

Impacts of Coalbed Methane Development on Water Quantity and Quality in the Powder River Basin

G.B. Paige, L.C. Munn

Abstract

The Powder River Basin (PRB) in northeastern Wyoming has large coal deposits and large (39 Tcf) reserves of coalbed methane (CBM). To produce CBM from wells installed in the coal seams, water (often groundwater) is pumped to depressurize and release the gas. In many cases large quantities of water are produced along with the CBM natural gas. Currently, there are 24,115 CBM wells in the PRB and each well produces approximately 12,600 gallons/day of produced water. Total production of produced water across all Wyoming coal fields could total roughly 7 million acre-feet (55.5 billion barrels) if all of the recoverable CBM gas in the projected reserves were produced over the coming decades. The water quality of the produced water varies and increases in both salinity and sodicity as one moves north and west across the PRB. The majority of the produced water is discharged into stream channels or impounded in ponds. Management of the co-produced water, beneficial use of the water, and protection of soil and vegetation resources within the PRB are of prime concern. Management alternatives and treatments are discussed based on potential short- and long-term effects on energy development and resources in the PRB and other western watersheds.

Paige and Munn are faculty at the University of Wyoming, Department of Renewable Resources, 1000 E. University Ave., Laramie, WY 82071. Email: gpaige@uwyo.edu; lcmunn@uwyo.edu.