

## **2.8 Noise and Visual Resources**

### **2.8.1 Key Issues**

The key issues related to noise and visual resources in the PRB include:

- Potential for noise from development to adversely affect residences, campgrounds, or other noise-sensitive receptors (land uses) in the study area; and
- Potential for development to be visually intrusive to a greater degree than would be acceptable under the BLM Visual Resource Management (VRM) System or the USFS Scenery Management System (SMS).

Potential noise-related effects to wildlife are discussed in Section 2.4 of this report.

### **2.8.2 Study Area**

The baseline study area for noise and visual resources includes all or portions of Sheridan, Johnson, Campbell, and Converse counties (see **Figure 1-1**). It includes all of the area administered by the BLM Buffalo Field Office, a portion of the area administered by the BLM Casper Field Office, and a portion of the TBNG, which is administered by the USFS (see **Figure 1-2**). State and private lands also are included in the study area (see **Figure 1-3**).

### **2.8.3 Current Conditions**

#### **2.8.3.1 Noise**

Noise generally is defined as unwanted sound. The effects of noise on people range from annoyance and inconvenience to temporary or permanent hearing loss. Since the human ear is not equally sensitive to sound at all frequencies, a frequency-dependent scale was developed so that full spectrum noise measurements could be adjusted to represent noise as it is perceived by human hearing. Sound intensity is measured in decibels (dB). The dBA compensates for the sensitivity of the human ear by discriminating against frequencies at the upper and, especially, the lower ranges of the audible sound spectrum. The dBA has been selected by most authorities for purposes of environmental noise regulation.

The decibel scale used for noise measurement is a logarithmic scale. Differences in noise levels must be calculated with this in mind. For example, combining sound from two sources producing 50 dBA each results in a total level of 53 dBA, not 100 dBA. A 10 dBA change in noise level represents a doubling in the energy level and is perceived by most people as a doubling of sound level. An increase from 40 dBA to 50 dBA would be twice as loud; an increase from 40 dBA to 60 dBA would be four times as loud, and so forth. The smallest perceivable change in noise levels is typically 3 dBA; an increase of 5 dBA is more clearly noticeable by the human ear.

Ambient, or background noise, is the all-encompassing noise associated with a given environment, usually a composite of sounds from many near and far sources. Outdoors, average nighttime

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ambient noise is, in general, lower than daytime ambient levels by approximately 5 dB. This difference, however, is widely affected by the characteristics of the area and environment. Ambient noise usually is most critical at nighttime during the summer, when people are resting, windows are often left open, and traffic or other noise generating activities are usually at a minimum.

Typical sounds in most communities range from 40 dBA (very quiet) to 100 dBA (very loud) or higher. Conversation is roughly 60 dBA at 3 to 5 feet. As background noise levels exceed 60 dBA, speech intelligibility becomes increasingly difficult. Noise generally becomes physically uncomfortable at 110 dBA. The above sound levels are stated in terms of short-term maximum sound. Some commonly experienced noise levels are illustrated in **Table 2.8-1**.

**Table 2.8-1**  
**Typical Sound Levels of Common Noise Sources**

Sound Pressure Level (dBA)	Common Indoor Noise Levels	Common Outdoor Noise Levels
110	Rock band	--
105	--	Jet flyover at 1,000 feet
100	Inside New York subway train	--
95	--	Gas lawn mower at 3 feet
90	Food blender at 3 feet	--
80	Garbage disposal at 3 feet, or shouting at 3 feet	Noisy urban daytime
70	Vacuum cleaner at 10 feet	Gas lawn mower at 100 feet
65	Normal speech at 3 feet	Commercial area, heavy traffic at 300 feet
60	Large business office	--
50	Dishwasher in next room	Quiet urban daytime
40	Small theater, large conference room	Quiet urban nighttime
35	--	Quiet suburban nighttime
33	Library	--
28	Bedroom at night	--
25	Concert hall (background)	Quiet rural nighttime
15	Broadcast and recording studio	--
5	Threshold of hearing	--

Source: BLM 2002a.

Ambient noise generally is a function of land use and density, although other environmental factors also may play a substantial role. Wind, precipitation, wildlife, and insects substantially can increase ambient noise in many places. Residents of the PRB study area are likely well familiar with these environmental influences.

Land uses in the PRB study area range from sparsely populated rural ranching areas to more densely populated urbanized areas and industrial areas such as coal mining and CBNG operations. Major sources of noise are larger towns; industrial facilities (e.g., coal mines and gas compressor stations); and major transportation facilities, particularly higher volume roadways such as I-90, I-25, and SR 59 near larger communities and railroad corridors. Frequent high winds raise noise levels well above ambient levels without wind.

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Background noise surveys have not been conducted in the study area; however, noise in rural areas away from industrial facilities and transportation corridors is likely to be in the range of 30 to 40 dBA when the wind speeds are low. Levels of noise close to industrial facilities and transportation corridors are likely to be in the range of 50 to 70 dBA or more, depending on the source and proximity to the source. The most substantial noise from CBNG operations results from the operation of compressor stations that use multiple engines to move natural gas from central gathering facilities and along high-pressure transmission pipelines. Noise from these compressor stations has been estimated to be 55 dBA at 600 feet from the compressor station (BLM 2000b).

The potential effects of noise depend on the spatial relationship between a noise source and noise-sensitive receptors. Noise attenuates over distance; the rate of attenuation also depends on the nature of the ground surface, atmospheric conditions, and topography, which can either block or reflect noise transmission. Consequently, effects of noise generally are site-specific, and generalizations over an area as large and diverse as the PRB study area may be misleading if not carefully qualified.

### 2.8.3.2 Visual Resources

#### Regional Landscape Character

The PRB study area is isolated in the Great Plains physiographic province; it is bordered by the Big Horn mountains to the west and the Black Hills to the east.

The landscape is composed of open grasslands, low rolling hills, and unobstructed views over many miles in most places. Most of the area is covered with dryland vegetation consisting of grasses and shrubs. Ponderosa pine forest covers large portions of the northeast quarter of the study area. Outside the urban centers of Sheridan, Gillette, Buffalo, and Douglas, the PRB study area is characterized by a rural landscape that has been modified by oil and gas field development, coal mines, grazing, and small towns. Grazing is evident in most of the area. Highways, county roads, private roads, and utility lines also are evident throughout the area. Portions of the study area remain natural and undeveloped in character despite widespread mineral development and grazing.

The most significant scenic values occur in the western portion of the study area. The South Big Horn Area, located in the southwest quarter of Johnson County primarily along the Middle Fork of the Powder River, provides sensitive and unique resource values, including scenery. Special management areas (SMAs) within the South Big Horn Area include the Middle Fork RA, the Red Wall/Hole-in-the-Wall area, Outlaw Cave, Dull Knife Battlefield site, and the Gardner Mountain and North Fork WSAs. The Powder River breaks in eastern Johnson County, the Fortification Creek SMA and WSA, and the Weston Hills RA in the eastern part of the study area also provide scenic settings for a variety of dispersed recreational activities.

Two scenic byways in the western part of the study area provide access to the Big Horn Mountains. The Bighorn Scenic Byway is on U.S. Highway 14 west of Ranchester. The Cloud Peak Skyway is on U.S Highway 16 west of Buffalo.

Oil and gas pumping units and associated well pads and access roads are evident in much of the study area. A majority of existing wells and facilities are in the eastern half of the study area in

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40- and 80-acre well spacing patterns. Well development is most evident in Campbell County between the cities of Gillette and Wright, and north, west, and northwest of Gillette. Development also is evident along I-90, and U.S. Highways 14 and 16 in Campbell and Sheridan counties. The landscape that has resulted from ongoing oil and gas development in this area is rural/industrial in character. The wells are intrusive (defined as readily visible) and visually dominant in the foreground (0.25- to 0.5-mile from the observer) views from roads and trails. In middleground (generally 0.5 mile to 3 miles) and background (more than 3 miles) distance zones, well pads and associated access road clearings are the most obvious feature of oil and gas development. Clearings are visible as light brownish gray exposed soils in geometric shapes with straight, linear edges that provide textural and color contrasts with the surrounding undisturbed vegetation. In general, oil and gas facilities are visually subordinate to the landscape in middle to background distance zones.

For natural gas development, the most prominent visual features, other than well pads, are the large compressor stations that transport the collected gas into and through the major pipelines. Although colors usually are selected to blend with the surroundings, the scale and character of the structures is often larger and appears more industrial than the agricultural landscape and facilities common to the area. Oil development, on the other hand, generally entails use of pumping “mules” on each well and tanks to store the oil awaiting shipment. Though typically smaller than the compressor stations, these facilities are more widely dispersed in the landscape and sometimes exhibit greater color contrast.

Coal mining occurs primarily in the east-central part of the PRB study area, east and south of Gillette. Twelve open-pit coal mines are actively producing coal in Campbell County; one coal mine in Campbell County is temporarily inactive. Open-pit mining results in landscapes that have been altered considerably from the natural character of the landscape. The topography of the landform is modified; there are significant color contrasts from exposed soils and spoil piles; vegetation is removed until post-mining reclamation occurs; dust is generated from mining operations; and associated infrastructure such as buildings, rail spurs, and road systems are introduced into the landscape that previously appeared relatively natural. Coal mines dominate foreground and middleground views in the affected viewsheds; background views generally depend on the status of reclamation activities and the perspective from a particular viewpoint. Coal mines commonly result in greatly disturbed landscapes that require rehabilitation through required reclamation activity after mining (see “Class V” in **Table 2.8-2** under VRM below).

### **Visual Resource Management**

**Bureau of Land Management.** The BLM is responsible for identifying and protecting scenic values on public lands under several provisions of the Federal Land Policy and Management Act of 1976 and NEPA. The BLM VRM system was developed to facilitate the effective discharge of that responsibility in a systematic, interdisciplinary manner. The VRM system includes an inventory process, based on a matrix of scenic quality, viewer sensitivity to visual change, and viewing distances, which leads to classification of public lands and assignment of visual management objectives. Five VRM classes have been established, which serve two purposes: 1) as an inventory tool portraying the relative value of existing visual resources, and 2) as a management tool portraying visual management objectives for the respective classified lands. (Class V requires selection of a different class as the management objective.) The management objectives for each of

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the VRM classes are displayed in **Table 2.8-2**. The system also includes a contrast rating procedure for evaluating the potential visual effects of a proposed project or management activity.

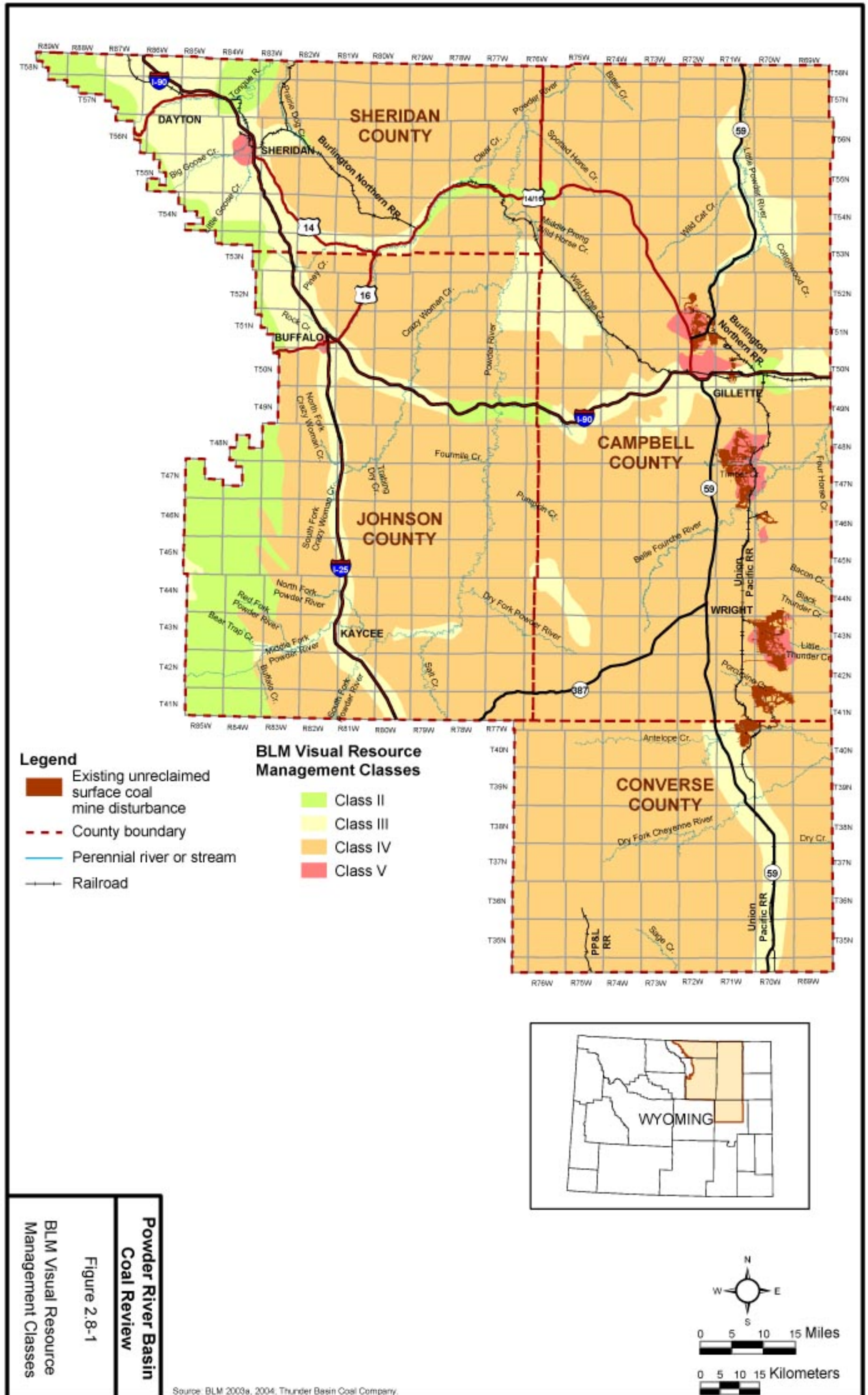
**Table 2.8-2  
BLM Visual Resource Management Class Objectives**

Class	Description
Class I Objective	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. (Class I is limited to application in wilderness areas, wild and scenic rivers, and similar situations.)
Class II Objective	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 (design) elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III Objective	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.
Class IV Objective	The objective of this class is to provide for management activities that require major modification of 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 be 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.
Class V Rehabilitation Areas	Areas in need of rehabilitation from a visual standpoint should be flagged during the inventory process. The level of rehabilitation will be determined through the resource management planning process by assigning the VRM class approved for that particular area.

Source: BLM 1986a.

The BLM has inventoried visual resources and established VRM classes for all BLM, state, and private land in the study area according to the VRM system. The inventory includes state, USFS, and private lands as well as BLM-administered lands; however, the BLM has the authority and responsibility to manage visual resources only on BLM-administered lands. Many private and public lands in the area have increased in sensitivity since the last inventory conducted in the 1970s as a result of increases in population and lifestyle shifts that emphasize outdoor recreation. Four VRM classes have been identified in the study area. **Figure 2.8-1** shows the generalized pattern of VRM classes for the study area.

As **Figure 2.8-1** illustrates, Class IV is the predominant VRM class, encompassing approximately 78 percent of the study area. Class III follows with approximately 14 percent. Class II applies to approximately 8 percent of the area. Generally speaking, the Class III areas reflect greater sensitivity along major highway corridors, and the major Class II areas reflect somewhat higher scenic quality, particularly along the foothills of the Big Horn Mountains. Class V (Rehabilitation)



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areas were applied primarily to active coal mines and to certain areas around several of the larger communities in the study area. Class V is applied to approximately 1 percent of the study area.

**U.S. Forest Service.** The Medicine Bow-Routt National Forest has developed a Revised Land and RMP for the TBNG (USFS 2001a). The USFS has inventoried visual resources under the new SMS, which incorporates viewing distance zones, concern level (public importance), scenic attractiveness (indicator of intrinsic scenic beauty of a landscape), scenic class (determined by combining the scenic attractiveness with distance zone and concern levels), and existing scenic integrity (state of naturalness).

Scenic Integrity Objectives (SIO) were assigned to each management area based on the intent of the management area direction. SIOs provide goals for management of grassland and forest scenic resources. There are five SIOs ranging from Very Low to Very High, plus an inventory class (“unacceptably low”) (see **Table 2.8-3**) which is similar in nature to the BLM Class V. TBNG lands in the PRB study area have been inventoried with two scenic integrity levels, Low and Moderate. A Low scenic integrity level refers to landscapes where the valued landscape character appears moderately altered. Most of the TBNG lands in the study area are managed with the scenic integrity level of Low, as the grassland landscape appears moderately altered by oil, gas, and mineral development, and, to a lesser extent, some grazing improvements (e.g., fences). The Moderate scenic integrity level refers to landscapes where the valued landscape character appears slightly altered. Portions of TBNG lands along Antelope Creek and east of SR 59 in Converse County are assigned a scenic integrity level of Moderate.

Visual management objectives for SIOs are associated with desired landscape character for each management area and are based on the intent of the management area direction. The desired condition for landscapes in each of the seven management areas within the PRB study area is summarized in **Table 2.8-4**.

**Counties.** The Sheridan County Growth Management Plan, a comprehensive master plan for the City of Sheridan and Sheridan County, was prepared in 2001 (Sheridan County 2001a). One of the primary themes identified in the plan is to maintain a community character that preserves the quality of life, values, and traditions of the area. Pursuant to this theme, Goal D of the plan encourages the county to inventory “natural or scenic resource areas,” among other things, with the ultimate intent of requiring mitigation before a development that would affect the resource could proceed (Sheridan County 2001a).

The City of Gillette and Campbell County jointly have prepared a Comprehensive Planning Program, last updated in 1994. The program identifies parks and recreation planning, including landscaping and beautification, as an essential element determining the character and quality of an environment. The program recommendation is that where industrial areas are located adjacent to residential areas, landscaping should be developed into the buffer zone between two uses.

The General Land Use Plan for Converse County was developed in 1978 and revised in 2003. The Converse Plan does not identify any objectives or policies for scenic resources or landscape character in the county.

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**Table 2.8-3  
USFS Scenery Management System Scenic Integrity Objectives**

<b>Class</b>	<b>Description</b>
Very High (Unaltered) Preservation	Very High scenic integrity refers to landscapes where the valued landscape character "is" intact with only minute, if any, deviations. The existing landscape character and sense of place is expressed at the highest possible level.
High (Appears Unaltered) Retention	High scenic integrity refers to landscapes where the valued landscape character "appears" intact. Deviations may be present, but must repeat form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.
Moderate (Slightly Altered) Partial Retention	Moderate scenic integrity refers to landscapes where the valued landscape character "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed.
Low (Moderately Altered) Modification	Low scenic integrity refers to landscapes where the valued landscape character "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed, but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed, but compatible or complimentary to the character within.
Very Low (Heavily Altered) Maximum Modification	Very low scenic integrity refers to landscapes where the valued landscape character "appears heavily altered." Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles within or outside the landscape being viewed. However, deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition.
Unacceptably Low	Scenic integrity refers to landscapes where the valued landscape character appears extremely altered. Deviations are extremely dominant and borrow little if any form, line, color, texture, pattern, or scale from the landscape character. Landscapes at this level of integrity need rehabilitation. This level should only be used to inventory existing integrity. It must not be used as a management objective.

Source: USFS 1995.

Johnson County currently does not have countywide zoning districts, land use districts, or a comprehensive land use plan; however, the county promulgated a Draft Comprehensive Land Use Plan in June 2004, which currently is under review (Johnson County 2004). The Buffalo/Johnson Joint Land Use Plan, which was adopted in August 2001, primarily addresses land uses adjacent to the residential areas within less than 10 miles of Buffalo. This plan will be superseded when the new comprehensive plan is adopted. Although the draft comprehensive plan recognizes the value of scenic views for attracting tourism, there currently are no specific goals for the management of scenic resources in the county.

**Table 2.8-4  
Desired Visual Conditions for TBNG Management Areas  
within the Study Area**

Management Area	Desired Condition for Scenic Values
Black-footed Ferret Reintroduction Habitat	NA
Rangelands with Diverse Natural-appearing Landscapes	Natural appearing landscapes predominate; however, oil and gas facilities may occur and are subordinate to the landscape.
Big Game Range	NA
Dispersed Recreation: High Use	Appears as a natural landscape over large areas, but modifications on a small scale are acceptable and blend with the area's natural features.
General Forest and Rangelands: Range Vegetation Emphasis	These areas are dominated by open meadows, grasslands, shrublands, and areas of woody vegetation. Signs of motorized travel, hunting, hiking, timber harvest, mining, and grazing may be evident.
Rangeland with Broad Resource Emphasis	NA
Mineral Production and Development	Facilities and landscape modifications are visible but are reasonably mitigated to blend and harmonize with natural features. Reclamation activities restore the area to a reasonable level of its pre-mining condition.

Note: NA = not applicable.

Source: BLM 2003a.

### **Visual Sensitivity**

The level of sensitivity to landscape modifications in the study area ranges from low to high. Most of the study area is not visually sensitive because of its remoteness from viewpoints used by the public. The overall population density of the rural portion of the PRB study area is low. Visitor use of most public lands in the study area is light for recreation or other activities. The portions of the area that have relatively higher levels of sensitivity to landscape modification occur near communities, along highway corridors, and at recreation-use areas. A substantial number of residents and visitors exposed to these landscapes would have a concern for scenic quality and would be sensitive to modifications to the landscape. In general, residents and other users of some portions of the area already developed with gas wells and coal mining are accustomed to viewing existing mineral resource development, but could be more sensitive to increased levels of development.

A majority of the more sensitive areas occur in the western part of the study area, including I-25, the cities of Sheridan and Buffalo, and several recreation and historic sites. The I-25 corridor, which connects several study area communities, has the highest levels of traffic of any area highway. Sensitive areas in the remainder of the PRB study area include Gillette and recreational use areas in the eastern part of the study area. Other travel routes include I-90, several state highways, and numerous county roads and BLM roads that access the area from the highways. Public use of BLM roads is relatively low with motorists being in the categories of local ranchers and residents, coal mine and gas field personnel, and some recreationists.

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### **2.8.4 Comparison to Previous Predictions**

#### **Noise**

Noise forecasts for PRB coal development were not provided in the Eastern Powder River Coal Final EIS (BLM 1979). Estimates in the Powder River Regional Coal Final EIS (BLM 1981) were limited to the potential effects of coal train traffic on downstream communities. Current levels of coal train traffic (see Section 2.9.4) indicate substantially fewer coal trains on Burlington Northern and Santa Fe Railroad (BNSF) lines through Newcastle and Torrington than were predicted in 1981, which indicates noise levels would be commensurately lower than predicted. There was no estimate of rail traffic on the Union Pacific (UP) line through Lusk in either the 1979 EIS or the 1981 EIS. Current levels of coal train traffic on that route are approximately two-thirds of the predicted traffic level for the Newcastle line, which suggests noise levels notably below the level predicted for Newcastle in the 1981 Final EIS.

#### **Visual Resources**

Previous forecasts of effects of coal development on visual resources in the PRB were general in nature, indicating reductions in VRM classification at mine sites during active mining followed by returns to pre-mining VRM Class III or IV after successful reclamation. Limited field observations suggest this predicted pattern has been largely accurate. Many of the mines are not readily visible from sensitive or high activity viewing areas, which has minimized the adverse visual effects to some degree.