

1.0 INTRODUCTION

The Powder River Basin (PRB) of Wyoming and Montana is a major energy development area with diverse 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 gas resources. Over the last decade, this region has experienced nationally significant development of natural gas from coal seams (coal bed natural gas [CBNG]).

BLM is required to complete a National Environmental Policy Act (NEPA) analysis (environmental impact statement [EIS] or environmental assessment [EA]) for each coal lease by application (LBA) as part of the leasing process. In the coal leasing EAs and EISs that have been prepared since the Powder River Regional Coal Team decertified the region in early 1990 (thereby allowing BLM to use the coal LBA process), cumulative impacts have been addressed in a separate section of the NEPA analyses to highlight the distinction between site-specific and cumulative impacts. With coal leasing continuing into the foreseeable future, and with impacts related to oil and gas development increasing beginning in the late 1990s due to development of coal bed natural gas (CBNG) in the PRB, BLM initiated studies and analyses to provide a consistent basis for evaluation of cumulative impacts in the coal leasing EISs. These studies and analyses included the PRB Coal Development Status Check (BLM 1996), Wyodak EIS (BLM 1999), PRB Oil and Gas EIS (BLM 2003), Montgomery Watson Harza (2003) study of PRB coal demand through 2020, and most recently, the PRB Coal Review.

Initiated in 2003, the PRB Coal Review includes the identification of current conditions (Task 1 reports), identification of reasonably foreseeable development (RFD) and future coal production scenarios (Task 2 Report), and predicted future cumulative impacts (Task 3 reports) in the PRB. All PRB Coal Review reports can be accessed from the BLM website.¹ For the air quality component 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 Bureau of Land Management (BLM) Buffalo Field Office, a portion of the area administered by the BLM High Plains District Office, and a portion of the Thunder Basin National Grasslands, which is administered by the U.S. Department of Agriculture-Forest Service (FS). The Montana portion of the PRB cumulative effects study area for air quality (**Figure 1-1**) comprises the area of relevant coal mines including portions of Rosebud, Custer, Powder River, Big Horn, and Treasure counties. It encompasses the area administered by the BLM Miles City Field Office. State and private lands also are included in the study area.

The Task 1A Report for the PRB Coal Review, Current Air Quality Conditions (ENSR 2005a) documented the air quality impacts of operations during a base year (2002), using actual emissions and operations for that year. The base year analysis evaluated impacts both within the PRB itself and at selected sensitive areas surrounding the region. The analysis specifically looked at impacts of coal mines, power plants, CBNG development, and other activities. Results were provided for both Wyoming and Montana source groups and receptors.

¹ http://www.blm.gov/wy/st/en/programs/energy/Coal_Resources/PRB_Coal/prbdocs.html

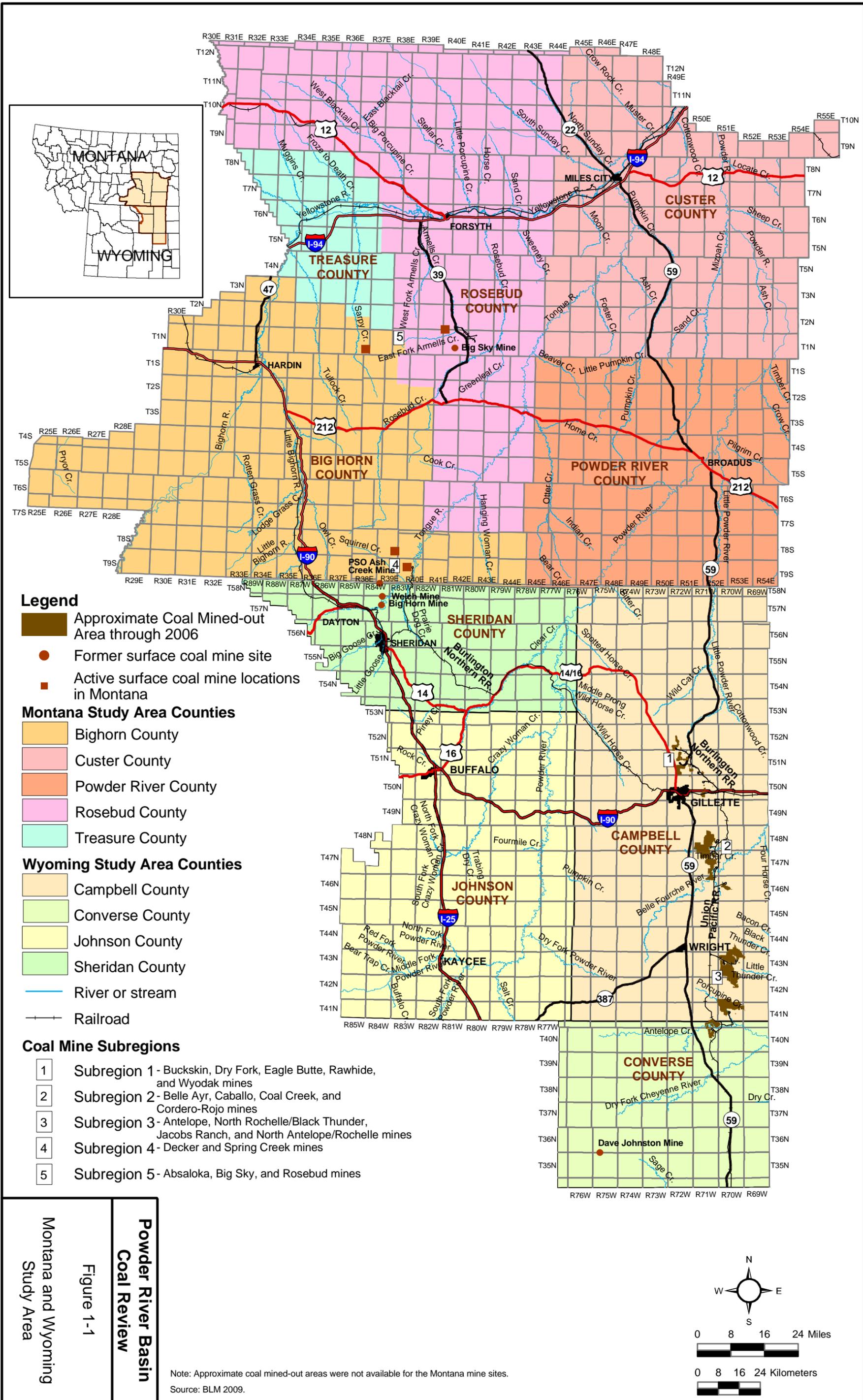
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The Task 2 component of the PRB Coal Review defined the past and present development actions in the study area that have contributed to the current environmental and socioeconomic conditions in the PRB study area. The Task 2 study also defined the projected RFD scenarios in the Wyoming and Montana PRB for years 2010, 2015, and 2020. The past and present actions were identified based on information in existing NEPA documents on file with federal and state agencies, and the Coal Development Status Check (BLM 1996). The identified RFD activities subsequently were evaluated as to their probability for occurrence. 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 to span the range of most likely foreseeable regional coal production levels and to provide a basis for quantification of development parameters that can be used to assess impacts. 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; and they are summarized in the Task 2 report (ENSR 2005b). The RFD scenarios presented in the Task 2 Report provide the basis for the analysis of potential cumulative impacts in the Task 3 component of the study. The 2020 RFD scenarios from the Task 2 report were updated with current information, as applicable, and revised emissions were included in this updated analysis.

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. As a result, the original Task 3A study (ENSR 2006) directly modeled RFD projections only for the year 2010. The original Task 3A study qualitatively evaluated cumulative air quality effects for years 2015 and 2020 based on the 2010 modeled impacts and the RFD projections from the Task 2 report. When the original Task 3A study was completed in 2006, the projected RFD activities for 2015 and 2020 had a higher level of uncertainty than is currently associated with revised projections. As the uncertainty associated with predicted developments for 2015 and 2020 decreased, it became increasingly valuable to update the original Task 3A qualitative estimates for 2015 and 2020 with a quantitative evaluation. In 2008, the cumulative air quality effects for 2015 were modeled, and the Task 3A study correspondingly was updated. The updated Task 3A report (ENSR 2008a) is referred to hereafter as the 2015 Update.¹

This current update to the Task 3A report quantitatively updates the original Task 3A qualitative analysis of projected changes in impacts on air quality and air quality-related values (AQRVs) resulting from projected upper and lower RFD activities in 2020. This updated report is supplemental in nature and focuses exclusively on summarizing updated information and documenting any changes that have occurred since submittal of the original Task 3A Report and the 2015 Update. As the PRB Coal Review's underlying objectives and methodology have not changed since the 2015 Update report, this 2020 update to the Task 3A report does not reiterate this information, which is available in the 2015 Update (ENSR 2008a). Instead, this updated Task 3A Report details all technical changes relative to the 2015 Update report in Chapter 2.0, provides a summary of impacts for the projected 2020 scenarios in Chapter 3.0, and compares projected 2020 results to both the revised base year (2004) and to the previous qualitative projections from the original Task 3A report in Chapter 4.0.

¹ Available at http://www.blm.gov/wy/st/en/programs/energy/Coal_Resources/PRB_Coal/prbdocs.html



Legend

- Approximate Coal Mined-out Area through 2006
- 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

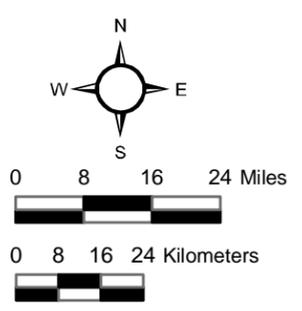
- Campbell County
- Converse County
- Johnson County
- Sheridan County
- River or stream
- Railroad

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, North Rochelle/Black Thunder, Jacobs Ranch, and North Antelope/Rochelle mines
- 4 Subregion 4 - Decker and Spring Creek mines
- 5 Subregion 5 - Absaloka, Big Sky, 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 2009.



1.1 Objectives

The PRB Coal Review is a regional technical study to assess cumulative impacts associated with past, present, and RFD in the PRB. The overall objectives of the PRB Coal Review have not changed from the original Task 3A Report. This current update to the Task 3A report furthers the objective of estimating the environmental impacts associated with RFD through the year 2020. The primary objective for updating the Task 3A report is to provide a quantitative evaluation of potential cumulative air quality effects for 2020.

Secondary objectives of this update are to develop the projected 2020 emissions using updated emissions from the base year (2004) and to compare the modeled impact to the previous qualitative evaluation for 2020. This objective is undertaken via a comparison of the original 2020 qualitative predictions to the quantitative evaluation performed here. Three important changes that affect the comparison of this updated report with the original Task 3A report include a new version of the dispersion model used to predict air quality and AQRVs, initiation of the dispersion model with a different meteorological year, and an improved base year emissions inventory. The 2015 Update report (ENSR 2008a) details these changes. This current update of the Task 3A report provides a summary of impacts for the projected 2020 scenarios, and compares projected 2020 results to both the revised base year (summarized in the 2015 Update report) and the qualitative projections from the original Task 3A report.

1.2 Agency Outreach, Coordination, and Review

The BLM directed the preparation of this PRB Coal Review. In order to ensure the technical credibility of the data, projections, interpretations, and conclusions of the study and ensure the study's usefulness for other agencies' needs, the BLM initiated contact with other federal and state agencies early in the study.

As part of this agency outreach and technical oversight, the BLM organized technical advisory groups. These groups were composed of agency representatives and stakeholders with technical expertise in the applicable resources. Participating agencies relative to air quality included the BLM; Wyoming Department of Environmental Quality (WDEQ); Montana Department of Environmental Quality (MDEQ); U.S. Environmental Protection Agency (USEPA); National Park Service; and FS. This technical advisory group provided comments on the original and 2008 modeling protocol (ENSR 2008b, 2005c). The 2008 modeling protocol was used for the 2015 Update and the current update for 2020; it provides additional details regarding the modeling approach and other technical details not presented in this report.

1.3 Methodology

The general methodology for updating the Task 3A report with quantitative estimates of 2020 cumulative air quality effects is unchanged relative to the original Task 3A approach used to produce quantitative estimates of 2010 cumulative effects, with the exception that Task 2 RFD projections for 2020 are the basis of the analysis rather than the projections for 2010.

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This study evaluates impacts at the same receptor groups for all of the same air quality metrics as the original Task 3A study. The evaluation of ambient air impacts includes the same pollutants (nitrogen dioxide [NO₂], sulfur dioxide [SO₂], particulate matter [PM] with an aerodynamic diameter of 10 microns or less [PM₁₀], and selected hazardous air pollutants [HAPs]), with the addition of PM with an aerodynamic diameter of 2.5 microns or less (PM_{2.5}). Similar to the original study, the HAPs were evaluated at the near-field receptors in Montana and Wyoming, but not at the sensitive receptor areas. At the sensitive receptor areas, impacts on visibility and acid deposition also were evaluated. Like the original study, the updated study evaluates the changes in impacts for each of these fields for the projected levels of development. A comparison of the quantitative 2020 results to the qualitative 2020 projections from the original Task 3A report also is provided.

For the original Task 1A and Task 3A reports, potential impacts were modeled using meteorological data for 1996. For this current update and the previous 2015 Update to the Task 3A report, meteorological data for 2003 were used to evaluate air quality impacts in this updated study. The 2004 base year emissions inventory used for this current update is the same base year emissions inventory as was used for the 2015 Update.

For this updated Task 3A report, an updated future year emissions inventory and/or production ratios were used to estimate emissions for future year 2020. Base year emissions for most groups were increased to projected 2020 levels by a ratio that was calculated using production data for the projected development level divided by the production data for the base year. The future year scenarios then were modeled, and results were compared to base year impacts.

For this updated study, air quality impacts for the 2020 upper and lower production scenarios were modeled directly. The changes from the base year to the upper and lower development scenarios for 2020 subsequently are summarized. The summary includes a comparison of modeled ambient air quality impacts and AQRVs. The comparison includes discussion of modeled impacts relative to applicable state and federal standards and guideline values. Cumulative air quality effects predicted for 2020 also are compared to the original Task 3A qualitative results.