

Applied Science for the Management and Beneficial Use of Saline-Sodic Water

Krista E. Pearson and James W. Bauder, Department of Land Resources and Environmental Sciences, Montana State University, Bozeman, Montana 59715

Introduction

Due to increasing interest in coal bed methane exploration and development throughout the Rocky Mountain region, the management and beneficial use of saline-sodic water has become an emerging water quality issue. Considerable amounts of moderately saline-sodic water are coproduced during coal bed methane extraction. Recent coal bed methane development in the Powder River Basin of Montana and Wyoming has prompted researchers at Montana State University-Bozeman to investigate new ways to manage large amounts of saline-sodic water.

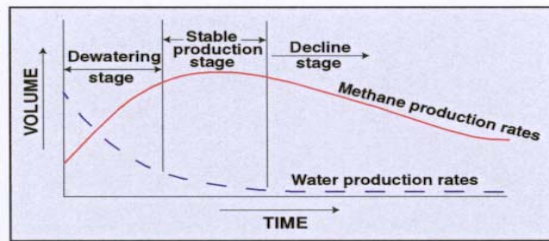


Figure 1. Production curves for a typical coal bed methane well illustrating relative volumes of methane and water through time (After Nuccio, 2000).

CBM Development in the Rocky Mountain Region

The Rocky Mountain region contains several provinces which have extensive coal deposits and significant accumulations of coal bed methane. CBM resources have been assessed in the Powder River Basin, Uinta-Piceance Basin, Wind River Basin, Southwestern Wyoming, Raton Basin, and San Juan Basin.



Figure 2. Major coal bed methane gas basins of the Rocky Mountain region (After Flores et al., 2001).

Montana State University Coal Bed Methane Product Water Management Research Goals

- Understand the chemistry, quantity, and distribution of CBM product water in the Powder River Basin
- Assess the interaction between surface dispersed CBM product water and soil, water, plants, groundwater, and land resources.
- Conduct research to help define CBM product water management strategies which will ensure sustainability of Montana's soil, plant, and water resources while allowing for CBM development.

CBM Product Water Management and Beneficial Use Options

The quality and quantity of CBM discharge is site specific. The strategies for the management and beneficial use of saline-sodic CBM product water are dictated by the water quality and quantity at each site. Researchers at MSU are investigating sustainable product water management strategies to minimize adverse affects to the landscape and to insure sustainable development of coal bed methane.

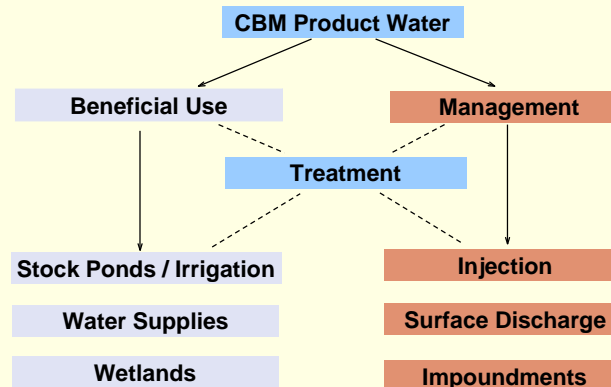


Figure 3. Flow chart illustrating options for management and beneficial use of coal bed methane product water (After Rice and Nuccio, 2000).



Native species have established hydrologically distinct communities in ephemeral channels where surface discharge of CBM product water has occurred.

Completed and Emerging CBM Research at MSU

- Physical and chemical responses of irrigable soils to CBM product water. Kim Hershberger, M.S. 2003
- Sustainable forage production with CBM product water. Shannon Phelps, M.S. 2003
- Characteristics and behavior of CBM product water. Holly Sessoms, M.S. Degree Candidate
- Soil hydraulic property responses to CBM product water. Kristin Keith, Ph.D. Candidate
- Forage responses to irrigation with CBM product water. Allison Levy, Undergraduate Research
- Wetland and transition plant community response to CBM product water. Amber Kirkpatrick, M.S. Degree Candidate
- Carbon sequestration using CBM product water. Suzanna Roffe, Research Associate
- Rangeland forage production using CBM product water. Krista Pearson, Research Associate
- Characterization of leaching and deep percolation below CBM product water impoundments. Keri Garver, Ph.D. Candidate

For more information:

Krista E. Pearson

Montana State University

109 Leon Johnson Hall

Bozeman, MT 59717

epearson@montana.edu

James W. Bauder

Montana State University

806 Leon Johnson Hall

Bozeman, MT 59717

jbauder@montana.edu

Montana State University Water Quality Web Site

<http://waterquality.montana.edu>