

## 1.0 Introduction

The Powder River Basin (PRB) Coal Review is a regional technical study for assessing the existing conditions and the projected future cumulative impacts associated with past, present, and reasonably foreseeable development (RFD) activities in the PRB. This Task 2 report summarizes the past and present energy-related development activities that have occurred in the PRB through the end of base year 2008 and the projected RFD activities for future years 2020 and 2030. The Task 2 component of the study provides the basis for the analysis of cumulative impacts for air quality, water resources, social and economic values, and other environmental resources as a result of existing and ongoing energy-related development in the PRB; the base year conditions (Task 1) and projected cumulative effects (Task 3) for these resources are described in separate stand-alone documents. This study is being conducted by AECOM, Inc. dba AECOM Environment (AECOM) under the direction of the Bureau of Land Management (BLM) High Plains District Office and Wyoming State Office.

### 1.1 Study Background

The PRB of Wyoming and Montana is a major energy development area with diverse resource and environmental values. The PRB is the largest coal-producing region in the United States (U.S.); PRB coal is used to generate electricity both within and outside of the region. The PRB also has produced large amounts of oil and natural gas resources. Over the last decade, this region has experienced nationally significant development of natural gas from coal seams (coal bed natural gas [CBNG]).

During the 1970s and early 1980s, federal coal leasing in the PRB was a high profile activity as over 90 percent of the coal is federally owned. Between 1974 and 1982, the BLM issued three and started a fourth separate regional coal environmental impact statement (EIS), all addressing federal coal leasing and development, as well as other regional development.

In 1982, the BLM temporarily halted further coal leasing. However, mining continued on existing leases. When leasing resumed in 1990, the existing mines were mature operations, and there was no need for regional leasing to open new mines. However, many of the mines were depleting their original reserves, so there was a need for maintenance leasing to provide the reserves to enable existing mines to meet the expanding demand. At that time, the Powder River Regional Coal Team decertified the region, allowing BLM to use the lease by application (LBA) process to meet this need.

To date, the BLM continues to use the LBA process to meet the need for maintenance coal leasing. Each LBA requires preparation of an EIS or environmental assessment (EA), as appropriate, as part of the leasing process. As required under the National Environmental Policy Act (NEPA), each EIS and EA must include an evaluation of the cumulative impacts on the environment that result from the incremental impact of the action (e.g., an LBA) when added to other past, present, and reasonably foreseeable future actions.

Starting with the first LBAs, the BLM met the need for cumulative analysis in each EIS or EA with a discrete analysis that was updated for each subsequent EIS or EA. In the mid-1990s, the BLM conducted a study called the Coal Development Status Check (BLM 1996) to evaluate how actual development levels compared to the development levels predicted in the earlier regional EISs. In the late 1990s, annual coal production and associated impacts drew closer to the maximum projections in the regional EISs. Furthermore, the large scale oil and gas development associated with CBNG activity had not been foreseen in those EISs. To meet the need of the coal mine LBA EISs and EAs at that time, the BLM used the cumulative analysis from their Wyodak Final EIS (BLM 1999) and their PRB Oil and Gas Final EIS (BLM 2003), particularly for air and water resources. Both EISs projected regional development, including CBNG activity. They both also used market demand projections to estimate future levels of coal development.

In early 2003, Montgomery Watson Harza (MWH), in coordination with the BLM, completed a study of PRB coal demand through 2020 (MWH 2003). The study projected production to increase at a steady pace, with current mines able to meet the demand as long as the existing mines continued to have access to additional coal reserves. Therefore, the need for leasing using LBAs will continue into the foreseeable future. As part of processing these LBAs, BLM will need to maintain a current cumulative impact analysis. The PRB Coal Review study was developed to meet that need.

Initiated in 2003, Phase I of the PRB Coal Review included the identification of current conditions (Task 1 reports); identification of base year (2003 and subsequently 2007) and RFD energy-related activities (including future coal production scenarios) for 2010, 2015, and 2020 (Task 2 report); and predicted future cumulative impacts (Task 3 reports) in the PRB. Phase II of the PRB Coal Review was initiated in January 2010 to update the Phase I analyses. Under Phase II of the study, base year information and current conditions descriptions have been updated through the end of 2008. Also, new RFD projects have been developed, and projected cumulative impacts will be analyzed for 2020 and 2030.

The PRB Coal Review provides data, models, and projections to facilitate cumulative analyses for BLM's future land use planning efforts and for the cumulative impact sections of future coal mine LBA EISs and EAs in compliance with NEPA. It should be noted that the PRB Coal Review itself is not a NEPA document. It also is not a policy study, analysis of regulatory actions, or an analysis of the impacts of project-specific development.

For purposes of this study, the Wyoming PRB cumulative effects study area (**Figure 1-1**) comprises all of Campbell County, all of Sheridan and Johnson counties outside of the Bighorn National Forest lands to the west of the PRB, and the northern portion of Converse County. 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 Thunder Basin National Grasslands, which is administered by the U.S. Forest Service (FS) (**Figure 1-2**). The Montana portion of the PRB cumulative effects study area (**Figure 1-1**) comprises the area of relevant coal mines and the air quality cumulative effects study area, including portions of Rosebud, Custer, Powder River, Big Horn, and Treasure counties. It encompasses the area administered by the BLM Miles City Field Office and the Billings Field Office (**Figure 1-2**). State and privately owned lands also are included in the study area (**Figure 1-3**).

As shown in **Figure 1-3**, the majority of the surface ownership in the PRB cumulative effects study area is private. Conversely, the majority of the mineral ownership in the Wyoming PRB cumulative effects study area is federal (**Figure 1-4**). Federal mineral ownership may include all minerals in some locations and only specific minerals (e.g., coal or oil and gas) in other locations. As a result, split-estates (where the surface ownership is different than the mineral ownership) exist in a large portion of the PRB.

The Task 2 component of the PRB Coal Review defines the past and present development actions in the study area that have contributed to the existing environmental and socioeconomic conditions in the PRB cumulative effects study area, as well as the projected RFD scenarios for the Wyoming and Montana PRB cumulative effects study areas. For the Wyoming PRB, the past and present development and RFD scenarios include coal mine development as well as coal-related activities (e.g., railroads and coal-fired power plants) and non-coal-related activities (e.g., other minerals, CBNG, and conventional oil and gas). Past and present development and RFD scenarios for coal mine development and coal-related activities also are included for the Montana PRB.

### 1.1.1 Phase I of the Study

Phase I of the PRB Coal Review was developed as a regional technical study for assessing the existing environmental and socioeconomic conditions in the PRB study area as of the end of 2003 and the projected future cumulative impacts associated with ongoing energy-related development in the PRB for years 2010, 2015, and 2020. A subsequent update of both the existing conditions through the end of 2007 and the projected future cumulative impacts for years 2010, 2015, and 2020 also was completed

during Phase I. The past and present activities identified in the original Task 2 report (ENSR 2005) were based on the available data at the end of 2003 and provided the basis for the resource-specific descriptions of existing conditions presented in the PRB Coal Review Task 1 reports. The past and present activities described in the updated Task 2 report (AECOM 2009a) were based on the available data for energy-related development in the study area through base year 2007 and reflected updated information on the status of existing projects, as well as identification of newly constructed and operational projects since 2003.

The RFD scenarios presented in the original Task 2 report (ENSR 2005) were based on information available through the end of 2004 and provided the basis for the analysis of potential cumulative impacts in the Task 3 reports. The RFD scenarios presented in the updated Task 2 report (AECOM 2009a) reflected updated information available on previously identified foreseeable development, as well as information on newly identified foreseeable development projected to be operational or constructed by 2010, 2015, or 2020.

### **1.1.2 Phase II of the Study**

Identical to Phase I, Phase II of the PRB Coal Review is a regional technical study to determine the base year (2008) conditions and assess potential future (2020 and 2030) cumulative effects of projected development-related activities in the PRB. Phase II of the study was initiated due to the ongoing energy-related development in the PRB, the elapsed time since initiation of Phase I of the study, and the BLM's need to maintain up-to-date development projections and related predicted future cumulative impact analyses for use in the agency LBA EISs and EAs. Under Phase II, the existing and projected future energy-related development activities have been updated (Task 2) based on updated information, and the air quality, water resources, socioeconomic, and environmental resources base year analyses (Task 1) and projected cumulative impact analyses (Task 3) subsequently will be updated.

### **1.1.3 Overview of Approach**

The accuracy of any projected cumulative impact analysis is dependent on the adequacy and accuracy of information regarding potential future development activities in the affected area. While it is impossible to identify all potential future activities over the next 20 years, it is possible and desirable to identify RFDs based on current industry announcements, agency plans, economic trends, and technological advances affecting major industry sectors. Information regarding potential new development is constantly changing; therefore, to facilitate development of the information in this study, the RFDs identified in this report reflect information available through mid 2010.

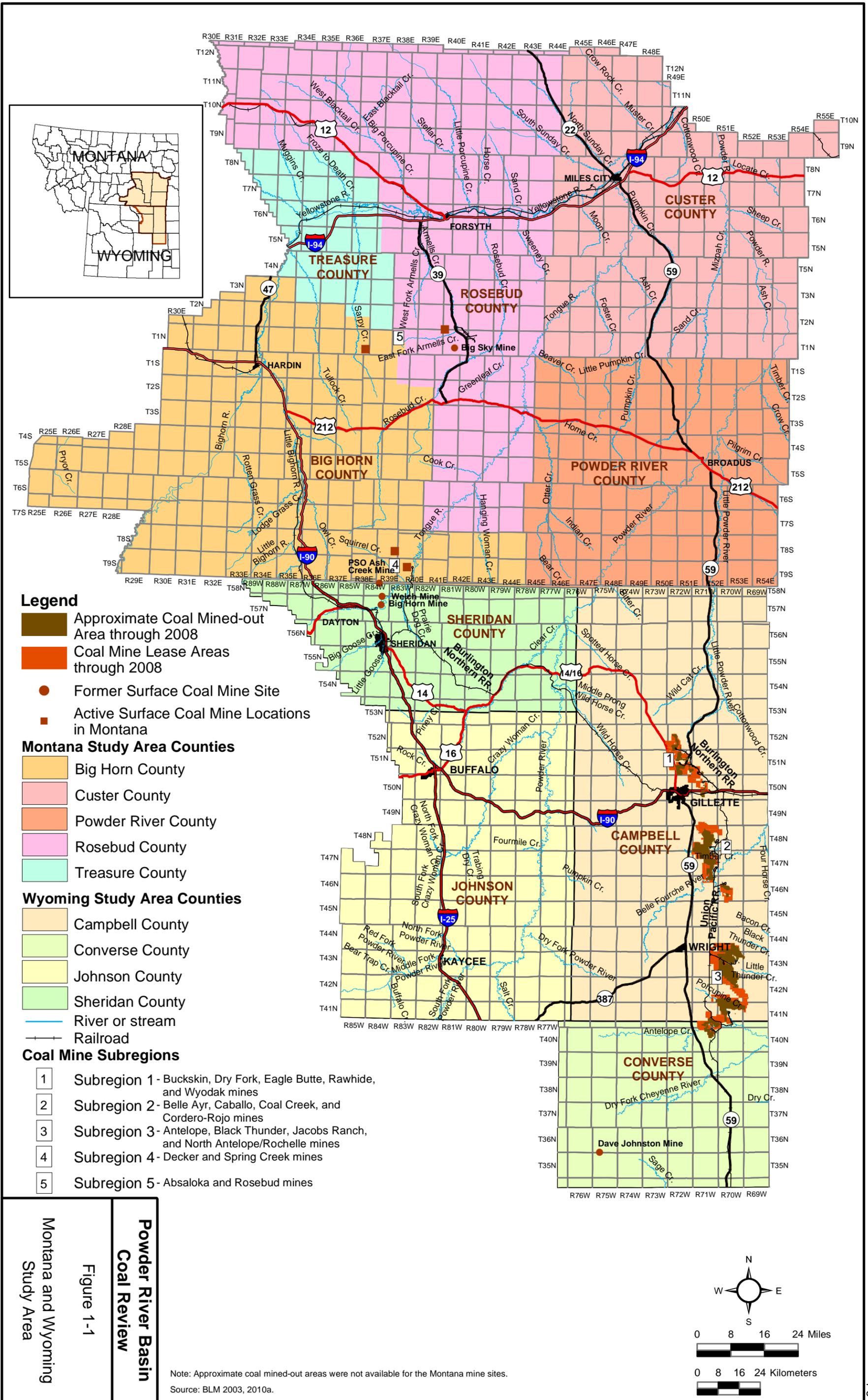
The past and present actions in this report were identified based on information in the updated Phase I PRB Coal Review Task 2 report (AECOM 2009a), existing NEPA documents on file with federal and state agencies, operating permits and annual reports on file with state agencies, and industry contacts. The RFD scenarios in this report were developed based on recent information that identifies proposed and anticipated development in the PRB, including NEPA documents; various other technical reports and studies; federal, state, and local (county) agency management plans; and permit applications. The specific development scenarios and development activities identified in these sources were assessed as to their current status prior to inclusion in the RFD scenarios for the PRB Coal Review. In addition, potential additional projects were identified through interviews with agency and industry representatives, review of published news articles and trade publications, and discussions with community leaders.

The identified RFD activities subsequently were evaluated as to their likelihood for occurrence. Due to the lack of detailed information for many developments beyond the next few years, the degree of uncertainty associated with the predicted developments and trends increases as the timeframe extends further into the future. In addition, the variables and uncertainties associated with potential future changes in regulations for air emissions, as well as the current attention focused on climate change and the role of coal in meeting future demand, also add to the degree of uncertainty associated with future projections as acknowledged in the applicable sections of this report.

For each of the past and present and RFD projects and activities, project-specific impact-causing parameters (e.g., disturbance acreage, groundwater pumping rates, employment levels, etc.) have been compiled from the sources identified above. Where specific information was unavailable, assumptions were developed and included based on typical industry-specific standards, permit criteria for similar existing industries, and professional judgment.

In order to account for the variables associated with future coal production, two detailed coal production scenarios (reflecting upper and lower production estimates) were projected for this study to bracket the most likely foreseeable regional coal production level and to provide a basis for quantification of related impact-causing parameters. These future production levels were derived from the analysis of historic production levels and current PRB coal market forecasts, public and private information sources, and input from individual PRB coal operators.

The methodology used to define the past and present and RFD activities is summarized in Chapter 2.0. Information specific to the past and present and RFD activities identified for this study is summarized in Chapter 3.0. The summary of the associated impact-causing parameters is provided in **Appendices A** through **C** of this report.



**Legend**

- Approximate Coal Mined-out Area through 2008
- Coal Mine Lease Areas through 2008
- Former Surface Coal Mine Site
- Active Surface Coal Mine Locations in Montana

**Montana Study Area Counties**

- Big Horn County
- Custer County
- Powder River County
- Rosebud County
- Treasure County

**Wyoming Study Area Counties**

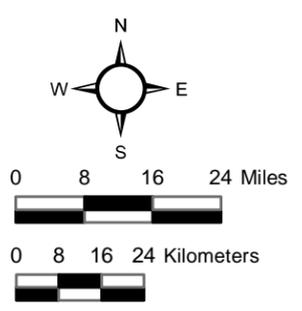
- Campbell County
- Converse County
- Johnson County
- Sheridan County
- River or stream
- Railroad

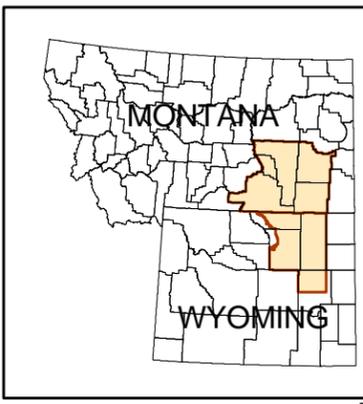
**Coal Mine Subregions**

- 1 Subregion 1 - Buckskin, Dry Fork, Eagle Butte, Rawhide, and Wyodak mines
- 2 Subregion 2 - Belle Ayr, Caballo, Coal Creek, and Cordero-Rojo mines
- 3 Subregion 3 - Antelope, Black Thunder, Jacobs Ranch, and North Antelope/Rochelle mines
- 4 Subregion 4 - Decker and Spring Creek mines
- 5 Subregion 5 - Absaloka and Rosebud mines

**Powder River Basin Coal Review**  
 Figure 1-1  
 Montana and Wyoming Study Area

Note: Approximate coal mined-out areas were not available for the Montana mine sites.  
 Source: BLM 2003, 2010a.





**Legend**

- Approximate Coal Mined-out Area through 2008
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- Active Surface Coal Mine Locations in Montana

**Montana Study Area**

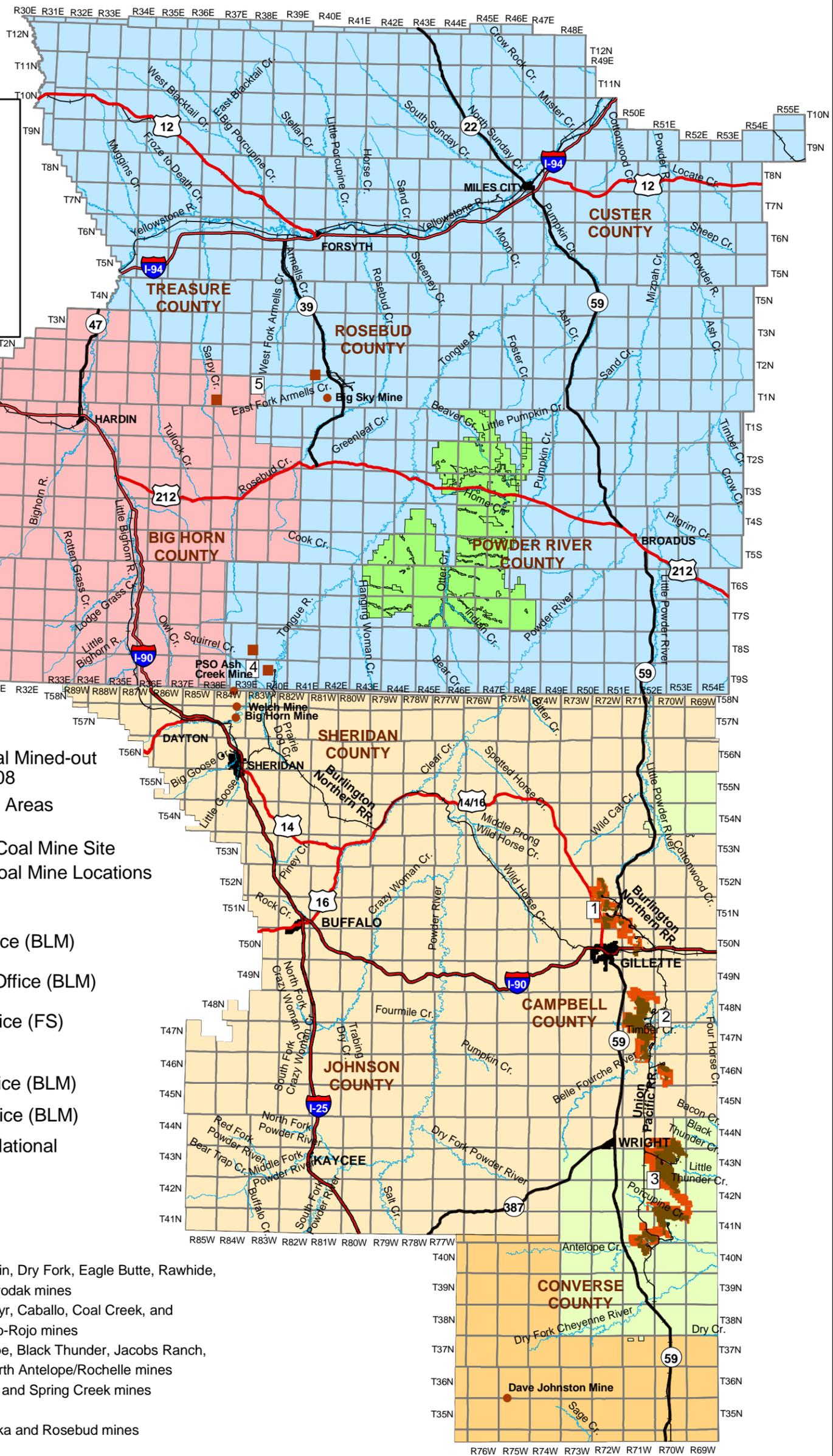
- Billings Field Office (BLM)
- Miles City Field Office (BLM)
- U.S. Forest Service (FS)

**Wyoming Study Area**

- Buffalo Field Office (BLM)
- Casper Field Office (BLM)
- Thunder Basin National Grasslands (FS)
- River or stream
- Railroad

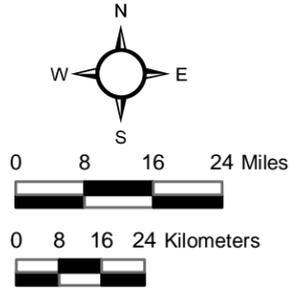
**Coal Mine Subregions**

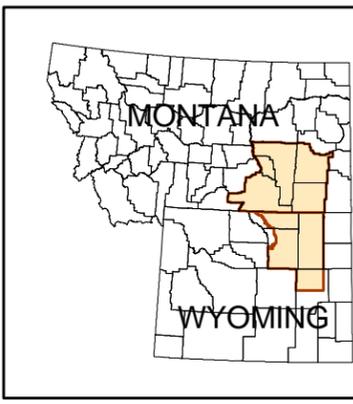
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- 3 Subregion 3 - Antelope, Black Thunder, Jacobs Ranch, and North Antelope/Rochelle mines
- 4 Subregion 4 - Decker and Spring Creek mines
- 5 Subregion 5 - Absaloka and Rosebud mines



**Powder River Basin Coal Review**  
 Federal Land Management  
 Figure 1-2

Note: Approximate coal mined-out areas were not available for the Montana mine sites.  
 Source: BLM 2003, 2010.





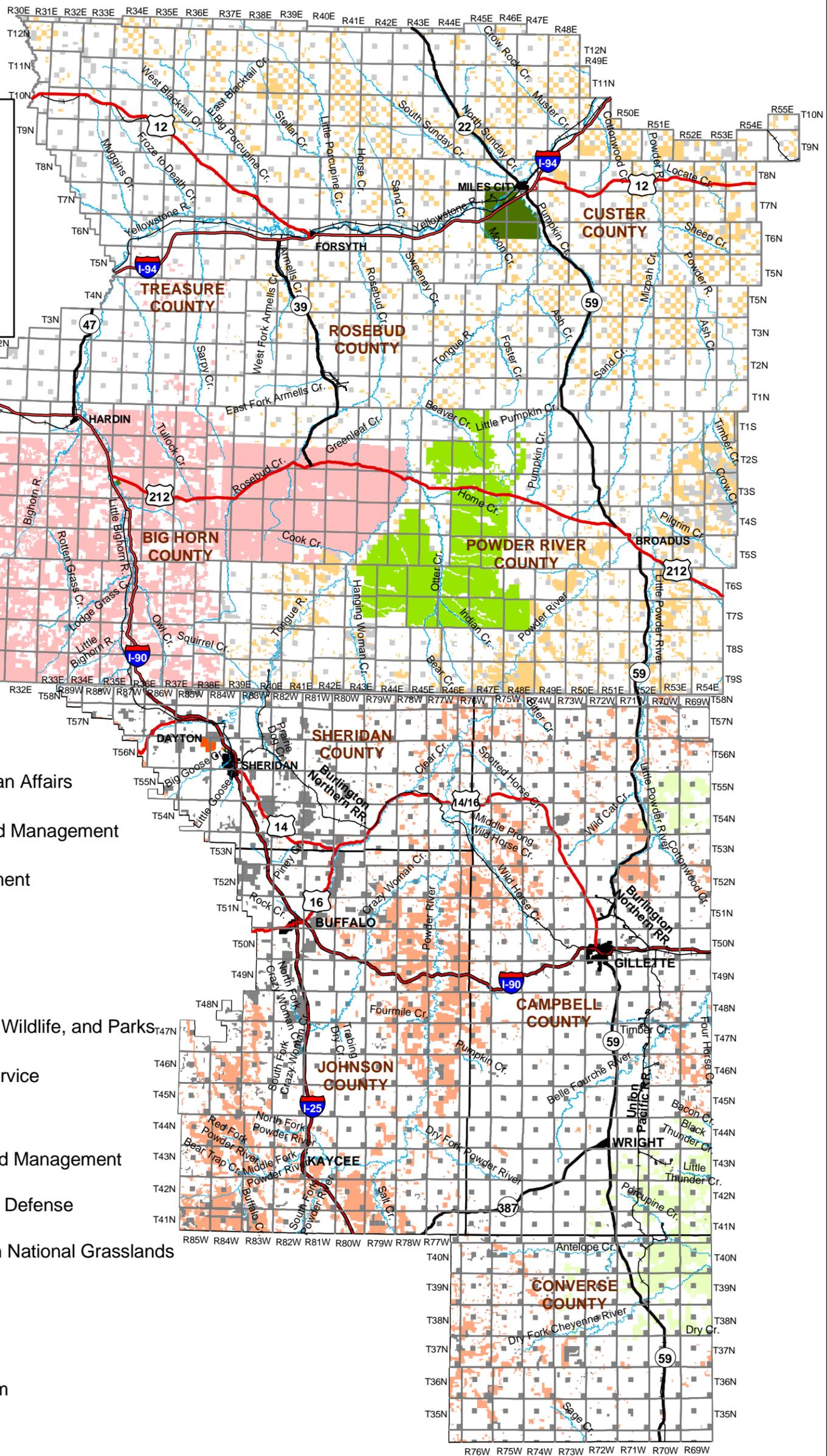
**Legend**

**Montana Study Area**

- Bureau of Indian Affairs
- Bureau of Land Management
- Local Government
- Other Federal
- Private
- Montana Fish, Wildlife, and Parks
- U.S. Forest Service

**Wyoming Study Area**

- Bureau of Land Management
- Department of Defense
- Thunder Basin National Grasslands
- Private
- State
- River or stream
- Railroad



**Powder River Basin Coal Review**  
 Figure 1-3  
 Surface Ownership

Source: BLM 2003.

