sources of methylmercury exposure to humans. Methylmercury builds up more in some types of fish and shellfish than others, depending on what they eat, how long they live and how high they are in the food chain.

Another less common exposure to mercury that can be a concern is breathing mercury vapor. This can occur when elemental mercury or products that contain elemental mercury break and release mercury to the air, particularly in warm or poorly-ventilated indoor spaces.

3.5.5.3 *Health Effects of Mercury*

As mentioned above, ingestion of contaminated fish and shellfish is the primary source of methylmercury to humans. Research shows that most people's fish consumption does not cause a health concern, and federal and state agencies issue fish consumption advisories for specific waterbodies and species when appropriate. High levels of methylmercury in humans are usually related to long-term exposure to low levels of methylmercury; these low levels build up in the body over time. If high levels are present in the bloodstream of unborn babies and young children, it has been demonstrated to harm the developing nervous system, making the child less able to think and learn.

3.5.5.4 *Ecological Effects of Mercury*

Birds and mammals that eat fish are more exposed to mercury than other animals in water ecosystems. Similarly, predators that eat fish-eating animals may be more exposed. At high levels of exposure, methylmercury's harmful effects on these animals include death, reduced reproduction, slower growth and development, and abnormal behavior.

3.5.5.5 *Controlling Mercury Emissions*

On March 15, 2005, the EPA issued the Clean Air Mercury Rule (CAMR) to reduce mercury emissions from coal-fired power plants. This is the nation's first rule to regulate utility emissions of mercury and will use a proven cap-and-trade approach to reduce mercury emission in two phases. The Clean Air Mercury Rule builds on the EPA's Clean Air Interstate Rule to reduce mercury emissions by 33 tons per year (nearly 70 percent) when fully implemented by 2018.

3.5.6 Greenhouse Gases and Atmospheric Changes

3.5.6.1 *Greenhouse Gases*

Gases that trap heat in the atmosphere are often called Greenhouse Gases (GHG). Some greenhouse gases such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities.

Since the start of the Industrial Revolution around 1750, human activities have added to the amount of heat-trapping greenhouse gases in the atmosphere. Burning fossil fuels and biomass (living matter such as vegetation) has also resulted in emissions of aerosols that absorb and emit heat and reflect light.

The addition of greenhouse gases and aerosols has changed the composition of the atmosphere. Climate change studies have analyzed possible cause-effect links between changes in atmospheric composition and changes in weather patterns and weather events, sea level, landscapes, and ecosystems. Causes of natural variations in weather patterns are extremely complicated, and this in turn complicates the scientific determination of what role changes in atmospheric composition may play. Research is on-going in this challenging field (EPA 2006d), and the compilation, assessment and potential application of this research has principally been accomplished by the Intergovernmental Panel on Climate Change (IPCC). In Spring 2007, the IPCC released its Fourth Assessment Report, and unless otherwise noted, most of the information that follows is taken from the Summaries for Policymakers of the Panel's Working Groups I (cited as IPCC 2007a) and II (IPCC 2007b).

Greenhouse Gases

The principal greenhouse gases that enter the atmosphere because of human activities are:

Carbon Dioxide (CO_2) enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). CO_2 is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.

Methane (CH_4) is emitted during the production and transport of coal, natural gas, and oil. CH_4 emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.

Nitrous Oxide (N_2O): N_2O is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

Fluorinated Gases include synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are often used as substitutes for ozone-depleting substances (i.e., CFCs, HCFCs, and halons). These gases are typically emitted in small quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases") (EPA, 2006c)

It is noteworthy that Working Group I states that "Most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations. This is an advance since the [Third Assessment Report's] conclusion that most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations." (IPCC 2007a)

Carbon Dioxide

Concentrations of CO_2 in the atmosphere increased from approximately 280 parts per million (ppm) in pre-industrial times to 379 ppm in 2005 (a 35 percent increase). The current (1995-

2005) rate of increase in CO_2 concentrations is about 1.9 ppm/year, and present CO_2 concentrations far exceed the natural range over the last 650,000 years. The increases seen since the pre-industrial period are due primarily to fossil-fuel use, with land use change another major contributor (IPCC 2007a).

Methane
Methane concentrations increased sharply during most of the 20th century, rising to 1774 ppb in 2005 from an estimated pre-industrial level of about 715 ppb. The rate of increase has slowed considerably since the early 1990s.

Nitrous oxide
Nitrous oxide has increased approximately 18 percent in the past 200 years (270ppb to 319 ppb), though the growth rate has been relatively constant since 1980. The present concentration of N_2O is the highest it has been in the past 1,000 years.

Tropospheric ozone
Tropospheric ozone is created by chemical reactions from automobile, power plant and other industrial and commercial source emissions in the presence of sunlight. It is estimated that O_3 has increased by about 36 percent since the pre-industrial era, but O_3 concentrations can vary significantly because the key ingredients to ozone production (emissions from sources noted above, plus nitrogen oxides, carbon monoxide, and hydrocarbons, along with climate) are geographically variable Besides being a greenhouse gas, ozone can also be a harmful air pollutant at ground level, especially for people with respiratory diseases and children and adults who are active outdoors.

Ozone Depleting Substances
Chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) are used in coolants, foaming agents, fire extinguishers, solvents, pesticides, and aerosol propellants. These compounds have steadily increased in the atmosphere since their introduction in 1928. Concentrations are slowly declining from their peak in the mid-late 1990s (at least in the upper atmosphere) as a result of their phaseout via the Montreal Protocol on Substances that Deplete the Ozone Layer (originally signed in 1987, and amended in 1990 and 1992). Fluorinated gases such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) are frequently used as substitutes for CFCs and HCFCs and are increasing in the atmosphere. These various fluorinated gases are sometimes called “high global warming potential greenhouse gases” because, molecule for molecule, they trap more heat than CO_2 (EPA 2006d). There is a reciprocal relationship between ozone and climate, as ozone concentrations effect climate and climate changes affect ozone .

3.5.6.2 *Atmospheric Changes*

Temperature
Temperatures are changing in the lower atmosphere, from the Earth’s surface all the way through the stratosphere 9-14 miles above the Earth’s surface. Scientists have further documented direct observational data on temperature trends, including (IPCC 2007a):

- Eleven of the last twelve years (1995-2006) rank among the 12 warmest years in the instrumental record (since 1850) of global surface temperature;
- The 100-year linear trend (1906-2005) of 0.6 °C from the IPCC Third Assessment Report (2001) has been updated to 0.74°C;
- Widespread changes in extreme temperatures have been observed over the last 50 years, with cold days, cold nights and frost becoming less frequent and hot days, hot nights and heat waves becoming more frequent; and
- Average Arctic temperatures increased at almost twice the global average rate in the past 100 years, though Arctic temperatures have high decadal variability; temperatures at the top of the permafrost layer have generally increased since the 1980s in the Arctic, by up to 3°C.

Precipitation

Increasing temperatures tend to increase evaporation (and in turn atmospheric water vapor content), which leads to more precipitation (IPCC 2007a). As average global temperatures have risen, average global precipitation has also increased. According to the IPCC, the following general precipitation trends have been observed:

- Precipitation has increased significantly since 1900 in eastern parts of North and South America, northern Europe, and northern and central Asia. However, participation is highly variable spatially and temporally, and data are limited in some regions; and
- Conversely, more intense and longer droughts have been observed over wider areas since the 1970s, particularly in the tropics and subtropics.

Storms

There is large natural variability in the intensity and frequency of mid-latitude storms and associated features such as thunderstorms, hail storms, and tornadoes. There is observational evidence for increased tropical cyclone activity in the North Atlantic since 1970, and suggestions of such increases in other regions where data are questionable. Analyses of severe storms are complicated by factors including the localized nature of the events, inconsistency in data observation methods, and the limited areas in which studies have been performed.

Observed Impacts

Observed impacts are addressed in the IPCC Working Group II report (IPCC 2007b), and the reader is directed to that document for further detail; these will not be summarized in this EIS. The areas covered in the report include changes in snow, ice and frozen ground, effects on hydrological systems, effects on terrestrial biological systems, and effects on marine and freshwater biological systems.

United States Climate Change Policy

To implement its climate policy, the Federal government is using voluntary and incentive-based programs to reduce emissions and has established programs to promote climate research. Recently, President Bush issued invitations to 11 other countries, including the European Union (EU) and the United Nations (UN), to attend a September 2007 meeting in Washington intended to work towards setting a long-term goal by 2008 to cut greenhouse gas emissions. Mr. Bush has assured (the invitees) that "the United States is committed to collaborating with other major

economies" to agree on a global framework for cutting greenhouse gas emissions (http://www.eesi.org/publications/Newsletters/CCNews/8.3.07%20CCNews.htm). Over the last year, both houses of Congress have debated and/or introduced legislation dealing with climate change policy and carbon regulation. It appears likely that these efforts will continue, but their eventual influence on national policy is unknown. As of this writing, the House and Senate continue to develop appropriations bills dealing with energy efficiency and renewable energy.

In February 2002, the United States announced a comprehensive strategy to reduce the greenhouse gas intensity of the American economy by 18 percent from 2002 to 2012. Greenhouse gas intensity is a measurement of greenhouse gas emissions per unit of economic activity. Meeting this commitment will prevent the release of more than 100 million metric tons of carbon-equivalent emissions to the atmosphere (annually) by 2012 and more than 500 million metric tons (cumulatively) between 2002 and 2012.

The EPA plays a significant role in helping the Federal government reach the country's reduction goals and has many current and near-term initiatives that encourage voluntary reductions from a variety of stakeholders. Initiatives, such as ENERGY STAR, Climate Leaders, and Methane Voluntary Programs, encourage emission reductions from large corporations, consumers, industrial and commercial buildings, and many major industrial sectors (EPA 2006e).

In November 2006, the U.S. Supreme Court began to hear arguments in a case to determine whether the EPA should regulate emissions of CO_2 as a pollutant. In April 2007, the court declared that CO_2 and other greenhouse gases are air pollutants under the CAA, and are therefore subject to regulation by the EPA. Although the EPA has not promulgated any regulations for greenhouse gas emissions, numerous methods have been proposed, such as cap and trade programs for large industrial emission sources (e.g. fossil-fueled power plants); improved fuel economy standards for new automobiles; more stringent new source performance standard for stationary sources; business tax incentives for demonstrated GHG emission reductions; increased tax incentives for utilities to include renewable and nuclear fuels in the power generation mix; improved efficiency standards for new buildings; tax-incentives for energy efficient retrofits, etc. Even with the Supreme Court decision, the EPA could still decide not to regulate carbon dioxide, but only if it concludes that such emissions do not contribute to climate change or endanger public health and welfare. If the EPA does decide to draft regulations, they would first need to perform a thorough evaluation of the various alternatives, and this process could take years.

3.6 ACOUSTIC ENVIRONMENT

3.6.1 Noise Terminology

Frequency is the measurement of the number of occurrences of a repeated event per unit of time.

Noise or "unwanted sound" can be intermittent or continuous, steady or impulsive, stationary or transient. Humans or wildlife can be affected by noise either interfering with normal activities or diminishing the quality of the environment. Perception of noise is affected by the intensity, frequency, pitch, and duration, as well as the auditory system and physiology of a particular animal. Noise levels heard by humans or wildlife depend on such variables as distance, percentage and type of ground cover, and objects or barriers between the noise source and the receiver, as well as the atmospheric conditions.

The loudest sounds that can be detected comfortably by the human ear have intensities that are 1 trillion (1,000,000,000,000) times larger than those of sounds that are barely audible (USDA 2007). A logarithmic unit known as the decibel (dB) is typically used to represent the intensity of a sound. Humans typically have reduced hearing sensitivity at low frequencies compared with their response at high frequencies, and the "A-weighting" of noise levels, or A-weighted decibels (dBA), closely correlates to the frequency response of normal human hearing. Common noise levels and their effects on the human ear are shown in Table 3.6-1.

Based on certain land uses or types of facilities, some receptors (human and wildlife) are more sensitive to a given level of noise than other receptors that may have less exposure to a given noise. These "sensitive receptors" may include schools, churches, hospitals, retirement homes, campgrounds, wilderness areas, hiking trails, and some species of threatened and endangered wildlife. Based on a summary evaluation by the U.S. Department of Housing and Urban Development (HUD), recommended land use and associated noise levels are listed in Table 3.6-2.

Table 3.6-1 – Common Noise Levels and Their Effects on the Human Ear

Source	Decibel Level (dBA)	Exposure Concern
Soft whisper	30	Normal safe levels
Quiet office	40	Normal safe levels
Average home	50	Normal safe levels
Conversational speech	66	Normal safe levels
Busy traffic	75	May affect hearing in some individuals, depending on such factors as sensitivity and exposure length.
Noisy restaurant	80	May affect hearing in some individuals depending on such factors as sensitivity and exposure length.
Average factory	80-90	May affect hearing in some individuals depending on such factors as sensitivity and exposure length.
Pneumatic drill	100	Continued exposure to noise over 90 dB may eventually impair hearing.
Automobile horn	120	Continued exposure to noise over 90 dB may eventually impair hearing.

Source: DOD 1978

Table 3.6-2 – Recommended Land Use Noise Levels (dBA)

Land Use Category	Clearly Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential	< 60	60-65	65-75	>75
Commercial, retail	<65	65-75	75-80	>85
Commercial, wholesale	<70	70-80	80-85	>85
Manufacturing	<55	55-70	70-80	>80
Agriculture, farming	<75	>75		
Natural recreation areas	<60	60-75	75-85	>85
Hospitals	<60	60-65	65-75	>75
Schools	<60	60-65	65-75	>75
Libraries	<60	60-65	65-75	>75
Churches	<60	60-65	65-75	>75
Nursing homes	<60	60-65	65-75	>75
Playgrounds	<55	55-65	65-75	>75

Source: HUD 1991

For environmental noise studies, noise levels are typically described using the A-weighted equivalent noise levels, or L_{eq}, during a defined period. The L_{eq} metric is useful because it is a single number that describes the constantly fluctuating instantaneous ambient noise levels at a receptor location during a specific period and accounts for all the noises and quiet intervals that occur during that period.

The 90th percentile-exceeded noise level, or L_{90}, is a metric that indicates the single noise level that is exceeded during 90 percent of a measurement period, although the actual instantaneous noise levels fluctuate continuously. The L_{90} noise level is typically considered the ambient noise level and is often near the low end of the instantaneous noise levels during a measurement period. It typically does not include the influence of discrete noises of short duration, such as car doors closing, bird chirps, dog barks, car horns, and wind gusts. For example, if a continuously operating piece of equipment is audible at a measurement location, typically it is the noise created by the equipment that determines the L_{90} of a measurement period even though other noise sources may be briefly audible and occasionally louder than the equipment during the same measurement period (BSA 2005).

The day-night average noise level, or L_{DN}, is a single number descriptor that represents the constantly varying sound level during a continuous 24-hour period. The L_{DN} is typically calculated using 24 consecutive one-hour L_{EQ} noise levels. The L_{DN} includes a 10 dBA penalty that is added to noises that occur during the nighttime between 10:00 PM and 7:00 AM to account for people's higher sensitivity to noise at night when the background noise level is typically low.

The ambient noise at a receptor location in a given environment is the all-encompassing sound associated with that environment and is due to the combination of noise sources from many directions, near and far, including the noise source of interest. Noise levels typically decrease by approximately 6-dBA every time the distance between the source and receptor is doubled, depending on the characteristics of the source and the conditions over the path that the noise travels. A 6-dBA change in noise level is clearly perceptible to most people, and a 10-dBA increase in noise level is judged by most people as doubling the sound level. The reduction or attenuation in noise levels is increased if a solid barrier, such as a man-made wall or building, or natural topography, blocks the direct line of sight (and noise propagation) between the noise source and receptor (USDOT FHA 1995).

3.6.2 Noise Guidelines

Noise impacts fall into two categories: the extent to which facility noise emissions may exceed applicable laws, ordinances, regulations, and standards and the degree to which facility noise emissions may elicit community annoyance or complaints.

There are no known city, county, or state noise-control laws, ordinances, or regulations applicable to the proposed Dry Fork Station Power Plant. In the absence of such standards, it is useful to compare predicted facility noise levels to the federal guidelines established by HUD and EPA.

U.S. Department of Housing and Urban Development Guidelines
Sites considered acceptable by HUD for housing register an L_{DN} of 65 dBA or less.

U.S. Environmental Protection Agency Guidelines
As a result of the Noise Control Act of 1972, EPA published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (commonly called the Levels Document). The EPA's criteria, which are stated mostly in terms of L_{DN}, are shown in Table 3.6-3. In summary, the EPA indicates that exposure to outdoor sound levels at or below L_{DN} = 55 dBA, or indoor sound levels at or below L_{DN} = 45 dBA, is satisfactory to "protect the public health and welfare with an adequate margin of safety," because no significant speech interference, either indoors or outdoors, will result from this exposure, nor will it lead to negligible community reaction, complaints, or annoyance in average communities.

Additional Criteria
Facility noise levels were also evaluated in terms of their potential for hearing damage and low-frequency noise annoyance, as well as for structural damage due to infrasound.

Table 3.6-3 – Noise Levels Identified as Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety

Effect	Level	Area
Hearing loss	$L_{EQ(24)}$ (70 dB)	All areas.
Outdoor activity interference	L_{DN} (55 dB)	Outdoors in residential areas and farms, other outdoor areas where people spend widely varying amounts of time, and other places in which quiet is a basis for use.
	$L_{EQ(24)}$ (55 dB)	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, and so forth.
Indoor activity interference and annoyance	L_{DN} (45 dB)	Indoor residential areas.
	$L_{EQ(24)}$ (45 dB)	Other indoor areas with human activities, such as schools, and so forth.

Source: Report No. EPA-550/9-74-004, March 1974
Note that HUD and EPA criteria do not constitute enforceable federal regulations or standards.

3.6.3 Existing Acoustic Environment

The acoustic environment of the area can be characterized as rural, with background noise levels typically controlled by natural sources, such as vegetation rustle, wildlife (birdcalls), and insects. Factors contributing to the acoustic environment in the region include mining operations at the Dry Fork, Rawhide, Eagle Butte, Clovis Point, and Wyodak mines, as well as agricultural activities associated with livestock grazing.

Noise from distant traffic on US Highway 14/16 and State Highway 59 trains, and mining operations also contribute to ambient noise levels within the region. The nearest noise-sensitive receivers (Figure 3.6-1) are single-family residences approximately 2 miles north of the proposed site (House 1) and 1 mile east of the alternative site (House 2).[1]

[1]Although the current nearest noise sensitive receiver is a single-family residence (Marshall Homestead) approximately 3,000 feet northeast of the preferred site, this property is owned by Basin Electric and would not be occupied when the proposed facility is scheduled to become commercially operable.

There are no noise sources within the proposed or alternative transmission line corridors other than those naturally produced by the earth or other power lines in the area, which represent background conditions.

3.7 BIOLOGICAL RESOURCES

3.7.1 Vegetation, Invasive Plant Species, and Noxious Weeds

The vegetation in Northeastern Wyoming is characterized as a mosaic of mixed-grass prairie, sagebrush shrublands, and streamside (riparian) wetlands with emergent, herbaceous, or forested cover types. The predominant shrub in the mixed-grass prairie and shrublands is the Wyoming big sagebrush (*Artemisia tridentata wyomingensis*).

Wyoming big sagebrush

Potential vegetation types within the proposed and alternative transmission line alignments were predicted using data obtained from the Wyoming GAP Analysis project (WY-GAP), distributed through a cooperative project between University of Wyoming's Spatial Data and Visualization Center and USGS Biological Resources Division's National Gap program (Basin Electric 2006b).

In 2005 and 2006, specialists conducted field investigations as part of this project to identify prevalent vegetation types within the proposed and alternative Dry Fork Station sites, the ash landfill site, and the proposed and alternative transmission line alignments (Basin Electric 2006a). Soil survey data was also used to determine vegetation types that occurred within the area prior to mining and agricultural disturbance.

Because the majority of land within the transmission line corridor is privately held, the field survey were restricted to 125 ft. Surveyors stepped off the center line of the ROW when permitted or if something of interest was rated (e.g. special status species or waterbody).

The alternative power plant site would be located within the Dry Fork Mine permit area (see Figure 1.1-4). Baseline and annual monitoring vegetation data has been developed for the Dry Fork Mine permit by GPR, Inc. and Intermountain Resources since 1982. This monitoring data was evaluated to gather information on pre-disturbance site conditions (Basin Electric 2006a).

Non-native plant species are rapidly becoming established and spreading in Wyoming. Once established, non-native plant species can out-compete and eventually replace native plants. Thus, non-native plant species are detrimental to the environment. The state and some counties have designated certain non-native plants as noxious weeds. The treatment and management requirements of noxious weeds are addressed under the Wyoming Weed and Pest Control Act (W.S. Title 11, Chapter 5, 1-119). County districts manage and enforce the noxious weed law that requires treatment of noxious weeds identified onsite after construction.

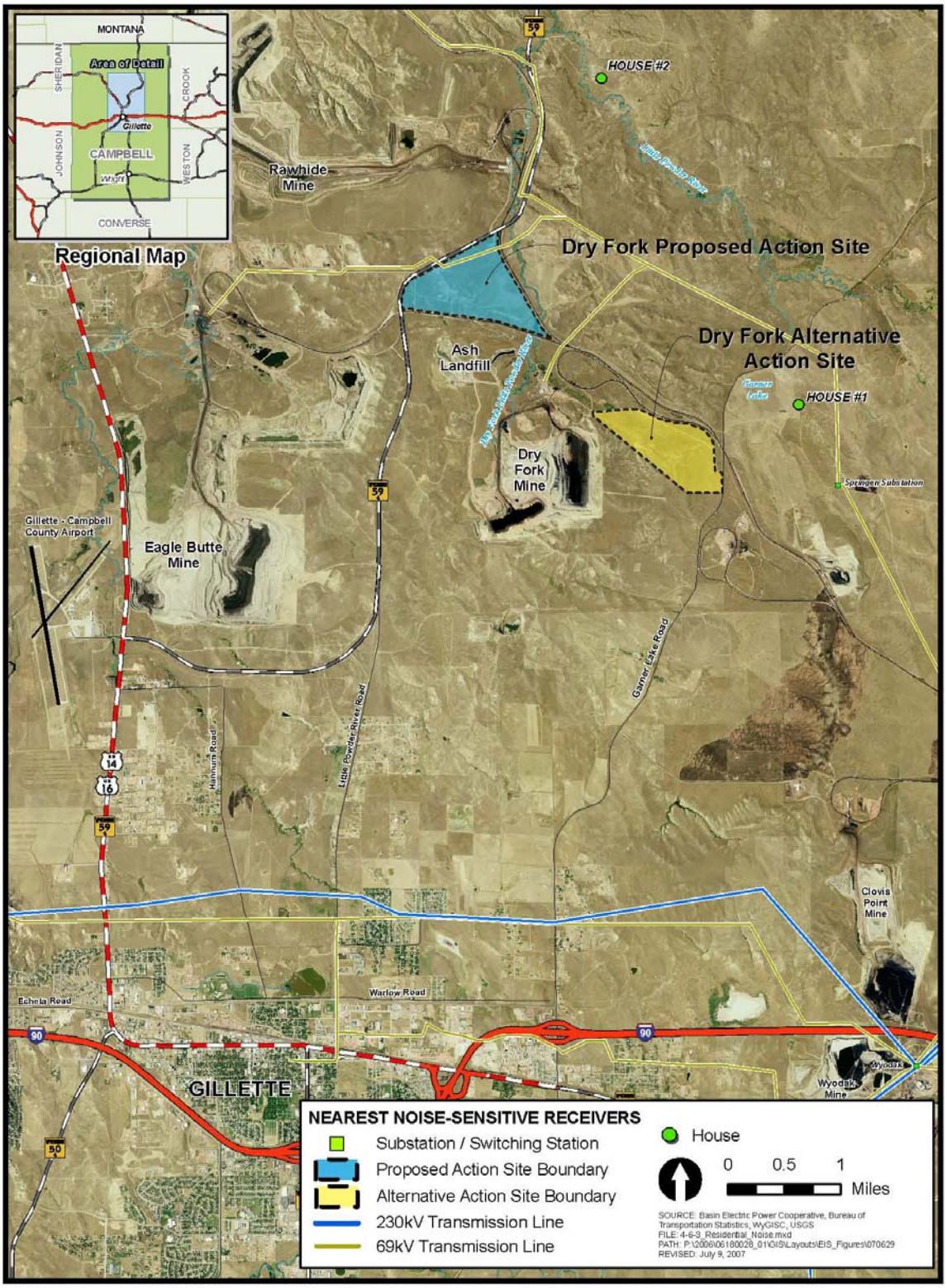


Figure 3.6-1 – Nearest Noise Sensitive Receivers

While not designated by the state or county as noxious, some aggressive invasive non-native plant species have the ability to decrease and potentially eliminate sensitive species and to alter the structure and function of native plant communities. Cheatgrass (*Bromus tectorum*) is one of the more common invasive species that can out-compete native grass species, particularly within areas with surface disturbances. Extensive noxious weed populations can lead to modified hydrologic cycles (increased surface runoff and sediment yield), change natural fire cycles, and alter soil properties and nutrient cycling.

Noxious and invasive weeds occur throughout northeastern Wyoming and their distributions are monitored by the Wyoming Cooperative Agricultural Pest Survey (CAPS) in association with county weed and pest districts and the Wyoming Department of Agriculture. Table 3.7-1 lists the noxious weeds in Campbell and Sheridan counties and their approximated acreages of infestation. Infestations of Canada thistle (*Cirsium arvense*) and leafy spurge (*Euphoria esula*) exceed 10,000 acres in Campbell and Sheridan counties, respectively.

Table 3.7-1 – Occurrence of Noxious Weeds in Campbell and Sheridan Counties, Wyoming

Noxious Weed	Areal Extent of Infestation						
	<10 acres	11 to 100 acres	101 to 1,000 acres	1,001 to 5,000 acres	5,001 to 10,000 acres	>10,000 acres	Known to occur
Black Henbane		C					
Canada Thistle					S	C	
Common burdock		C		S			
Dalmation toadflax	S		C				
Diffuse knapweed			C				
Field bindweed				C			S
Foxtail barley							C
Hoary cress			C, S				
Houndstongue		C		S			
Jointed goatgrass			C				
Leafy spurge				C		S	
Musk thistle		C, S					
Perennial pepperweed	C						
Purple loosestrife	S						
Quackgrass			S				C
Rush skeletonweed	C						
Russian knapweed			S	C			
Saltcedar		C	S				
Scotch thistle	S	C					
Skeletonleaf bursage				C			
Spotted knapweed			C, S				
Yellow toadflax	S						

Source: DOI 2003
C = Campbell, S = Sheridan

3.7.1.1 *Power Plant*

Proposed Site

Vegetation
The proposed power plant site is characterized by rolling terrain influenced by agriculture and has a long and ongoing history of livestock grazing. Native vegetation has been converted to support agricultural practices. There are no trees found within the proposed power plant site (Basin Electric 2006a). Data from the Wyoming GAP analysis program predicted the primary native vegetation on the proposed power plant site to be Wyoming big sagebrush. However, due to historic and current livestock grazing onsite, the current vegetation types actually consist of grassland with scattered Wyoming big sagebrush. The sagebrush vegetation type is located primarily on the south side of the proposed power plant site. Grasses dominate the northern portion of the site, primarily smooth brome (*Bromus inermis*), with some sideoats grama (*Bouteloua curtipendula*), slender wheatgrass (*Elymus trachycaulus*), buffalo grass (*Buchloe dactyloides*), blue grama (*Bouteloua gracilis*), western wheatgrass (*Agropyron smithii*), and threadleaf sedge (*Carex filifolia*). The primary shrub species on the proposed power plant site include plains prickly pear (*Opuntia polyacantha*), snakeweed (*Gutierrezia sarothrae*), fringed sagebrush (*Artemesia frigida*), and Wyoming big sagebrush. Forb species found onsite include yarrow (*Achillea lanulosa*), scarlet globemallow (*Sphaeralcea coccinea*), spiderwort (*Tradescantia occidentalis*), Hood's phlox (*Phlox hoodii*), and nodding onion (*Allium cernuum*) (Basin Electric 2006a).

The proposed power plant site also contains wetland vegetation in the southeast corner of the site. Further information on wetlands is found in Section 3.7.2.

The proposed ash landfill site was previously mined and has since been reclaimed and replanted with crested wheatgrass (*Agropyron cristatum*). Other dominant vegetation found within the proposed ash landfill site are Wyoming big sagebrush, silver sagebrush (*Artemisa cana*), mountain brome (*Bromus marginatus*), and cheatgrass (Basin Electric 2006a).

Noxious Weeds and Invasive Species
The dominant non-native plant species found within the proposed power plant site are smooth brome, Canada thistle, cheatgrass, and common dandelion (*Taraxacum officinale*). Mayweed chamomile (*Anthemis cotula*) was also observed onsite in some of the heavier grazed portions of the proposed project area. Of these species, only Canada thistle is classified as a noxious weed. The ash disposal site is heavily disturbed, and weeds include low densities of Canada thistle and high densities of cheatgrass and Russian thistle (*Salsola iberica*). Canada thistle is the only designated noxious weed identified onsite during field surveys conducted in 2006 (Basin Electric 2006a).

Alternative Site

Vegetation
The dominant vegetation type found at the alternative site is undisturbed sagebrush shrubland. The site also contains wetlands, which are discussed further under Section 3.7.2. The site is

adjacent to several roads, rail corridors, the Dry Fork mine, and a coal processing center.

The primary shrub species observed within the site include Wyoming big sagebrush, yucca (*Yucca glauca*), silver sagebrush, plains prickly pear, fringed sagebrush, hairy golden-aster (*Heterotheca villosa*), and yellow sweetclover (*Melilotus officinalis*). Forbs include yarrow, milkvetch (*Astragalus ssp*.), silvery lupine (*Lupinus argenteus*), and upright prairie coneflower (*Ratibida columnifera*). Grass species observed on the site include Kentucky bluegrass (*Poa pratensis*), smooth brome, junegrass (*Koeleria macrantha*), mountain brome, needle-and-thread (*Stipa comata*), sedge species (*Carex ssp.)*, bluebunch wheatgrass (*Agropyron spicatum*), crested wheatgrass, blue grama, and cheatgrass. There are no trees within the alternative power plant site.

A **forb** is a flowering plant with a non-woody stem that is not a grass, a shrub or a tree. Most wild and garden flowers, herbs and vegetables are forbs.

Overall range condition is considered good, relative to the proposed Dry Fork Station site, as indicated by the species composition and low densities of noxious weeds (Basin Electric 2006a).

Noxious Weeds and Invasive Species
Noxious weeds identified were Canada thistle and Dalmatian toadflax (*Linaria dalmatica*). The primary invasive species found onsite was cheatgrass. Densities of all noxious and invasive weeds species were considered low, in part due to the limited site disturbance. Canada thistle, Russian thistle, and cheatgrass were also observed along access roads leading to the alternative power plant site (Basin Electric 2006a).

3.7.1.2 *Transmission Line Alignments*

Because the proposed and alternative transmission line alignments are geographically close, this discussion provides a general overview of the vegetation types and noxious or invasive weeds found along both the proposed and alternative alignments.

Vegetation
Five dominant vegetation types occur within the transmission line alignments: mixed-grass prairie, sagebrush shrubland, herbaceous riparian, forested riparian and emergent wetlands (Figure 3.7-1). Emergent wetlands are discussed in Section 3.7.2. Other cover types in the area include developed/disturbed, agriculture, and open water.

The mixed-grass prairie is common within the alignments and occurs on prairies, hills, and swales. The mixed-grass prairies occur in well-drained, medium- to fine-textured friable soils. Grass species include crested wheatgrass, western wheatgrass, bluebunch wheatgrass, needle-and-thread, and junegrass. Isolated patches of blue grama were also observed during field surveys (Basin Electric 2006b). Shrub species are intermixed within the mixed-grass prairie and include silver sagebrush, fringed sagebrush and Wyoming big sagebrush. Silver sagebrush occurs in sites with deeper moderately dry to moist soils with a loamy to sandy texture. Other common shrub species include hairspine prickly pear (*Opuntia polyacantha Haw. var. polyacantha*), plains prickly pear, and scarlet globemallow (Basin Electric 2006b).

Sagebrush shrublands cover many of the plains, valleys, and upland areas along the alignments. Sagebrush species include big sagebrush, Wyoming big sagebrush, fringed sagebrush, and silver sagebrush. Wyoming big sagebrush and fringed sagebrush occur in dry well-drained soils that are gravelly or rocky in texture. Rabbitbrush (*Chrysothamnus spp.),* yucca, snakeweed, pricklypear (*Opuntia spp.),* and prairie rose (*Rosa woodsii*) are frequently associated with sagebrush species. Common forb species present include alyssum (*Alyssum simplex*), pale madwort (*A. alyssoides*), scarlet globemallow, and yarrow. Common grasses present include western wheatgrass, junegrass, and needle-and-thread (Basin Electric 2006b).

The herbaceous riparian (streamside) vegetation type includes moist grasses, sedges, and rushes. Most of the riparian areas in the alignments are ephemeral (intermittent flow) and were dry at the time of the survey. Riparian areas were found to contain a mixture of wetland and upland species. Dominant species include sedge, foxtail barley (*Hordeum jubatum*), Kentucky bluegrass, and wire rush (*Juncus balticus*); less dominant species include elk sedge (*Carex geyeri*), Canada wildrye (*Elymus canadensis*), bluebunch wheatgrass, slender wheatgrass, and other rushes (*Juncus spp*.). Trees observed in the herbaceous riparian areas include box elder (*Acer negundo*) and cottonwood (*Populus spp*.) (Basin Electric 2006b).

Forested riparian vegetation type occurs along the alignments and is primarily associated with major drainages, creeks, and rivers. Dominant species observed in the project area include cottonwood, box elder, and willow (*Salix spp*.). Some forested riparian areas were observed to have a higher density of herbaceous and shrub species than trees (Basin Electric 2006b).

Developed/disturbed areas have generally resulted from CBM recovery, pipelines, mining, and private residences, or are areas where the dominant vegetation is noxious and invasive plant species. Portions of the alignments occur within existing pipeline ROWs that have been cleared and replanted with non-native wheatgrass. Much of the grassland and pastureland along the alignments exhibits evidence of heavy grazing or overgrazing. Common noxious and invasive species observed include Canada thistle, musk thistle (*Carduus nutans*), ox-eye daisy (*Leucanthemum vulgare*), cheatgrass, and smooth brome (Basin Electric 2006b).

Portions of both alignments intersect small areas with irrigated and/or non-irrigated agriculture. Predominant irrigated crops include sugar beets, beans, potatoes, and hay. Non-irrigated crops include wheat, barley, and oats. Many of these areas contain noxious and invasive weeds similar to those occurring in other developed/disturbed areas (Basin Electric 2006b).

Wetlands and open water include ponds and streams along the transmission line alignments. The numerous small drainages and creeks within the both alignments are ephemeral and generally carry water only in spring. Most of the surface waters were dry during the June 2006 site visit. Many stock ponds along the alignments were filled, indicating current use. The major surface waters crossed by the proposed and alternative alignments are the Prairie Dog Creek, Clear Creek, Powder River, Spotted Horse Creek, Wildcat Creek, Little Powder River, and Wild Horse Creek. A number of man-made ponds are also present. The dominant plant species adjacent to the open water cover type varies depending on the level of human disturbance. Common plant species found include sedge, spikerush (*Eleocharis spp*.), Canada wildrye, horsetail (*Equisetum spp*.), bluebunch wheatgrass, foxtail barley, rushes, Kentucky bluegrass, and other bluegrass

species (*Poa spp.)* (Basin Electric 2006b).

Noxious Weeds and Invasive Species
Eleven state-listed noxious weed species were observed in the two county study area containing the alignments. The most commonly occurring weed species observed during the field surveys were Canada thistle, musk thistle, field bindweed (Convolvulus arvensis), ox-eye daisy, and leafy spurge (Euphorbia esula). Cheatgrass, observed on all segments, is not classified as a noxious weed but is aggressive invasive species. The noxious weeds and invasive species found on each segment are discussed below.

Hughes Substation to Dry Fork Station Switchyard

Proposed Alignment: Segment A. This segment of the proposed transmission line alignment crosses the following vegetation and cover types - sagebrush shrubland, dry land agriculture, disturbed lands, forested riparian and open water. Topography in this segment includes hills and swales with an occasional steep draw and sandstone cliff. Areas of open water are primarily associated with stock ponds. Disturbances observed include livestock trampling and grazing, dry land agriculture, and habitat fragmentation caused by CBM development and roads.

Observed noxious weeds include musk thistle, Canada thistle, ox-eye daisy, dalmatian toadflax, and yellow toadflax (*Linaria vulgaris*). Invasive species present include pale madwort, alyssum, flixweed (*Descurainia sophia*), clasping pepperweed (*Lepidium perfoliatum*), yellow sweetclover, knotweed (*Polygonum spp.),* tumble mustard (*Sisymbrium altissimum*), sowthistle (*Sonchus spp*.), common dandelion, field pennycress (*Thlaspi arvense*), Western salsify (*Tragopogon dubius*), wild oat (*Avena fatua*), smooth brome, cheatgrass, timothy (*Phleum pratense*), bulbous wheatgrass (*Poa bulbosa*), Kentucky bluegrass, and cattail (*Typha spp*.) (Basin Electric 2006b).

Alternative Alignment: Segment B. Access to Segment B was limited to the first four to five miles from the western end of the segment. Sagebrush shrubland and grassland are the dominant vegetation types within the ROW. The eastern (north-south) portion of the segment, viewed from Adon Road, contains herbaceous riparian and forested riparian vegetation. Multiple residences occur along the ROW for this segment, so there is a high level of disturbance in some areas.

Common Alignment: Segment C. This segment is on property owned and operated by Caballo Coal Company. The transmission corridor would span an area of the Rawhide Mine that has been reclaimed. The area has been replanted in the past few years, and past disturbance has likely increased the potential for the establishment and spread of noxious weeds. Mine reclamation measures that are under way would likely prevent further spread of noxious weeds (Basin Electric 2006b).

Figure 3.7-1 – Vegetation Cover Types in the Hughes Transmission Line Study Area

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Dry Fork Station Switchyard to Carr Draw Substation

Proposed Alignment: Segments D, E, F, H. Segment F is the only section unique to the proposed alignment in this corridor; Segments D, E, and H are common to both the proposed and alternative alignments. Segment D is also on property owned and operated by Caballo Coal Company and conditions are similar to those of Segment C detailed above. This corridor is dissected by several swales, draws, and deep drainages with riparian vegetation in the bottomland and exposed bluffs along the walls. Sagebrush shrubland and mixed-grass prairie alternate on the hilltops and slopes. Forested and/or herbaceous riparian vegetation occur adjacent to the streams in Segments F and H. Waterbodies include Rawhide Creek, the upper reaches of Wild Horse Creek, and Fortification Creek.

Disturbance issues stem from habitat fragmentation caused by CBM development and existing transmission lines in Segment E; two-track dirt and gravel roads, a CBM well near the centerline, a water well, distribution lines in Segment F; oil fields and cattle congregation near a stock pond in Segment H. Noxious species include musk thistle, hoary cress (*Cardaria spp*.), Canada thistle, Scotch thistle (*Onopordum acanthium*), and ox-eye daisy. Density of noxious weeds is low along Segment H. Invasive species include alyssum, yellow sweetclover, Russian thistle, tumble mustard, sowthistle, common dandelion, Western salsify, common cattail (*Typha latifolia*), wild oat, smooth brome, flixweed, clasping pepperweed, Kentucky bluegrass, pale madwort, peavine (*Lathyrus spp*.), field pennycress, bulbous wheatgrass, and cheatgrass (Basin Electric 2006b).

Alternative Alignment: Segment G. This segment was not thoroughly surveyed due to limited access. Vegetation types alternate between sagebrush shrubland and mixed-grass prairie with areas of open water. The eastern portion of this segment is characterized by moderate terrain; Rawhide Creek and Lone Tree Prong Creek bisect the segment ROW. The terrain of the western half of the segment is moderate, and several hills and draws are present. Primary disturbance factors include stock ponds, dense CBM development, and roads. While no noxious weed species were observed from the survey access, this may not necessarily be representative of the condition of the rest of the vegetation along the ROW, to which access was restricted. Invasive species observed include alyssum, clasping pepperweed, yellow sweetclover, tumblemustard, cheatgrass, and bulbous wheatgrass (Basin Electric 2006b).

Dry Fork Station Switchyard to Sheridan

Proposed Alignment: Segments C, J, L, N, P, Q, S, T, W, X, AA. Segments unique to the proposed alignment are N, P, S, W, and X. Generally, this part of the alignment transitions from a mixed-grass prairie between the Little Powder River and Wildcat Creek (Segments J-L) to sagebrush shrubland in Segment N, then enters an agricultural area along Hwy 14 (Segments P-S), then back to a sagebrush shrubland near Clear Creek (Segments T-W) before entering the Badger Creek valley with mixed-grass prairie (Segment X). More specifically, Segment J alternates from sagebrush shrubland and mixed-grass prairies on the hilltops and slopes in the south to an area dominated by sagebrush shrubland on hills and draws in the north. There is a small section of ponderosa pine in the center of this segment north of the mine. Open water habitat was present in two stock ponds at the south end of Segment J. Segment L spans an ephemeral section of Wildcat Creek that contains herbaceous riparian vegetation. North of the

creek, Segment N is dominated by sagebrush shrubland, dryland agriculture (predominantly crested wheatgrass), and disturbed rangeland containing invasive cheatgrass. This segment spans the upper reaches of Horse Creek then Hwy 14. Sagebrush shrubland is present in Segments P-Q with some dryland agriculture in Q and disturbed rangeland in P. The Powder River is traversed on the western end of Segment S. Characteristic vegetation is again predominantly sagebrush shrubland with some dryland agriculture and disturbed rangeland. Forested riparian vegetation is present along the river. The topography varies from rolling hills to steep terrain with deep canyons of eroding sandstone. Segment T spans Clear Creek. Sagebrush shrubland and grassland are the dominant vegetation types. Contracted Indian Ricegrass (*Oryzopsis contracta*), listed as a rare plant species in the State of Wyoming was observed in Segment T. Segments W and X primarily consists of alternating hills and valleys with sagebrush shrubland and mixed-grass prairie. Several streams are traversed by these segments including Badger Creek. Sources of disturbance include roads, trailer homes, stock ponds, CBM development, utility structures, agriculture, mining, and overgrazing (Basin Electric 2006b).

Although Segment C was unavailable for ground surveys of noxious and invasive plant species, past disturbance at the mine has likely increased the potential for establishment but recent reclamation will likely prevent the spread of these species. Low densities of noxious weed species occur along Segments L-N and in Segments P-S except in some past reclaimed areas with mining disturbances in Segment P. Noxious weed abundance was low to moderate in Segment T. Leafy spurge, a noxious weed, was prevalent throughout the majority of the drainages within Segments W-X although some evidence of weed eradication was observed. With the exception of drainages and swales, a large portion of Segment AA consists of noxious and invasive plant species due in part to occupation by the black-tailed prairie dog. Cheatgrass, an invasive species, is abundant in Segment P and totally covers some areas of this segment. Degraded rangeland dominated by cheatgrass is common in Segment S.

<u>Alternative Alignment: Segments C, J, L, O, Q, R, T, U, Y, AA</u>. The segments in the alternative route are similar to the proposed route in species composition, disturbance issues, and noxious/invasive species composition. Segments O, R, U, and Y are unique to this alignment. Segment O is north of but roughly parallel to Segment N; both traverse several ephemeral streambeds and Horse Creek containing herbaceous riparian vegetation. Segment O like N, is dominated by sagebrush shrubland, dryland agriculture, and disturbed rangeland. Segment R is south of Hwy 14 and parallel to Segment S which is north of Hwy 14. No ground survey information is available for Segment R but it appears to traverse an area with more agriculture and rangeland than the predominantly shrubland vegetation of Segment S. Both traverse the Powder River in the western end. Segments U-Y take a more southerly route running parallel with Buffalo Creek and Indian Creek compared to Segments W-X that run parallel with Badger Creek. Sagebrush shrubland occurs in the east end of Segment U crossing several deep draws then the vegetation changes to mixed-grass prairie along the upper reaches of Buffalo Creek. The terrain becomes rugged in Segment Y with steep slopes and open valleys. The western end of Segment Y is grazed rangeland dominated by sagebrush and yucca parallel to Buffalo Creek.

Livestock grazing is the predominant disturbance along Segments O and Y. Other factors include CBM development, utility corridors, dirt roads, cattle congregation, and/or dryland agriculture.

Segment O contains relatively low densities of Canada thistle, the only noxious weed observed within this segment. Segment Y contains the greatest number of noxious weed species (nine) within either the proposed or alternative transmission line alignments (Basin Electric 2006b). Leafy spurge, a noxious weed species, is very common in Segment Y covering hundreds of acres in some areas. In Segment U, dense patches of leafy spurge occur in many of the draws, floodplains, and along Buffalo Creek.

3.7.2 Wetlands and Riparian Areas

Wetlands and riparian areas provide a unique water-related habitat in the arid landscape of northeastern Wyoming. In the project area, both are typically restricted to lands immediately adjacent to water sources. This includes lands immediately adjacent to or surrounding major and minor rivers, streams, creeks, lakes, draws, ponds, and valley bottoms (topographic depressions) where the water table is high enough to saturate the soil during the growing season. There are four types of riparian communities in the project area: forested riparian, shrubby riparian and emergent wetlands including herbaceous riparian and wet meadows.

Many plants and wildlife species are found only in these lush wetlands and riparian habitat, where waterfowl and shorebirds tend to congregate. Wetlands at the power plant sites are associated with the Dry Fork of the Little Powder River. Wetlands at the transmission line alignments study area awere concentrated near Badger Creek, Clear Creek, Buffalo Creek, Powder River, Middle Prong Wild Horse Creek, Wildcat Creek, Little Powder River, Wild Horse Creek, Rawhide Creek, Hay Creek, and the draws and ephemeral drainages associated with these major surface waters (Basin Electric 2006b).

3.7.2.1 *Power Plant*

Proposed and Alternative Sites

Wetland delineations were conducted for the proposed and alternative power plant sites and the proposed ash landfill site during the summers of 2005 and 2006. Wetland boundaries were delineated based on criteria outlined in the U.S. Army Corps of Engineers Wetlands Delineation Manual (USACE 1987) and their locations mapped using global positioning systems (GPS). Wetlands delineated on each site are listed in Table 3.7-2 and locations are shown in Figure 3.7-2 and Figure 3.7-3. The complete delineation report is included in Appendix E.

The proposed site contains two herbaceous riparian wetlands in the southeast corner of the site; both are associated with the Dry Fork of the Little Powder River. An unnamed intermittent drainage to the Dry Fork, called Drainage B, contains a small wetland and a larger wetland lies adjacent to the Dry Fork upstream of a culvert under the railroad. The proposed ash landfill site and the alternative power plant site each contain a small wetland area. The wetland in the alternative site lies adjacent to an intermittent drainage and is intersected by a primary access road. The wetland in the proposed ash landfill site occurs along a reclaimed intermittent narrow drainage channel. A sediment pond that carries runoff from the spoil piles contains water but no wetland vegetation.

3.7.2.2 *Transmission Line*

Potential wetlands and riparian communities in the proposed and alternative alignments of the transmission line were evaluated by studying hydrology layers provided by the state and through field studies conducted in June 2006. Wetland delineations were not conducted during field studies, but potential wetland locations were recorded using GPS within the proposed and alternative alignments. No wetland complexes larger than a linear width of 800 feet (an average transmission line span) were observed in the project area. The largest complex was found along Segment F (unique to the proposed alignment) and was approximately 500 to 600 feet wide.

Table 3.7-2 – Wetlands or Potential Wetlands Found on the Proposed and Alternative Power Plant Sites

Site	Wetland Name	Species Observed	Approximate Size and Location	Jurisdictional Wetland
Proposed Power Plant	Dry Fork of the Little Powder River	Cattails (Typha spp.), rushes (Juncus spp.), bulrushes (Scirpus ssp.), and sedges (Carex spp.)	1.5 acres; southeast portion of site	Yes
	Drainage B	Patches of Spikerush sedge (Carex stenophylla), Wood bluegrass (Poa nemoralis ssp interior), and Dog Grass (Elytrigia repens)	0.03 acre; southeast portion of site	Yes
Proposed Ash Landfill Site	Intermittent drainage to Dry Fork of the Little Powder River	Shortawn foxtail (Alopecurus aequalis) and reed canary grass (Phalaris arundinacea)	0.68 acre	Yes
	Sediment Pond	No wetland vegetation present	Unknown acreage; southeast corner of site	To Be Determined
Alternative Power Plant	Intermittent drainage to Dry Fork of the Little Powder River	Shortawn foxtail and reed canary grass	Transected by primary Dry Fork Mine access road; north portion: 1.57 acres, south portion: 0.27 acre	Yes, awaiting USCOE concurrence

Source: Basin Electric 2006b;

Proposed and Alternative Alignment

Potential wetlands and riparian communities in the proposed and alternative alignments of the transmission line were evaluated by studying hydrology layers provided by the state and through field studies conducted in June 2006. Wetland delineations were not conducted during field studies, but potential wetland locations were recorded using GPS within the proposed and alternative alignments. No wetland complexes larger than a linear width of 800 feet (an average transmission line span) were observed along the alignments. The largest complex was found along Segment F (unique to the proposed alignment) and was approximately 500 to 600 feet wide.

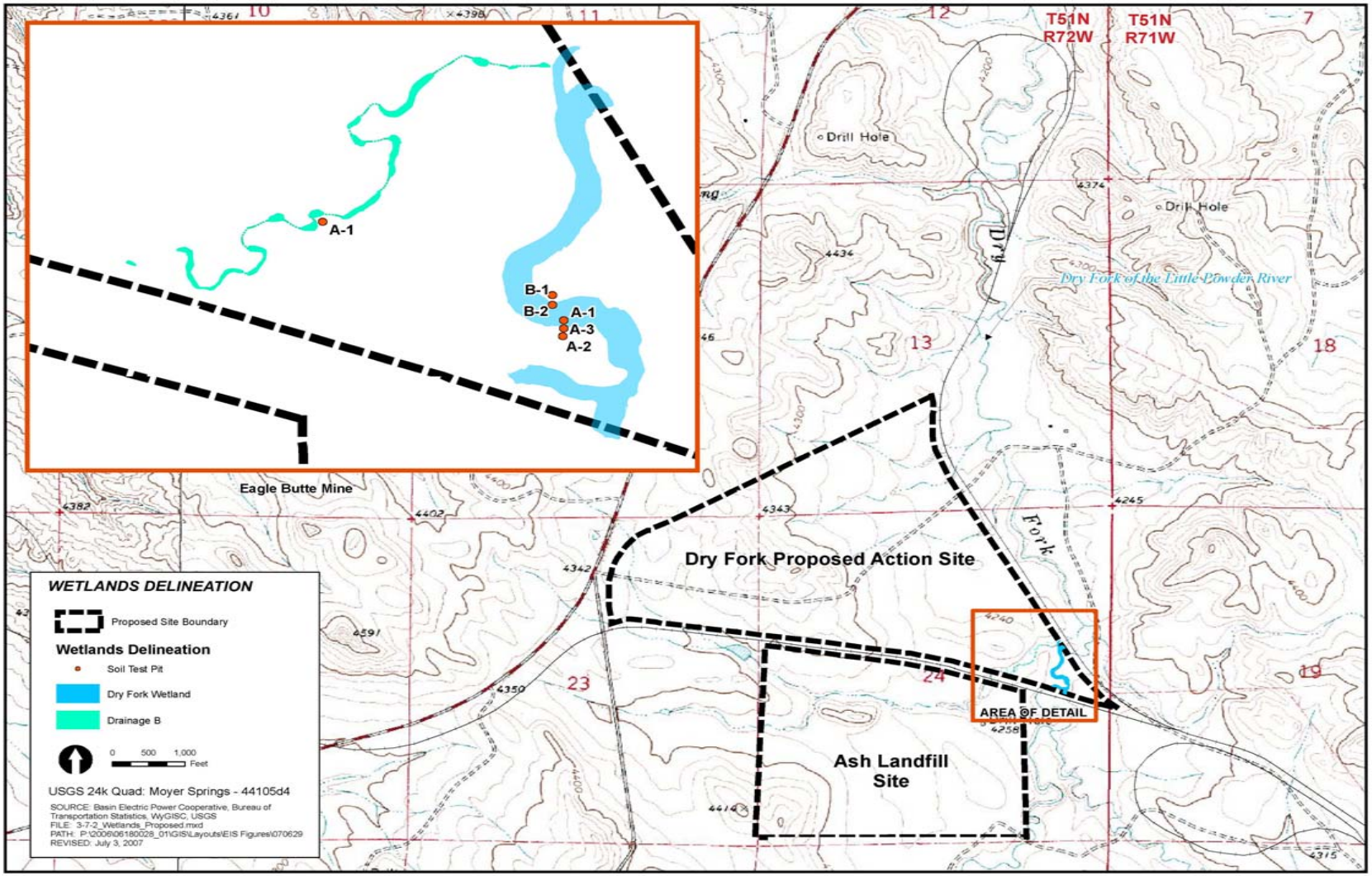

Figure 3.7-2 – Wetlands Delineation at the Proposed Power Plant Site

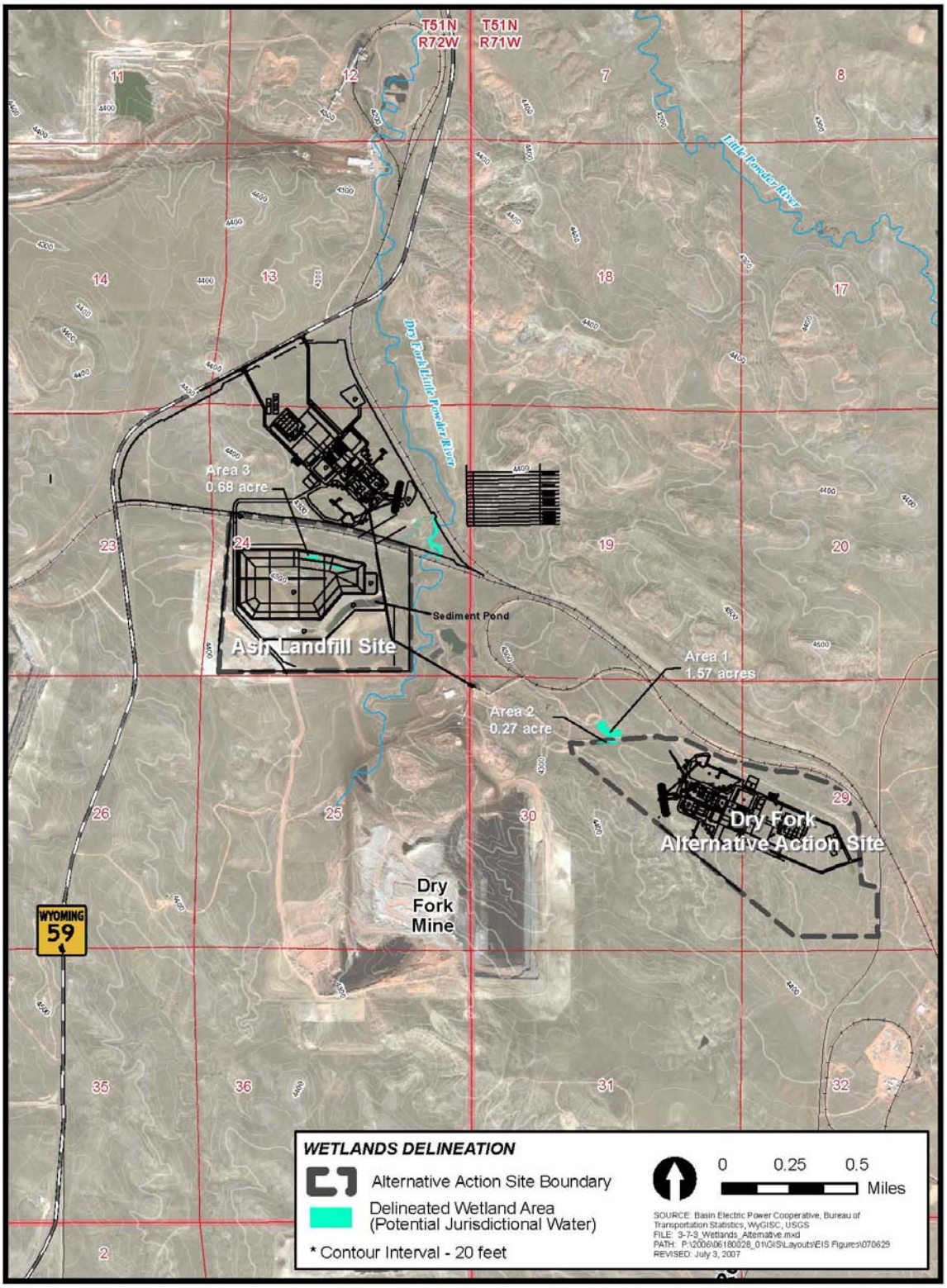

Figure 3.7-3 – Wetlands Delineation at the Alternative Power Plant Site

There were approximately twelve potential wetlands identified in the ROWs for segments unique to the proposed alignment, four potential wetlands in the ROWs for the segments common to both alignments, and seven potential wetlands within the ROWs for the alternative segments. Characteristics of wetlands or potential wetlands found along segments of the proposed and alternative alignments are reported in Table 3.7-3. A detailed description of the wetlands found along the proposed and alternative transmission line alignments can be found in Appendix E.

Hughes Substation to Dry Fork Station Switchyard

Proposed Alignment: Segment A. No wetlands were identified in field surveys of Segment A except for potential riparian wetlands along spans of the Little Powder River and Deer Creek. Well-developed riparian areas where Segment A spans Cottonwood Creek were identified as potential wetlands.

Alternative Alignment: Segments B and C. Access to Segment B was restricted so no ground survey was conducted, however, two ponds were observed. An area of forested riparian vegetation containing cottonwoods was identified from aerial photos and topographic maps as potential wetlands where Segment B spans West Fork of Cottonwood Creek. There is also a large wetland on the east side of Adon Road associated with the West Fork but outside the current configuration of Segment B. Information on wetlands of Segment C on the Rawhide Mine is unavailable.

Dry Fork Station Switchyard to Carr Draw Substation

Proposed Alignment: Segments D, E, F, H. Riparian wetlands likely exist where Segment D spans a tributary to the Little Fork of the Powder River but no ground surveys were performed because it lies within the Rawhide Mine. One potential wetland was identified in Segment E where it spans Russell Draw between Hwy 14/16 and an existing transmission line. The wetland is located in a trough and swale drainage system and contains emergent wetland plants.

There are six potential wetlands associated with Segment F. The eastern end of Segment F flows parallel with Rawhide Creek where an oxbow forms three connected wetlands. The first is approximately 500 feet across, the second approximately 165 feet long and the third approximately 245 feet long. At the time of the survey, the water was at least 12 inches deep and the wetland contained cattails (*Typha spp*.), milkweed (*Asclepias spp*.), bulrush (*Schoenoplectus spp*.) and common threesquare (*Schoenoplectus pungens*). The next wetland is 140 feet long and associated with Lone Tree Prong. Segment F also spans a 4 feet wide creek channel where standing water was observed approximately 15 feet west of Long Tree Prong. An additional wetland was identified further west along Rawhide Creek. This wetland was degraded by heavy grazing from livestock. Three additional wetlands formed a complex that was also degraded by livestock grazing. One of the wetlands in this complex is 300 feet long. A pond, located north of the proposed ROW, may be associated with Red Hill Spring. The final potential wetland site (0.5 acre) within the ROW of Segment F is associated with Hay Creek which is located in a deep canyon with a channel approximately 20 ft wide.

Table 3.7-3 – Wetlands or Potential Wetlands Identified Along the Proposed and Alternative Transmission Line Alignment

Segment Letter and Alignment	Potential Wetlands within ROW	Notes
A - Proposed	Yes	Associated with Little Powder River and Deer Creek; possible riparian wetlands on Cottonwood Creek
B - Alternative	Yes	Associated with the west fork of Cottonwood Creek; possible riparian wetlands on Little Powder River
C - Common	No	—
D - Common	Yes	Potential tributary to the DryLittle Fork of the Little Powder River
E - Common	Yes	Result of outflow from water trough; about 20 feet wide
F - Proposed	Yes	Six wetlands; large wetland complex associated with Rawhide Creek; several wetlands associated with Lone Tree Prong and Hay Creek
G - Alternative	No	—
H - Common	No	Possible riparian wetlands at Wild Horse Creek
J - Common	Yes	Large wetland complex (200 to 300 feet long) associated with Rawhide Creek (15 feet wide)
N - Proposed L - Common	Yes	Possible riparian wetlands associated with Horse Creek Wildcat Creek and associated drainages
P - Proposed	No	—
Q - Common	Yes	Spotted Horse Creek (about 250 feet long) and three ponds nearby
R - Alternative	Yes	Adjacent to Chicken Creek; large reservoir nearby; possible riparian wetlands associated with Powder River and North Prong
S - Proposed	Yes	Associated with Cross H Creek - a portion of Segment S was rerouted after field surveys were completed in the summer of 2006. Additional information will be collected within this segment prior to construction. Possible riparian wetlands on Powder River and Robinson Draw
T - Common	No	Possible riparian wetlands on Clear Creek and Little Powder River
X and W - Proposed	Yes	Several associated with Badger Creek, Little Badger Creek and possibly Prairie Dog Creek
Y - Alternative	No	Possible riparian wetlands associated with Prairie Dog Creek and various others
AA - Common	No	—

Source: Basin Electric 2006b

There were no potential wetlands present within the ROW of Segment H except for possible riparian wetlands adjacent to Wild Horse Creek.

Alternative Alignment: Segments D, E, G, H. Wetlands identified in Segments D, E, and H are discussed above. No information is available for wetlands along Segment G. The configuration of Segment G avoids running parallel with the Rawhide Creek channel as does Segment F.

Dry Fork Station Switchyard to Sheridan

Proposed Alignment: Segments C, J, L, N, P, Q, S, T, W, X, AA. Unique segments to the proposed route are N, P, S, X and W. Information on wetlands of Segment C on the Rawhide Mine is unavailable. Segment J contained one large wetland complex associated with Rawhide Creek consisting of a large wet meadow and an herbaceous riparian wetland. No wetlands were identified with the Segment J ROW spanning Hay Creek. No information is available on

wetlands in Segments L, N, and P that span Wildcat Creek (Segment L), Horse Creek (Segment N) and associated tributaries. There are two potential wetlands located within the ROW for Segment Q. The first is associated with Spotted Horse Creek and extends approximately 250 ft. There are three ponds located near where the route extends towards Hwy 14/16. A significant forested riparian wetland of cottonwoods exists along Spotted Horse Creek. The second potential wetland is located within and adjacent to Chicken Creek. South of the proposed ROW for Segment Q, a large reservoir was identified with abundant waterfowl. Segment S spans riparian vegetation associated with the Powder River, Robinson Draw, and Cross H Creek. A potential wetland was identified in the span of Cross H Creek. There are no potential wetlands associated with the ROW for Segment T other than riparian vegetation spanned on Clear Creek and the Little Powder River. There are a number of ephemeral drainages containing riparian vegetation that may be designated wetlands on Segments X and W. Segment X spans portions of Badger Creek and associated drainages including Little Badger Creek, Prairie Dog Creek, Riley Draw, Windmill Draw, Mile Long Draw, Indian Creek, Buffalo Creek, several unnamed springs, and dense riparian vegetation at Horsley Draw and West Prong of Hanging Woman Creek. Little Badger Creek and Prairie Dog Creek are the major creek crossings at the west end of Segment X. Potential wetlands were observed in spans of Little Badger Creek and Badger Creek including riparian wetlands and/or wet meadows. No wetlands occur in Segment AA.

Alternative Alignment: Segments C, J, L, O, Q, R, T, U, Y, AA. Information on wetlands in Segments C, J, L, Q, T, and AA are discussed above. Unique segments to the alternative route are O, R, U, and Y. No wetlands occur at Segment O. Segment R has four riparian areas as potential wetlands along the Powder River, North Prong of the Wild Horse Creek, and associated tributaries. Cottonwood galleries and box elder riparian vegetation are present within the Powder River corridor. At the east end of Segment R, a possible wetland was identified south of the Arvada Substation on the North Prong. Segment Y spans riparian areas that are potential wetlands at Prairie Dog Creek, SR Creek, Lanabaugn Draw, Jones Draw, Sears Draw, North Prong, Spear Draw, SR Springs, Peter's Gulch, Buffalo Creek, Schuler Draw, Luman Draw, Deer Creek, Hay Creek, Indian Creek, and many unnamed tributaries. There are two potential wetlands within the ROW, an isolated wetland in a grazed pasture near Prairie Dog Creek and another isolated area formed by runoff from a stock pond. There are several potential wetlands along SR Creek, Spear Draw, and in an unknown gulch wet of Peter's Gulch. Wetlands were also tentatively identified along Buffalo Creek, Hay Creek, and Luman Draw. Segment U parallels the edge of Buffalo Creek, another possible wetland location.

3.7.3 Wildlife Resources

The Wyoming Game and Fish Department (WGFD), the U.S. Fish and Wildlife Service (USFWS), the Department of Interior (DOI) Bureau of Land Management (BLM), the Wyoming Natural Diversity Database (WYNDD), Caballo Coal Company and Western Fuels, Inc. (Dry Fork Mine) were contacted for information on wildlife and fisheries resources that occur or have the potential to occur in the power plant sites and in the transmission line alignments. Local, county, and state wildlife management reports were also evaluated to identify species and habitats of biological significance within the study areas. Field surveys were conducted in the summers of 2005 and 2006 to obtain information on habitat types within the study areas and to record the presence of biological resources of concern within the transmission line alignments

(Basin Electric 2006a, 2006b). Surveys were conducted along the centerline of each segment within a 125-ft ROW. Aerial surveys were also performed to collect information on segments of the alignment with limited ground access and on areas within 2 miles of the ROWs.

The Consultation with the WGFD indicated that potential issues of concern related to common wildlife in Campbell and Sheridan counties include: crucial winter range for big game; big game migration routes; effects to certain wildlife species that have the potential to occur at the power plant sites and transmission line corridors (including, but not limited to, pronghorn (*Antilocarpa americana*), mule deer (*Odocoileus hemionus*), waterfowl, raptors, and nesting songbirds); habitat fragmentation; risk of avian collision along electric transmission interconnection; displacement of wildlife; a potential increase in hunters within the Gillette area; and a potential increase in poaching as a result of increased access and human presence in the area.

Table 3.7-4 lists the wildlife species typically found within Campbell and Sheridan Counties and their habitat associations.

3.7.3.1 *Big Game and Other Mammals*

The primary big game species found within the project area are pronghorn and mule deer. However, elk (*Cervus elaphus*) white-tailed deer (*Odocoileus virginianus*), and possibly moose (*Alces alces*) can also be found within the project area. Preferred habitat for moose is rare in the project area (Basin Electric 2006a).

Wyoming supports the largest population of pronghorn in North America. Grasslands and semi-desert shrublands are the preferred habitat. Daily movements are approximately 6 miles and some migrate seasonally between summer and winter habitats dependent upon the availability of succulent plants, not local weather conditions (DOI 2003).

Mule deer are common in the project area (Basin Electric, 2006a). Typical habitats include prairie, sagebrush shrubland, woodlands, and forested and shrubby riparian areas. Mule deer tend to be more migratory than white-tailed deer, traveling from higher elevations in the summer to winter ranges that provide more food and cover (DOI 2003). Both corridors contain suitable year-round habitat for mule deer. Within the PRB, the overall mule deer population trend has been stable to increasing (Basin Electric, 2006b).

In the project area, white-tailed deer are concentrated in river and stream drainages in forested or shrubby riparian habitat and tend to be absent from the prairie grasslands and shrubland (DOI, 2003). Historically, the greatest concentration of Wyoming's white-tailed deer has been located in the Black Hills area in the northeast. Recently, white-tailed deer populations in Wyoming have been slowly increasing along cottonwood-willow stream/river bottoms and in agricultural areas. Preferred habitat for white-tailed deer in Wyoming includes lower elevation areas with alfalfa, corn, or small grain croplands located adjacent to riparian habitat, wetland marshes, or interspersed woodlots with abandoned farmlands reverting to brushy cover areas. White-tailed deer typically migrate only a short distance between winter and summer range.

Table 3.7-4 – Common Wildlife Species Occurring in Campbell and Sheridan Counties, Wyoming

Scientific Nomenclature	Common Name	Associated Vegetation and Cover Types
Mammals		
Antilocarpa americana	Pronghorn	Sagebrush/shrub/grass
Odocoileus hemionus	Mule deer	Sagebrush/shrub/grass
O. virginianus	White-tailed deer	Agricultural /riparian woodland
Taxidea taxus	American badger	Sagebrush/shrub/grass
Canis latrans	Coyote	Sagebrush/shrub/grass
Felis rufus	Bobcat	All habitat types
Vulpes vulpes	Swift fox	Shortgrass prairie
Lepus townsendii	White-tailed jackrabbit	Grassland/agricultural
L. californicus	Black-tailed jackrabbit	Sagebrush/shrub
Sylvilagus nuttallii	Mountain cottontail	Shrubland
S. audobonii	Desert cottontail	Shrub/grass
S. foridanus	Eastern cottontail	Shrub/grass
Mustela frenata	Long-tailed weasel	Sagebrush/shrub/grass
Mephitis mephitis	Striped skunk	Grassland/shrub/riparian
Cynomys ludovicianus	Black-tailed prairie dog	Grassland
Spermophilus tridecemlineatus	Thirteen-lined ground squirrel	Grassland
Microtus pennsylvanicus	Meadow vole	Sagebrush/shrub/grass
Spermophilus elegans	Wyoming ground squirrel	Sagebrush/shrub
Microtus ochrogaster	Prairie vole	Grassland
Sorex cinereus	Masked shrew	Grassland
Peromyscus maniculatus	Deer mouse	Sagebrush shrub/grassland
Myotis lucifugus	Little brown myotis	Sagebrush shrub/grassland
M. ciliolabrum	Western small-footed myotis	Sagebrush steppe/shortgrass prairie/near rock outcrops
Plecotus towndsendii	Townsend's big-eared bat	Shrub grassland
Eptesicus fuscus	Big brown bat	Prairie/sagebrush shrub/grassland/ eastern plains
Lasionyctoris noctivagans	Silver-haired bat	Grassy valleys
Lasiurus cinereus	Hoary bat	Sagebrush grass/shortgrass prairie
Birds		
Sturnella neglecta	Western meadowlark	Sagebrush shrub/grassland
Eremophila alpestris	Horned larks	Grass/agricultural
Calamospiza melanocorys	Lark bunting	Sagebrush shrubland/grassland
Zenaida macroura	Mourning dove	Grassland/sagebrush shrubland/agricultural
Spizella breweri	Brewer's sparrow	Sagebrush shrubland/grassland
Euphagus cyanocephalus	Brewer's blackbirds	Grassland/agricultural
Amphispiza belli	Sage sparrow	Sagebrush shrubland/grassland
Calcarius mccownii	McCown's longspur	Sagebrush shrubland/grassland
C. ornatus	Chestnut-collared longspur	Sagebrush shrubland/grassland
Lanius ludovicianus	Loggerhead shrike	Sagebrush shrubland/grassland
Charadrius vociferous	Killdeer	Grassland/wetlands/agricultural
Agelaius phoeniceus	Red-winged blackbird	Wetlands
Centrocercus urophasianus	Greater sage-grouse	Sagebrush shrubland/riparian
Tympanuchus phasianellus columbianus	Columbian sharp-tailed grouse	Montane scrub/sagebrush-shrub/ Grassland/riparian
Perdix perdix	Gray partridge	Grassland

Table 3.7-4 – Common Wildlife Species Occurring in Campbell and Sheridan Counties, Wyoming (Continued)

Scientific Nomenclature	Common Name	Associated Vegetation and Cover Types
Birds (continued)		
Asio flammeus	Short-eared owl	Sagebrush shrub
Haliaeetus leucocephalus	Bald eagle	Open water/riparian
Buteo swainsoni	Swainson's hawk	Sagebrush shrub/grassland
B. lagopus	Rough-legged hawk	Wintering riparian/wetlands
Circus cyaneus	Northern harrier	Wetlands/sagebrush shrub
Buteo jamaicensis	Red-tailed hawk	Sagebrush shrub/grassland
Falco mexicanus	Prairie falcon	Grassland/sagebrush steppe
Amphibians		
Rana pipiens	Northern leopard frog	Aquatic/wetlands/riparian
Ambystoma tigrinum	Tiger salamander	Sagebrush shrub/riparian
Pseudacris triseriata	Western chorus frog	Aquatic/wetlands
Scaphiopus bombifrons	Plains spadefoot toad	Grassland/aquatic
Reptiles		
Thamnophis elegans	Wandering garter snake	Aquatic/wetlands
Pituophis melanoleucas	Gopher snake	Grassland
Crotalus viridis viridis	Prairie rattlesnake	Sagebrush shrub/grassland
Phrynosoma douglasii brevirostre	Eastern short-horned lizard	Sagebrush shrub
Fish		
Salvelinus fontinalis	Brook trout	Aquatic
Rhinichthys cataractae	Longnose dace	Aquatic
Catostomus commersonii	White sucker	Aquatic
Couesius plumbeus	Lake chub	Aquatic
Esox masquinongy	Flathead minnow	Aquatic

Source: Basin Electric 2006a

Moose occur in the western half of Wyoming, are very limited in the project area, and are restricted to areas along the western boundary of the Big Horn Mountains. In the Rocky Mountains, typical moose habitat consists of wet meadows, and forested and shrubby riparian that contain willows. Moose tend to stay in specific home ranges but may migrate seasonally in search of suitable forage and habitat (DOI 2003). No crucial winter/year-round habitat for moose occurs with the project area.

Winter habitat refers to an area that a species may use year-round, but that experiences a significant influx of additional animals into the area between December 1 and April 30. Crucial habitat is the area that a species requires to maintain itself at a certain population over the long term. Crucial habitat for big game would include winter range and parturition areas (calving, fawning, and lambing grounds). There is no crucial habitat for big game species within the project area (Basin Electric 2006a). In the Powder River Basin (PRB), elk are found in the Big Horn Mountains and the Fortification Creek Area west of Gillette (Basin Electric 2006a). Crucial winter habitat for elk occurs along the southern boundary of the project area between the Powder River and Burlington Northern and Santa Fe (BNSF) Railway.

Power Plant Sites

Pronghorn were the primary big game species observed within and adjacent to the proposed site where disturbance is relatively minimal. Large herds of mule deer were not observed within the

proposed site, but between three and five individuals were observed during field surveys conducted in 2005 (Basin Electric 2006a). The unnamed drainages (Drainage B) and the Dry Fork of the Little Powder River provide a watering source for big game species. There were no pronghorn or mule deer observed on the alternative site, though suitable sagebrush shrubland habitat is present. This lack of occurrence may be due to noise and increased human activity from the adjacent mining activities and the presence of the railroad.

Transmission Line Alignments

The primary big game species found within the proposed and alternative transmission line corridors are pronghorn and mule deer, although elk and white-tailed deer can also be found. Year-round range exists for mule deer and pronghorn. Pronghorn were the most frequently observed big game within the ROWs for both corridors from field surveys conducted in June 2006 (Basin Electric 2006b). Several pronghorn rids were observed within the ROW of the proposed corridor during field survey. No pronghorn kidding areas were mapped by WGFD in the corridors. Field investigations also showed that white-tailed deer occurred in Sheridan County along Segments W and X of the proposed alignment and Segment Y of the alternative alignment. Badger Creek (Segment X) and Buffalo Creek (Segment Y) riparian communities provide suitable habitat adjacent to a number of private properties that have been converted for agricultural purposes.

3.7.3.2 *Raptors*

Data on raptor occurrence from BLM's Buffalo Field Office and from Dry Fork Mine were used in conjunction with field surveys conducted in June 2006. BLM surveys are only general indicators of raptor activity since BLM surveys did not distinguish between occurrence or nesting, and observations were not available for all segments of the alignments. The field survey recorded raptor occurrence and nesting sites within the transmission line corridors. A number of the raptor species within the project area are federally protected under the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), as BLM Sensitive Species and/or as WGFD Species of Special Concern. These species are discussed in Section 3.7.4.

Common raptor species in the project area include the ferruginous hawk (*Buteo regalis*), great-horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*Accipiter striatus*), short-eared owl (*Asio flammeus*), long-eared owl (*Asio otus*), burrowing owl (*Athene cunicularia*), northern harrier (*Circus cyaneus*), golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), rough-legged hawk (*Buteo lagopus*), and American kestrel (*Falco sparverius*). All are associated with grassland and shrubland habitats that occur in the project area. The ferruginous hawk, Swainson's hawk, short-eared owl, burrowing owl and golden eagle are migratory species of special concern.

Three types of nesting habitats for raptors occur in the project area: ground nests including nests located in shrubs (sagebrush), tree nests and cliff nests. Tree and cliff nesting habitat is rare within the project area, however, scattered trees provide potential nesting habitat for several

species. The most abundant nesting habitat in the project area is shrubland and grassland for ground nesting raptors.

Power Plant Sites

Records indicate that the Dry Fork Station Project Area has historically contained (and currently contains) habitat for the following raptor species: Swainson's hawk, ferruginous hawk, great-horned owl, red-tailed hawk (*Buteo jamaicensis*), short-eared owl, burrowing owl, northern harrier, and golden eagle (Basin Electric 2006a). The Ferruginous hawk and burrowing owl are migratory species of special concern and are described in Section 3.7.5.

According to Dry Fork Mine's 2005 Annual Monitoring Report (Intermountain Resources, Inc. 2006), the permit area, including a one-mile buffer, contains 31 intact raptor nesting territories. Eleven of these 31 raptor territories were active in 2005 and included two ferruginous hawk nests, two Swainson's hawk nests, four red-tailed hawk nests, and one great-horned owl nest (Intermountain Resources, Inc. 2005). No burrowing owls or short-eared owls, both of which are ground-nesting species, were found nesting within the Dry Fork permit area in 2005. Burrowing owls have not nested within the Permit Boundary (including the one-mile buffer) since 1988 (Intermountain Resources, Inc. 2006). There are two raptor nests within a mile of the proposed power plant site; a red-tailed hawkone near the proposed power plant site and a great-horned owl the other near the alternative power plant site.

Other raptor species recorded within the Dry Fork Mine permit area and up to a mile away include bald eagles (*Haliaeetus leucocephalus*), rough-legged hawks, and prairie falcons (*Falco mexicanus*) (Intermountain Resources 2006). Both the bald eagle and rough-legged hawk have been observed in the area only during winter. Bald eagle occurrence is discussed in more detail in Section 3.7.4. Prairie falcons are considered migrants in the area (Intermountain Resources, Inc. 2006). Escarpment and tree-nesting habitat is not present on these sites (Basin Electric 2006a). Suitable nesting habitat for ground-nesting raptor species such as ferruginous hawk short-eared owl (*Asio flammeus*), and burrowing owl (*Athene cunicularia*) occurs at both the proposed and alternative sites.

Proposed Site

Records for the Dry Fork Mine obtained from Western Fuels, Inc., indicated that the proposed power plant site had historically supported (and currently contains) habitat for several raptor species, though no active raptor nest sites have been found within the boundaries of the proposed site. A pair of kestrels was observed on the proposed power plant site during field surveys in 2005. A red-tailed hawk was observed flying to the east of the proposed power plant site and was likely nesting in the Dry Fork Mine permit area, outside of the proposed power plant site (Basin Electric 2006a). Within 1 mile of the proposed site, an active red-tailed hawk nest was observed in a former golden eagle nest site located approximately 0.5 mile to the northeast of the proposed site.

Alternative Site

No active raptor nests were found on the alternative power plant site, although suitable nesting habitat for ground-nesting raptor species also occurs on the alternative site. Biologists conducting wetlands delineation at the alternative site flushed a short-eared owl from sagebrush

in July 2006. The biologists found no nest associated with this owl (Basin Electric 2006a). Within 1 mile of the alternative site, a great-horned owl nest was located on the south side of the rail spur northwest of the site and three chicks fledged in this nest in 2005 (Intermountain Resources, Inc. 2006). The nest is approximately 0.25 to 0.50 mile from the alternative site.

Transmission Line Alignments

Some raptor species which occur or have the potential to occur in the transmission line corridors include the ferruginous hawk, great-horned owl, red-tailed hawk, Swainson's hawk, Cooper's hawk sharp-shinned hawk, short-eared owl, long-eared owl burrowing owl, northern harrier, golden eagle, bald eagle, rough-legged hawk, and American kestrel. All of these species are associated with grassland and shrubland habitats that occur within the corridors. Bald eagles are known to nest and winter in the two county areas of the corridors this species is discussed in Section 3.7.4.

Habitat for tree nesting, cliff nesting, and ground nesting (including shrubs) species occurs within or adjacent to both corridors. However, tree and cliff nesting sites are rare. Scattered trees found throughout the two county alignment study area provide potential nesting habitat for several raptor species and the few rock outcrops provide substrates for cliff nesting species. Most of the study area consists of sagebrush shrubland and grassland, and, as a result, this is the most abundant type of nesting habitat within both the proposed and alternative corridors (Basin Electric 2006b).

Table 3.7-5 summarizes the number of raptors, nest sites, and activity observed along the proposed and alternative transmission line during surveys conducted in 2006. Surveys conducted in 2006 were limited to the immediate 125-foot ROW of the corridors and were extended whenever a nest was observed within close proximity of the ROW or data provided by BLM, WGFD or USFWS showed a potential nest or habitat of concern within approximately two miles of the ROW. BLM data was used primarily as a general indicator of raptor activity.

Sources of prey such as black-tailed prairie dog colonies are found throughout the study area and are particularly prevalent along Segments AA, X, Y, T, and J. These colonies also provide habitat for burrowing owls (Basin Electric 2006b). Smaller colonies were observed along Segments N, F, and H (Table 3.7.5).

Several of the segments of the proposed transmission line corridor (Segments AA, X-W, T, S, and J) have been moved outside the ROWs surveyed in June 2006, as noted in Table 3.7-5. As a result, site-specific information is not available for these areas. However, field surveys are likely representative of the occurrence of nesting sites in the corridor. Pre-construction surveys will be conducted to identify sensitive raptor nesting sites.

No bald eagle nest sites were identified within the ROWs of the proposed or alternative transmission line alignments (Table 3.7.5), but one winter communal roost site was identified at the Horse Creek crossing within 1 mile of the ROW for Segment N. However, within 2 miles of the ROWs, five bald eagle nest sites were identified near Segments AA, T (prior to moving), and X. Two were identified within 2 miles from the ROW of the proposed Segment AA. For the proposed Segment T, one nest site was identified 1.25 miles south of the ROW along Clear

Creek. Two bald eagle nest sites were observed within 2 miles of Segment X; one along the Tongue River 1 mile north of the ROW and another along Prairie Doge Creek, 1.8 miles north.

Two golden eagle nest sites were observed in or near the ROWs – one inactive within 0.5 mile of Segment T and one active nest in the ROW of Segment F. Eight nest sites were located near Segments AA, X, T, S, R, C, F, and H.

Inactive raptor nests were identified within 0.25 mile of the ROWs of Segments AA (within 0.25 mile), X (in ROW), W (2 nests in ROW), S (2 in ROW and 2 within 1000 ft), J (3 in ROW), F (1 in ROW), and H (1 in ROW and 2 within 0.25 mile). Red-tailed hawk nests were identified within 0.25 mile of the ROWs of Segments X-W (in ROW), S (1 in ROW and 1 within 315 ft), C, D, and H (1 in ROW and 1 within 200 ft). Other nests located in the ROWs include a great-horned owl with 3 chicks in Segment U-Y, a short-eared owl with fledglings in Segment L, a ferruginous hawk with 3 eggs in Segment F, and a short-eared and great-horned owl nests in Segment A.

More raptor nests were identified in the proposed segments (A, F, N&P, S, and X&W) than in the alternative segments (B, G, O, R, U &Y). A total of 12 raptor nests were located in the ROWs of proposed Segments F (golden eagle and ferruginous hawk), X (red-tailed hawk), S (red-tailed hawk), A (short-eared owl and great-horned owl), and unknown raptor nests in W, X, S, and F. A total of 10 raptor nests were identified within 2 miles of the ROWs of proposed Segments X (2 bald eagles and 2 golden eagles), S (2 golden eagle, 1 red-tailed hawk and1 sharp-shinned hawk), and F (1 golden eagle and 1 short-eared owl). Potential cliff nesting habitat suitable for peregrine and prairie falcons exists in Segments T, S, J, F, H, and B.

No raptor nests were identified in the ROWs of the alternative segments and 4 nests were located within 2 miles of Segment R (golden eagle nest) and U (2 red-tailed hawks and 1 Swainson's hawk).

3.7.3.3 *Neotropical Birds*

Neotropical birds that may seasonally migrate through the proposed and alternative plant sites project area during the spring and summer months include McCown's longspur (C*alcarius mccownii*), lark bunting (*Calamospiza melanocorys*), chestnut-collared longspur (*Calcarius ornatus*), grasshopper sparrow (*Asmmodramus savannarum*), vesper sparrow (*Pooecetes gramineus*), horned larks (*Eremophila alpestris*), and mountain plovers (*Charadrius montanus*) among others. Species observed during biological site visits for the project include meadowlarks (*Sturnella neglecta*), horned larks, lark buntings, mourning doves (*Zenaida macroura*), Brewer's sparrow (*Spizella breweri*), Brewer's blackbirds (*Euphagus cyanocephalus*) and upland sandpiper (*Bartramia longicauda*). Species observed during biological site visits for the project include meadowlarks (*Sturnella neglecta*), horned larks, lark buntings, mourning doves (*Zenaida macroura*), Brewer's sparrow (*Spizella breweri*), and Brewer's blackbirds (*Euphagus cyanocephalus*).

Table 3.7-5 – Raptor Nests and Occurrence for Hughes Transmission Project

Segment Letter and additional information	Raptor Species	No. of Occurrences in Surveys	Nests in ROW	Nests within 2 miles or less of ROW	Chicks Observed
Aa (Moved)	Golden Eagle	0	0	1 Within 1.5 Miles +	Unknown
7 Prairie Dog Colonies +;	Bald Eagle	0	0	2 Within 2 Miles +	Unknown
Goose Creek Span	Red-Tailed Hawk	1	0		N/A
	Unknown Raptor	0	0	1 Within 1/4 Mile +	Inactive
X-W (Moved)	Golden Eagle	1 (Seg X)	0	2 (Seg X)(Blm) +	Unknown
Seg X: 9 Prairie Dog Colonies +;	Bald Eagle	0	0	2 Within 1 And 1.8 Miles (Seg X) +	Unknown
Prairie Dog	Red-Tailed Hawk	3	1 +	0	4
Creek Span +	Sharp-Shinned Hawk	1	0	0	N/A
	Short-Eared Owl	1	0	0	N/A
	Swainson's Hawk	1	Potential	0	N/A
	Great-Horned Owl	1	0	0	N/A
	Long-Eared Owl	1	0	0	N/A
	Ferruginous Hawk	1	0	0	N/A
	American Kestrel	1	0	0	N/A
	Northern Harrier	2	0	0	N/A
	Prairie Falcon	Possible	0	0	N/A
	Unknown Raptor	0	2 (Seg W) +	0	Not Active In 2006
	Unknown Raptor	0	1 (Seg X) +	0	Not Active In 2006
U-Y	Red-Tailed Hawk	5	0	2	3 Each
Prairie Dog Colonies +	Swainson's Hawk	2	1	0	Unknown
	Sharp-Shinned Hawk	1	0	0	N/A
	Northern Harrier	2	0	0	N/A
	Short-Eared Owl	1	0	0	N/A
	Great-Horned Owl	1	1	0	3
T (Moved)	Golden Eagle	1	1 (Inactive) Within 1/2 Mile +	2 Greater Than 1/2 Mile +	Unknown
Cliff Nesting Habitat +; Prairie Dog Colonies +;	Bald Eagle	1 (Juvenile)	0	1 Within 1.25 Miles Of Row+	N/A
Clear Creek Span +	Ferruginous Hawk	1	0	0	N/A
	Red-Tailed Hawk	1	0	0	N/A
S (Moved)	Golden Eagle	0	0	2 Within 1 Mile Of Row +	Unknown

Table 3.7-5 – Raptor Nests And Occurrence For Hughes Transmission Project (Continued)

Segment Letter And Additional Information	Raptor Species	No. Of Occurrences In Surveys	Nests In ROW	Nests Within 2 Miles Or Less Of ROW	Chicks Observed
Forested And Cliff	Red-Tailed Hawk	2	1#	1 Within 315 Ft +	Unknown
Nesting Habitat;	Ferruginous Hawk	2	Possible +	0	N/A
Powder River	Sharp-Shinned Hawk	1	0	1 Within 300 Ft +	Unknown
Span +	American Kestrel	1	0	0	N/A
	Unknown Raptor	0	1 Abandoned On Pole + (Ferruginous Or Red-Tailed Hawk)	0	Failed
	Unknown Raptor	0	1 +	2 Within 1000 Ft +	Inactive
R	Golden Eagle	0	0	1 Within 1 Mile (Blm) +	Unknown
	Red-Tailed Hawk	1	0	0	N/A
	American Kestrel	1	0	0	N/A
Q Spotted Horse Creek And Chicken Creek Reservoir +	None Observed In Survey	0	0	0	N/A
P-N Prairie Dog Colony (N) + Horse Creek Span (N) +	Bald Eagle	Winter Communal Roost (Seg N) +	0	0	Unknown
	Northern Harrier	1	0	0	N/A
O	Golden Eagle	1	0	0	N/A
	Red-Tailed Hawk	2	0	0	N/A
	Northern Harrier	1	0	0	N/A
L	Short-Eared Owl	1	1 +	0	Fledglings Observed
J (Moved)	Red-Tailed Hawk	0	0	3 Within 1/4 Mile Before Move; Now 2 Within 1/4 Mile +	Unknown
Forested And Cliff	Northern Harrier	3	0	0	N/A
Nesting Habita +;	Ferruginous Hawk	1	0	1 (New Mine Data)	N/A
Large Prairie Dog	Unknown Falcon	2 Within 1/4 Mile	0	0	N/A
Colony Present +	Short-Eared Owl	2	0	Possible	N/A
	Long-Eared Owl	1 Within 1/4 Mile	0	1 Within 1/4 Mile	Unknown
	Great-Horned Owl	0	0	1 (New Mine Data)	

Table 3.7-5 – Raptor Nests And Occurrence For Hughes Transmission Project (Continued)

Segment Letter And Additional Information	Raptor Species	No. Of Occurrences In Surveys	Nests In ROW	Nests Within 2 Miles Or Less Of ROW	Chicks Observed
	Burrowing Owl	2 Within 300 Ft (1 Dead; 1 Heard)	0	Nest Site Within 650 Ft +	Unknown
	Unknown Raptor	0	3 +	0	Inactive
C-D	Bald Eagle	1 (Winter)	0	0	N/A
Includes Data From	Golden Eagle	1	0	1 Platform Within 1/4-1/2 Mile +	Used By Red-Tailed Hawks In 2006
Field Surveys In 2005 And 2006 And 2005	Red-Tailed Hawk	1	1 In Seg C +; 1 In Seg D +	5 (New Mine Data) +	Unknown
Annual Monitoring	Short-Eared Owl	1	0	0	N/A
From Dry Fork Mine;	Great-Horned Owl	1	0	3	1 Nest Fledged 3 Chicks In 2005
	American Kestrel	2	0	0	N/A
	Rough-Legged Hawk	1	0	0	N/A
E	Burrowing Owl	0	0	4 Nest Sites (New Mine Data)	Unknown
F	Golden Eagle	1	1 +	1 Within 1/2 Mile +	Juvenile On Nest In 2006 Survey
Cliff Nesting Habitat +;	Ferruginous Hawk	2	1 +	0	3 Eggs In Nest
One Small Prairie Dog Colony +	Falcons	Possible +	0	0	N/A
	Northern Harrier	2	0	0	N/A
	Cooper's Hawk	1	0	0	N/A
	Short-Eared Owl	4	Possible +	1 Within 200 Ft	Unknown
	Unknown Raptor	0	1	0	Inactive Nest
G	Not Surveyed +				
H	Golden Eagle	1	0	2 Within 1-2 Miles (Blm)+	N/A
One Prairie Dog Colony;	Red-Tailed Hawk	3	1 +	1 Approx 200 Ft South +	Unknown
Cliff Nesting Habitat +; Wild Horse Creek Span	Falcons	0	0	Possible Within 1/4 Mile +	Unknown
	Unknown Raptor		3 +	1 Within 1/4 Mile +	Inactive
A	Golden Eagle	1	0	0	N/A
Little Powder	Red-Tailed Hawk	3	0	0	N/A
River Span	Swainson's Hawk	1	0	0	N/A
	American Kestrel	1	0	0	N/A
	Cooper's Hawk	1	0	0	N/A
	Short-Eared Owl	3	1 +	0	Unknown
	Great-Horned Owl	1	1 +	0	Unknown

Table 3.7-5 – Raptor Nests And Occurrence For Hughes Transmission Project (Continued)

Segment Letter And Additional Information	Raptor Species	No. Of Occurrences In Surveys	Nests In ROW	Nests Within 2 Miles Or Less Of ROW	Chicks Observed
B	Golden Eagle	2 Greater Than 1-2 Miles From Row	0	0	N/A
Mostly Not Surveyed +; Cliff Nesting Habitat +	Ferruginous Hawk	1	0	0	N/A
	Falcons	0	Possible	0	N/A

#: Previous Survey Data - Segment Moved
Blm: Blm Data Of Historical Nest Sites
+: May Require Mitigation
Gsg: Greater Sage-Grouse
N/A: not applicable
Shaded segment letter cells are alternative alignment
Cliff nesting habitat will be surveyed for falcon nests (prairie and peregrine)
Prairie dog colonies will be surveyd for burrowing owls
STG: Columbian sharp-tailed grouse
Unshaded segment letter cells are proposed alignment
0 = not observed during surveys
N: nesting; ?: questionable info; ND: no data; D: dead; blank cells: not observed

Many of the neotropical migrants, shorebirds, and wading shorebirds, and other raptors (and bats) are designated as special status species based on their inclusion in the MBTA Coal Mine Listof special concern by the WGFD with a Native Species Status (NSS) based on their distribution, loss of habitat, and sensitivity to human disturbance. NSS1, NSS2, NSS3, and NSS4 are considered high priority for conservation. Special status nNeotropical migrants and, shorebirds, and was ding birds with NSS designations are discussed in Section 3.7.4 and include McCown's longspur, Brewer's sparrow, lark bunting, chestnut-collared longspur, grasshopper sparrow, Brewer's sparrow, mountain plover, and upland sandpiper. and the Great Blue Heron.

Power Plant Sites

Species observed during biological site visits at the power plant sites include meadowlarks, horned larks, lark buntings, mourning doves, Brewer's sparrow, and Brewer's blackbirds.

Proposed Site

Upland sandpipers have been recorded to the north of the proposed power plant site in the Dry Fork Mine permit area and may be found foraging (although not nesting) on the proposed site (Basin Electric 2006a).

Alternative Site

Neotropical migrant birds were not reported as observed in or near the alternative power plant site.

Transmission Line Alignments

Neotropical and short distance migrants observed throughout the proposed and alternative transmission line alignments in 2006 included the lark bunting, western meadowlark, loggerhead shrike, black-billed magpie, lark sparrow (*Chondestes grammacus*), eastern kingbird (*Tyrannus tyrannus*), yellow warbler (*Dendroica coronata*), Brewer's blackbird, red-winged blackbird,

brown-headed cowbird (*Molothrus ater*), American goldfinch (*Carduelis tristis*), American robin (*Turdus migratorius*), chipping sparrows (*Spizella passerina*), western kingbird (*Tyrannus verticalis*), vesper sparrow, northern flicker (*Colaptes auratus*), barn swallow (*Hirundo rustica*), Townsend's solitaire (*Myadestes townsendi*), mountain bluebird (*Sialia currucoides*), eastern phoebe (*Sayornis phoebe*), grasshopper sparrow, flycatcher, Bullock's oriole (*Icterus bullockii*), and horned lark. There were also numerous active nests found along the proposed and alternative transmission line corridors (Basin Electric 2006b).

3.7.3.4 *Waterfowl including Shorebirds and Wading Birds*

Wetlands, aquatic habitats, numerous stock pond, guzzlers, and CBM-associated ponds within the two county transmission line study area provide foraging and stopover habitats for a number of waterfowl in the area. These include Canada goose (*Branta canadensis*), wood duck (*Aix sponsa*), northern shoveler (*Anas clypeata*), mallard (*Anas platyrhynchos*), blue-winged teal (*A. discors*), and northern pintails (*A. acuta*). Most waterfowl observed were associated with man-made reservoirs and stock ponds (Basin Electric 2006b). It is likely that there is a higher abundance of waterfowl found during spring and fall migration. Since surface waters are scarce in this part of Wyoming, open water habitats provide important stopover habitats for waterfowl and other migratory birds (Basin Electric 2006b).

Power Plant Sites
Although no waterfowl were observed during the 2005 and 2006 biological surveys, the wetland and aquatic habitats within both the proposed and alternative power plant sites may provide foraging and stopover habitats for a number of waterfowl in the area, including the Canada goose, wood duck northern shoveler, blue-winged teal, and northern pintail. Killdeer (*Charadrius vociferous*) and great blue heron (*Ardea herodias*) have also been observed on the proposed site (Basin Electric 2006a).

Transmission Line Alignments
Waterfowl observed within the proposed and alternative alignments include the American widgeon (*Anas americana*), gadwall (*A. strepera*), common merganser (*Mergus merganser*), mallard, American coot (*Fulica americana*), and northern shoveler.

There were a number of waterfowl observed from a distance near Segments T and S in the various stock ponds and reservoirs, such as Chicken Creek Reservoir. In addition, waterfowl were observed within the large wetland complex on the eastern portion of Segment F and within Little Badger Creek along Segment X (Basin Electric 2006b).

3.7.3.5 *Upland Game Birds*

Several species of upland game birds may occur within the project area including the greater sage-grouse (*Centrocercus urophasianus*), Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*), gray partridge (*Perdix perdix*), wild turkey (*Meleagris gallopavo*), and mourning dove (*Zenaida macroura*).

Both grouse species and their leks are discussed in greater detail in Section 3.7.4. The greater

sage-grouse is highly dependent on sagebrush shrubland and vulnerable to habitat disturbances. The sharp-tailed grouse occurs primarily in the northern portion of the PRB, where its preferred habitats (grassland intermixed with shrublands) are more common (DOI, 2003). The gray partridge occurs near agricultural lands and along riparian bottomland. Wild turkeys occur in ponderosa pine and shrubby or forested riparian areas.

Mourning doves are common throughout the summer in Campbell County. This species typically nests in windbreaks and sagebrush shrubland. This species typically nest in windbreaks and sagebrush shrubland. They are also found within agricultural areas and near ephemeral surface waters.

Power Plant Sites

The primary upland game birds that may occur at the proposed and alternative power plant sites are the greater sage-grouse gray partridge, and mourning dove (Basin Electric 2006a). The greater sage-grouse is discussed at length under Section 3.7.5.

According to the Dry Fork 2005 Annual Report (Intermountain Resources, Inc. 2006), mourning doves are common throughout the summer. This species typically nests in windbreaks and sagebrush shrubland. It was also found within the Dry Fork permit area near cultivated areas and ephemeral surface waters (Basin Electric 2006a).

Columbian sharp-tailed grouse are known to occur in the Dry Fork permit area but are considered uncommon. No Columbian sharp-tailed grouse were observed within either the proposed or alternative power plant areas in 2005 (Basin Electric 2006a). However, observation of an active Columbian sharp-tailed grouse lek was recorded in Segment Y of the alternative alignment.

Gray partridges have been observed within the proposed and alternative power plant sites but not since 2002. Suitable habitat exists along the rail spurs, within areas revegetated with crested wheatgrass (primarily the ash landfill site), and within the draws and creek drainages of the Little Powder River (Intermountain Resources, Inc. 2006).

Proposed Site

During field surveys conducted in summer 2005, a number of mourning doves were observed on the proposed power plant site (Basin Electric 2006a). Suitable habitat for the gray partridge exists along Drainage B and the Dry Fork of the Little Powder River located within the proposed power plant site and in the revegetated areas at the proposed ash disposal facility (Basin Electric 2006a).

Alternative Site

Upland game birds were not reported as observed in field surveys on the alternative power plant site although habitat for gray partridges occurs along the rail spurs.

Transmission Line Alignments

The primary upland game birds that may occur within and adjacent to the proposed and alternative transmission line corridors are the greater sage-grouse, Columbian sharp-tailed

grouse, wild turkey, and mourning dove (Basin Electric 2006b). The greater sage-grouse and Columbian sharp-tailed grouse are discussed in greater detail in Section 3.7.4.

During the 2006 field surveys, there were a number of mourning doves observed along the proposed and alternative corridors. Several flocks of wild turkey were observed along the western portions of the project area during aerial sage-grouse surveys conducted in April 2006 (Basin Electric 2006b).

Suitable habitat exists for gray partridges near Segments C and D, in areas revegetated with crested wheatgrass and in river and creek drainages. These segments are common to both alignments in the Hughes Substation to Carr Draw Substation corridor. This species has not been observed within these segments since 2002 (Intermountain Resources, Inc. 2006). Only the project area within the Dry Fork Mine permit area has been surveyed for partridges and suitable habitat. No information is available for gray partridges in other segments associated with proposed and alternative alignments.

A single observation of an active Columbian sharp-tailed grouse lek was recorded in Segment Y of the alternative alignment. Almost 50 leks of the greater sage-grouse were identified in (8) or within 2 miles (40) of the ROW of the proposed and alternative corridors.

3.7.3.6 *Reptiles and Amphibians*

Common reptiles and amphibians in the two county project study area include gopher snakes (*Pituophis melanoleucas*), prairie rattlesnakes (*Crotalus viridis viridis*), wandering garter snakes (*Thamnophis elegans*), chorus frogs (*Pseudacris triseriata*), northern leopard frogs (*Rana pipiens*), plains spadefoot toads (*Scaphiopus bombifrons*) and painted turtles (*Chrysemys picta*). The power plant sites and transmission line corridor all contain habitat for these common reptile and amphibian species. Painted turtles were observed around the man-made reservoirs, stock ponds and perennial streams. Northern leopard frogs are designated as a BLM sensitive species and are described in more detail under Section 3.7.4.

Power Plant Sites
No reptile species were observed within the proposed site and the only amphibian observed was the northern leopard frog in Drainage B on the proposed site (Basin Electric 2006a). Although the alternative power plant site contains suitable habitat, no reptiles or amphibians were observed during field service.

Transmission Line Alignments
Rattlesnakes were observed on Segment F and T; gopher snakes in Segment Y; a chorus frog and a western garter snake were recorded along Segment A. Painted turtles were observed around stock ponds in Segment N and around Little Badger Creek in Segment W. Other than Segment Y, no other reptiles or amphibians were recorded in segments of the alternative corridor. Eight painted turtles were observed in a man-made reservoir near an historic golden eagle nest in a lone cottonwood tree. Painted turtles were also observed in Segment J. Northern leopard frogs were recorded in the Dry Fork of the Little Powder River near Segments C and D.

3.7.3.7 *Black-tailed Prairie Dog*

The black-tailed prairie dog is a common resident of grassland or prairie habitat in eastern Wyoming. It is found in isolated populations of declining numbers and extent due to habitat disturbances and pest control. It is a highly social, burrowing mammal whose groups of individual burrows are known as colonies. Black-tailed prairie dog colonies provide habitat for a number of other avian, reptile, and mammal species, including three species of federal concern: the black-footed ferret (USFWS federally endangered), mountain plover, and burrowing owl (BLM and WGFD sensitive species). The swift fox and ferruginous hawk also depend upon the black-tailed prairie dog for some of their life cycle (DOI 2003).

Power Plant Sites
No black-tailed prairie dogs were observed at either the proposed and alternative power plant site.

Transmission Line Alignments
The black-tailed prairie dog was the most abundant and frequently observed small mammal within and adjacent to the transmission line corridors. There were 28 black-tailed prairie dog colonies identified in surveys conducted in June 2006 within the alignments. Not all colonies were mapped due to lack of access, but surveys were used to approximate linear beginning and ending points of colonies observed along each of the segments of the proposed and alternative transmission line corridors (Basin Electric 2006b). Information on prairie dog colonies identified in ROW surveys is listed in Table 3.7-6. Note that some of the segments are unique to the proposed or alternative corridors and some are common to both the proposed and alternative corridors.

The proposed corridors contained 10 prairie dog colonies within the ROWs (1 at F, 1 at X, 8 at W), the alternative corridor contained 8 colonies (6 at Y, 2 at U) and the common segments contained 13 colonies (1 at H, 1 at J, 1 at N, 3 at T, 7 at AA). No information on prairie dog colonies exist for 3 proposed segments (S, P, and A), 3 alternative segments (O, G, and B), and 5 common segments (Q, L, C-D, and E). The largest of the colonies was estimated at over 80 acres in Segments W and Y.

Seven active prairie dogs colonies were recorded within the ROW for Segment AA. The majority of this corridor contained prairie dog colonies. Nine prairie dog colonies were present in Segments X-W (1 in X and 8 in W). Most were found within the valley of Badger Creek. A large colony (80 ac) is located entirely in the ROW at the east end of Segment W. Segments Y-U contained 7 prairie dog colonies primarily located along the western half of Segment Y ROW. One colony in Segment Y is over 80 acres in size and is in good rangeland condition based on the abundance and diversity of native grasses. Three prairie dog colonies were recorded within the ROW for Segment T. Segment J contained one large colony within the ROW and burrowing owls were found nesting in this colony. One colony was recorded in each of the other three Segments N, F, and H.

Table 3.7-6 – Black-tailed Prairie Dog Colonies along Segments of the Proposed and Alternative Transmission Line Alignment

Segment	No. of Colonies	Alignment	Approximate Size or Dimension	Observations
AA	7	Common	3-4 acres	--
			Quarter mile east of centerline; 0.5-1 mile west	Large colony
			15-30 acres	--
			Throughout ROW and 1,300 ft from edge of corridor	--
			20-30 acres	Large colony on State land
			10-15 acres	Previously mapped by BLM
			10-15 acres	Previously mapped by BLM; expanded since mapped
X	1	Proposed	270 feet along ROW	Was once 20 acres, now only remnant
W	8	Proposed	200 feet along ROW	No animals observed; 4 historic colonies mapped in the area
			400-500 feet north and south, 15 feet from centerline	--
			5 acres	Colonies extend the greatest length of Segment W
			7-10 acres	
			Less than 1 acre	
			5 acres	Approximately 1.5 acres is inactive
			1 acre	--
			80 acres	Entirely within East end of ROW
U	2	Alternative	1,600 feet by 1,400 feet	No animals observed; previously mapped by BLM; size has decreased
			5 acres	Previously mapped by BLM
Y	6	Alternative	5-10 acres	Additional colonies surrounding area
			Less than 5 acres	--
			50 acres or less	--
			15 acres	--
			Over 80 acres	Good rangeland condition – abundant and diverse native grasses
T	3	Common	10 acres	--
			0.5 acre	-No animals observed
			125 ft x 1,300 ft x 500 ft	--
S	Not surveyed	Proposed		
R				
Q		Common		
P		Proposed		
N	1	Proposed	N/A	Few animals observed; colony fumigated in the past
O	Not surveyed	Alternative		
L		Common		
J	1	Common	5-10 acres	Large, over 50 animals observed; burrowing owls nesting
C-D	Not surveyed	Common		
E		Common		
F	1	Proposed	Less than 1 acre	Fewer than 100 burrows
G	Not surveyed	Alternative		
H	1	Common	5 acres or less	Approximately 100 animals observed
A	Not surveyed	Proposed		
B		Alternative		

3.7.3.8 *Other Mammalian Species*

During field surveys conducted in 2005 and 2006, observations or signs of other species (*scat, [fecal remains] burrows, dens, etc*.) were noted including bobcat (*Felis rufus*), American badger (*Taxidea taxus*), coyote (*Canis latrans*), white-tailed jackrabbit (*Lepus townsendii*), and cottontail (*Sylvilagus ssp*.). At least six bat species are known to exist within the PRB and the Dry Fork Mine permit area (GPR, Inc. 1982). These species may inhabit rock cliffs and mine structures. Many of the bats are designated as species of special concern and are described in Section 3.7.4.

Power Plant Sites
Biologists conducting field surveys in 2005 observed bobcat scat and an American badger on the proposed power plant site. The proposed site also has a number of burrows likely belonging to white-tailed jackrabbits, cottontails, American badgers, and coyotes (Basin Electric 2006a). Bat foraging habitat was reported in wetland, shrubland, and grassland communities in the proposed power plant project area.

No other species were recorded at the alternative power plant site, including black-tailed prairie dogs. No bat foraging habitat was reported on the alternative site.

Transmission Line Alignments
Incidental observations were also recorded for American badgers, cottontails, and a number of burrows likely belonging to white-tailed jackrabbits. A number of coyotes and coyote dens were observed throughout the Hughes Transmission Line Study Area. Evidence (scat) of bobcat was also identified. Bats also may forage within the riparian, shrubland and grassland communities within the project area (Basin Electric 2006b).

3.7.3.9 *Fisheries and Aquatic Resources*

WGFD, USFWS, BLM, the WYNDD, and Western Fuels, Inc. (Dry Fork Mine) were contacted to obtain information on fisheries and aquatic resources that occur or have the potential to occur in the proposed and alternative power plant sites and the proposed and alternative transmission line alignments. Local, county, and state wildlife management reports were evaluated to identify fish species and habitats of biological significance within the project area (Basin Electric 2006a).

Power Plant Sites
There are five species of fish historically known to occur in the Dry Fork of the Little Powder River and Moyer Springs Creek within the Dry Fork Mine permit boundary: brook trout (*Salvelinus fontinalis*), longnose dace (*Rhinichthys cataractae*), white sucker (*Catostomus commersoni*), lake chub (*Couesius plumbeus*), and fathead minnow (*Pimephales promelas*). No fish were observed within the proposed or alternative power plant sites during wetlands delineation work conducted during summer 2005 and 2006 (Basin Electric 2006a).

Transmission Line Alignments
The area of the proposed and alternative transmission line alignments contains a number of perennial streams and rivers which provide habitat for a variety of native and nonnative fish

species. However, the intermittent or ephemeral channels within the project area do not support game fish, and, although data are lacking, most are believed to have no fish at all. The Powder River supports mainly native, nongame species, but native stream-dwelling gamefish can include the black bullhead (*Ameiurus melas*), stonecat (*Noturus flavus*), smallmouth bass (*Micropterus dolomieu*), rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), shovelnose sturgeon (*Scaphirhynchus platorynchus*), sauger (*Stizostedion canadense*), and walleye (Stizostedion vitreum) Salmonids are captured occasionally in the river and warm water portions of the tributaries. The common species in the Powder River include flathead chub (*Platygobio gracilis*), sturgeon chub (*Macrhybopsis gelida*), goldeye (*Hiodon alosoides)*, river carpsucker (*Carpoides carpio*), stonecat, common carp (*Cyprinus carpio*), longnose dace, and channel catfish (*Ictalurus punctatus*) (Basin Electric, 2006b).

Habitats for fish are limited in the Little Powder River watershed because of the low mean annual water balance and overall small size of the ephemeral streams during extreme low water periods. The assemblage of fish in the Tongue River drainage basin is diverse, with streams containing Snake River cutthroat trout (*Oncorhynchus clarkii bouvieri*), rainbow trout (O. mykiss), brown trout (*Salmo trutta*), and brook trout (*Salvelinus fontinalis*), whereas a reach of the lower river contains sauger and smallmouth bass. The Upper Tongue River watershed contained within the Tongue River drainage basin has irrigation diversions, which forming barriers that impede seasonal upstream movements of channel catfish, sauger, and smallmouth bass, as well as certain nongame species (Basin Electric, 2006b).

There are five species of fish found within the southeastern end of the proposed and alternative transmission line corridor within the Dry Fork of the Little Powder River and Moyer Springs Creek: brook trout, longnose dace, white sucker (*Catostomus commersoni*), lake chub, and fathead minnow. The majority of the major creeks and rivers in the corridors are ephemeral and were nearly dry at the time of field visits in June 2006 (Basin Electric 2006b).

3.7.4 Special Status Species

Some species have been afforded special status designations by federal and state agencies including the USFWS, BLM and WGFD (Table 3.7-7). The designations include:

- Species listed as threatened or endangered, proposed for listing as threatened or endangered, or considered as a candidate for listing as threatened or endangered by the USFWs;
- Eagles protected by the BGEPA;
- Migratory species of management concern in Wyoming: the Coal Mine List created by the USFWS for species protected under the Migratory Bird Treaty Act (MBTA);
- Species listed as sensitive by the BLM; and
- Species categorized by WGFD as Native Species Status (NSS) 1 or 2 which have a high priority for conservation of the species.

U.S. Fish and Wildlife Service – Federally Listed Species and the BGEPA
As part of the ESA Section 7 requirements for the project, a letter requesting informal consultation and a list of threatened and endangered species that could occur within the project

area was sent to the USFWS in 2005. The USFWS provided a list of threatened and endangered species for Campbell and Sheridan Counties on July 26, 2005. The letter listed three species that could occur within the proposed and alternative power plant sites and the proposed and alternative transmission line corridors: the bald eagle, the black-footed ferret (*Mustela nigripes*), and the Ute ladies'-tresses orchid (*Spiranthes diluvialis*) (Table 3.7-7). The black-footed ferret is not included in this evaluation for reasons described below.

Subsequent to the USFWS' ESA Section 7 consultation letter, the bald eagle has been de-listed as threatened and is no longer protected under the ESA effective August 8, 2007. The bald eagle is protected by two other federal laws: the BGEPA (16 USC §668-668d) and the MBTA (16 USC §703-712). Until a modification to regulations implementing the BGEPA establishes a regulatory definition of "disturb" and allows "take" of eagles under the BGEPA, the National Bald Eagle Management Guidelines (http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf) provides information on compliance with BGEPA.

The project area is located within the block clearance area for the black-footed ferret, meaning surveys for this species are no longer required within the project area. The USFWS requests information collected during field surveys such as the size and quality of prairie dog colonies within the project area which could be re-introduction sites. USFWS guidelines state that areas of 1,000 acres or more should be considered for black-footed ferret re-introduction sites. The prairie dog colonies within the project area are of insufficient size (<1000 acres) to maintain a pair of black-footed ferrets, and they are primarily located on private lands where signs of prairie dog control were frequently observed. Further impact analysis for black-footed ferrets is not included in this evaluation.

U.S. Fish and Wildlife Service – Migratory Bird Species of Management Concern in Wyoming (Coal Mine List) and the MBTA

Migratory birds are protected under the MBTA which legislates that no one may take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter any migratory bird, or their parts, nests, eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations. The USFWS created a list of Migratory Bird Species of Management Concern in Wyoming: the Coal Mine List (2002).

Bureau of Land Management, Buffalo Field Office Sensitive Species

The list of federally-listed and BLM sensitive species addressed in this chapter wasere derived from scoping letters received from the USFWS and the BLM Buffalo Field Office Resource Management Plan (RMP). Species include neotropical migratory birds, wintering bald and golden eagles, greater sage-grouse and other special status raptors including the ferruginous hawk and burrowing owl. Golden eagles have been discussed in Section 3.7.3 (raptors). The proposed Dry Fork Station site lies entirely on private land owned by Western Fuels, Inc. Therefore, impacts on BLM sensitive species are not specifically addressed in the discussion focusing on the proposed power plant site (Basin Electric 2006a). Although the proposed and alternative transmission line alignments would be constructed and operated primarily on private land, a portion of either alignment would occur on lands administered by the BLM's Buffalo Field Office (1.2 miles of BLM-administered land for the proposed transmission line, and 2.6

miles of BLM-administered land for the alternative transmission line). Therefore, the discussion on the proposed and alternative transmission line alignments also addresses BLM sensitive species.

Wyoming Game and Fish Department – State Species of Concern
Some species tropical migrants, shorebirds, wading birds, other raptors and bats are designated as species of special concern by the WGFD with a NSS classification based on their distribution, loss of habitat, and sensitivity to human disturbance. NSS1 and, NSS2, NSS3, and NSS4 are considered high priority for conservation. Several species including the Common loon, the yellow-billed cuckoo and the trumpeter swan are very rare in northeast Wyoming. The greater sage-grouse and the bald eagle are included because of loss of habitat and declining populations or restricted numbers.

3.7.4.1 *Federally Listed Species*

Bald Eagle
The proposed site lies within the BLM's Buffalo Field Office RMP area where there are 33 bald eagle nest sites representing 18 breeding territories. All of these breeding territories are on private land (Basin Electric, 2006b). In Wyoming, the bald eagle is an uncommon breeding resident building large nests in the crown of large mature trees such as cottonwoods or pine (DOI 2003). Bald eagles tend to use the same nests year after year. In Wyoming, they nest from early February through mid-August. These nest sites are frequently located in riparian habitats associated with major creeks and rivers, which include the Powder River, Clear Creek, Lone Tree Creek, the Tongue River, Young's Creek, and Wild Horse Creek (Basin Electric, 2006b).

The rivers, streams, lakes, and upland habitats that occur throughout the PRB provide foraging opportunities for bald eagles. In Wyoming, the bald eagles diet is more varied than in other regions. Fish and waterfowl make up a large percent of the diet where eagles occur along waterbodies. Big game and livestock carrion, as well as larger rodents (like prairie dogs) are also large sources of food when available (DOI 2003). Availability of food is probably the single most important factor in the winter distribution and abundance of the eagle (DOI 2003). Winter eagle concentrations and roosts in eastern Wyoming are often associated with large, ice-free water bodies and areas with concentrations of ungulates (particularly pronghorn), livestock, waterfowl, or fish (Basin Electric, 2006b).

Approximately 40 communal winter roosting (current and historic) sites have been documented in the Buffalo RMP area. These communal roosting sites are found on private land along the Powder River, Wild Horse Creek, Clear Creek, Lone Tree Creek, the Tongue River, and Young's Creek. Bald eagles are found within roosting habitats primarily from November 1 through April 1. Aerial surveys conducted by the BLM during winters 2003 and 2004 showed that only seven of the communal roosts were being used by bald eagles; six along Clear Creek and one along the Powder River (Basin Electric, 2006a).

There has been an apparent decline in bald eagle winter populations within the Buffalo RMP area, possibly due to the reduction in domestic sheep operations that has been occurring since the 1980s (Basin Electric, 2006b).

Table 3.7-7 – Special Status Species Occurring or Potentially Occurring within the Power Plant Sites and/or the Transmission Line Alignments

Common Name	Scientific Name	Status	Occurring	Potentially Occurring
Bald eagle	Haliaeetus leucocephalus	Delisted as Threatened; WGFD NSS2; BGEPA;	Proposed and Alternative Sites	
		MBTA & Coal Mine List	Proposed and Alternative Alignments	
Golden eagle	Aquila chrysaetos	BGEPA	Proposed and Alternative Sites	
			Proposed and Alternative Alignments	
Ute ladies'-tresses orchid	Spiranthes diluvialis	Federal Threatened	Proposed and Alternative Sites	Proposed and Alternative Alignments
Greater sage-grouse	Centrocercus urophasianus	BLM Sensitive; WGFD NSS2; MBTA & Coal Mine List	Proposed and Alternative Alignments	Proposed and Alternative Sites
Columbian sharp-tailed grouse	Tympanuchus phasianellus columbianus	BLM Sensitive	Alternative Alignment	Proposed and Alternative Sites
				Proposed Alignment
Ferruginous hawk	Buteo regalis	BLM Sensitive;	Proposed and Alternative Sites	
		MBTA & Coal Mine List	Proposed and Alternative Alignments	
Peregrine falcon	Falco peregrinus	BLM Sensitive;	Proposed and Alternative Sites	
		MBTA & Coal Mine List	Proposed and Alternative Alignments	
Swainson's hawk	Buteo swainsoni	MBTA & Coal Mine List	Proposed and Alternative Sites	
			Proposed and Alternative Alignments	
Northern goshawk	Accipiter gentilis	BLM Sensitive		Proposed and Alternative Alignments
Burrowing owl	Athene cunicularia	BLM Sensitive; MBTA & Coal Mine List	Proposed and Alternative Alignments (Seg J)	Proposed and Alternative Sites

Table 3.7-7 – Special Status Species Occurring or Potentially Occurring within the Power Plant Sites and/or the Transmission Line Alignments (Continued)

Common Name	Scientific Name	Status	Occurring	Potentially Occurring
White-faced ibis	Plegadis chihi	BLM Sensitive		Proposed and Alternative Sites Proposed and Alternative Alignments
Trumpeter Swan	Cygnus buccinators	BLM Sensitive; WGFD NSS2		Proposed and Alternative Alignments
Mountain plover	Charadrius montanus	MBTA & Coal Mine List		Proposed and Alternative Sites Proposed and Alternative Alignments
Long-billed curlew	Numenius americanus	BLM Sensitive; MBTA & Coal Mine List		Proposed and Alternative Sites Proposed and Alternative Alignments
Sage thrasher	Oreoscoptes montanus	BLM Sensitive	Alternative Alignments	Proposed and Alternative Sites Proposed Alignments
Loggerhead shrike	Lanius ludovicianus	BLM Sensitive	Proposed and Alternative Alignments	Proposed and Alternative Sites
Brewer's sparrow	Spizzela breweri	BLM Sensitive MBTA & Coal Mine List	Proposed and Alternative Sites	Proposed and Alternative Alignments
Sage sparrow	Amphispiza belli	BLM Sensitive; MBTA & Coal Mine List		Proposed and Alternative Sites Proposed and Alternative Alignments
Baird's sparrow	Ammodramus bairdii	BLM Sensitive		Proposed and Alternative Sites Proposed and Alternative Alignments
Mccown's longspur	Calcarius mccownii	MBTA & Coal Mine List		Proposed and Alternative Sites Proposed and Alternative Alignments
Short-eared owl	Asio flammeus	MBTA & Coal Mine List	Alternative Site Proposed and Alternative Alignments	Proposed Site
Upland Sand piper	Bartramia longicauda	MBTA & Coal Mine List	Proposed and Alternative Sites	Proposed and Alternative Alignments
Common Loon	Gavia inmer	WGFD NSS1		Proposed and Alternative Alignments
Yellow-billed Cuckoo	Coocyzus americanus	WGFD NSS2		Proposed and Alternative Alignments

Table 3.7-7 – Special Status Species Occurring or Potentially Occurring within the Power Plant Sites and/or the Transmission Line Alignments (Continued)

Common Name	Scientific Name	Status	Occurring	Potentially Occurring
Fringed myotis	Myotis thysanodes	BLM Sensitive		Proposed and Alternative Sites
				Proposed and Alternative Alignments
Long-eared myotis	M. evotis	BLM Sensitive		Proposed and Alternative Sites
				Proposed and Alternative Alignments
Spotted bat	Euderma maculatum	BLM Sensitive		Proposed and Alternative Sites
				Proposed and Alternative Alignments
Townsend's big-eared bat	Corynorhinus townsendii	BLM Sensitive		Proposed and Alternative Sites
				Proposed and Alternative Alignments
Swift fox	Vulpes velox	BLM Sensitive		Proposed and Alternative Sites
				Proposed and Alternative Alignments
Northern leopard frog	Rana pipiens	BLM Sensitive	Proposed Site	Alternative Site
				Proposed and Alternative Alignments

Source: Basin Electric 2006a, 2006b

Power Plant Sites
Information was collected from the BLM, the WGFD, and the USFWS regarding bald eagle occurrence within the proposed power plant site. The bald eagle is a common winter resident in the Gillette region and has been observed hunting on the Dry Fork Mine site during the winter. During surveys conducted in January 2005 by the Dry Fork Mine, two bald eagles were observed within the mine permit boundary. The first bald eagle was observed flying over the mine southeast of the proposed site in (approximately three-quarters of a mile from the alternative site). The second occurrence was of an individual perched on a power pole more than a mile northwest of the proposed site. The proposed power plant site does not contain areas mapped by the USFWS or the BLM as critical habitat or nesting and roosting sites. The bald eagle roost site closest to the EIS Study Area is approximately seven to eight miles to the southeast. The roost is south of I-90 and southeast of the Wyodak Substation (Basin Electric 2006a).

The nearest known bald eagle nest site to the proposed site is along Clear Creek, more than 30 miles west. Trees that could be used for nesting do not occur at the proposed power plant site or the ash landfill site.

Transmission Line Alignments
Information was collected from the BLM, the WGFD, and the USFWS regarding bald eagle occurrence in 2005 and 2006 in the form of GIS layers and survey reports. Approximately 40 communal winter roosting (current and historic) sites have been documented in the Buffalo RMP area. Aerial surveys conducted by BLM during the winter of 2003 and 2004 showed six active roosts on Clear Creek (crossed by Segment T) and one along the Powder River (crossed by Segments R and S). There are eight known winter communal roost sites within the EIS project area. Of the eight winter roost sites, two are within and close to (approximately 1/4 mile) Segment N of the proposed alignment. The next nearest communal roosting site to the alignments is over 2 miles from Segment T on Clear Creek. An existing natural gas compressor station is located within 1 mile of the Clear Creek roost site and south of the Segment T ROW. There are no winter communal roost sites within the transmission line corridors (Basin Electric 2006b). The other six roost sites were not close to the proposed or alternative alignments.

There are approximately twelve bald eagle nests within the two county study area. Five of these nest sites are less than 2 miles from the proposed and alternative transmission line alignments (Segments AA, T, and X). The other seven nests are greater than two miles from the alignments. Two nests are found approximately 2 miles west of Segment AA along Goose Creek/Tongue River. The Sheridan and Goose Creek substations are less than ¼ mile east of these nests. A nest site is located along Clear Creek, approximately 1 ¼ miles south of Segment T common to both alignments. Two bald eagle nest sites were observed within 2 miles of Segment X; one along the Tongue River 1 mile north of Segment X ROW and another along Prairie Doge Creek, 1.8 miles north of the Segment X ROW (Basin Electric 2006b).

Northeastern Wyoming provides year-round (nesting and winter forage) habitat for bald eagles. During mid-winter surveys conducted by the BLM and USFWS, approximately 22 bald eagle sightings were recorded. All but one of these sightings occurred from the Powder River west toward Sheridan. The single sighting east of the Powder River was greater than five miles southwest of proposed segment P and east of Wild Horse Creek. There was one juvenile bald

eagle seen flying through Segment T during field surveys conducted in 2006 (Basin Electric 2006b).

Golden Eagle

The golden eagle is a common species in the EIS Study Area and a special status species, protected under BGEPA. Although also protected under the MBTA, the golden eagle is mostly non-migratory in Wyoming (DeLong 2004).

In Wyoming, golden eagles inhabit open shrubland and grassland habitats interspersed with scattered hayfields and woodland. Their preferred nesting sites are in deciduous trees (cottonwoods) but also in ponderosa pines, and occasionally on rock outcrops, peaks, human-made structures (windmills, towers, and artificial nest platforms), and creek banks. In Wyoming, they begin breeding from late February to late March and continue to mid-July. Golden eagles generally show fidelity to territories and often reuse nests from year to year (Basin Electric, 2006). They primarily prey upon mammals such as black-tailed prairie dogs, ground squirrels, jackrabbits and cottontails but have been known to feed upon reptiles, fish, and carrion. Areas with high densities of golden eagles are characterized by diverse prey and abundant suitable nesting locations.

The USFWS, in coordination with the BLM, conducts annual winter surveys for bald and golden eagles in the PRB. Most golden eagles have been observed in cottonwood riparian areas, along paved highways, within agricultural fields, and near prairie dog towns. Very few eagles were observed in rural upland rangelands (BLM 2006). The true nesting population of golden eagles in the PRB is unknown. The BLM, WGFD, and CBM companies have been surveying throughout the PRB for several years to identify raptor nests, including golden eagles, in the area. As of 2006, 105 golden eagle nests had been identified in the PRB, and 25 of these were active in 2005 (BLM 2006).

Power Plant Sites

A man-made nesting platform for golden eagles was created outside the Dry Fork Mine permit area to mitigate impacts on a golden eagle nest that had to be removed from the permit area. This nest is approximately one mile north of the alternative power plant site and three-quarters of a mile from the proposed power plant site. The original nest was used by golden eagles prior to 1989. However, golden eagles have not nested on this platform or anywhere else within the permit area or within a mile of the Dry Fork Mine since 1989 (Intermountain Resources, Inc. 2006). Ground surveys were conducted in 2005 to search for alternate nests for this species. Golden eagles were seen within the permit boundary, but no nests were found. Red-tailed hawks have used the nesting platform from 1996 to 2005 (Basin Electric 2006a).

Transmission Line Alignments

Surveys recorded golden eagle occurrences at Segment X, a juvenile at T, O, A, B and several along the Burlington Northern Railroad near Segment F-H. An active golden eagle nest was observed within or very near the ROW of Segment F, apparently adjusted to human disturbance and noise from the railroad and CBM development. There is an inactive (from 2003 to 2006) golden eagle nest approximately 0.5 mile from the ROW of Segment T. Five historic nests are located within 2-3 miles of Segment T. Within 2 miles of the ROW, nests were identified near

Segments AA, X, T, S, R, C-D, and F. The golden eagle nest at Segment S was recently identified in steep terrain approximately 1,000 feet south of the ROW. There are three historic golden eagle nests approximately 1 to 2 miles from the ROW for Segment F - two located in riparian vegetation along Wild Horse Creek and the other about 0.5 mile north of the ROW.

Golden eagle nests were identified in three of five segments (X, S, and F) unique to the proposed alignment and one of five segments (R) unique to the alternative alignment. One nest was located in the ROW of a proposed segment and none were located in the ROW of alternative segments.

Ute Ladies'-Tresses Orchid

This orchid is a perennial herb that flowers from July to September but may not flower every year. It reproduces by seeds and some individuals or populations remain dormant below ground in drought years (Basin Electric 2006a). In Wyoming, four recorded occurrences of the orchid have been found, all along perennial streams. Known sites have low, short vegetative cover and may be subjected to periodic disturbances such as grazing or flooding. Populations are often dynamic (do not persist over time) and "move" within a watershed as disturbances create new habitat or succession eliminates old habitat (DOI 2003). Periodic flood events within perennial stream channels can rework alluvial bars and terraces to create early successional conditions conducive to the establishment of streamside colonies. The orchid is associated primarily with moist meadows near perennial stream terraces, floodplains, and oxbows at elevations between 4,300 to 6,850 feet. However, one-third of the population is found on alluvial banks, point bars, floodplains, or oxbows associated with perennial streams and this species has been found along lakeshores, irrigated meadows, rivers, groundwater-fed springs, and perennial springs (Basin Electric 2006).

Fertig et al. (2005) reports that populations found on seasonally inundated river floodplains typically occur on clayey-sand beds, sandy point bars, or thin alluvium over large cobbles (Ward and Naumann 1998; Western Wetland Systems 1998; Moseley 2000). Ward and Naumann (1998) found that soils had to be sufficiently stable and moist in the summer flowering season to support occurrences. Most streamside populations are characterized as emergent herbaceous riparian communities of grasses and forbs. The low-growing vegetation in these habitats has typically been maintained by grazing, periodic flooding, or mowing.

Field surveys were conducted in June 2006 to record potential habitat for this species and not on locating the orchid itself. Habitat is limited in the project area since most of the creeks are ephemeral and this orchid is found primarily along perennial waterways within floodplains.

Power Plant Sites

There are no previously recorded occurrences of the Ute ladies'-tresses orchid at the proposed power plant site. However, wetlands at the proposed site along Drainage B, an unnamed intermittent tributary to the Dry Fork of the Little Powder River, are dominated by low, short plant species (graminoids and forbs) that are common to areas with Ute ladies'-tresses orchids in Wyoming (Basin Electric 2006a). Potential habitat for the Ute ladies'-tresses orchid occurs on the proposed site.

Transmission Line Alignments
The Ute ladies'-tresses orchid was not observed during field surveys conducted in June 2006 within the proposed and alterative transmission line corridors. The field surveys concentrated on recording potential habitat for this species. Potential habitat for the Ute ladies'-tresses orchid in the ROW is shown in Table 3.7-8.

Table 3.7-8 – Potential Habitat for Ute Ladies'-Tresses Orchid along the Proposed and Alternative Transmission Line Alignments

Segment	Wetlands Present Within ROW	Potential Orchid Habitat	Alignment
X and W	Yes—Little Badger Creek/Badger Creek	Yes—on Little Badger Creek	Proposed
T	No	No	Common
S	Yes—Cross H Creek	No	Proposed
Q	Yes—2 at Spotted Horse Creek and associated drainages	No	Common
N-L	Yes—Wildcat Creek and associated drainages	No	N - Proposed L - Common
J	Yes—Rawhide Creek	Yes—along Rawhide Creek	J - Common
C-D	Yes—Little Powder River	No	Common
E	Yes—man-made	No	Common
F	Yes—Six along Rawhide Creek and channel of Long Tree Prong	Yes—along Rawhide Creek	Proposed
H	No	No	Common
A	Yes—Little Powder River and Road Creek	No	Proposed

Source: Basin Electric 2006b

Black-footed Ferret
The ferret is a nocturnal mammal limited to open habitats where prairie dogs are found – mixed-grass prairie and sagebrush shrubland. The black-footed ferret depends almost entirely on the prairie dog for its survival. Black-tailed prairie dog colonies should be at least 1,000 acres in size to be considered potential black-footed ferret habitat.

The last known wild population for black-footed ferrets existed near Meeteetse, Wyoming, until early 1987 when ferrets were captured from this area and used for captive breeding. The species was reintroduced in South Dakota, Montana, Arizona, Utah, Colorado, and Chihuahua, Mexico. No black-footed ferret populations occur in Campbell or Sheridan County. Surveys for the ferret are no longer required throughout the majority of Wyoming. Mandatory survey blocks were developed based on the quality of ferret habitat; power plant sites or transmission line corridors do not occur in any of the designated mandatory survey blocks (DF POEE Basin Electric, 2006a). The only known population in Wyoming is an introduced population in Shirley Basin. Extensive efforts have failed to identify any existing wild populations of this species in the PRB (DOI, 2003).

Power Plant Sites
The proposed power plant site does not contain suitable habitat for the black-footed ferret (prairie dog colonies).

Transmission Line Alignments
No known black-footed ferret populations occur in Campbell and Sheridan Counties. The species has been extirpated virtually everywhere but reintroduced in Shirley Basin, Wyoming, and 5 southwestern states. Surveys for this species are no longer required except in 16 designated blocks with high quality ferret habitat. The proposed and alternative alignments do not occur within any of the mandatory survey blocks.

3.7.4.2 *BLM Sensitive Species*

Greater Sage-Grouse
The greater sage-grouse was considered for but denied federal ESA listing in January 2005 (USFWS 2005). It remains a species of concern across its range and is listed on the Coal Mine List of the BLM's Buffalo District Office. The greater sage-grouse is also considered a species of special concern (NSS2) by the WGFD. The State of Wyoming maintains statutory authority to manage and protect sage-grouse through Title 23 of state law and policies and direction from the WGFD Commission (Basin Electric 2006a).

Greater Sage-Grouse

Greater sage-grouse occur throughout Campbell and Sheridan Counties in sagebrush habitats. According to the Wyoming Greater Sage-grouse Conservation Plan (WGSGCP 2003), sage-grouse are common since sagebrush habitats within Wyoming are relatively more intact than those in other states. Sage-grouse are considered sagebrush obligates, relying almost entirely on sagebrush for their winter breeding, nesting, and brooding habitat requirements. In the winter, the species feed almost entirely on sagebrush leaves and buds and select wintering sites in areas where sagebrush is approximately 10 to 14 inches above the snow (Basin Electric 2006a).

Beginning in late March and early April, greater sage-grouse move to their breeding grounds which are called leks. Leks are primarily found in open areas and occur on windswept ridges and rocky knolls, in low sagebrush, in bare openings created by roads and fire, near stock ponds, air strips, natural meadows, dry lake beds, alkaline flats, and ant hills (Patterson 1952; Connelly et al. 1981). Active and occupied leks are protected but historically inactive leks (continuously for 10 years) do not need to be buffered. Occupied leks are defined by WGFD as a lek that has been active during at least one strutting season within the last 10 years.

Greater sage-grouse usually nest between two and four miles from active leks. Average distance moved by hens from undisturbed leks to nests in western Wyoming was 1.3 miles, while average distance traveled from disturbed leks to nests was 2.5 miles (Lyon and Anderson 2003). Breeding sites must have sufficient habitat for lek attendance, nesting, and early brood-rearing to occur (Connelly et al. 2000a, 2003). Suitable breeding habitat for the greater sage-grouse is "sagebrush-dominated rangelands, typically consisting of large, relatively contiguous sagebrush stands, and are critical for survival of sage-grouse populations" (Connelly et al. 2000a; Leonard et al. 2000).

During the summer, greater sage-grouse inhabit sagebrush grasslands, upland meadows, and riparian areas. Disturbed areas, such as roads, plowed fields, gravel pits, and stock ponds, have been used as lek sites. These types of areas are used when adjacent to sagebrush habitat (Basin Electric 2006b).

Lek – A lek is a gathering of males, of certain animal species, for the purposes of competitive mating display. Leks assemble before and during the breeding season, on a daily basis. Sage-grouse are notable for their elaborate courtship rituals. Each spring males congregate on leks and perform a "strutting display". Leks are generally open areas adjacent to dense sagebrush stands, and the same lek may be used by grouse for decades.

Studies have shown the amount and frequency of noise associated with development have negative effects on greater sage-grouse. Sage-grouse on leks within 1 mile of CBM compressor stations in Campbell County, Wyoming, were consistently fewer than leks not affected by this disturbance (Braun et al. 2002). Research conducted by Holloran and Anderson (Basin Electric, 2006b) has shown that lek activity decreased downwind of drilling activities, suggesting that noise had measurable negative impacts on sage-grouse. Road noise may also have adverse effects on greater sage-grouse. (Connelly et al. 2004) showed there were no active sage-grouse leks within 1.24 miles of Interstate 80 (I-80) across southern Wyoming. Only nine leks were known to occur between 1.24 miles and 2.49 miles of I-80. Research conducted by Lyon and Anderson (2003) has shown that the rate of sage-grouse nest initiation is influenced by noise from construction activities greater than 1.86 miles away. Leks require a 0.25 mile buffer from all human and vehicular movement seasonally from mid-March to April. WGFD recommends avoiding disturbing activities in suitable nesting and early brood-rearing habitat within 2 miles of an occupied sage grouse lek. The USFWS recommends a 2 mile buffer for leks when building powerlines and other tall structures.

Greater sage-grouse populations have been declining throughout Wyoming since the 1960s. Since 1965, sage-grouse breeding populations, as estimated through changes in the number of males occupying leks statewide, have declined by 5.2 percent annually, and the average number of males per lek has declined 49 percent (Connelly et al. 2004; Basin Electric, 2006b). In 2002-2003, populations were conservatively estimated at fewer than 182 – 64 percent below pre-1950 estimates (Basin Electric, 2006b).

Power Plant Sites

In spring of 2005, surveys for greater sage-grouse leks were conducted within the proposed power plant site. No sign of sage-grouse was observed and the site was evaluated as containing poor habitat for sage-grouse, given the limited extent of sagebrush onsite. There are open areas suitable for use as a lek, but surrounding areas would not provide a suitable nesting and brooding habitat. In addition, the site is surrounded by disturbances. The area has never been used as a breeding area by greater sage-grouse according to annual monitoring reports provided by the Dry Fork Mine (Intermountain Resources, Inc. 2006).

Surveys conducted in 2005 of the alternative power plant site boundary indicated that a previously active lek approximately 0.5 mile south was abandoned that year, likely due to mining activities, and individuals from this lek moved approximately 0.75 to 1 mile to the northeast. According to these surveys (Intermountain Resources 2006), overall lek attendance has

significantly declined from 1997 through 2005. A maximum of five males was observed on the lek located approximately 0.75 to a mile from the alternative power plant site. Both the active and inactive leks are downwind of the proposed power plant project site (Basin Electric 2006a).

Habitat assessment for sage-grouse was conducted in summer 2006. The alternative power plant site consists of and is surrounded by relatively undisturbed sagebrush habitat, although it is bordered by a rail line on the north and mine disturbance on the south, east, and west. Suitable foraging habitat for greater sage-grouse occurs within the undisturbed sagebrush habitat that is located within a mile of the alternative power plant site. However, there was no sign of sage-grouse within the alternative site or ash landfill site in 2006. This area has never been used as a breeding area by greater sage-grouse according to annual monitoring reports provided by the Dry Fork Mine (Basin Electric 2006a).

Transmission Line Alignments

According to data provided by the BLM (BLM 2004) and the WGFD, there are approximately 84 previously recorded lek locations within the two county area. Of these leks, 64 occur in Campbell County and 20 in Sheridan County. In 2006, there were 25 active leks on the Campbell County side of the transmission line study area and nine active leks on the Sheridan side of the study area (Basin Electric 2006b).

In spring 2006, the WGFD and the BLM were contacted for data on active greater sage-grouse leks within the two county area. In addition, lek surveys were conducted by air in April 2006 to identify active leks within the 2 miles of the ROW for both the proposed and alternative transmission line alignments (Basin Electric 2006b). There are approximately 37 previously recorded occupied leks (as mapped by the WGFD and the BLM) on or within two miles of the proposed and alternative transmission line alignments. Aerial surveys showed that 12 of these leks were active in 2006. Occupied leks are defined as leks that have been active during at least one strutting season within the last 10 years. Management protection in the form of a buffer and timing restriction is afforded occupied leks by WGFD and by BLM on lands under their jurisdiction.

Table 3.7-9 identifies leks within the ROWs and within 2 miles or less of the ROWs. In 2006, a total of 48 leks were identified - eight leks within the ROW, 10 within ½ mile of the ROWs, and 30 within 1 to 2 miles of the ROWs. An undocumented lek of a Columbian sharp-tailed grouse was observed within the ROW of Segment U. The segments with the greatest number of sage-grouse leks were Segments N (proposed), P (proposed), X (proposed), O (alternative), U (alternative), and Q (common).

Seven leks were observed within the 125-ft ROW along Segment N (2 leks) of the proposed alignment and Segments B, O, R and U (2 leks – one a sharp-tailed grouse) of the alternative alignment. One lek was identified in the ROW of Segment L of the common alignment. The Squaw Creek South and Dugout lek within the ROW of Segment O are adjacent to an existing transmission line ROW.

Seven leks were observed within 2 miles of the ROW at Segments F, P (2 leks), and X (2 leks) of the proposed alignment and Segment O (2 leks) of the alternative alignment. Three leks were

identified within 2 miles of the ROW at Segments Q (2 leks) and T of the common alignment. The Kendrick lek along Segment T is located approximately 1 mile from Highway 14. The Hayden 1 and Sat A leks near Segment H were found near existing transmission lines and the existing Carr-Draw substation.

Both corridors contain suitable nesting habitat for the greater sage-grouse.

Columbian Sharp-tailed Grouse

The Columbian sharp-tailed grouse is considered an uncommon species in Wyoming and is a BLM sensitive species. In Wyoming, it is found in mountain-foothills shrub and sagebrush-snowberry habitats in the transition zone between sagebrush-grassland and forested habitats (WYCWCS 2005). Similar to the greater sage-grouse, the Columbian sharp-tailed grouse congregate at the beginning of breeding season in leks. Columbian sharp-tailed grouse leks are in areas with little slope and minimal, short vegetation, such as ridgetops, benches, and knolls that provide good visibility (WYCWCS 2005). Columbian sharp-tailed grouse nest within 0.60 mile of the active lek, whereas greater sage-grouse can nest from 0.5 mile up to two to four miles from the lek, depending on surrounding habitat. Brood-rearing habitat usually contains a variety of dense shrubs and grasses with rich forb and insect foods, usually in mountain-foothills shrub or sagebrush-snowberry habitats (WYCWCS 2005). Breeding predominantly occurs in late April or early May (Hoffman 2001). Columbian sharp-tailed grouse are found close to riparian areas and within other habitat types within four miles of the breeding complex. Deciduous trees are used for feeding, roosting, and escape cover. This grouse species' diet consists of insects, seeds, and leaves from various forbs and grasses (Hoffman 2001).

Columbian sharp-tailed grouse occupy less than 10 percent of their former range (Basin Electric, 2006b). Habitats for Columbian sharp-tailed grouse are threatened by conversion of low-elevation mountain-foothills shrub and grassland communities for agricultural purposes or human development, introduction and spread of noxious weeds, isolation of lek sites, and noise impacts as a result of human disturbance (WYCCS 2005).

Power Plant Sites

This species was not observed within the power plant sites.

Transmission Line Alignments

None were identified on the proposed transmission line corridor during field surveys conducted in 2006. However, Columbian sharp-tailed grouse were documented within a previously undocumented lek along Segment Y of the alternative alignment in April 2006 (Table 3.7-9). There were four males and four females observed on the lek on April 29 during a general site reconnaissance and again on April 30 during aerial surveys (Basin Electric 2006b).

Ferruginous Hawk

The ferruginous hawk is a BLM sensitive species and included on the MBTA associated Coal Mine List. It inhabits open grasslands, basin prairie, sagebrush, and mountain meadows, particularly where ground squirrels are common (WYGAP 2006). These hawks breed throughout most of Wyoming and nest in conifers (pinyon-juniper) and on rock outcrops, man-made

structures, cut-banks, cliff ledges, and in scrapes on the ground. It winters from the central and southern portions of its breeding range south into Baja California and central Mexico.

Table 3.7-9 – Leks in Alignments

Segment Letter	Lek Name	Lek Status 2006	Lek Within ROW Or Within 2 Miles or Less of ROW
AA (moved)	None	N/A	None
X-W (moved)	PPL (Lek X-2) +	Active	Within ROW prior to move, now within 1/2 mile of ROW (Seg X)
	Badger Creek (Lek X-1) +	Active	Within ROW prior to move, now within 1/2 mile of ROW (Seg X)
U-Y	PK	Occupied-Inactive in 06	Within 2 Miles (Seg U)
	Sheridan Ranches +	Occupied-Inactive in 06	Within ROW (Seg U)
	Jacobs	Active	Within 2 Miles (Seg U)
	COLUMBIAN SHARP-TAILED GROUSE +	Active	Within ROW (Seg U)
T (moved)	Dexter (Lek T-2)	Occupied-Inactive	Within 2 Miles
	Leiter (Lek T-3)	Occupied-Inactive in 06	Within 2 Miles
	Kendrick (Lek T-1) +	Active	Within 2 miles prior to move, now within 2500 ft of ROW
S (moved)	Barton North	Occupied-Inactive in 06	Within 2 Miles
	Larey Draw	Occupied-Inactive in 06	Within 2 Miles
R	Barton North	Occupied-Inactive in 06	Within 2 Miles
	Larey Draw +	Occupied-Inactive in 06	Within ROW
Q	Ruckell Draw (Lek Q-1) +	Occupied-Inactive in 06	Within 1000 ft of ROW
	Howell Draw	Occupied-Inactive in 06	Within 2 Miles
	Spotted Horse (Lek Q-2) +	Occupied-Inactive in 06	Within 1700 ft of ROW
P-N	Case I (Lek P-1) +	Occupied-Inactive in 06	Within 1000 ft of ROW (Seg P)
	Case II (Lek P-2) +	Occupied-Inactive in 06	Within 2500 ft of ROW (Seg P)
	Case III (Lek P-3)	Occupied-Inactive in 06	Within 2 Miles of ROW (Seg P)
	William's Reservoir (Lek N-1) +	Occupied-Inactive in 06	Within ROW (Seg N)
	New Lek N-2 +	Active	Within ROW (Seg N)
O	Wolfe +	Occupied-Inactive in 06	Within ROW
	Squaw Creek	Active	Within 2 Miles
	Squaw Creek South +	Active	Within 600 ft of ROW
	Dugout Draw +	Active	Within 600 ft of ROW
L	McGee +	Occupied-Inactive in 06	Within ROW
J (moved)	Hay Creek	Occupied-Inactive in 06	Within 2 Miles
	McGee +	Occupied-Inactive in 06	Within 2 Miles
	Holler	Occupied-Inactive in 06	Within 2 Miles
	Buckskin	Inactive in 06	Within 2 Miles

Table 3.7-9 – Leks in Alignments (Continued)

Segment Letter	Lek Name	Lek Status 2006	Lek Within ROW Or Within 2 Miles or Less of ROW
C-D	Dry Fork 1	Occupied-Inactive in 06	Within 2 Miles (Seg C)
	Dry Fork 2	Occupied-Inactive in 06	Within 2 Miles (Seg C)
	Eagle Butte (Lek D-2)	Occupied-Inactive in 06	Within 2 Miles (Seg D)
	Meadowlark (Lek D-1)	Inactive in 06	Within 2 Miles (Seg D)(adjacent to Proposed Ash Disposal Facility)
E	Rawhide School	Occupied-Inactive in 06	Within 2 Miles
F	Rawhide Creek (Lek F-6) +	Active	Within 565 ft of ROW
	Wildhorse (Lek F-8)	Occupied-Inactive in 06	Within 2 Miles
G (limited access)	Barbour	Occupied-Inactive in 06	Within 2 miles
	Rawhide Creek	Active	Within 2 Miles
H	Throne	Active	Within 2 Miles
Fortification	Montgomery	Active	Within 2 Miles
Creek area +	Hayden I	Active	Within 2 Miles
	Wildhorse	Occupied-Inactive in 06	Within 2 Miles
	Hayden Sat. A	Active	Within 2 Miles
A	Gerard (Lek A-2)	Occupied-Inactive in 06	Within 1 Mile of ROW
	Skybow	Occupied-Inactive in 06	Within 2 Miles
B (limited access)	Skybow +	Occupied-Inactive in 06	Within ROW
	Gerard	Occupied	Within 2 Miles

ROW: Right of way; Seg: Segment
Leks of Greater sage-grouse unless indicated otherwise
Shaded Segment Letter Cells are alternative alignment
Unshaded Segment Letter Cells are proposed alignment
+: May require mitigation

During the breeding season from late February through early October, ferruginous hawks prey primarily on mammals, such as ground squirrels, pocket gophers, jackrabbits, and prairie dogs, but will also prey on birds, amphibians, reptiles, and insects. During the winter, ferruginous hawks are commonly found near black-tailed prairie dog colonies (Basin Electric 2006b).

Power Plant Sites

The ferruginous hawk is considered common in the Dry Fork Mine permit area (Intermountain Resources, Inc. 2006).

Transmission Line Alignments

During field surveys in June 2006 of the proposed corridor, a total of 5 ferruginous hawks, one active nest, and one possible nest were observed near the ROWs of Segments X-W (one), S (two

and a potential nest in a power pole), and F (two flushed from an active nest with three eggs). In the alternative corridor there was only one ferruginous hawk observed and no active nests on Segment B. In segments common to both alignments, there were two hawks observed and one nearby nest in Segments J (one and a nest within 2 miles) and T (one)(Basin Electric 2006b).

Peregrine Falcon

The peregrine falcon is designated as a BLM sensitive species and included on the MBTA Coal Mine List. It breeds on every continent except Antarctica but has only recently occupied the region from the Cascades in Oregon and Washington to the eastern slope of the Big Horn Mountains of Wyoming and Montana. The peregrine falcon is a cliff-nesting species that primarily inhabits forested and woodland habitats. Nonbreeding individuals can also be found in mountain meadows, grasslands, desert scrub, pastures, marshes, riparian areas, and mountainous areas and cliffs near large rivers and lakes (WYGAP 2006). Peregrine falcon nests are found on large cliffs at heights greater than 200 feet (WYGAP 2006). This species primarily feeds on other medium-sized avian species, such as passerines (perching birds) and small waterfowl (NatureServe 2006). It will also prey on lizards, fish, and insects.

Power Plant Sites

The peregrine falcon has been recorded in the Dry Fork Mine permit area, where it is considered a migrant species.

Transmission Line Alignments

A pair of unidentified falcons was observed near the ponderosa pine forest east of Segment J (common to both alignments) during surveys in June 2006. A number of rocky cliffs are present in the area. Segment F, unique to the preferred alignment, has the greatest potential habitat in a large cliff complex on the north end of the segment. Cliff-nesting habitats at Segments T, S, J, F, H and B will be surveyed for this species prior to construction (Table 3.7.5).

Northern Goshawk

Northern goshawks are year-round residents found throughout Wyoming and included by BLM as a sensitive species. They are considered a resident breeder and short-term migrant in temperate forests and woodlands (Smith et al. 2005). Northern goshawks are uncommon in the summer and rare in the winter and will occur during peak migration in March and October (Smith et al. 2005 as cited in Basin Electric 2006b).

This species is primarily associated with mature forest stands consisting of lodgepole pine, mixed conifer, and quaking aspen and occasionally cottonwoods (DOI 2003). Preferred nesting locations are on northeast-facing slopes with little to no understory (WYGAP 2006). Prey species typically include squirrels, ducks, and other birds (DOI 2003).

Outside of breeding season, goshawks can also be found in low woodlands and sagebrush areas (WYGAP 2006). The project area contains small patches of forested communities, primarily ponderosa pine. Breeding habitat for this species is limited to nonexistent within the project area.

Power Plant Sites and Transmission Line Alignments

Goshawks were not observed within the sites or corridors during field surveys in June 2006.

Segments S and J contain sections of forested habitat potentially used by the goshawks. According to the BLM 2003-2004 database for raptor occurrences, goshawks have not been recorded within the area of the sites and corridors (Basin Electric 2006b).

Burrowing Owl

The Western burrowing owl is considered an uncommon summer resident in Wyoming. It is designated as BLM sensitive and included on the MBTA Coal Mine List. Burrowing owls have been adversely affected by the elimination of burrowing mammals (black-tailed prairie dogs) through control programs and habitat loss. The highest concentrations of burrowing owls in Wyoming are found in the southern and eastern portions of the state, although this owl occurs and breeds throughout Wyoming (WGFD 2005). Western burrowing owls primarily use prairie dog burrows for nesting, but may also use the burrows of other mammals (Nature Serve 2006). Migratory populations of burrowing owls normally return to breeding areas in March or April each year. Nests occur within a burrow chamber lined with dry grasses and other plants (Green and Anthony 1989). Preys include insects, rodents, lizards, and small birds (USDOI, 2003).

Power Plant Sites

Although habitat occurs on the proposed (and alternative) power plant site, nesting has not occurred within the Dry Fork Mine permit area, including a 1-mile buffer, since 1988 (Intermountain Resources, Inc. 2006)

Transmission Line Alignments

BLM data from 2003 through 2004 show no previous occurrences of burrowing owls within the proposed or alternative transmission line corridors. However, burrowing owls were found nesting within one prairie dog colony during surveys in June 2006 in Segment J common to both alignments. New mine data indicates four nest sites were identified within 2 miles of Segment E of the common alignment (Table 3.7.5).

Although only a few burrowing owls nest sites were found, there are black-tailed prairie dog colonies throughout the corridors (AA – common, X – proposed, W – proposed, Y – alternative, T – common, N – proposed, J – common, F – proposed, and H - common) that may contain potential habitats for burrowing owls (Basin Electric 2006b).

White-faced Ibis

In Wyoming, the white-faced ibis is classified as an uncommon summer resident (Basin Electric, 2006b). This species has been documented in 26 of Wyoming's 28 mapping units, but confirmed or probable breeding has been recorded in only five of those units (WGFD 1996). In Wyoming, the white-faced ibis has been observed breeding at six sites, from 1982 through 1994, in Southwest Wyoming (Basin Electric 2006b). This species nests in tall emergent vegetation such as bulrush and cattail stands growing as islands surrounded by water deeper than 18 inches. Feeding habitats may include wet hay meadows, and flooded agricultural croplands, as well as marshes and shallow water ponds, lakes and reservoirs (USDOI, 2003). This species primarily feeds on aquatic invertebrates, crustaceans, and earthworms (Ryder and Manry 1994).

Power Plant Sites and Transmission Line Alignments

Habitat for this species is limited to wet areas along Segments F and P along the proposed

alignment. White-faced ibis were not observed during field surveys conducted in June 2006 (Basin Electric 2006b).

Trumpeter Swan

This species is included as a BLM sensitive species and a species of special concern (NSS2) by WGFD. Suitable habitat for the trumpeter swan includes lakes and ponds with developed aquatic vegetation for feeding and nesting materials. Although suitable habitat exists with the project area, most occurrences are expected to be migrating individuals.

Power Plant Sites and Transmission Line Alignments

The trumpeter swan is not expected to occur or nest within the project area because suitable habitat is not present at the power plant sites or along the transmission line corridors.

Long-billed Curlew

This species is included on the MBTA Coal Mine List. It occurs and breeds throughout most of Wyoming, where it is considered an uncommon summer resident. However, populations near Pinedale, Cody, and Lusk are considered locally common: the nearest is about 150 miles south of Gillette. Curlew populations were impacted by uncontrolled hunting, by widespread conversion of native shortgrass prairie to agricultural fields and by organochlorine pesticides. Long-billed curlew populations in eastern Wyoming may be declining significantly (WGFD 2005).

Long-billed curlews inhabit a variety of grassland types, ranging from moist meadow grasslands to agricultural areas and dry prairie uplands, usually near water. It prefers a complex of shortgrass prairies, agricultural fields, meadows and prairies, and grazed mixed-grass and scrub communities. This species is a ground nester (WGFD 2005).

Power Plant Sites and Transmission Line Alignments

No long-billed curlews were observed within the two county study area during field surveys conducted in June 2006, although suitable habitat exists within the power plant sites and transmission line corridors (Basin Electric 2006b).

Sage Thrasher

Sage thrashers are considered sagebrush obligates and inhabit prairie, foothills, and shrubland habitats. They prefer shrubland habitats with tall shrubs and low grass cover and sagebrush clumped across a patchy landscape (WGFD 2005). The sage thrasher is considered a common species in Wyoming and is found throughout the state during summer. It is a BLM sensitive species (Basin Electric 2006b).

Sage thrasher

Power Plant Sites and Transmission Line Alignments

The alternative power plant site and the entire transmission line study area contains suitable sagebrush habitat for sage thrashers, although agricultural and CBM development and heavy livestock grazing in some areas has reduced sagebrush habitat quality in the project area. One occurrence of this species has been documented within the alternative alignment Segment Y-U (Basin Electric 2006b).

Loggerhead Shrike

The loggerhead shrike inhabits open areas characterized by shorter grasses and forbs interspersed with bare ground, shrubs, and trees. It is found in prairies, pastures, sagebrush, and fencerows and shelterbelts of agricultural fields, riparian areas, and open woodlands (Johnson et al. 2004). Preferred vegetation types include big sagebrush, mixed shrub, and antelope bitterbrush (Purshia tridentata) (Johnson et al. 2004). The shrike prefers nesting in big sagebrush and antelope bitterbrush. Nest habitat usually has denser and taller shrub cover and less annual grass cover than nonnesting habitats. Loggerhead shrikes return to their breeding grounds from mid-February to early May and migrate to wintering grounds in the fall, beginning in August to late October (Basin Electric 2006b).

Loggerhead shrikes prey primarily on large insects and other arthropods, small mammals, birds, reptiles, amphibians, and occasionally carrion (Sprunt 1965; Kridelbaugh 1982; Yosef 1996). They are known to occasionally impale prey on a plant thorn or barbed wire (NatureServe 2006).

Power Plant Sites and Transmission Line Alignment

This species was not reported in surveys and monitoring on the power plant sites. There were five loggerhead shrike occurrences and one nest site within the corridors – one in Segment Y of the alternative alignment, two in Segment T common to both corridors and a pair found nesting in Segments P-N of the proposed alignment.

Brewer's Sparrow

Brewer's sparrows breed in plains and foothills of western Wyoming and are considered a common summer resident in Wyoming (WGFD 2005). It has been designated a BLM sensitive species and is also protected under the MBTA classified as a NSS4 species by the WGFD due to declines in breeding populations and vulnerability of sagebrush habitats in the region (WGFD 2005).

Brewer's sparrows are closely associated with shrublands dominated by big sagebrush. They prefer dense stands broken by grassy areas (Audubon 2006) and are considered sagebrush obligates (Paige and Ritter 1999; Rotenberry et al. 1999). Adults return to the same breeding sites each year (Audubon 2006). This species arrives in Wyoming around April and begins nesting in May. Young are fledged in June and July. Brewer's sparrows leave Wyoming by October. During winter they prefer low dry vegetation and can often be found in large noisy flocks (Audubon 2006).

Power Plant Sites

Brewer's sparrows have been documented in the Dry Fork Mine permit area and at the proposed power plant site (Intermountain Resources, Inc. 2006; Basin Electric 2006a).

Transmission Line Alignments

During field surveys in June 2006, Brewer's sparrows were observed within sagebrush habitat in the transmission line corridors. Both corridors contains suitable habitat for this species, although agriculture, CBM development, and heavy livestock grazing in some areas have reduced sagebrush habitat quality (Basin Electric 2006b).

Sage Sparrow

The sage sparrow is also a sagebrush obligate and occurs throughout most of Wyoming where sagebrush is present. The sage sparrow is considered a common summer resident in Wyoming, although BLM classifies it as a sensitive species and it is listed as a species of special concern on the MBTA Coal Mine List. It prefers shrublands with tall shrubs (three to six feet) and low grass cover where sagebrush is clumped in a patchy landscape. Sage sparrows are considered area sensitive and require a large block of unfragmented habitat to successfully breed and survive (RMBO 2006). Sage sparrows breed almost exclusively in sagebrush (especially big sagebrush) or sagebrush mixed with other shrubs (RMBO 2006). Breeding takes place in mid-April through early August and can occur in high densities (Audubon 2006).

Power Plant Sites and Transmission Line Alignments

Sage sparrows were not observed within the power plant sites or transmission line corridors during surveys conducted in June 2006. Both corridors and the alternative power plant site contain suitable habitat for this species, although agricultural and CBM development and heavy livestock grazing in some areas has reduced the quality and percentage of unfragmented sagebrush habitats (Basin Electric 2006b).

Baird's Sparrow

Baird's sparrows are associated with mixed grass prairie. The conversion of native prairie to cropland, over-grazing, and poor rangeland management are threats to Baird's sparrow populations (NatureServe 2006). General habitat requirements for Baird's sparrow include moderately deep litter, vegetation height of 8 to 40 inches, and patches of forbs, grass, and litter, with little woody vegetation. Shrub cover greater than 25 percent may negatively impact habitat suitability (Sousa and McDonal 1983).

Baird's sparrows have also been observed in hayfields, weedy stubble fields, retired croplands, wheat fields, dry wetlands basins, and in local pockets of tall-grass prairie along the periphery of ponds and lakes or along intermittent streams. This species is known to avoid association with intense grazing (NatureServe 2006). Baird's sparrow nests are scrapes in the ground that are made with fine materials, such as horse hair, stems, forbs, moss, and grasses (Lane 1968). Nests are hidden by tufts of grass to conceal the nest from above (Lane 1968; Cartwright et al. 1937; NatureServe 2006).

Baird's sparrows arrive on breeding grounds as early as late April, with the peak arrival occurring in early to mid-May (Lane 1968; Maher 1973; Basin Electric, 2006b; Jones and Green 1998). Nesting occurs on the Great Plains from late May through mid-August (Maher 1973; Basin Electric, 2006b; Jones and Green 1998), with peak activity from June to late July. Sparrows lay eggs in June through July, and the chicks fledge in late June through August. They depart for wintering grounds from mid-September to October (Maher 1973; Jones and Green 1998).

Power Plant Sites and Transmission Line Alignment

Baird's sparrow was not observed within the two county area during field surveys conducted in June 2006 (Basin Electric 2006b).

Fringed Myotis
This species is included as a BLM sensitive species but WYGAP maps of species distribution indicate that the species does not occur within the two county study area. Fringed myotis are found in dry coniferous forests, juniper, and desert scrub. This species can also be found in riparian (forested, shrub, and grassland), clear-cut conifer, aspen, and Wyoming big sagebrush habitats. This species roosts in rock crevices, caves, mines, and buildings. It also uses woodland-chaparral and basin-prairie shrublands (WYGAP 2006).

Power Plant Sites and Transmission Line Alignments
The transmission line corridors contain suitable vegetation types where this bat species could occur but the power plant does not. The occurrence of this bat species is unknown.

Long-eared Myotis
The long-eared myotis is included as a BLM sensitive species and found in coniferous and deciduous forests, caves, and mines. This species is primarily found in ponderosa and juniper forests, cottonwood-riparian areas, basin-prairie shrublands, and sagebrush-grasslands. In shrub steppe/desert areas, this species is probably limited to small pockets of coniferous trees (WYGAP 2006). It has also been found in spruce-fir forests, greasewood flats with juniper, Douglas-fir, and subalpine meadows, and mixed riparian (forested and shrub dominant) areas.

Power Plant Sites and Transmission Line Alignments
Suitable habitat is limited within the transmission line corridors and the power plant sites. Forested pockets of ponderosa pine are found along Segments A, J, S, and P of the proposed alignment and Q of the alternative corridors. There are no known occurrences of this bat species within the corridors (Basin Electric 2006b). The occurrence of this species is unknown in the power plant sites.

Spotted Bat
According to WYGAP distribution maps, spotted bats are not known to occur in the two county area. However, habitat for this species exists within the transmission line corridors. This species is found in cliffs over perennial streams, in sagebrush communities near ponderosa pine forests, in forest-dominated riparian areas, and in big sagebrush. The spotted bat primarily roosts near water on cliffs or steep hillsides with loose or fractured rock. Good roosting sites appear to be more important than proximity to vegetation association. Spotted bat roosts are not commonly associated with man-made structures (WYGAP 2006).

Power Plant Sites and Transmission Line Alignments
Suitable habitat for this species does not occur on the power plant sites and is limited on the transmission line corridors. The occurrence of this bat species is unknown.

Townsend's Big-eared Bat
According to WYGAP distribution maps, this species may occur throughout the two county study area. It roosts in caves and abandoned mine shafts. Townsend's big-eared bat can be found in desert shrublands, dry coniferous forests, deciduous forests, basin-prairie and mountain-foothills shrublands, open grasslands, riparian areas, juniper woodlands, desert shrublands, sagebrush shrublands, juniper woodlands, and dry coniferous forests (WYGAP 2006).

Power Plant Sites and Transmission Line Alignments
Suitable habitat for this species occurs on the power plant sites and the transmission line corridors but the occurrence of this bat species is unknown.

Swift Fox
The swift fox prefers short to mid-grass prairies. It has also been found within riparian areas, floodplains, and short-grass prairies interspersed with agricultural fields. Swift fox dens are usually located near the tops of hills on east-facing slopes. They are near prairie dog towns, which are close to an available water source (WYGAP 2006).

Power Plant Sites and Transmission Line Alignments
There are a large number of prairie dog colonies along Segments X-W (proposed) and Y-U (alternative); thus, suitable habitat for the swift fox may be found in these areas as well as other prairie habitats within the corridors ROW (Basin Electric 2006b). This species would not be expected in or nearby the proposed or alternative power plant sites.

Northern Leopard Frog
This BLM sensitive species is common throughout Wyoming, except in Teton County, Park County, and Yellowstone National Park (Basin Electric, 2006b). Northern leopard frogs' preferred habitats are swampy cattail marshes on the plains and beaver ponds in the foothills and montane zones (Smith 2003). These frogs are commonly found around beaver ponds in Wyoming. More specifically, northern leopard frogs require a mosaic of habitats to meet annual requirements of all life stages (Basin Electric, 2006b). Northern leopard frogs forage in midsummer among sedges, cattails, and tall grasses, where they eat a wide variety of foods, including invertebrates, birds, snakes, fish, and the tadpoles of its own kind (Smith 2003).

In Wyoming, adults emerge in March or April (Basin Electric, 2006b). Activity begins when ice melts. Northern leopard frogs breed from mid-March through July. Females lay round clusters of eggs in shallow, still areas of permanent waters or seasonally flooded areas near permanent pools (Smith 2003). Larvae usually develop in shallow warm and still water exposed to sunlight. Eggs hatch in four to fifteen days, and metamorphosis takes place in 14 to 60 days. Northern leopard frogs winter in ponds, buried in the mud.

Power Plant Sites and Transmission Line Alignments
Suitable aquatic and wetland habitat for this species is limited within the two county study area. Wetlands associated with ephemeral creeks, drainages, man-made reservoirs, and stock ponds are scattered throughout the alignments and the power plant sites. Areas with wetland complexes suitable for northern leopard frog habitat include Rawhide Creek (Segment F – proposed), Chicken Creek (Segment R – alternative), Hay Creek (Segment F), and Little Badger Creek (Segment X - preferred). In addition, northern leopard frogs were observed within Drainage B wetland complex associated with the Dry Fork of the Little Powder River in the proposed power plant site, which is in close proximity to Segments C and D common to both alignments (Basin Electric 2006b).

3.7.4.3 *MBTA Coal Mine Listed Species*

Swainson's Hawk
This migratory hawk is classified by WGFD as NSS4 included in the MBTA and the Coal Mine List because its population is suspected to be stable and no ongoing significant loss of habitat is occurring. In Wyoming, it is considered a summer resident of grasslands below 9000 feet in elevation. Breeding pairs build nests in the tops of isolated trees or use nests built by magpies, crows, ravens, or other hawks. Typical prey consists of rodents, small mammals, and occasionally rabbits. Swainson's hawks are relatively sensitive to human disturbance near active nests (USDOI 2003).

Power Plant Sites
Two active nests occur in Dry Fork mine permit area which encompasses the alternative power plant site and ash landfill site. No active nests were identified on the proposed site.

Transmission Line Alignments
A total of four Swainson's hawks, one active nest, and one potential nest site were observed in three Segments – X-W (one with a potential nest site), U-Y (two with an active nest), and A (one).

Mountain Plover
This migratory species is included on the MBTA Coal Mine List. Mountain plover's preferred habitat is flat grassland expanses with sparse, short vegetation, and bare ground (Johnson et al. 2004). Areas that have been previously disturbed by fire cultivation or heavy grazing and that contain large prairie dog colonies also provide suitable habitat. They prefer heavily grazed grasslands and have also been found nesting in cultivated fields in Wyoming. Studies in Montana have shown that plovers occurred at a higher density on prairie dog towns of 14 to 123 acres in size, and they were less abundant on smaller towns (Knowles et al. 1982; Olson 1984; Olson and Edge 1987). Mountain plovers arrive on their breeding grounds from mid-March to mid-April. Fall migration begins in early August to late October (Johnson et al. 2004).

Power Plant Sites and Transmission Line Alignments
Mountain plovers were not observed within the power plant sites or transmission line corridors during field surveys conducted in June 2006. However, proposed alignment segments X, N, F and W, alternative segment Y, and common segments AA, T, H and J contain black-tailed prairie dog colonies. Some of these segments and the power plant sites have been heavily grazed or disturbed in areas, and may provide suitable habitat for this species (Basin Electric 2006b).

McCown's Longspur
This grassland bird is a summer breeding resident – nesting on the ground in Wyoming's dry prairies with short vegetation including disturbed and overgrazed habitats. It over winters in grasslands of the southwestern U.S. This is a very high priority species (Level I of the Wyoming Bird Conservation Plan) that is clearly in need of active conservation and for which Wyoming has a high percentage of the breeding population (DOI, 2003) It is protected under the MBTA.

Power Plant Sites and Transmission Line Alignments
The McCown's longspur was not observed in the biological site visits but may migrate into and nest in the Hughes Transmission Line Study Area.

Short-eared Owl
An MBTA NSS4 special status raptor, the short-eared owl is a ground-nesting species that is not sensitive to human disturbance. In Wyoming, it is a common year-round resident, building its nest of grasses, weeds, and down feathers in short- and mixed-grass prairies and herbaceous wetlands. Densities of nests are based on the abundance of voles and other small mammals (DOI 2003). Although habitat occurs on the proposed (and alternative) power plant site, none was observed. However, a short-eared owl was flushed from the sagebrush during a wetland delineation at the alternative power plant site.

Upland Sandpiper
This species is included in the MBTA and Coal Mile List.an NSS4 avian species of special concern. The upland sandpiper has a wide distribution and is an uncommon breeding resident in grasslands of eastern Wyoming. It nests in mid- to tall-grasslands and croplands using tall vegetation to hide its nest (DOI 2003).

Power Plant Sites and Transmission Line Alignments
It has been recorded in the Dry Fork Mine permit area and may be found foraging (although not nesting) on the proposed site. Although suitable habitat exists in the transmission line corridors, no upland sandpipers were observed in surveys.

3.7.4.4 *WGFD Species of Special Concern*

Common Loon
This species is listed as a species of special concern (NSS1) in Wyoming by the WGFD. The common loon breeds throughout Canada and the northern states of the US. It typically nests on floating vegetation, muskrat houses, or shorelines of lakes with suitable prey fish and invertebrate populations. In Wyoming, it nests in lakes above 6,000 ft in elevation but is seen in lakes of lower elevation during migration. This species has been observed throughout the state but breeding has been restricted to the northwestern corner of the state (DOI 2003).

Power Plant Sites and Transmission Line Alignments
The common loon is not expected to breed in the PRB but may be observed in suitable habitat during migration. No observations were recorded during surveys of the power plant sites or transmission line corridors.

Yellow-billed Cuckoo
This species is listed as a state species of special concern (NSS2) by the WGFD. The western yellow-billed cuckoo range is mostly limited to California and Arizona. In Wyoming, it is an uncommon summer resident, occupying cottonwood and alder riparian habitats below 7,000 feet and urban areas. Typical prey includes insects and caterpillars.

Power Plant Sites and Transmission Line Alignments
The yellow-billed cuckoo may occur in suitable habitats within the transmission line corridors but no habitat exists in the power plant sites. No observations of this species were recorded during surveys.

3.7.4.5 *Special Status Fisheries*

Based on the USFWS letter Basin Electric received in July 2005, there are no federally listed fish species within the project area.

3.8 LAND RESOURCES

This section is a discussion of existing land resources in and surrounding the proposed and alternative Dry Fork Station Power Plant site as well as the proposed and alternative transmission line alignment. The potentially affected environment is discussed as it relates to land use and zoning, livestock grazing and agriculture, and prime and unique farmlands.

The affected area for the proposed and alternative Dry Fork Station Power Plant site is defined as the proposed power plant EIS study area and comprises the sites themselves and the immediately adjacent properties one mile from the physical border of the site, including the proposed ash landfill site.

3.8.1 Ownership, Land Use and Zoning

Surface ownership within the proposed and alternative Dry Fork Station Power Plant site as well as the proposed and alternative transmission line alignments include lands in private ownership, state land, and BLM land (Figure 3.8-1). Subsurface mineral rights are part of active federal coal leases and Wyoming oil and gas leases. Land uses within the proposed and alternative Dry Fork Station Power Plant site as well as along the proposed and alternative transmission line alignments are primarily commercial (livestock grazing and agriculture), industrial (surface coal mining and CBM extraction), residential, and recreational (Basin Electric 2006a, 2006b).

Surface ownership data were obtained from the Bureau of Transportation Statistics (BTS) and the Wyoming Geographic Information Science Center (WyGISC). Land use data were obtained from the BTS, WyGISC, the USGS, and the BLM. Additional data were obtained from the University of Wyoming, Department of Geography.

3.8.1.1 *Power Plant*

Proposed Site
The surface of the entire proposed Dry Fork Station site is privately owned by the Dry Fork Mine with a purchase option held by Basin Electric. The proposed site is within a mine permit area and subsurface mineral rights on approximately 50 percent of the site are part of an active federal coal lease to Western Fuels Cooperative Dry Fork Mine (Figure 3.8-2). Active Wyoming oil and gas leases are on a portion of the site, but there are no known wells or planned CBM

drilling activity on the site (Basin Electric 2006a). Federal oil and gas leases are also on the site, but it is not known if these leases are active (WyGISC 2006).

A 69-kV transmission line crosses the northern portion of the site (see Figure 1.1-4). An easement for the right-of-way is held by the Powder River Energy Corporation.

Campbell County has not zoned the proposed site. A current zoning map provided by Campbell County Public Works Department shows the nearest zoned areas are residential subdivisions in northern Gillette (approximately three miles south) and Oriva (approximately three miles west) (Knievel 2006).

The entire proposed Dry Fork Station Power Plant site is currently covered by shrubland and used for grazing. The property owner leases the grazing rights. The lease is subject to termination upon notice of start of construction. No agriculture or other land uses take place at the site.

Surrounding Properties
Transportation corridor easements for Wyoming State Highway 59 and the Burlington Northern Santa Fe (BNSF) railroad bordering the proposed Dry Fork Station Power Plant site are permanent (see Section 3.11).

Approximately half of the land beyond these transportation corridors is privately owned and is used for industrial purposes, primarily surface coal mining operations. Industrial developments include the Dry Fork Mine (1.2 miles south-southeast), the Rawhide Mine (1.4 miles northwest), and the Eagle Butte Mine (1.4 miles southwest) as shown in Figure 1.1-4.

In addition to crossing the northern portion of the site, various 69-kV transmission lines are east, southeast, and west of the site (see Figure 1.1-4).

Alternative Site
Land ownership of the alternative site is shown in Figure 3.8-1. The site is owned by the Western Fuels Cooperative Dry Fork Mine and is part of an active federal coal lease (Figure 3.8-2). Active Wyoming oil and gas leases are on a portion of the site, but there are no known wells or planned CBM drilling activity on the site. Federal oil and gas leases are also on the site, but it is not known if these leases are active (WyGISC 2006).

Campbell County has not zoned the alternative site. No grazing or agriculture is known to occur at the alternative site.

Surrounding Properties
Transportation corridors border the Dry Fork Station site on the north and west, the BNSF railroad borders the site on the north, and Garner Lake Road borders the site on the east. No information was available regarding easements associated with transportation features.

Garner Lake is northeast of the site (Figure 3.8-1). Various 69-kV transmission lines are present to the north, northwest, and east of the site. The Springen Substation is approximately a mile east

of the alternative Dry Fork Station Power Plant site. As the alternative site is approximately a mile southeast of the proposed power plant site, many of the surrounding properties described above are also near it.

3.8.1.2 *Transmission Line*

Surface ownership of land that would be traversed by the proposed transmission line and the alternative transmission line alignments is shown on Figure 3.8-1, and relative private, state, and federal ownership is estimated in Table 3.8-1.

Most of the land along these alignments is privately held and is used for livestock grazing. A smaller portion of the land along these alignments is currently used for agriculture, as discussed in Section 3.8.2. Unsanctioned recreational use, including off-highway vehicle use, hunting, and hiking, is also likely to occur, as discussed in Section 3.9. State-owned parcels generally coincide with the 16th and 36th sections of each township, which are designated school sections.

BLM manages small, scattered parcels which are likely used for grazing. The centerline of the proposed transmission line alignment would traverse seven parcels of federal land managed by BLM, for a total of 1.22 miles. The centerline of the alternative transmission line alignment would traverse nine parcels of federal land managed by BLM, for a total of 2.6 miles.

Table 3.8-1 – Estimated Current Surface Ownership Crossed by Transmission Line

Transmission Line Segments	Private	State	Federal
Proposed Route, Segment A	88%	12%	0%
Proposed Route, Segment D, E, F, and H	93%	7%	0%
Proposed Route, Segments C, J, L, N, P, Q, S, T, W, X, and AA	92%	7%	1%
Alternative Route, Segments B and C	85%	15%	0%
Alternative Route, Segments D, E, G, and H	88%	12%	0%
Alternative Route, Segments C, J, L, O, Q, R, T, U, Y and Z	85%	12%	3%

Source: Basin Electric 2006b

Other land uses include industrial (surface mining and CBM wells), residential, and commercial (radio and communication towers). The numbers of wells, residences and communication towers near the alignment are summarized in Tables 3.8-2 through 3.8-4. Figure 3.8-3 shows the locations of residences in the project study area.

Residences

Residences, while primarily concentrated around the cities of Gillette and Sheridan, are scattered throughout the Hughes Transmission Line Study Area. Rural residences tend to be located along water features, particularly Prairie Dog Creek, and on transportation routes, particularly along US Highway 14/16 and SH 59. Rural communities are found within the study area, including Oriva, Wyodak, Rozet, Arvada, Ranchester/Dayton, and Big Goose Valley (Figure 3.8-3). No residences are located within the 125-foot wide ROW of either the proposed or alternative transmission line alignments. Table 3.8-2 lists the number of nearby residences. There are no residences at the proposed Dry Fork Station site; the nearest residence is located approximately two miles north.

Figure 3.8-1 – Surface Ownership in the Hughes Transmission Line Study Area

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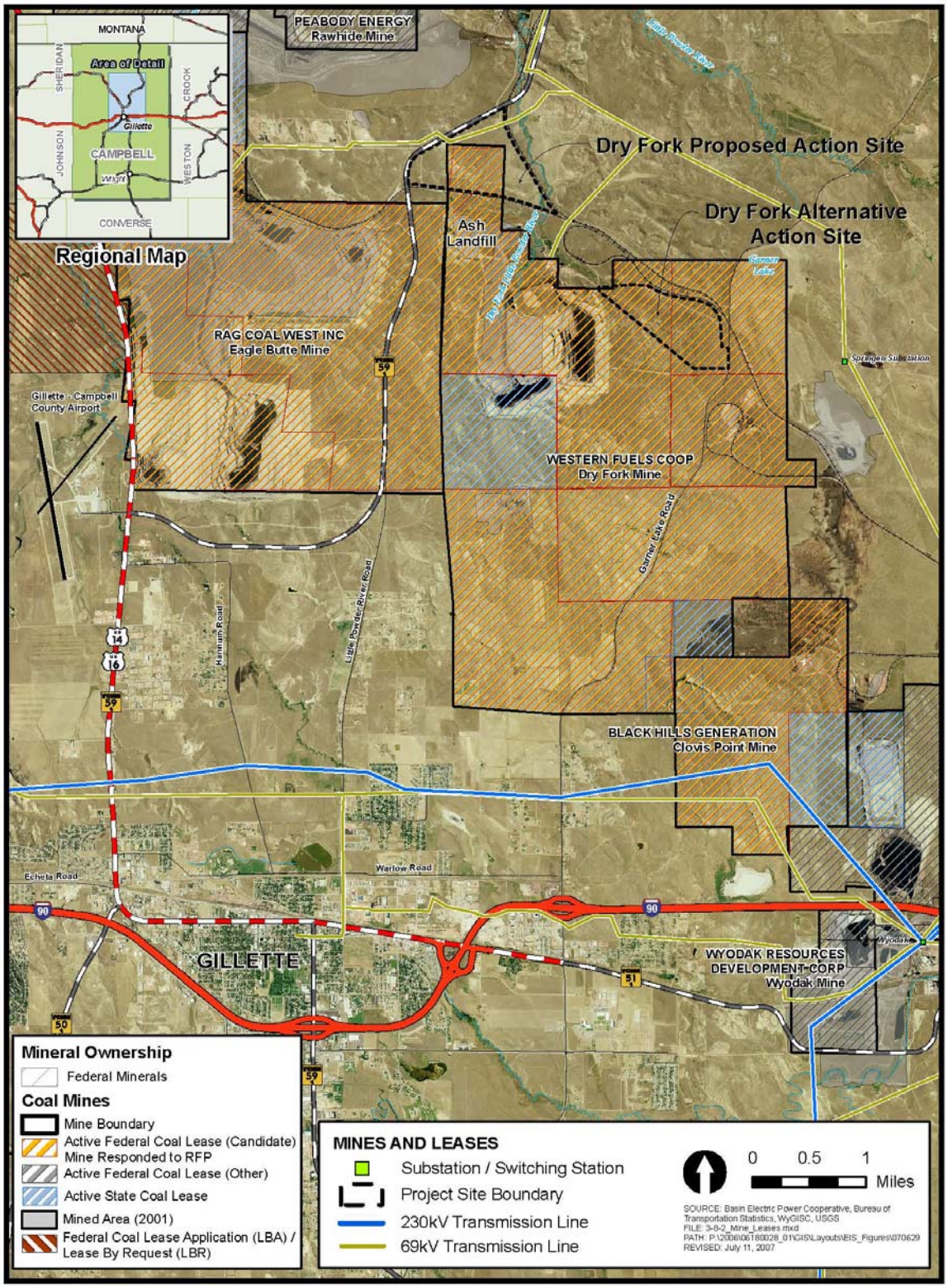

Figure 3.8-2 – Mines and Leases in the Dry Fork Mine Area

Table 3.8-2 – Residences near the Proposed and Alternative Transmission Line Alignments

Transmission Line Segments	Residences within 500 Feet (0.1 mile) of Transmission Centerline	Residences within a Half Mile of Transmission Centerline
Proposed Route, Segment A	0	12
Proposed Route, Segment D, E, F and H	0	1
Proposed Route, Segments C, J, L, N, P, Q, S, T, W, X and AA	3	28
Total Proposed Alignment	**3**	**41**
Alternative Route, Segments B and C	10	48
Alternative Route, Segments D, E, G and H	0	3
Alternative Route, Segments C, J, L, O, Q, R, T, U, Y and Z	4	33
Total Alternative Alignment	**14**	**84**

Source: Basin Electric 2006b

Radio and Communications Towers

Radio and communications towers can be affected by interference generated by transmission lines. Section 3.15 discusses these effects in greater detail. A count of radio and communication towers located within a quarter mile of the transmission line alignment is presented in Table 3.8-3.

Table 3.8-3 – Radio or Communication Towers near the Transmission Line Proposed and Alternative Routes

Transmission Line Segments	Radio or Communication Towers within 0.25 Mile of Transmission Centerline
Proposed Route, Segment A	0
Proposed Route, Segment D, E, F and H	2
Proposed Route, Segments C, J, L, N, P, Q, S, T, W, X and AA	4
Total Proposed Alignment	6
Alternative Route, Segments B and C	0
Alternative Route, Segments D, E, G and H	2
Alternative Route, Segments C, J, L, O, Q, R, T, U, Y and Z	8
Total Alternative Alignment	10

Source: Basin Electric 2006b

Coal Bed Methane

CBM can be simply defined as methane (natural gas) found in coal seams. CBM extraction wells found near the proposed and alternative transmission line alignments are concentrated in the southwestern and northwestern portions of the project study area (near Gillette and Sheridan) (Basin Electric 2006b). CBM extraction wells are small and inconspicuous, while exploration and drilling exercises and other ancillary structures, such as meters, compressors, and dehydration units can be much larger (CSUG 2006). The number of nearby CBM wells within 250 feet of the proposed and alternative transmission line alignments is presented in Table 3.8-4.

Coal Bed Methane, or CBM, is natural gas found in coal beds during the first stages of coal formation.

Figure 3.8-3 – Residences within the Hughes Transmission Line Study Area

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Livestock Grazing and Agriculture

Figure 3.8-4 shows the land use/land cover in the Hughes Transmission Line Study Area. Rangeland, primarily shrubland and grassland used for livestock grazing, is the dominant land use throughout the project area (Basin Electric 2006a, 2006b). Agriculture, some of which occurs on lands recognized as prime and unique farmlands, represents a small percentage of the land use. (Table 3.8-5)

Livestock and agriculture data were obtained from the BTS, WyGISC, USGS, and BLM (Basin Electric 2006a, 2006b) and locations of prime and unique farmlands were obtained from the USGS (USGS 2001).

Table 3.8-4 – CBM Wells near the Transmission Line Proposed and Alternative Routes

Transmission Line Segments	CBM Wells within 250 Feet (0.05 mile) of Transmission Centerline
Proposed Route, Segment A	0
Proposed Route, Segment D, E, F and H	4
Proposed Route, Segments C, J, L, N, P, Q, S, T, W, X and AA	32
Total Proposed Alignment	36
Alternative Route, Segments B and C	0
Alternative Route, Segments D, E, G and H	8
Alternative Route, Segments C, J, L, O, Q, R, T, U, Y and Z	25
Total Alternative Alignment	33

Source: Basin Electric 2006b

3.8.2 Prime and Unique Farmlands

The stated purpose of the Farmland Protection Policy Act (FPPA) is to minimize federal programs that contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. To that end, the FPAA defines prime and unique farmlands, as well as additional farmland of statewide or local importance.

Prime and Unique Farmlands

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor and without intolerable soil erosion. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks.

Unique farmland is defined as land other than prime farmland that is used for producing specific high-value food and fiber crops, such as, citrus, tree nuts, olives, cranberries, fruits, and vegetables.

3.8.2.1 *Power Plant*

No prime or unique farmlands or agricultural lands exist on or adjacent to either the proposed or alternative site (Basin Electric 2006a).

3.8.2.2 *Transmission Line*

Proposed Alignment

Prime farmlands exist along approximately two miles of the proposed alignment, Segments W and X. Approximately 30 acres of prime and unique farmlands exist within the alignment ROW

for the transmission line. Additional prime and unique farmlands may border this alignment (Basin Electric 2006b).

Table 3.8-5 — Estimated Percent of Land Use Crossed by Transmission Lines

Transmission Line Segments	Rangeland	Prime and Unique Farmlands	Other
Proposed Route: Segment A	92%	0%	8%
Proposed Route: Segment D, E, F and H	96%	0%	4%
Proposed Route: Segments C, J, L, N, P, Q, S, T, W, X and AA	95%	2%	3%
Alternative Route: Segments B and C	96%	0%	4%
Alternative Route: Segments D, E, G and H	97%	0%	3%
Alternative Route: Segments C, J, L, O, Q, R, T, U, Y and Z	95%	4%	1%

Source: Basin Electric 2006b

Alternative Alignment

Prime farmlands exist along approximately four miles of the length of the alternative alignment, Segments U and Y. Approximately 61 acres of prime and unique farmlands exist within the alignment ROW for the alternative transmission line. Additional prime and unique farmlands may border this alignment (Basin Electric 2006b).

3.9 RECREATION, WILDERNESS, AND AREAS OF CRITICAL ENVIRONMENTAL CONCERN

This section is a discussion of recreational opportunities in and surrounding the proposed project area. The potentially affected environment is discussed as it relates to recreation, wilderness, and areas of critical environmental concern (ACECs).

The affected area for the proposed or alternative Dry Fork Station power plant site is defined as the Power Plant EIS Study Area. The affected area for the proposed and alternative Hughes transmission line alignments is defined as the 125-foot ROW and the immediately adjacent properties. References to the larger Hughes Transmission Line Study Area are included, as appropriate.

3.9.1 Recreation

Designated recreation areas are defined as those areas (lands) that are set aside for public use by city, county, state, or federal government or are made available to the public by private entities (such as golf courses and private campgrounds). Designated recreation areas within the Hughes Transmission Line Study Area are shown on Figure 3.9-1.

Data related to recreation were gathered from BLM, the Wyoming Statewide Comprehensive Outdoor Recreation Plan 2003-2005 (SCORP), the 2002 Digital Wyoming Atlas developed by the University of Wyoming's Department of Geography, the 1994 Comprehensive Plan prepared by Gillette and Campbell Counties, and the City of Gillette Parks Division. The data were then reviewed to determine the proximity of these areas to the project area.

Figure 3.8-4 – Land Use/Land Cover within the Proposed and Alternative Power Plant and Transmission Line Study Area

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3.9.1.1 *Power Plant*

Proposed Site

There are no designated recreation areas on or adjacent to the proposed Dry Fork Station site. There are no designated trails, campgrounds, or public roads on or adjacent to the site, which is privately owned, and public use of the property is prohibited without permission from the owner (Basin Electric 2006a).

The closest designated recreation areas to the proposed power plant site include two golf courses, two campgrounds, the CAM-PLEX events center, and 26 city parks in the Gillette area (Basin Electric 2006a; City of Gillette Parks Division 2006). Various coal mines in the area offer tours between June and August. Fishing in nearby Moyer Springs Creek is prohibited without permission from the Dry Fork Mine (Basin Electric 2006a). The nearest off-road vehicle use areas are the Whitetail area, 29 miles north of Gillette, and the Little Powder River area, with two sections located 18 and 43 miles north of Gillette. Major public lands in the region include the Keyhole State Park (44 miles east of Gillette) and the Thunder Basin National Grassland (20 miles north of Gillette). The historic trails in the region are the Texas Trail and the Bozeman Trail. The Texas Trail is east of State Highway 59 and runs north-south through the Thunder Basin National Grassland (Figure 3.9-1); the Bozeman Trail is west of Sheridan and runs north-south through the Big Horn National Forest.

The Gillette, Sheridan, and Casper region is the most populous area in Wyoming (BLM 2001). The combination of population density and a limited, nearby public land base results in a high demand for recreation on public lands and a considerable amount of unauthorized recreational use of nonpublic lands.

Alternative Site

There are no designated recreation areas on or adjacent to the alternative Dry Fork Station power plant site, nor are there any designated trails, campgrounds, or public roads. The site is privately owned, and public use is prohibited without permission from the owner. The regional affected environment is the same as discussed for the proposed power plant.

3.9.1.2 *Transmission Line*

There are no designated recreation areas within or near the affected area for the proposed and alternative transmission line alignments. Unsanctioned recreation use, including hunting, off-road vehicle use, hiking, and camping, is likely to occur on both alignments. For a discussion of regional recreational areas and uses, refer to Section 3.9.1.1.

The closest designated recreation areas to the proposed and alternative transmission line alignments are those discussed in Section 3.9.1.1.

The proposed transmission line alignment would cross seven isolated parcels of BLM land. The alternative alignment would cross nine isolated parcels of BLM land, which are inaccessible without crossing private lands (Basin Electric 2006b). None of these parcels are formally designated for recreation use, although unsanctioned recreational use may occur (Bills 2006).

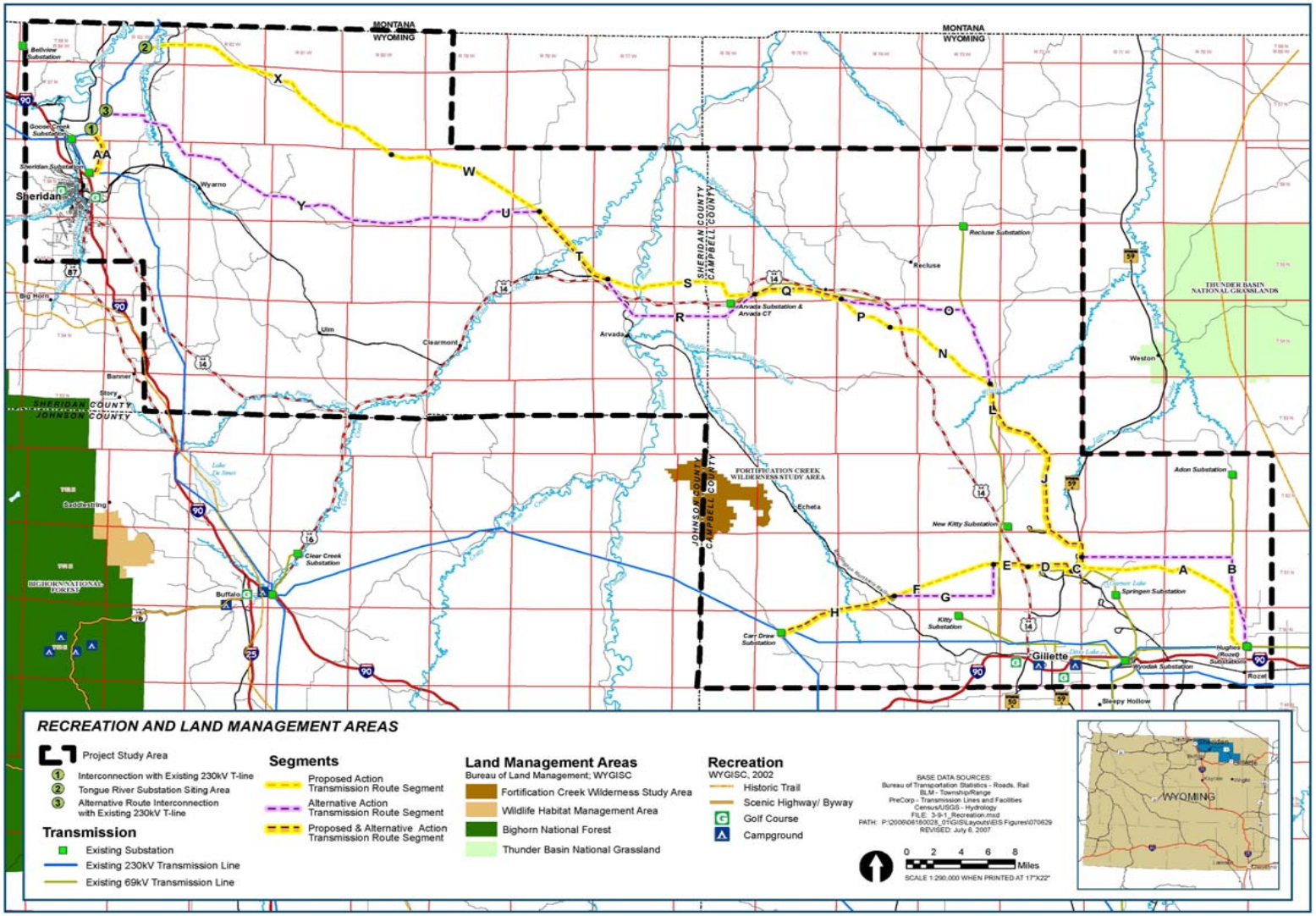

Figure 3.9-1 – Recreational and Land Management Resources in the Study Area

3.9.2 Wilderness and Wild and Scenic Rivers

As defined in the Wilderness Act of 1964, wilderness is "an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions." Lands designated as wilderness are preserved for their natural qualities as well as for the outstanding opportunities they provide for solitude and primitive recreation. Wilderness, wilderness study areas (WSAs), and wild and scenic rivers (WSRs) in the vicinity of the project area were mapped and intentionally avoided during the sitting process for both the power plant and the transmission line.

Data concerning the location of existing and proposed wilderness areas and WSAs were gathered from the BLM, SCORP, and the 2002 Digital Wyoming Atlas developed by the University of Wyoming, Department of Geography. Data concerning the location of existing and proposed WSRs were gathered from the BLM and the National Park Service (NPS). The data were then reviewed to determine the proximity of these areas to the project area.

3.9.2.1 *Power Plant*

No designated wilderness, WSAs, or WSRs are within or near the affected area for the proposed or alternative Dry Fork Station power plant site. The Fortification Creek WSA, which lies approximately 25 miles to the west, is the nearest WSA (Figure 3.9-1) (Basin Electric 2006a).

3.9.2.2 *Transmission Line*

No designated wilderness, WSAs, or WSRs are within or near the affected area for the proposed and alternative transmission line alignments.

The Fortification Creek WSA is the nearest wilderness study area. It is at least 10 miles from any point along the proposed or alternative transmission line (Figure 3.9-1) (Basin Electric 2006b).

The closest candidate for WSR designation is the 50-mile stretch of the north and south forks of the Tongue River, which lies approximately 15 miles west of Sheridan, near Dayton, Wyoming. This portion of the Tongue River is located outside the project study area.

3.9.3 Other Areas of Critical Environmental Concern

An ACEC is a designated unit of BLM land where special management attention is required to protect and prevent irreparable damage to fish and wildlife, important historic, cultural, or scenic values, or other natural systems or processes or to protect life and safety from natural hazards. In addition to ACECs, the BLM can designate other special management areas (SMAs), such as Nature Study Areas. No ACECs or SMAs are within the Power Plant EIS Study Area or the Transmission Line Study area.

3.10 VISUAL RESOURCES

This section describes the visual resources that could be affected by construction, operation, and maintenance associated with the proposed and alternative projects. Included in this section are a description of visual resource management plans, policies, and regulations and a description of the visual resources.

The Federal Land Policy and Management Act (FLPMA) states that "public lands would be managed in a manner which would protect the quality of the scenic (visual) values of these lands." To meet its responsibility to maintain the scenic values of public lands, the BLM has developed the Visual Resource Management (VRM) system. The BLM's VRM system is only applicable to BLM land. Only a small portion of the transmission lines would be on BLM land. However, in order to provide a standard method of discussing visual resources, the visual component of the proposed project makes use of the VRM system.

There are five VRM classes with of the following objectives:

- VRM Class I - The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention;
- VRM Class II - The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape;
- VRM Class III - The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape;
- VRM Class IV - The objective of this class is to provide for management activities that require major modifications to the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and become the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements; and
- VRM Class V - This class applies to areas where the natural character has been drastically altered and where the area requires rehabilitation to upgrade it to a higher classification. This is an interim classification until reclamation or rehabilitation activities allow the landscape to achieve a higher VRM objective. Class V lands in proximity to this project occur in the vicinity of Rawhide Mine, Eagle Butte Mine, US 14/16, and the city of Gillette.

Through their Buffalo District Resource Management Plan (RMP), the BLM developed VRM classes for the entire Hughes Transmission Line study area, regardless of ownership (Basin

Electric 2006b). This methodology is very conservative, since compliance with VRM classes is only required for impacts that may occur on BLM-managed land. The Buffalo RMP established VRM classes in conjunction with other resource allocation decisions made in the RMP. The overall management objective of the Buffalo RMP is to "maintain or improve scenic values, visual quality, and establish visual resource management priorities in conjunction with other resource values." It further states that visual resources will be "managed in accordance with objectives for VRM classes." Figure 3.10-1 shows the locations of the VRM classes with respect to the proposed project.

No national- or state-designated scenic byways or scenic rivers exist in the study area (Basin Electric 2006b). US 14 is not legally designated as a scenic highway at the municipal, county, state, or federal level, nor does it require compliance with visual resource protection policies.

Regulations for private lands in the study area are determined by county and municipal general plans and codes (Basin Electric 2006a). The Campbell County 1994 Comprehensive Plan and current zoning regulations do not contain visual quality guidance for power plant facilities or transmission lines.

The Sheridan County Growth Management Plan and the 1985 Sheridan County Zoning Resolution require that impacts to visual resources be considered during project planning and construction (Basin Electric 2006b). However, these documents do not contain performance outcomes or prescriptive criteria for evaluating compliance for the analysis area.

3.10.1 Power Plant

Proposed Site

There are no recreational use areas on the proposed Dry Fork Station site, nor are there any in the foreground-middleground zone (zero to 4 miles). The background distance zone (4 miles to the horizon) includes portions of Gillette, which contain the closest recreational facilities (such as golf courses and campgrounds) to the site. The proposed Dry Fork Station would be in an area characterized as having VRM Class V scenic qualities.

The site's open, rolling hills, combined with dirt roads, barbed-wire fencing, traces of historic dryland farming, and current livestock grazing uses, support a dry-ranching landscape typical of the region. However, other human activities are readily apparent adjacent to the site and throughout the region. Dry Fork Mine, Rawhide Mine, and Eagle Butte Mine and processing facilities, a 69-kV transmission line, SH 59, rail lines, and other mining facilities in the immediate vicinity create highly visible deviations from the dry-ranching landscape in the foreground view of travelers along SH 59. The scale, texture, lighting, and forms of the Dry Fork Mine facilities and overburden areas are readily visible from most locations. A 69-kV transmission line crosses SH 59 0.5 mile north of the southern rail line and continues northeast, bisecting the northern portion of the site. Due to their height and location on higher terrain, the wood poles are visible for up to 3 miles from the site.

The most prominent sources of light near the site are the Gillette-Campbell County Airport, Rawhide Mine, Eagle Butte Mine, and Dry Fork Mine (Basin Electric 2006a). These facilities

occupy between 500 and 1,000 acres and feature lights on principal structures, in parking areas, on access roads, and around the perimeter of the properties. Several mine extraction operations have high-powered directional lighting to facilitate nighttime operations. Under normal visibility, lights from these facilities can be seen from distances of up to 4 miles in every direction. Light sources throughout most of the surrounding countryside are limited primarily to exterior lights at scattered farm residences and to vehicles on local roads, which generally are lightly traveled at nighttime. Gillette is an exception to this general pattern. Due to the grassland vegetation and industrial activities, the overall visibility is very high and the scenic quality of the site is low.

The proposed ash landfill site (Basin Electric 2006a) is part of the Dry Fork Mine, and is visually similar to the proposed Dry Fork Station site. It shows visible evidence of recent grading and material storage. Consequently, portions of the site have a raw appearance and low scenic quality. The ash landfill site is separated from the proposed power plant site by an existing railroad line. A new overpass will be constructed to allow ash haul trucks to pass over the tracks safely. The ash landfill site would be in an area characterized as having VRM Class V scenic qualities.

Alternative Site

The parcel is adjacent to and highly visible from Garner Lake Road (Figure 2.2-7 in Chapter 2) (Basin Electric 2006b). The site is bounded by a dirt road and a rail line to the north, Dry Fork Mine to the south and west, and Garner Lake Road to the east. There are no recreational use areas within the foreground-middleground zone. The background distance zone includes portions of Gillette, where parks, camping, and other similar uses occur, as described in Section 3.9. A history of past human disturbances, such as land clearing, soil stockpiling, dirt access roads, and livestock grazing, are readily visible to the casual observer. Recently disturbed or unvegetated areas are more pronounced as the red, exposed soil lies in contrast to the muted tans, grays, and greens of sage and grasslands. A north-south distribution line bisects the property, and the 69-kV transmission lines that cross the proposed power plant site are visible 2 to 3 miles to the northwest. The scale, texture, lighting, and forms of the adjacent Dry Fork Mine facilities and overburden areas are readily visible from most locations. The alternative generating station would be in an area characterized as having VRM Class V scenic qualities.

As with the proposed power plant, the most prominent sources of light in the vicinity of the alternative site are the Gillette-Campbell County Airport, Rawhide Mine, Eagle Butte Mine, and Dry Fork Mine (Basin Electric 2006b). Due to the grassland vegetation, existing site fragmentation, and industrial activities, the visibility of the site is very high and the scenic quality is low.

Visual resources for the ash disposal site would be the same as described for the proposed power plant above because the alternative power plant would use the same ash disposal site.

3.10.2 Transmission Line

Lines and forms of the rolling topography and the colors and textures of vegetation characterize the transmission line study area landscape (Basin Electric 2006b). Outside the urban areas of Gillette and Sheridan, the project area is characterized by a rural landscape that has been

modified by oil and gas field development, coal mines, grazing, and developed town centers. The general visual experience along US 14 is one of dissected, upland plains bounded by low to moderate relief from buttes, mesas, hills, and ridges. Earth-colored, rolling, sage grasslands with unobstructed views extend to the horizon in many areas. Major river valleys have wide flat floors with broad floodplains bordered in some areas by wide belts of steeply sloping badlands or flat-topped, steep-sided buttes that rise sharply above the surrounding plains (USFS 2006). Smaller portions of the project study area are covered in coniferous forest (north of Recluse and in the Wyarno vicinity). In the far eastern and western portions of the study area, background views are bounded by the blue, green, and white outlines of the Big Horn Mountains to the southwest and the Black Hills to the east.

Most visitors and residents experience the area while traveling US 14 and I-90 (Basin Electric 2006b). US 14 is the primary route for residents of the small towns of Clearmont and Arvada and the unincorporated rural communities of Spotted Horse, Leiter, and Recluse. Residential areas and subdivisions are primarily associated with Gillette and Sheridan.

Farmhouses, outbuildings, windbreaks, and associated ranching infrastructure are common both in and between these small towns, and have become part of the existing rural landscape character (Basin Electric 2006b). Livestock grazing occurs in most of the study area on shrubland-grassland vegetation types, and barbed-wire fences, gates, cattle, windmills, and earth-colored dirt roads characterize the landscape. The geometric patterns of dryland farming and curvilinear deciduous forests are concentrated in the irrigated valleys of perennial streams and major river valleys, such as Prairie Dog Creek, Clear Creek, Powder River, and Wild Horse Creek. The gradual gradient, horizontal landforms and sweeping curves of the BNSF Railway traverse the area from east to west. Dispersed off-highway vehicle (OHV) use, wildlife viewing, and hunting and fishing recreational uses occur throughout the project area, especially on state and BLM lands. Highways, county roads, private roads, and utility lines are also evident throughout the project area. Portions of the project area remain natural and undeveloped in character despite widespread mineral development and grazing.

Oil, gas, and coal production facilities and related infrastructure comprise the dominant deviation to the existing character of the landscape (Basin Electric 2006b). Oil and gas development and ancillary facilities are extensive and occur in 40- and 80-acre well spacing patterns. There are approximately 770 CBM wells within 1 mile of the preferred and alternative alignments. CBM development is most heavily concentrated in eastern and central Campbell County.

The 40- and 80-acre well spacing pattern is generally followed regardless of the landform and vegetation, and is highly pronounced when viewed from the air or from ridgelines, though not readily traceable from the ground (Basin Electric 2006b). The wells are readily visible and visually dominant in the foreground views from roadways. In middle ground and background distance zones, well pads and associated access road clearings are the most obvious feature of the oil and gas development. Pad clearings and CBM discharge ponds are visible as light brownish-gray or red exposed soils in geometrically shaped areas with straight, linear edges that contrast with the texture and color of the surrounding undisturbed vegetation. Pumping stations and distribution facilities are often lighted and located adjacent to major roads.

Coal mines and processing plants are concentrated north of Gillette (Basin Electric 2006b). Horizontal overburden areas, tall facilities, night lighting, and extensive land disturbance associated with coal mining result in broad-scale change in the lines, colors, forms, and textures of the existing landscape character. In general, oil and gas development is visually subordinate to the landscape in the middle to background distance zones, while coal development is only visually subordinate in the background. The landscape that has resulted from these resource extraction developments is rural/industrial in character.

Other deviations from the existing landscape character include radio and communication towers, cell towers, billboards, substations, and distribution and high-voltage transmission lines (Basin Electric 2006b). Four segments of existing 230-kV transmission lines and six segments of 69-kV transmission lines are located in and near the study area. Corridors for the 230-kV line are located along I-90 near Gillette and Sheridan. The 69-kV corridors are visible throughout the study area in the foreground and middleground along major roads, especially in Campbell County, along US 14 east of the Arvada Substation, and north of Sheridan. The brown color and lack of a clearcut ROW make them subordinate to the landscape in the middle and background distance zones. Substations are generally located adjacent to major roads and create a greater degree of contrast due to geometric lines, tall fencing, metallic colors, and glare.

Visually sensitive lands in the project area were identified during the siting process and the public involvement program (Basin Electric 2006b). VRM Class II lands extend along a portion of US 14. An additional area of Class II lands is located in the Tongue River area, which is crossed by an existing 230-kV line.

The greatest concentration of viewpoints within the project area includes the residential and highway viewpoints in and near the cities of Gillette and Sheridan, along primary travelways, and near the rural towns throughout the project area (Basin Electric 2006b). Figure 3.8-3 shows the location of residences within the project area.

The Fortification Creek WSA abutting the south-central border of the study area and the Thunder Basin National Grassland to the east of the study area provide scenic settings for a variety of dispersed recreational activities (Basin Electric 2006b).

Overall, the scenic quality of the area is low to moderate with rolling landforms; homogenous vegetation composition; and existing resource extraction development. Clear Creek and Powder River valleys and the Fortification Creek WSA have moderate to high scenic quality.

Figure 3.10-1 – Visual Resource Management Classes and Key Observation Points in the Study Area

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3.11 TRANSPORTATION

This section is a discussion of the transportation system between Sheridan and Gillette in the vicinity of the proposed Hughes Transmission Line Study Area, inclusive of the Power Plant EIS study area. Facilities addressed include roads and traffic, airports, and railways.

3.11.1 Roads and Traffic

The location of roads in the project study area was obtained from the BTS National Transportation Atlas (BTS 2003). Information concerning design capacity, average daily traffic (ADT), Level of Service (LOS), and accidents was provided by the Wyoming Department of Transportation (WYDOT), Campbell County Public Works and Sheridan County Engineering (Basin Electric 2006a, 2006b). Supplemental information used to evaluate the potential impacts associated with the project is also referenced. All analyses and reviews have been completed in accordance with nationally accepted traffic engineering standards and procedures.

The transportation system serving the project area includes a system of interstate highways (I), US highways (US), state highways (SH) and county roads (CR). County roads and improved and unimproved BLM and private roads serve local traffic on federal land. Figure 3.11-1 is a map of the transportation network of these roads. Table 3.11-1 provides ADT volumes for segments of these highways and roads within the project vicinity. Hourly volumes were not available; however, for typical roadways, the proportion of traffic occurring in the peak hour generally falls in the range of 0.09 to 0.10 vehicles (WYDOT 2006).

Level of Service
LOS is a qualitative measurement used to define operational conditions in a traffic stream, as well as motorists' or passengers' perceptions of those conditions. An LOS classification generally defines operational conditions in terms of speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. There are six LOS classifications with letter designations from A to F. LOS A represents the best, or free-flowing, travel conditions and LOS F represents the worst, or total stoppage of traffic flows. WYDOT assigns an LOS classification to the state's highways. The LOS for the roads in Table 3.11-1 are assigned level C or better (Basin Electric 2006b).

Accident History
WYDOT provided accident histories on SH 59, Little Powder River Road and Garner Lake Road for the most recent three-year period (Basin Electric 2006a). Table 3.11-2 summarizes the frequency and type of accidents on those roadways during this period.

County Roads
Many Campbell and Sheridan County roads provide access to and within the project area. The counties have upgraded several of their roads to improve safety and reduce maintenance. The Campbell County road with the highest recorded traffic volume is Force Road. The count taken in October 2002 measured 358 eastbound vehicles per day passing a point west of Wyoming 50 (Campbell County Public Works 2002).

BLM Roads

Designated graveled and unimproved BLM roads provide access to BLM-managed public lands within the project area.

Table 3.11-1 – ADT in the Vicinity of the Proposed and Alternative Power Plant and Transmission Line Project Area

Road Segment	General Direction	Functional Class[1]	Total ADT	Truck ADT
I-90	East-West	Interstate	4,700	420
I-90 (milepost 7.1 and 117.6)	East-West	Interstate	3,894	NR[2]
I-90 (milepost 133.5)	East-West	Interstate	6,525	NR
US 14/16/SH 59	North-South	Principal arterial	14,610	660
US 14/16 (SH 59)	East-West	Principal arterial	8,650	620
US 14/16 (north)	North-South	Principal arterial	3,000	300
SH 59 (US 14/16)	North-South	Principal arterial	1,160	190
SH 59 (north)	North-South	Principal arterial	620	110
SH 59 (south of I-90)	North-South	Principal arterial	25,800	700
SH 59 (milepost 103.12)	North-South	Principal arterial	5,028	NR
SH 59 (milepost 111.20)	North-South	Principal arterial	17,614	NR
Garner Lake Road (north of I-90)	North-South	Collector	5,200	NR
Garner Lake Road (north of Warlow Drive)	North-South	Collector	2,300	NR
Garner Lake Road (north of Hilltop Drive)	North-South	Local	500	NR
Force Road	East-West	Local	358	NR
Little Powder River Road (north of Warlow Drive)	North-South	Collector	7,700	NR
Little Powder River Road (Midland Road)	North-South	Collector	2,400	NR
Little Powder River Road (SH 59)	North-South	Collector	1,050	NR

Source: WYDOT 2004, 2006
[1]Functional class: The classification of streets and highways grouped into classes, or systems, according to the character of traffic service.
[2]NR: Not recorded

Table 3.11-2 – Accident History in Project Vicinity for 2003 through 2005

Road	Accidents with Property Damage Only	Injury Accidents	Fatal Accidents	Total Accidents
SH 59 (milepost 118.0 to 124.5, Gillette city limits)	2	6	0	8
Garner Lake Road	4	1	1	6
Little Powder River Road	2	2	0	4

Source: WYDOT 2005 Operation

Planned Transportation Projects

The State Transportation Improvement Program anticipates improvements to state highways and county roads in the Gillette-Sheridan area over the next several years. The pavement overlay of SH 59 is a priority project for WYDOT. Other important transportation projects include general improvements to local and collector roads within the municipal boundaries of Sheridan and Gillette, milling and leveling US 16 connecting Buffalo to Ucross, and reconstructing areas along US 14 connecting Ucross to Sheridan (WYDOT 2006).

3.11.1.1 *Power Plant*

Proposed Site
The proposed Dry Fork Station site is bordered on all sides by transportation features. SH 59 borders the site to the west and north, and the BNSF railroad borders the site to the east and south (see Figure 1.1-4).

Access to the proposed site would be via SH 59. The segment of SH 59 adjacent to the site is a paved three-lane highway (two lanes southbound and one lane northbound) rural principal arterial. The roadway serves as a regional highway north to Weston but primarily supports traffic between Gillette and the surrounding coal mines (Basin Electric 2006a).

LOS was determined for SH 59 using the procedures outlined in the Highway Capacity Manual for analysis of two-lane highways (Transportation Research Board 2000). In this case, LOS is defined in terms of percentage of time spent following another vehicle and average travel speed. A conservative estimate to 10 percent of the ADT volume was used to estimate the peak-hour volumes of traffic to and from the site. Results indicate that SH 59 is operating at LOS B (Basin Electric 2006a).

Alternative Site
Access to the alternative Dry Fork Station site would be via Garner Lake Road. Garner Lake Road is a minor arterial both south and north of I-90 and transitions to a collector road north of Gillette.

LOS was determined for Garner Lake Road using the procedures outlined in Section 3.11.1.1. Results indicate that Garner Lake Road is operating at LOS B (Basin Electric 2006a).

3.11.1.2 *Transmission Line*

Hughes Substation to Dry Fork Station Switchyard
Access to the project ROW would generally be from the larger named roads listed below. Access to the specific structure locations would include other unnamed roads, many of which are located on private lands.

<u>Proposed Alignment: Segment A.</u> The four primary roads that would provide access to Segment A are Adon Road, Svalina Road, Garner Lake Road North, and CR 38 North (Basin Electric 2006b).

<u>Alternative Alignment: Segments B and C.</u> Segments B and C would cross and be primarily accessed by Adon Road, South Heptner Road, and SH 59 (Basin Electric 2006b).

Dry Fork Station Switchyard to Carr Draw Substation
<u>Proposed Alignment: Segments D, E, F, H.</u> Segments D, E, F and H would cross at least three primary roads. These roads are SH 59, US 14/16 and Echeta Road (CR 29) (Basin Electric 2006b). Figure 3.11-1 shows the locations of these crossings.

At least four roads would provide access to Segments D, E, F, and H: SH 59, US Highway14/16, Echeta Road (CR 29), and Fortification Road (CR 36) (Basin Electric 2006b).

Alternative Alignment: Segments D, E, G, H. Segments D, E, G, and H would cross at least three primary roads: SH 59, US Highway 14/16, and Echeta Road (CR 29) (Basin Electric 2006b).

Five primary roads would provide access to Segments D, E, G, and H, and these roads are SH 59, US Highway 14/16, McKenzie Road (CR 74), Echeta Road (CR 29), and Fortification Road (CR 36) (Basin Electric 2006b).

Dry Fork Station Switchyard to Sheridan

Proposed Alignment: Segments C, J, L, N, P, Q, S, T, W, X, AA. Principal roads crossed by the proposed alignment are presented in Table 3.11-3; Figure 3.11-1 shows the locations of these crossings.

Table 3.11-3 – Main Roads Crossed by Proposed Alignment from Dry Fork Station Switchyard to Sheridan

Segment	Number	Roads Crossed
C, J, L, N, P	3	SH 59, Collins Road (CR 23), US Highway 14/16
Q, S, T	2	US Highway 14/16, Lower Powder River Road
W, X	2	Passic Road, Badger Creek Road
AA	1	Beatty Gulch Road
Total	8	

Source: Basin Electric 2006b

Principal roads providing access to the Proposed Transmission Line from Segments C, J, L, N, P, Q, S, T, W, X, and AA are presented in Table 3.11-4.

Table 3.11-4 – Main Roads Providing Access to the Proposed Alignment from Dry Fork Station Switchyard to Sheridan

Segment	Number	Access Roads
C, J, L, N, P	3	SH 59, Collins Road (CR 23), US Highway 14/16
Q, S, T	2	US Highway 14/16, SH 341
W, X	3	Passic Road, Badger Creek Road, Wakeley Road
AA	2	I-90, Beatty Gulch Road South
Total	10	

Source: Basin Electric 2006b

Alternative Alignment: Segments C, J, L, O, Q, R, T, U, Y, AA. Principal roads crossed by the transmission line alternative action are presented in Table 3.11-5; Figure 3.11-1 shows the locations of these crossings.

Figure 3.11-1 – General Transportation in the Hughes Transmission Line Study Area

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Table 3.11-5 – Main Roads Crossed by the Alternative Alignment from Dry Fork Station Switchyard to Sheridan

Segment	Number	Roads Crossed
C, J, L, O	4	SH 59, Collins Road (CR 23), Recluse Road (CR 82), US Highway 14/16
Q, R, T	3	US Highway 14/16, Barton Road, Upper Powder River Road
U, Y	6	Passic Road, Buffalo Creek Road, Clear Creek-Buffalo Creek Road, Willow Springs Road, Sears Road, Lower Prairie Dog Creek Road
AA	1	Beatty Gulch Road
Total	14	

Source: Basin Electric 2006b

Principal roads providing access to the alternative alignment from Segments C, J, L, N, P, Q, S, T, W, X, and AA are presented in Table 3.11-6.

Table 3.11-6 – Main Roads Providing Access to the Alternative Alignment from Dry Fork Station Switchyard to Sheridan

Segment	Number	Access Roads
C, J, L, O	4	SH 59, Collins Road (CR 23), Recluse Road (CR 82), US Highway 14/16
Q, R, T	4	US Highway 14/16, Barton Road, Arvada-Gillette Road, Upper Powder River Road
U, Y	6	Passic Road, Buffalo Creek Road, Clear Creek-Buffalo Creek Road, Willow Springs Road, Sears Road, Lower Prairie Dog Creek Road
AA	2	I-90, Beatty Gulch Road South
Total	16	

Source: Basin Electric 2006b

3.11.2 Airports

The following five airports are located within the transmission line study area.

- Gillette-Campbell County Airport (public);
- Sheridan County Airport (public);
- Madsen Airport (private);
- Campbell County Memorial Hospital Heliport (private); and
- Symons Airport (private).

The location of airports in the project study area was obtained from the BTS's National Transportation Atlas (BTS 2003).

3.11.2.1 *Power Plant*

There are no airports on the proposed or alternative Dry Fork Station sites (Basin Electric 2006a). Table 3.11-7 shows the approximate distances to the nearest airports.

Table 3.11-7 – Location of Airports Relative to the Proposed and Alternative Power Plant Sites

Airport Name	Distance from Site	Nearest Power Plant Site	Direction to Airport from Site
Campbell County Memorial Hospital	7 miles	Proposed	Southwest
Gillette-Campbell County	5 miles	Proposed	Southwest
Madsen	6 miles	Alternative	Southeast

3.11.2.2 *Transmission Line*

There are no airports within a mile of the proposed or alternative transmission line alignments (Basin Electric 2006b). Table 3.11-8 shows the approximate distances to the nearest airports.

Table 3.11-8 – Distance to Airports from the Proposed Transmission Line

Airport Name	Distance from Site	Nearest Transmission Line Segment	Direction to Airport from Transmission Line
Campbell County Memorial Hospital	6 miles	G	Southeast
Gillette-Campbell County	2 miles	G	Southeast
Madsen	3 miles	A	Southwest
Sheridan County	10 miles	AA	Northeast
Symons	2 miles	Y	Southwest

3.11.3 Rail

In this section is a description of the rail network in the transmission line study area, where the BNSF Railway has over 100 miles of rail (Figure 3.11-1). BNSF carries coal, industrial products, consumer goods, and agricultural products, but primarily hauls coal in the project study area. Ninety percent of the coal BNSF hauls each year comes from the Powder River Basin (BNSF 2006). In addition to linking Gillette, Sheridan, and other population centers in Wyoming, the BNSF rail network contains many spurs that provide direct service to coal mines in the area, including the Dry Fork, Rawhide, Eagle Butte, Clovis Point, and Bighorn mines.

The BTS's National Transportation Atlas (BTS 2003) was used to identify railroads in the project study area.

3.11.3.1 *Power Plant*

BNSF rail lines border the eastern and southern portions of the proposed Dry Fork Station site and the northeast portion of the alternative site (see Figure 1.1-4). Most construction materials are expected to be hauled to either site via rail (WYDOT 2006).

3.11.3.2 *Transmission Line*

Both the proposed and alternative transmission line alignments intersect the railway in multiple locations (Table 3.11-9).

Table 3.11-9 – Railway Intersections along the Transmission Line Routes

Segment	Location of Intersection	Transmission Line Route
D	Along the east edge of the proposed power plant site	Both proposed and alternative
H	East of Echeta Road	Alternative
J	West of SH 59	Both proposed and alternative
R	East of Prairie Dog Creek	Alternative
X	Approximately four miles north of Arvada	Proposed
Y	East of Prairie Dog Creek	Alternative

Source: Basin Electric 2006b

The railway also runs immediately west of Segment C (part of both the proposed and alternative transmission line routes) and Segment S (part of the proposed route). No segments other than those discussed above would span railways.

3.12 CULTURAL RESOURCES

This section describes efforts to identify cultural resources within a direct and indirect area of potential effect (APE) that could be affected by the proposed and alternative power plant and transmission line alignments.

Cultural resources can be prehistoric, Native American, or historic. Prehistoric resources are physical properties resulting from human activities that predate written records and are generally identified as isolated finds or sites. Prehistoric resources can include village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, petroglyphs, rock features, and burial plots.

Native American resources are sites, areas, and materials important to modern Native Americans for religious, spiritual, or traditional reasons. These resources can include villages, burial plots, petroglyphs, rock features, or spring locations and are often referred to as traditional cultural properties (TCPs). Fundamental to Native American religions is the belief in the sacred character of physical places, such as mountain peaks, springs, or burial plots. Traditional rituals often prescribe the use of particular native plants, animals, or minerals, so activities that can affect sacred areas, their accessibility, or the availability of materials used in traditional practices are of primary concern. Although some types of Native American resources overlap with prehistoric and historic resources, they require separate recognition as unique cultural resources.

Historic resources consist of physical properties, structures, or built items resulting from human activities that pre-date written records. Historic resources can include archaeological remains and architectural structures. Historic archaeological sites include town sites, homesteads, agricultural or ranching features, mining-related features, refuse concentrations, and features or artifacts associated with early military use of the land. Historic architectural resources can include houses, cabins, barns, lighthouses, bridges, local structures (such as churches, post offices, and meeting halls), and early military structures (such as hangars, administration buildings, barracks, officers quarters, warehouses, and guardhouses). Generally, architectural resources are considered historic if they are over 50 years old.

The APE for the Dry Fork Station encompasses the surface and subsurface areas that would be disturbed by the proposed power plant. Additionally, an indirect APE includes locations of historic properties or TCPs where components of the proposed power plant would be visible or audible.

3.12.1 Cultural Resources Inventory

Many peoples have made their homes in the PRB. Prehistoric groups include the Clovis, Folsom, and Eden Valley. The earliest of the historic peoples to arrive appear to have been the Crow (Frison 1976). Other nomadic tribes that followed included the Arapahoe, Arikara, Bannock, Blackfeet, Cheyenne, Gros Ventre, Kiowa, Nez Perce, Sheep Eater, Sioux, Shoshone, and Ute. Trapping and trading opportunities of the early 1830s served as a powerful lure for increasing numbers of white settlers to move westward.

Project-specific efforts to identify cultural resources and Native American resources include Class I file searches for the proposed and alternative transmission line alignments, proposed power plant site, and the ash landfill site. A Class III field survey of the proposed power plant site and of the BLM-owned portions of the transmission line alignments has also been conducted. A site visit was conducted at the ash landfill site for rerecording previously recorded sites; however, no formal pedestrian survey was conducted at this location. As part of the scoping process, RUS sent letters to local tribes in the region.

With regard to the management of cultural resources, the BLM uses three classes of inventories:

- **Class I–Existing Data Inventory**: an inventory study of a specific area designed to provide a narrative overview from existing cultural resource information (such as site records and other relevant literature as may be obtained through a files search), and to provide a compilation of existing cultural resource site data;
- **Class II–Sampling Field Inventory**: a sample-oriented field inventory designed to locate and record, from surface and exposed profile indications, all cultural resources within a portion of a specific area. This inventory allows an objective estimate of the nature and distribution of cultural resources in a larger area, and is issued in management and planning activities as an accurate predictor of cultural resources in a planning area. Class II inventory is used for a specific project in which an intensive field inventory (Class III) is not practical or necessary; and
- **Class III–Intensive Field Inventory**: an inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a specific area. Usually, upon completion of such inventories, no further cultural resource inventory work is needed in that area. Appropriate on small project areas, all areas to be disturbed, and primary cultural resource areas.

The Class I file searches conducted for the proposed power plant and ash landfill site, and the Hughes transmission line are documented in ACR 2005 and 2006, respectively. A planning level file search was also conducted for the ash landfill site. The file searches were conducted through the Wyoming State Historic Preservation Office (SHPO) and the internet site of the Wyoming State Cultural Records Office (WYCRO). The file searches identified previously inventoried

areas within the proposed power plant APE. Previously recorded sites within the area were also identified. For the proposed and alternative transmission lines, a 1,800-foot-wide corridor was established around the reference centerline for the preferred and alternative ROWs. Most of the area of the proposed power plant and the entirety of the ash landfill site had been previously surveyed (ACR 2005).

ACR Consultants, Inc. (ACR) conducted Class III surveys for the proposed power plant site (ACR 2005) and the portions of Hughes transmission line segments that crossed BLM-administered parcels (ACR 2007). ACR did not survey eighteen block acres within the proposed power plant location since those blocks had been previously surveyed using current and acceptable survey standards. No survey was conducted at the alternative power plant site. Although ACR personnel did not formally survey the ash landfill site location, they did revisit four previously recorded sites in that APE.

ACR personnel recorded three isolated finds within the proposed power plant APE and rerecorded three sites within the ash landfill sites (ACR 2005). A fourth previously recorded site within the ash landfill site was found to have been destroyed. None of the recorded sites were determined to be eligible for the National Register of Historic Places (NRHP).

The Class III survey was to assess potential impacts from constructing the Hughes Transmission Line Segments H, L, Q, R, S, and T (ACR 2007). These segments cross BLM lands. The survey personnel also assessed effects on historic properties within a one-mile-wide indirect APE. Segment S was partially realigned as part of the normal siting process. Two of the parcels had been previously surveyed and were not resurveyed. Eighteen previously recorded sites were identified through a records search. No additional sites were identified during the pedestrian survey in the five surveyed parcels.

Results of the Class I and Class III work for the proposed and alternative power plant sites and transmission line alignments are summarized in Table 3.12-1.

Table 3.12-2 contains a summary of the results of the Class I survey for the proposed and alternative transmission line alignments, adapted from Basin Electric (2006b) and updated with information from ACR (2006). Some of the sites are included in multiple 1,800-foot-wide corridors. More detailed information concerning the sites and surveys identified by the Class I survey can be found in ACR (2006). None of the segment corridors have been entirely surveyed. No records were found for portions of Segments E, L, N, T, U, X, Y, and AA through the Class I survey. This lack of records indicates that these areas have not been previously surveyed. Regarding Segment C, it was not possible for ACR to determine if previous surveys had actually traversed the segment area. Consequently, the percentage of previously surveyed acreage within the corridor is indicated as unknown in Table 3.12-1.

3.12.1.1 *Power Plant*

Proposed Site

The Class I survey identified 13 previously recorded sites within the map sections containing the APE of the proposed Dry Fork Station site. One site, 3,000 feet from the APE, has been

evaluated as NRHP eligible and has received SHPO concurrence. The rest of the surrounding sites have been evaluated as NRHP ineligible or are unevaluated and range from 150 to 2,700 feet from the APE. Only one of the ineligible sites has received SHPO concurrence.

Table 3.12-1 – Summary of Results of Cultural Resource Studies for the Proposed and Alternative Power Plant and Transmission Line

	Class I Research and File Searches		Class III Survey*	
	Number of Previous Surveys within Map Section(s)	**Number of Previously Recorded Sites within Map Section(s)**	**Number of Newly or Rerecorded Sites within APE**	**Number of NRHP-Eligible Sites within APE**
Proposed power plant	12	13	0	0
Alternative power plant	N/A	N/A	N/A	N/A
Ash landfill site	5	7	3	0
	Percentage of Corridor Previously Surveyed	**Number of Previously Recorded Sites within 1,800-Foot Corridor**	**Number of Previously Recorded Sites within BLM Parcels**	**Number of NRHP-Eligible Sites within BLM Parcels**
Transmission line alignment (proposed)	20	55	9	0
Transmission line alignment (alternative)	12	70	3	0

*Class III surveys were conducted only for the proposed power plant site and portions of transmission line segments that were within BLM parcels. During the station survey, previously recorded archaeological sites within the ash landfill site were rerecorded, but the APE was not formally surveyed.

Table 3.12-2 – Summary of Class I Survey Results for the Proposed and Alternative Transmission Line

Segment	% Surveyed	Previously Surveyed Acreage	Number of Previously Recorded Sites	Number of NRHP-Eligible Sites Identified	Number of NRHP-Ineligible Sites Identified	Number of Unevaluated Sites Identified*
A-Preferred	6	80	3	0	3	0
B-Alternative	6	160	7	3	4	0
C-Preferred (Common)	unknown	400	2	1	0	1
D-Preferred (Common)	89	2,600	9	0	8	1
E-Preferred (Common)	0	0	0	0	0	0
F-Preferred	12	440	8	2	3	3
G-Alternative	9	240	8	2	4	2
H-Preferred (Common)	70	4,340	6	1	5	0
J-Preferred (Common)	50	3,940	12	1	9	2
L-Preferred (Common)	0	0	0	0	0	0

Table 3.12-2 – Summary of Class I Survey Results for the Proposed and Alternative Transmission Line (continued)

Segment	% Surveyed	Previously Surveyed Acreage	Number of Previously Recorded Sites	Number of NRHP-Eligible Sites Identified	Number of NRHP-Ineligible Sites Identified	Number of Unevaluated Sites Identified*
N-Preferred	0	0	2	0	0	2
O-Alternative	23	1,600	16	0	16	0
P-Preferred	23	960	2	0	2	0
Q-Preferred (Common)	4	40	0	0	0	0
R-Alternative	33	1,440	7	0	7	0
S-Preferred	57	4,440	8	0	5	3
T-Preferred (Common)	0	0	0	0	0	0
U-Alternative	0	0	1	0	0	1
W-Preferred	9	400	2	0	0	2
X-Preferred	0	0	4	0	1	3
Y-Alternate	0	0	4	2	0	2
AA-Preferred (Common)	0	0	0	0	0	0

Preferred Segment S (ALT) from ACR (2006) has been removed from study.
*Sites unevaluated for NRHP eligibility are treated as NRHP eligible.

The Class III survey identified four previously recorded sites and three isolated archaeological resources within the APE of the proposed power plant and ash landfill site. The isolated resources within the proposed power plant APE are described in ACR (2005). Three sites were identified in the Class I survey as being within or close to the ash landfill site APE. ACR personnel recommended these sites as ineligible for the NRHP after they conducted the power plant Class III survey. SHPO has concurred with the findings of the Class III survey (ACR 2007). Details regarding site types and the reasoning behind eligibility recommendations are described in ACR (2005).

Alternative Site

No records of previous surveys of the alternative power plant site were discovered during the Class I survey conducted for this project. The site will need to be surveyed before it can be evaluated.

3.12.1.2 *Transmission Line*

Hughes Substation to Dry Fork Station Switchyard Corridor

Proposed Alignment: Segment A

Three sites have been previously recorded within Segment A. Although all three sites have been recommended as ineligible for the NRHP, the SHPO has concurred with only one of those recommendations.

Alternative Alignment: Segments B and C

Eight sites have been previously recorded within Segments B and C, one of which is within the

1,800-foot-wide corridor of both segments. Three sites were recommended as NRHP eligible, and the SHPO has concurred. The four sites that have been recommended as NRHP ineligible have not received SHPO concurrence. The eighth site is unevaluated. Additional pre-construction surveys will be conducted as identified in BMP-CR-M1 (see table 2.4-1).

Dry Fork Station Switchyard to Carr Draw Substation Corridor

Proposed Alignment: Segments D, E, F, H
Twenty sites have been previously recorded within Segments D, E, F, and H. The ROWs of both Segments F and H overlap three of the sites. Of the 20 recorded sites, two have been recommended as being eligible for the NRHP, and SHPO has concurred with both recommendations. Fourteen of the sites have been recommended as ineligible, but SHPO has concurred with only seven of those recommendations; the last four of the 20 sites have not been evaluated. A portion of Segment H that runs through a BLM parcel was surveyed, but no additional sites were identified within the 1,800-foot corridor. Additional pre-construction surveys will be conducted as identified in CR-M1.

Alternative Alignment: Segments D, E, G, H
Twenty sites were previously recorded within Segments D, E, G, and H; Segments G and H share three of these sites. Of the 20 sites, two have been recommended as eligible for the NRHP, and the SHPO has concurred; three of the sites are unevaluated; and 15 of the sites have been recommended as ineligible, but SHPO has concurred with only eight of those recommendations. ACR surveyed a portion of Segment H as part of its Class III survey but identified no additional sites. Additional pre-construction surveys will be conducted as identified in CR-M1.

Dry Fork Station Switchyard to Sheridan Corridor

Proposed Alignment: Segments C, J, L, N, P, Q, S, T, W, X, and AA
Through the Class I and Class III surveys of the Segments C, J, L, N, P, Q, S, T, W, X, and AA, 32 sites were found to have been previously recorded within these segments. Thirty previously recorded sites were identified by the Class I survey as within the 1,800-foot-wide corridor. Of those, two were recommended as being eligible for the NRHP, and the SHPO concurred. Eighteen sites were recommended as ineligible, but the SHPO concurred with that recommendation for only eight of the sites. The remaining ten sites are unevaluated.

ACR personnel surveyed a portion of Segment S during their Class III survey of BLM parcels. During the file records search for that survey, ACR identified three additional previously recorded sites within the 1,800-foot-wide corridor, and they found one previously recorded site from the Class I survey to be outside the corridor. None of the sites have been evaluated, and ACR recommended the three previously recorded sites to be ineligible; to date, the SHPO has not concurred. Thus, within this proposed transmission line, there are 32 sites; two NRHP-eligible sites with SHPO concurrence, 17 ineligible sites, eight of which have received SHPO concurrence, and 13 unevaluated sites. Additional pre-construction surveys will be conducted as identified in BMP CR-M1.

Alternative Alignment: Segments C, J, L, O, Q, R, T, U, Y, AA
Forty-two sites were previously recorded within Segments C, J, L, O, Q, R, T, U, Y, AA through the Class I and III surveys.

Forty-one previously recorded sites were identified by the Class I survey as being within the 1,800-foot-wide corridor of these segments of the alternative transmission line alignment. Five of the sites were recommended as eligible for the NRHP, and SHPO concurred with all five recommendations. Thirty sites were recommended as ineligible, but SHPO concurred with only 13 of those recommendations. The final six sites have not been evaluated.

ACR personnel surveyed a portion of Segment R during their Class III survey of BLM parcels. During the file records search for that survey, two additional previously recorded sites were identified within the 1,800-foot-wide corridor, and one previously recorded site from the Class I survey was found to be outside the corridor. The sites within the corridor are NRHP ineligible and SHPO concurred with this. The site outside the corridor, which would be within the indirect APE of the transmission lines, is NRHP eligible, and SHPO has concurred. This NRHP-eligible site is part of the NRHP-eligible historic Chicago, Burlington, and Quincy Railroad. However, ACR evaluated this particular portion as a noncontributing element of the railroad's NRHP-eligibility (ACR 2007).

This would bring the total sites within this proposed route to 42, including four NRHP-eligible sites with SHPO concurrence, 32 ineligible sites, 15 of which have received SHPO concurrence, and six unevaluated sites.

3.12.2 Traditional Cultural Properties

Native American consultations were initiated as part of the scoping and development of the project overview and environmental evaluation documents (Basin Electric 2006a, 2006b). The results of consultations are documented in the Native American Tribal Consultation sections of these documents.

The sole reservation in Wyoming is located outside the APE for this project and is the Northern Arapaho's and Eastern Shoshone's Wind River Reservation. It encompasses over 2,268,008 acres in the central region of Wyoming, and is located approximately 175 miles south southwest of Gillette and 150 miles southwest of Sheridan.

The APE for this project includes lands that are part of what is considered the territory of Plains cultures. Various migrating tribes have occupied the region, and the direct and indirect APEs may contain places and resources that have special cultural or historical significance to members of various tribal communities. Early in the development of this project, consultations were held with the Northern Cheyenne Tribal Council, Ogallala Lakota Tribal Council, and Shoshone and Arapahoe Joint Tribal Business Council. None of these councils have thus far expressed concerns or indicated the locations of TCPs, Native American resources, or other sacred sites.

At this time, the presence or absence of TCPs or other Native American resources that could be affected by the proposed action is unknown.

3.13 PALEONTOLOGICAL RESOURCES

Paleontological fossils can include those of vertebrates, such as dinosaurs, mammals, fishes and reptiles, and invertebrates, such as those of plants, mollusks, and trilobites. Vertebrate fossils collected under a permit remain the property of the federal government in perpetuity. They cannot be traded, bartered, or sold, and the museums that act as repositories are chosen for their suitability to preserve these irreplaceable remnants of America's national natural history. No permit is needed for plant fossils, such as leaves, stems, and cones, or common invertebrate fossils, such as ammonites and trilobites. Collection permits for BLM-managed lands are generally issued only to professional paleontologists, who must agree to preserve their finds in a public museum, a college, or a university. Petrified wood is also considered a paleontological resource.

3.13.1 Power Plant

With regard to the management of paleontological resources, a Class I inventory or report is an inventory study of a specific area designed to provide a narrative overview from existing paleontological resource information and to provide a compilation of existing paleontological data. A Class I report that assimilated vertebrate fossil site locations from historic data (library and internet) was developed by Dr. Michael Cassiliano of the University of Wyoming (Cassiliano n.d.) for assessment of paleontological resource potential within the area of the ROWs of the proposed and alternative transmission line alignments. The Class I report did not include the proposed or alternative power plant, or the ash landfill site. However, since the geology of these areas is similar to those documented for the proposed and alternative transmission lines, the findings of the Class I report extended to these unsurveyed locations. The report summarizes the geology within the area of the proposed and alternative transmission line alignments, position of known vertebrate fossil sites with respect to this portion of the study area, and assesses the potential to encounter vertebrate fossils within the area of the proposed and alternative transmission line alignments.

As described in the Class I report, the only formations potentially crossed by the proposed and alternative transmission line alignments are the Fort Union Formation and the Wasatch Formation. The Class I report concluded that there are very few published reports on the vertebrate paleontology of the Fort Union and Wasatch Formations in the Wyoming portion of the PRB. Museum records show that there are no known vertebrate fossil sites within the proposed and alternative transmission line ROWs.

The Class I survey also reported that the Fort Union Formation crops out around the margins of the PRB, with its main outcrop area on the east side of the basin. It is Paleocene in age, ranging from 65 to 55 million years ago. In this region the Fort Union Formation is typically a flat-lying unit, only slightly uplifted along the margins of the basin. Throughout most of the basin, the Fort Union is covered by the Wasatch Formation. The Fort Union Formation is a fossil-rich unit in most places. However, within the PRB, vertebrate fossils seem concentrated in a limited geographic area. In others areas outside the PRB, the Fort Union produces a diverse assemblage of vertebrate, invertebrate, and plant fossils. The PRB portion of the Fort Union Formation typically exhibits a rich assemblage of nonmarine mollusks and plant fossils (Cassiliano n.d.).

The scarcity of vertebrate fossils from the Fort Union and Wasatch Formations within the PRB may be attributed to the absence of paleontological surveys and/or outcrops where fossils may be found more easily (Basin Electric 2006a).

The Wasatch Formation is described as a heterogeneous unit of sedimentary rocks, deposited mainly in fluvial environments, in the PRB during the earliest part of the Eocene Epoch, 57 million years ago. When fossil sites are found in the Wasatch Formation they are most often in small numbers. Fossils are not common in the Wasatch Formation in the PRB in Wyoming. It is unknown why this is so but may be due to the acidity of the sediments, as suggested by the presence of coal beds (Cassiliano n.d.). The first documented systematic searches for fossils in the Wasatch Formation in this region were conducted in 1938, 1941, 1951, 1952, and 1953 by H. E. Wood, II (Basin Electric, 2006b). Most finds were in the badlands near the community of Sussex and a series of topographic highs called Pumpkin Buttes to the southeast of the project study area. Among the common species found in that area were Arfia shosoniensis (Hyaenodontidae), Phenacolemur pracox (Paromomyidae), Microsyops wilsoni (Microsyopidae), Cantius ralstoni (Adapidae), Ectocion osbornianus (Phenacodontidae), Haplomylus sperianus (Hyopsodontidae), Hyopsodus “miticulus” (Hyopsodontidae), Hyracotherium angustidens (Equidae), Homolgalax protapirinus (Isectolophidae), Diacodexis metsiacus (Dichobunidae), and Coryphodon sp. (Coryphodontidae). Most of the above finds were teeth of the specimens and are typically only millimeters across and tall. This means that fossils within the project area would be exceedingly difficult to identify during construction.

In the vicinity of the transmission lines, the Wasatch Formation strata are nearly horizontal (Delson 1971). Flat-lying strata are less likely to form the outcrop-rich, fossil-producing badlands because they offer little potential for erosion to carve the strata into outcrops. This stratigraphy, combined with the distant location of finds within the Wasatch Formation and the size of those finds, indicate that the potential to find fossils is minimal.

Based on the conclusions of the Class I report, it appears that the Fort Union Formation in the PRB does not preserve vertebrate fossils and the Wasatch Formation in the PRB is limited in its fossil content. Additionally, vertebrate fossils in the Wasatch Formation seem to be concentrated in a limited geographic area within a restricted stratigraphic interval. Based on the conclusion of the Class I report, the potential to find vertebrate fossils within the ROWs of the proposed and alternative transmission lines is low. It should be noted, however, that the reported scarcity of paleontological resources in this part of the PRB may simply be due to a lack of fieldwork by qualified researchers and a lack of outcrops in which fossils could be observed.

Proposed Site

Given the similarity of the geology underlying the proposed power plant site and assertion within the Class I report as to the similarity of the area of proposed and alternative transmission line alignments to the proposed power plant site, including the ash landfill site, the likelihood of paleontological resources within this portion of the project area is considered minimal.

Alternative Site

Given the similarity of the geology underlying the alternative power plant site and assertion within the Class I report as to the similarity of the area to the vicinity of the proposed and

alternative transmission line ROWs, the likelihood of paleontological resources within this portion of the project area is considered minimal.

3.13.2 Transmission Line

Proposed and Alternative Alignments
Based on the conclusions of the Class I report, the likelihood of paleontological resources within the proposed and alternative transmission line alignments is considered minimal.

3.14 SOLID WASTE AND HAZARDOUS MATERIALS

Existing conditions at the proposed and alternative Dry Fork Station Power Plant sites are similar due to their proximity to each other and the predominantly similar land uses (livestock grazing and agriculture) that have historically occurred in the vicinity of the EIS study area (Basin Electric 2005a). Based on available information, there are no known significant hazardous materials or solid waste sites that exist at either the proposed or alternative plant locations. The proposed ash landfill would be in an area of reclaimed land that was formerly mined and backfilled with mine overburden soils (GPR, Inc. 1982).

No hazardous or solid waste sites have been identified within the proposed or alternative transmission line ROW (Basin Electric 2006b), although hazardous materials, including oil in transformers, may be found at existing substations in the project area. Maintenance shops associated with the substations may contain various petroleum products, solvents, and lubricants for use at those facilities.

The geology, surface water, and groundwater resources within the Study Area are important in evaluating potential impacts of hazardous materials, and solid waste handling and disposal. Summaries of existing conditions related to these resources are provided in Sections 3.3 and 3.4.

Numerous laws govern the use, storage, and disposal of hazardous materials and solid waste. The laws applicable to the proposed action are presented in Section 1.3.3 and Table 1.3-1 in Chapter 1.

Hazardous materials that would be used and waste streams generated by the proposed and alternative actions are discussed in Section 4.14.

3.15 PUBLIC HEALTH AND SAFETY

This section focuses on public health and safety issues with emphasis on potential electromagnetic fields (EMFs), corona effects, and associated noise within the project area. The surface water and groundwater resources, air quality, and acoustic environment within the project area are also of particular interest in evaluating potential impacts on public health and safety. The EPA and WDEQ have regulatory jurisdiction over water quality, air quality, and hazardous waste management issues. Separate hazardous waste management programs and requirements exist for solid and liquid wastes, wastewater discharges, and air releases of

hazardous materials. Issues related to air quality, water quality, and solid and hazardous waste management are discussed in Sections 3.4, 3.5, 3.6, 3.11, and 3.14.

Occupational health and safety issues are primarily the responsibility of the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA). OSHA regulations applicable to the construction and operation activities at the proposed Dry Fork Station power plant site, the proposed transmission line, and associated alternatives include 29 CFR 1910 and 29 CFR 1926. The State of Wyoming has supplemental worker safety requirements and is one of 21 states operating an approved occupational safety and health program. This program is operated by the Department of Employment, which oversees private and industry sector compliance with the federal rules and regulations, including those established by the Wyoming Occupational Health and Safety Commission. The Department of Employment investigates occupational fatalities, safety and health complaints, and safety and health discrimination complaints and ensures inspection coverage in employment areas with high injury rates.

3.15.1 Electric and Magnetic Fields

3.15.1.1 *Power Plant*

As discussed above, the principal public health and safety issues for the proposed and alternative power plant sites are related to air quality, water quality, and solid and hazardous waste management. EMF effects related to the proposed power plant are considered inconsequential.

3.15.1.2 *Transmission Line*

The following discussion focuses on background information regarding EMF effects and corona effects. The proposed and alternative transmission line alignments would be new structures where no EMF or corona effects exist, other than those naturally produced by the earth or other power lines in the area; this represents background conditions. Since background information applies to each transmission line alternative and associated segments in the same manner, the discussion is combined rather than repeated separately for each alternative and segment.

Both current and voltage are required to transmit electrical energy over a transmission line. The current, a flow of electrical charge measured in amperes (A), creates a magnetic field. The voltage, the force or pressure that causes the current to flow, measured in units of volts (V) or thousand volts (kV), creates an electric field. Both fields occur together whenever electricity flows, hence the general practice of considering both as EMF exposure.

This section contains a summary of the credible scientific evidence relevant to evaluating the potential impacts of EMF. Included in this section is a discussion of the safety considerations in the immediate vicinity of transmission lines.

Magnetic Field Health Studies

The focus of the EMF health studies for power lines has been on the magnetic fields created by the power lines. Electric fields were studied in previous years and were not found to be a concern for levels typical of power lines. A 60-hertz magnetic field is created in the space around

transmission line conductors by the electric current flowing in the conductors. This is the frequency of ordinary household current, usually referred to as 60-cycle. The strength of the magnetic field produced by an electric transmission line depends on the electrical load, the configuration of the conductors (spacing and orientation), the height of the conductors, the distance from the line, and the proximity of other electrical lines. As the load on a transmission line varies daily and seasonally, the magnetic fields likewise vary throughout the day and year. Physical structures, such as buildings (unless they are of metal construction), are usually transparent to magnetic fields created by power lines (that is, buildings do not generally have a shielding effect), thus fueling the interest in potential health effects.

EMF levels in the study area are primarily dominated by EMF from common household appliances. Table 3.15-1 shows that the magnetic fields at a distance of three feet range from less than 0.1 milligauss (mG) to 18 mG. Existing transmission and distribution lines also contribute to EMF levels.

Milligauss (mG): Milligauss a measure of magnetic field that corresponds to one thousandth of a Gauss.

No federal regulations have been established specifying environmental limits on the strengths of fields from power lines. However, the federal government continues to conduct and encourage research necessary for an appropriate policy on EMF. Several states have opted for design-driven regulations, ensuring that fields from new lines are generally similar to those from existing lines. These limits are not based on any specific health effects. Most regulatory agencies believe that health-based limits are inappropriate and that the present knowledge of the issue does not justify any retrofit of existing lines.

Table 3.15-1 – EMF Level of Some Common Household Appliances

Appliance	Magnetic Field at Three Feet (mG)
Clothes dryer	0.0 to 1.0
Clothes washer	0.2 to 0.48
Electric shaver	Less than 0.1 to 3.3
Fluorescent desk lamp	0.2 to 2.1
Hair dryer	Less than 0.1 to 2.8
Iron	0.1 to 0.2
Portable heater	0.1 to 2.5
Television	Less than 0.1 to 1.5
Toaster	Less than 0.1 to 0.11
Vacuum cleaner	1.2 to 18.0

Source: Waveguide 2007

Safety

The potential safety considerations in the immediate vicinity of electric power lines include the potential for electric shock, the clearance of the power lines aboveground, measures to prevent unauthorized climbing of the poles, and the proximity of the transmission lines to other utilities.

The electric field created by a high-voltage transmission line extends from the energized conductors to other conducting objects such as the ground, towers, vegetation, buildings, vehicles, and persons. Potential field effects can include induced currents, steady-state current

shocks, spark discharge shocks, and in some cases field perception and neuro-behavioral responses; these are discussed below.

Induced Currents
When a conducting object, such as a vehicle or person, is placed in an electric field, currents and voltages are induced. The magnitude of the induced current depends on the electric field strength and size and shape of the object. The induced currents and voltages represent a potential source of nuisance shocks near a high-voltage transmission line.

Steady-State Current Shock
Steady-state currents are those that flow continuously after a person comes in contact with an object, such as a vehicle, and provides a path to ground for the induced current. The effects of these shocks range from involuntary movement in a person to direct physiological harm. Steady-state current shocks occur in instances of direct or indirect human contact with an energized transmission line.

Spark-Discharge Shocks
Induced voltages appear on objects such as vehicles when there is an inadequate ground. If the voltage is sufficiently high, a spark-discharge shock will occur as contact is made with the ground. Spark-discharge shocks that create a nuisance occur in instances of carrying or handling conducting objects, such as irrigation pipe, under transmission lines.

Field Perception and Neurobehavioral Responses
When the electric field under a transmission line is sufficiently strong, it can be perceived by hair rising on an upraised hand. This is the effect of harmless levels of static electricity, similar to the effect of rubbing stocking feet on a carpet.

An additional safety concern in the immediate vicinity of electric power lines is the potential for unauthorized persons to climb the poles, which can be prevented by proper pole design. In addition, sufficient clearance height must be considered to avoid members of the public from coming into contact with the lines, either directly or by contact with other objects.

3.15.2 Corona Effects

Corona is the electrical breakdown of air into charged particles caused by the electrical field at the surface of conductors. Corona is of concern for potential radio and television interference, audible noise (60-cycle hum), and photochemical reactions. Corona can occur on the conductors, insulators, and hardware of an energized high-voltage transmission line. Corona on conductors occurs at locations where the field has been enhanced by protrusions, such as nicks, insects, or drops of water. During fair weather, the number of these sources is small and the corona effect is insignificant. However, during wet weather, the number of these sources increases and corona effects are much greater (DOE 2001).

The Electric Power Research Institute (EPRI) reports that “corona and arcing activity may occur at numerous points in overhead transmission, substation, and distribution power systems. This activity may result in audible noise or radio interference complaints or indicate a defective

component that may be close to failure. If the offending component can be located, it can be replaced. EPRI's daytime corona and arcing visual inspection technology (DayCor) lets the exact position, type, and magnitude of corona activity be determined, thus enabling the identification of the offending component and the possibility of failure. DayCor observations are totally unaffected by sunlight and allow corona inspection to become part of everyday inspections (EPRI 2001).

Audible Noise
Corona-generated audible noise from transmission lines is generally characterized as a cracking/hissing noise. The noise is most noticeable during wet weather. Audible noise from transmission lines is often lost in the background noise at locations beyond the edge of the ROW. Refer to Section 3.6 for a complete description of noise in the project area.

Radio and Television Interference
Corona-generated radio interference is most likely to affect the AM broadcast band (535 to 1,605 kilohertz); FM radio is rarely affected. Only AM receivers near transmission lines have the potential to be affected by radio interference. The potential for interference from corona effects is more severe during damp or rainy weather.

Visible Light
Corona may be visible at night as a bluish glow or as bluish plumes. On the transmission lines in the area, the corona levels are so low that the corona on the conductors usually is observable only under the darkest conditions with the aid of binoculars.

Photochemical Reactions
When coronal discharge is present, the air surrounding the conductors is ionized and many chemical reactions take place. These reactions produce immeasurable amounts of ozone and other oxidants such as NO_x. Refer to Section 3.5 for a complete description of air quality in the area.

3.16 SOCIOECONOMICS

This section describes the social and economic environment that would be potentially affected by the construction and operation of the proposed power plant and transmission line. The social and economic environment of a region is characterized by its demographic composition, the structure and size of its economy, and the types and levels of public services available to its citizens.

The Basin Electric Dry Fork Station Socioeconomic Impact Analysis (Socioeconomic Impact Analysis) was prepared to evaluate the benefits and impacts on social and economic resources within a six-county area (Campbell, Crook, Converse, Johnson, Sheridan, and Weston) (CH2M Hill 2006b). The Socioeconomic Impact Analysis included an assessment of the baseline conditions in the six-county area and the impacts in a narrower geographic region. The Socioeconomic Impact Analysis identified Campbell County as the primary area of impact, including the city of Gillette, which is also the major population center within Campbell County.

The Hughes Transmission Project Overview and Environmental Evaluation was prepared for the Hughes Transmission Project which identified Campbell and Sheridan Counties as the study area for the transmission lines. In addition, as required by the Wyoming Industrial Siting Act, Basin Electric was required to file a permit with the Wyoming Industrial Siting Council that analyzed the socioeconomic and environmental impacts of the proposed project. On June 14, 2006, Basin Electric was awarded the permit to construct and operate the Dry Fork Station by the Wyoming Industrial Siting Council.

The socioeconomic environment evaluated for this EIS includes Campbell and Sheridan Counties. The primary area of impact identified in the Socioeconomic Impact Analysis was Campbell County. Also included are the cities of Gillette and Sheridan, which are the major population centers within these two counties. The socioeconomic conditions considered for the study areas include population, economics, housing, education, public safety, health, and municipal services.

It is anticipated that most of the temporary and permanent employees for the proposed action and the alternative action would likely reside in the counties identified above. Therefore, the current socioeconomic conditions described below are presented for Campbell and Sheridan Counties and the cities of Gillette and Sheridan.

3.16.1 Population and Demographics

Table 3.16-1 shows population changes between 2000, 2005, and 2006 within the proposed study area. Campbell County is the third most populated county in Wyoming, with an estimated population of 38,934 in 2006 (US Census Bureau 2000), and it accounts for nearly eight percent of the total state population. Gillette, located approximately seven miles south of the proposed power plant site, is the most populated city within Campbell County, with an estimated 2005 population of 22,685. Between 2000 and 2005, the populations of Campbell County and Gillette increased by 11.0 percent and 15.5 percent, respectively (State of Wyoming 2005). Between 2000 and 2006, the population of Campbell County increased by 15.5 percent (US Census Bureau 2007).

The estimated 2006 population in Sheridan County was 27,673, which is a 4.2 percent increase over the 2000 population. The city of Sheridan is estimated to have experienced a population increase of 3.4 percent from 15,794 in 2000 to 16,333 in 2005 (State of Wyoming 2005).

The proposed Dry Fork Station site is in Census Block Groups 1 and 3 of Census Tract 7 in Campbell County. The population of this area was 3,711 in 2000. The alternative power plant site, located in Block Group 1 of Census Tract 7 in Campbell County, had a population of 1,798 in 2000 (Basin Electric 2006a).

Table 3.16-2 summarizes the projected populations in Campbell and Sheridan Counties and the cities of Gillette and Sheridan through 2020. The 2000 population of Campbell and Sheridan Counties represented approximately 12 percent of the statewide population, and this ratio is not expected to change significantly through 2020. Between 2000 and 2020, Campbell and Sheridan

Counties are projected to grow by 38 percent and 14 percent, respectively (Basin Electric 2006b).

Table 3.16-1 – Population Trends in the Proposed and Alternative Power Plant and Transmission Line Study Area

Area	2000	2005 Estimates	2006 Estimates	Population Change 2000-2005 (%)	Population Change 2000-2006 (%)
Wyoming	493,782	508,798	515,004	3.0%	4.3%
Campbell	33,698	37,420	38,934	11.0%	15.5%
Sheridan	26,560	27,341	27,673	2.9%	4.2%
City of Gillette	19,646	22,685	ND	15.5%	ND
City of Sheridan	15,794	16,333	ND	3.4%	ND
Proposed Power Plant Project Area[a]	3,711	—	—	—	—
Alternative Power Plant Project Area[b]	1,798	—	—	—	—

Sources: Basin Electric 2006a; US Census Bureau 1990, 2000; State of Wyoming 2005
[a] – Population for Census Block Group 1 and 3, Census Tract 7
[b] – Population for Census Block Group 1, Census Tract 7
ND=No Data

Table 3.16-2 – Population (2000) and Projected Population (2020) in the Proposed and Alternative Power Plant and Transmission Line Study Area

Area	2000 Population	2005 Estimate	2010 Projection	2015 Projection	2020 Projection	Population Change 2000-2020
Wyoming	493,782	509,294	540,040	559,210	579,090	14.7%
Campbell County	33,698	37,405	43,090	47,650	46,529	38.1%
City of Gillette	19,646	22,685	26,062	28,820	28,175	43.4%
Sheridan County	26,560	27,389	28,750	29,740	30,336	14.2%
City of Sheridan	15,794	16,333	17,124	17,713	17,832	12.9%

Source: Basin Electric 2006b, Wyoming Economic Analysis Division 2007

Table 3.16-3 summarizes the age distribution of the population within Campbell and Sheridan Counties. In 2000, 33 percent of the population in Campbell County was under the age of 18. Approximately 62 percent of the population in Campbell County was 18 to 64, and the remaining five percent of the population was 65 or over. Gillette reflects a similar age structure (Basin Electric 2006a).

In Sheridan County in 2000, 24 percent of the population was under 18, and 60 percent of the population was 18 to 64. Approximately 16 percent of the population was 65 or over. In Campbell County a slightly greater percentage of the population was of working age (62 percent) than in Sheridan County, and a greater percentage of the population of Campbell County was under 18 (33 percent). The median age in Sheridan County was 40.6 years, compared to the median age in Campbell County of 32.2 years (Basin Electric 2006a). The city of Sheridan reflects a similar age structure to that of Sheridan County (US Census Bureau 2000).

Table 3.16-3 – Age Structure of Population in the Proposed and Alternative Power Plant and Transmission Line Study Area (2000)

Area	Under 18 (percent)	18-64 (percent)	65 and Over (percent)	Median Age
Campbell County	33	62	5	32.2
City of Gillette	30	64	6	31.7
Sheridan County	24	60	16	40.6
City of Sheridan	23	60	17	39.3
Proposed power plant project area	33	63	4	31.6
Alternative power plant project area	32	65	3	31.1

Source: Basin Electric 2006a; US Census Bureau 2000

3.16.2 Housing

Table 3.16-4 shows housing supply characteristics in Campbell County, Gillette, Sheridan County, and the city of Sheridan at the time of the 2000 Census. Campbell County had the greatest number of housing units; 59.7 percent of which were in Gillette. Approximately eight percent of Campbell County's housing units were vacant; roughly seven percent of Gillette's housing units were unoccupied. The greatest number of vacant housing units (and highest vacancy rate) was in Sheridan County (Basin Electric 2006b). Most of the housing stock in both counties (74 and 69 percent, respectively) was owner occupied. About 58 percent of occupied housing units in Campbell County and 69 percent of Sheridan County's occupied units were single-family residences. Homeowner occupancy rates were lowest in multifamily units, at one percent in Campbell County and two percent in Sheridan County (CH2M Hill 2006b).

Table 3.16-4 – Housing (2000) in the Proposed and Alternative Power Plant and Transmission Line Study Area

Area	Housing Units	Occupied Units	Vacant Units (vacancy rate)
Campbell County	13,288	12,207	1,081 (8.1%)
City of Gillette	7,931	7,390	541 (6.8%)
City of Sheridan	7,413	7,005	408 (5.5%)
Sheridan County	12,577	11,167	1,410 (11.2%)

Source: Basin Electric 2006b; US Census Bureau 2000

A shortfall in the number of housing units (as compared to the number of households requiring housing) has been forecast for both Campbell and Sheridan Counties, with the Campbell County housing gap beginning in 2010 and the Sheridan County housing gap beginning in 2015. However, this projected gap exists only in owner-occupied units; the number of rental units is projected to be greater than the projected demand. Table 3.16-5 shows the projected housing gap for Campbell and Sheridan Counties from 2000 to 2020.

3.16.3 Economic Conditions

The 1999 median household income in Campbell County was $49,536, while the median household income in Gillette was $46,521 (Basin Electric 2006a). According to the 2000 US Census, the 1999 median household income in Sheridan County was $34,538. The median household income in the city of Sheridan was slightly lower, at $31,420 (US Census 2000a).

Table 3.16-5 – Housing (2000) in the Proposed and Alternative Power Plant and Transmission Line Study Area

County	Total Vacant Housing Units	Vacant Homeowner Housing	Vacent Rental Housing
Campbell County			
2000	1,081	806	275
2005	255	-128	383
2010	-655	-1,114	459
2015	-1,645	-2,186	541
2020	-2,483	-3,170	688
Sheridan County			
2000	1,410	441	969
2005	1,125	135	991
2010	524	-398	922
2015	-72	-944	1,015
2020	-570	-1,434	1,252

Source: CH2M Hill 2006b
Note: Negative values indicate a shortage in available housing.

The 2000 labor force in Campbell and Sheridan Counties totaled 32,689 people. Of this total, 31,316 were employed, which is equivalent to an unemployment rate of 4.2 percent in Campbell and Sheridan Counties. By comparison, the 2000 Wyoming unemployment rate was about 5.3 percent. Table 3.16-6 provides details about the available labor force in Campbell and Sheridan Counties.

Table 3.16-6 – Labor Force in the Proposed and Alternative Power Plant and Transmission Line Study Area

Area	Labor Force	Employed	Unemployed	Unemployment Rate (Percent)
Campbell County				
2000	18,805	17,975	830	4.4
2005	23,303	22,681	622	2.7
City of Gillette				
2000	10,991	10,494	497	4.5
Sheridan County				
2000	13,884	13,266	618	4.5
2005	15,123	14,537	586	3.9
City of Sheridan				
2000	8,361	7,977	384	4.6

Source: US Census Bureau 2000, US Bureau of Labor Statistics 2007

By 2005, Campbell County's labor force totaled 23,303, with 22,681 employed (97.3 percent) and 2.7 percent unemployed. In 2005, the labor force of Sheridan County was 15,123, with 14,537 (96.1 percent) employed and 3.9 percent unemployed (US Bureau of Labor Statistics 2007).

Collectively within Campbell and Sheridan Counties and the cities of Gillette and Sheridan, jobs in the education and health and social services accounted for most of the employment (20.4 percent), followed by the agriculture, fishing and hunting, and mining industries (16 percent). The construction industry accounted for approximately 10 percent of jobs (US Census Bureau 2000a).

Within Campbell County and the city of Gillette, agriculture, forestry, fishing and hunting, and mining account for most of the employment (23.3 percent and 18.9 percent, respectively), followed by educational, health, and social services (16.7 percent and 18.4 percent, respectively), and the retail trade (10.6 percent and 11.7 percent, respectively). The construction sector employed 1,775 workers in Campbell County and 1,067 workers in the city of Gillette accounting for 9.9 percent and 102 percent of employment, respectively.

Within the Proposed Power Plant Project Area agriculture, forestry, fishing and hunting, and mining account for most of the employment (24.3 percent), followed by educational, health, and social services (12.3 percent), and the construction sector (11.3 percent). The construction sector employed 214 workers in the Proposed Power Plant Project Area.

Within the Alternative Power Plant Project Area agriculture, forestry, fishing and hunting, and mining account for most of the employment (17.7 percent), the construction sector (14.1 percent), and retail trade (14 percent). The construction sector employed 132 workers in the Alternative Power Plant Project Area.

Within Sheridan County and the city of Sheridan, educational, health, and social services accounted for the most employment (24.2 percent and 25.3 percent, respectively), followed by the retail trade (12 percent and 12.5 percent, respectively), and the construction sector (10 percent and 10.3 percent, respectively). The construction sector employed 1,308 workers in Sheridan County and 824 workers in the city of Sheridan.

The construction sector employed 1,775 workers in Campbell County and 1,325 workers in Sheridan County (US Census Bureau 2000a). The mean earnings in the construction industry lag behind the mean earnings in all industries in the state, and turnover in the construction industry in Wyoming is the highest of the goods-producing industries. The average wages for the construction trades required to build the facilities involved with this project are higher than the average construction worker wages. The average hourly wage per construction worker is $15.58, and the mean hourly wage for all construction workers in northeast Wyoming (Campbell, Crook, Johnson, Sheridan, and Weston Counties) is $16.31. The average hourly wage for the types of labor required for construction of this project ranges from $12.61 for laborer to $39.45 for elevator construction (CH2M Hill 2006b).

There has been a historical gradual increase in the services-producing sector and it is expected to continue up to 2010, but with more volatile employment in the goods-producing sectors of mining and construction. Exceptions relevant to this project include the following:

- The maturing population will also decrease the mobility of the labor force, making job-related migrations less likely than in the previous decade;
- Because the low wage structure in the services-producing sector and the instability in the goods producing sector do not produce enough sustained demand to attract new labor, the state's resident labor force is expected to represent most of the labor available for work; and
- Competition with neighboring states for labor could intensify as economies of these states diversify further and provide higher wages.

There are 4,991 persons (2000) employed in the construction industry in Campbell and Sheridan Counties and the cities of Gillette and Sheridan. The Wyoming Department of Employment projects that construction employment will grow at an average annual rate of 1.2 percent assuming that the rate of growth for these areas is similar to that projected for the state (CH2M Hill 2006b).

3.16.4 Government Revenues

Tax Revenues
Various sources of revenue are in place within the six-county area and the Hughes Transmission Line Study Area, including ad valorem taxes, sales and use taxes, and income taxes.

Ad Valorem Taxes
Ad valorem taxes are based on the assessed value of real estate or personal property and are levied in proportion to the value of the item(s) being taxed. Exemptions and use-value assessment provisions aside, the property tax is an ad valorem tax. In Wyoming, properties are assessed at both the county and state levels. The state assesses utility and mineral properties and then provides this information to local governments for the purposes of ad valorem taxes. In 2005, the assessed land value for Campbell County totaled $3,660,527,493. In 2005, the assessed land value for Gillette totaled $1,288,626,442. Mill levies are then assessed to property values to determine the tax rates for various properties. A mill levy is the number of dollars a taxpayer must pay for every $1,000 of assessed value. In 2005, the mill levy was 58.885 in Campbell County and 66.885 in Gillette (Basin Electric 2006a). The average property tax rate in Sheridan County was 6.7237 percent (Wyoming Business Council undated).

Sales and Use Taxes
The State of Wyoming levies a four percent sales and use tax. Counties have the option of levying additional sales and use taxes up to two percent, with a lodging option tax. Campbell County levies 1.25 percent county sales and use tax and does not exercise a lodging tax. Sheridan County has a six percent sales and use tax (four percent state base tax, a one percent general purpose county tax, and a one percent specific purpose county tax [Wyoming Business Council n.d.]).

3.16.5 Community Structure and Resources

The area surrounding the proposed power plant site is rural and undeveloped. The nearest community is Gillette, which is approximately 7 miles south of the proposed power plant site. No schools, police, fire, or emergency facilities, health care facilities, or municipal facilities are located in the vicinity of the proposed site.

3.16.5.1 *Educational Facilities*

Campbell County
Campbell County contains a single school district, District 1, with a 2004 enrollment of 7,198 students. This single district includes 20 schools (15 elementary schools, two junior high/middle schools, and three high schools). An additional 1,261 students would have to enroll in Campbell

County School District 1 for the student-teacher ratio to exceed the national ratio (Basin Electric 2006a).

Sheridan County
Sheridan County contains three school districts (Districts 1, 2, and 3) with a 2004 total enrollment of 3,939. The three districts have a total of 23 schools: 12 elementary schools, six junior high/middle schools, and five high schools. In Sheridan County School District #1, an additional 1,872 students would have to enroll for the student-teacher ratio to exceed the national ratio. Similarly, in Sheridan County School Districts 2 and 3, an additional 4,969 and 439 students, respectively, would need to enroll for the student-teacher ratio to exceed the national ratio (CH2M Hill 2006b).

3.16.5.2 *Police/Fire/Emergency Services*

Campbell County
The Campbell County Fire Department serves Campbell County and the cities of Gillette and Wright. The department maintains eight fire stations and one training center in Gillette and a single station in Wright. Eleven full-time firefighters and 175 volunteer firefighters staff the 10 facilities. In 2001, there were 5.5 firefighters for every 1,000 citizens in Campbell County, which is higher than the ratio for Wyoming and the US at 1.8 firefighters per 1,000 people (Basin Electric 2006a).

A county sheriff's station, located in Gillette, serves Campbell County. The Sheriff's Office employs 24 deputies to serve the needs of the citizens of Campbell County. The Sheriff's Office has four officers stationed at the Wright Substation to serve the town of Wright and southern Campbell County. The Gillette Police Department provides additional police protection to that city. In 2001, there were 98 law enforcement officers in the county. In 2001, there were 2.9 law enforcement officers per 1,000 citizens in Campbell County, higher than the ratio of 2.5 per 1,000 citizens for both Wyoming and the US (Basin Electric 2006a).

Sheridan County
There is one fire department in Sheridan County, in the city of Sheridan. Twenty full-time fire fighters are employed by the Sheridan Fire Department (CH2M Hill 2006b).

There are two law enforcement offices within Sheridan County, the Sheridan Police Department, which serves the city of Sheridan, and the Sheridan County Sheriff's Department, which serves Sheridan County. Both are in the city of Sheridan. In 2001, there were a total of 51 law enforcement officers within the county, or 1.9 officers per 1,000 citizens (CH2M Hill 2006b).

3.16.5.3 *Health Facilities*

Campbell County
Campbell County Memorial Hospital in Gillette, the only hospital in the county, offers 24-hour ambulance and emergency response services. The hospital contains 119 acute care beds and 155 swing beds. Acute care beds accommodate patients whose average length of stay is 18 days or less; swing beds are used for either skilled nursing or hospital acute care levels on an as needed

basis. Fifteen ambulances, five of which are in Gillette, serve the residents of Campbell County (Basin Electric 2006a).

The physician-to-patient ratio at the hospital in 2000 was 114 physicians per 100,000 citizens, which was less than the ratios for both Wyoming and the US. The Bureau of Health Professionals and Graduate Medical Education National Advisory Committee recommend physician-to-patient ratios of 230.9 and 194.6 per 100,000, respectively. The number of beds per 100,000 citizens at the hospital was 308.2, which was less than the Wyoming ratio of 364.7 but greater than the US average of 291.8 (Basin Electric 2006a).

Sheridan County
There are two hospitals in Sheridan County. The two hospitals have 64 acute care beds and no swing beds. Thirty-nine physicians serve Sheridan County and, in 2005, that accounted for a ratio of 1.42 physicians per 1,000 people (CH2M Hill 2006b).

3.16.5.4 *Municipal Services*

Campbell County
Water in Campbell County is provided through municipal water services in both Gillette and Wright. Gillette maintains five pump stations and nine storage reservoirs. The city maintains 19 million gallons of water storage for peak demands and fire protection, with an annual average water production of 4.4 mgd. Private wells serve the more rural areas of the county (Basin Electric 2006a).

Campbell County has 33 wastewater facilities, serving 36,342 customers throughout the county. The largest wastewater facility is the Gillette Wastewater Treatment Plant, which serves 25,000 customers. Wastewater in the rural areas of the county is discharged to private leach fields or septic systems. The current wastewater flow in Gillette is 2.5 mgd. The design flow capacity of the facility is 3.85 mgd (Basin Electric 2006a).

The largest natural gas supplier in Campbell County is KN Energy, serving customers in both Gillette and Wright. Powder River Energy Corporation and the city of Gillette are the primary electrical suppliers in Campbell County, collectively serving 29,000 customers (Basin Electric 2006a).

Sheridan County
Water in Sheridan County is provided through a municipal water service in the city of Sheridan. Private wells serve the more rural portions of the county. There are six wastewater facilities within Sheridan County serving approximately 17,800 people. The largest facility is in the city of Sheridan and serves 15,500 people (CH2M Hill 2006b).

There are six solid waste disposal facilities within Sheridan County and two of them are industrial landfills. Another two waste disposal facilities are Type II municipal waste disposal facilities, one Type I municipal waste disposal facility, and hazardous waste treatment, storage, and disposal facility (CH2M Hill 2006b). Type II landfills make up the vast majority of landfills in Wyoming, and are generally small and remote landfills handling less than 20 tons/day of

municipal solid waste. Type I landfills handle equal to or greater than 20 tons/day of municipal solid waste.

3.17 ENVIRONMENTAL JUSTICE/PROTECTION OF CHILDREN

This section addresses issues related to environmental justice in accordance with Executive Order 12898, and issues related to protecting children from environmental health risks are presented, in accordance with Executive Order 13045. The environmental justice affected area is the combined area of Campbell and Sheridan Counties as this area includes both the proposed and alternative sites for the project.

On February 11, 1994, President Clinton issued Executive Order 12898 entitled Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. This order requires that "each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (Executive Order 12898, 59 Federal Register 7629 [Section 1-201]).

Racial data for Campbell and Sheridan Counties, as well as for the city of Gillette and the city of Sheridan, as compared with state and national figures, are presented in Table 3.17-1. For the purpose of this EIS, "minority" refers to people who classified themselves as Black or African American, Asian or Pacific Islander, American Indian or Alaskan Native, or other non-White races in the 2000 Census. The percentage of minority populations in Campbell and Sheridan Counties was smaller in 2000 than in the state or nationally with 3.9 percent and 4.1 percent minorities, respectively. The percentage of the populations of Campbell and Sheridan counties and of Gillette and Sheridan was lower than the State average, with an average level proportion of approximately one percent of the population in these areas (US Census Bureau 2000).

Table 3.17-1 – Racial Composition by County, 2000

Race	Campbell County Percent	Sheridan County Percent	Gillette Percent	Sheridan Percent	Wyoming Percent	U.S. Percent
White	96.1	95.9	95.5	95.9	92.1	75.1
Black or African American	0.2	0.2	0.2	0.2	0.8	12.3
American Indian and Alaska Native	0.9	1.3	1.0	1.0	2.3	0.9
Asian	0.3	0.4	0.4	0.5	0.6	3.6
Native Hawaiian and Other Pacific Islander	0.1	0.1	0.1	0.2	0.1	0.1
Some other race	1.1	0.8	1.3	0.9	2.5	5.5
Two or more races	1.3	1.3	1.5	1.4	1.8	2.4

Source: US Census Bureau 2000

U.S. Census Bureau's Summary File-3 at the census tract level from the 2000 Census data was used to determine a more detailed analysis of minority populations within Campbell and Sheridan Counties. GIS layers were produced identifying polygons from the 2000 Census data showing any census tract with a minority percent greater than 50 percent. No high minority population's census tracts were identified within Campbell or Sheridan Counties.

The U.S. Census Bureau uses a set of income thresholds that vary by family size and composition to determine which families are living in poverty. If a family's total income is less than its threshold, then that family, and every individual in it, is considered to be living in poverty. The poverty thresholds do not vary geographically, but they are updated annually for inflation using the Consumer Price Index (US Census Bureau 2000b). For example, the estimated weighted average poverty threshold for 2004 was $9,643 for an individual and $19,311 for a four-person household. Table 3.17-2 shows per capita personal income within the environmental justice affected area and the state for 2004. The average per capita personal income in both Campbell and Sheridan Counties was considerably higher than the poverty threshold, and the per capita personal income for Sheridan County exceeded the state average (Bureau of Economic Analysis 2006).

Table 3.17-2 – Per Capita Personal Income, 2004

Geographic Area	Household Income
Wyoming	$34,279
Campbell County	$33,388
Sheridan County	$35,716

Source: Bureau of Economic Analysis 2006

The 2004 poverty rate in Campbell and Sheridan Counties ranged from 7.9 percent to 11.0 percent (Table 3.17-3). The poverty rate in Campbell County was lower than the state average, and in Sheridan County the poverty rate was higher than the state average (US Census Bureau 2006). The national poverty rate data for 2004 is also presented in Table 3.17-3 and shows the national rate was about 13.1 percent (US Census Bureau 2004).

Table 3.17-3 – 2004 Poverty Rate

Area	Poverty Rate (%)
United States[1]	13.1
Wyoming[2]	10.3
Campbell County[2]	7.9
Sheridan County[2]	11.0

[1]US Census Bureau 2004
[2]US Census Bureau 2006

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (Executive Order 13045, 62 FR 19885), states that each federal agency shall make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children. The agency also must ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks, which are those attributable to products or substances that children are likely to come into contact with or to ingest.

At the time of the 2000 Census, approximately 33 percent of Campbell County (Basin Electric 2006a), 24.1 percent of Sheridan County (US Census Bureau 2000), 30 percent of Gillette (Basin Electric 2006a), and 23.1 percent of the city of Sheridan (US Census Bureau 2000) was made up of children (under 18). According to the National Center for Education Statistics, there are 23 public and private schools in Campbell County and 28 public and private schools in Sheridan County and there are approximately three schools within a 10-mile radius of the city of Gillette and approximately 10 schools within a 10-mile radius of the city of Sheridan (NCES 2007).