

Montana Chapter of the American Fisheries Society

Bureau of Land Management
Miles City Field Office
P.O. Box 219
Miles City, MT 59301

April 23, 2007

Dear Director,

This letter provides comments from the Montana Chapter of the American Fisheries Society (MCAFS) on the draft supplement to the Montana Statewide Oil and Gas EIS and Amendment of the Powder River and Billings Resource Management Plans (DSEIS) addressing coalbed methane development in Montana. The MCAFS is an organization of professional fisheries scientists and students from agencies, universities, and the private sector across Montana. Our objectives include the following: conservation, development, and wise utilization of Montana's fisheries; promoting education, scientific and technological development; advancement of fisheries science and practice; and exchange and dissemination of knowledge about fish, fisheries, and related subjects. Given our focus on conservation of fisheries, the MCAFS has considerable interest in ensuring that coalbed methane development proceeds in a manner that is not detrimental to fisheries or associated aquatic resources.

Review of the DSEIS indicates substantial improvement over earlier documents. Specifically, the proposed phased approach, combined with establishment of filters or screens to inform the adaptive management process, is a sound conceptual approach to developing CBM resource in the face of considerable uncertainty over its potential effects on natural resources. Nonetheless, several shortcomings still exist that place undue risk on fish and associated aquatic life.

Phased Development

Although phased development would conceptually allow for adaptive management, we feel the geographic area defined as a phase is too large to accurately monitor and manage. Using the 4th order watershed unit as the basic monitoring unit is overwhelming. The ability to monitor direct impacts to fish, wildlife, and water resources at this large scale is unlikely. For phased development to accomplish the goal of adaptively managing development in order to limit impacts to fisheries and wildlife resources, we recommend phases of development at a much smaller scale, such as a 5th order watershed.

Water Quality

A substantial shortcoming of the DSEIS is its sole emphasis of water quality concerns affecting irrigation as a beneficial use and incomplete application of relevant water quality standards. The tacit assumption in the document is that maintaining the numeric

standards for two integrative measures of dissolved solids (electrical conductivity [EC] and sodium adsorption ratio [SAR]) will protect the “most sensitive beneficial use”. This assumption fails to acknowledge the differential toxicity of various common ions (Mount et al. 1997), with the highly toxic bicarbonate often being the dominant anion in produced water. A maximum EC of 2,500 $\mu\text{mhos/cm}$ allowable for the Tongue, Powder, and Little Powder rivers and Rosebud Creek, may be sufficient to protect irrigation; however, if dominated by bicarbonate, this water may be toxic to an unknown number of fishes and associated aquatic life. Adding bicarbonate to the monitoring of water quality, and adapting the fate of produced water accordingly, will address this deficiency.

By relying solely on numeric standards as a screen for determination of potential impact of produced waters on beneficial uses, the DSEIS ignores the narrative standard applicable to bicarbonate. Specifically, the Administrative Rules of Montana states under the section General Prohibitions:

State surface waters must be free from substances attributable to municipal, industrial, agricultural practices or other discharges that will:
... create concentrations or combinations of materials which are toxic or harmful to human, animal, plant, or aquatic life (ARM 17.30.637[1][d])

The BLM’s failure to incorporate ALL relevant water quality standards is contrary to state law and must be corrected in the final supplemental EIS. The development of numeric standards for EC and SAR does not eliminate the applicability of this narrative standard.

The DSEIS reported an investigation on the toxicity of bicarbonate to select native fishes (Skaar 2005) but failed to address the issue of toxicity within its analysis on impacts or monitoring needs. Skaar (2005) found that fathead minnows (*Pimephales promelas*) were more sensitive to bicarbonate than white sucker (*Catostomus commersoni*). Sodium bicarbonate concentrations in excess of 400 mg/L caused substantial mortality of newly hatched fathead minnows, whereas white suckers were not adversely affect until concentrations reached over 4,000 mg/L. These results confirm the potential for bicarbonate to “create concentrations or combinations of materials which are toxic or harmful to human, animal, plant, or aquatic life”, which would constitute a violation of state water quality standards. Therefore, the final SEIS MUST include a strategy to prevent violation of the narrative standard and protect fish and aquatic life from toxic bicarbonate.

A responsible application of the bioassay investigation (Skaar 2005) is to acknowledge the potential for considerable interspecific variability in toxicity of bicarbonate, and set limits that are protective of the most sensitive species. Ironically, of the few species evaluated, the fathead minnow, which is typically highly tolerant of most pollutants and environmental stress, was the most sensitive to bicarbonate. In absence of bioassays on the other 30+ members of the Powder River Basin fish assemblage, screening values for sodium bicarbonate should not be less than concentrations shown to be toxic to fathead

minnows. Additionally, conducting bioassays on other fishes should ensue as part of the adaptive management approach.

Water quality monitoring requirements specified in the DSEIS for CBM producers and natural resource agencies are insufficient to inform the adaptive management approach to phased development. In addition to the integrative parameters (EC and SAR), CBM producers should also monitor produced water for specific common ions, including bicarbonate. Alarming, the monitoring approach detailed by the USGS in the appendix does not include bicarbonate among the list of parameters. Rectifying this oversight will be critical in conservation of Montana's fishes with respect to CBM development.

Water Quantity

Discharge of product water may decrease the seasonality of streams, wetlands, and ponds. We encourage additional research and monitoring of fish, aquatic reptiles, and amphibians that will identify and address potential impacts resulting from the changes in flow regimes and of wetland seasonality.

We also recommend a water monitoring system that will allow for the quantification of CBM product water discharge into the system at any given time. The availability of quantity or water volume data will assist with the study of potential impacts to aquatics, and has unfortunately not been readily available in Wyoming areas of development.

Depletion of groundwater sources is another concern, especially given the importance of groundwater/surface water interactions in support of fish and aquatic life in prairie streams. The DSEIS states that drawdown will occur over a large continuous area that may extend 4-5 miles from production. The reduction of springs and hyporheic (the zone where surface and groundwater mix) flow will reduce crucial water inputs to intermittent streams. These water sources are vital to maintaining pools and base flows that provide refugia for fish, aquatic macroinvertebrates, reptiles, and amphibians. Under the DSEIS, companies must mitigate for the loss of these water resources by providing a supplemental water source. However, it is unclear in the DSEIS whether these supplements will be used for instream water augmentation or if they are to supplement beneficial uses for landowners off stream. We recommend that mitigation should occur on public rather than private water bodies. In addition, we encourage a timeline for supplementation that would reduce the amount of time that instream flows are compromised.

Monitoring and Screens

The proposed monitoring approach within the DSEIS is insufficient to manage CBM adaptively to avoid undue negative effects on fish and aquatic life. Shortcomings in water quality monitoring are described above. The following comments address deficiencies in monitoring biological assemblages in streams receiving product water, either through direct discharge or seep from infiltration ponds. Likewise, streams linked to dewatered aquifers should be monitored to evaluate water quantity concerns described above.

Consistent with the stated commitment to adaptive management, we encourage monitoring that will lend itself to an experimental design that will address sound research questions related to impacts of CBM development. Screens are mentioned as a protective tool to ensure ecosystem health, while moving to full development scenarios. However, the use of specific monitoring criteria is not defined. We recommend the use of a multimetric index, such as the index of biotic integrity developed for Montana prairie streams (Bramblett et al. 2005), as a measure of stream health as part of the aquatic monitoring and protection plan. This index will allow for the detection of changes in occurrence, abundance, and diversity of fish assemblages. Likewise, evaluation of macroinvertebrate and periphyton associations will allow inference on water quality and environmental stresses resulting from CBM in the area.

Additionally, the DSEIS does not fully address the impacts of numerous evaporative storage basins across the landscapes on water quality and fisheries. We encourage aquatics monitoring to take place on streams in the study area that are in areas where water management includes the use of storage ponds.

Infrastructure

Road construction associated with CBM development may increase stream sedimentation and constructed stream crossings may fragment fish populations and lead to decreased diversity. Whereas some streams of the Powder River Basin have naturally high sediment loads, others have rocky substrate and provide important spawning habitat for migratory fish. Increased sedimentation of these streams may lead to the elimination of reproductive opportunities for litho-obligate (species that require rocky substrate for reproduction) species such as goldeye (*Hiodon alosoides*), sturgeon chub (*Macrhybopsis gelida*), longnose dace (*Rhinichthys cataractae*), and sand shiner (*Notropis stramineus*). We encourage the BLM to strictly enforce road construction guidelines to minimize sedimentation and stream fragmentation.

Thank you for the consideration of our comments to better manage and protect our outstanding aquatic resources.

Sincerely,

Leanne H. Roulson
President, MCAFS

CC: Bob Bukantis, Montana Department of Environmental Quality

References Cited:

Bramblett, R. G., T.R. Johnson, A. V. Zale, and D. G. Heggem. 2005. Development and evaluation of a fish assemblage index of biotic integrity for northwestern Great Plains streams. *Transactions of the American Fisheries Society* 134:624-640.

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Skaar, D., A. Farag, and D. Harper. 2005. Toxicity of major salt (salt bicarbonate) from coalbed methane production to fish in the Tongue and Powder River drainages in Montana. National Pollution Discharge Elimination System, Semi-Annual Progress Report to US Environmental Protection Agency by Montana Fish, Wildlife, & Parks, and US Geological Survey.