

Barry Noon Comments on BLM's Draft EIS

COMMENTS ON THE POWDER RIVER BASIN DEIS PREPARED BY THE BUREAU OF LAND MANAGEMENT

Bureau of Land Management
Buffalo Field Office
Buffalo, Wyoming

To Members of the BLM DEIS Team:

The purpose of this letter is to provide comments on draft environmental impact statement (DEIS) evaluating the effects of coalbed methane (CBM) development in the Powder River Basin, Wyoming. Specifically, I will comment on the adequacy of the assessments in the DEIS on wildlife populations in the Basin. These comments were

prepared by Dr. Barry R. Noon, Professor in the Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, Colorado.

GENERAL COMMENTS:

The DEIS is a lengthy document containing numerous tables of numbers and statistics apparently relevant to wildlife and their habitats. On the surface the sheer volume of text and the number of tables suggest a thorough and exhaustive analysis. However, on closer examination, it becomes clear that little analysis of CBM project impacts on wildlife was attempted. For the most part, the data and accompanying text in chapters 3 and 4 represent little more than a compilation of the number of acres within the watershed estimated to be directly affected by project implementation. These data are subsequently cross-tabulated in many ways, usually by means of various combinations of vegetation type, sub-watershed, and wildlife species. This gives, in my opinion, a false impression of extensive and thoughtful analysis.

This lack of analysis is admitted to in the DEIS though not emphasized. For example, in the wildlife effects analysis section of Chapter 4 (page 4-141) the DEIS states, "Much of the following information is restricted to a qualitative analysis due to the lack of data relevant to the potential effect types and species." Given the admitted lack of data, perhaps the most honest assessment of project impacts would be to state that the BLM is highly uncertain of the effects of the proposed projects on wildlife and their habitats. The lack of data, however, does not prevent the authors of the DEIS from concluding a lack of significant adverse effects. In fact the DEIS generally concludes, for almost all wildlife species evaluated, that "...The relative amount of habitat loss would be outweighed by the availability and widespread occurrence of suitable habitat throughout the Project Area " (page 4-147). The conclusion of "no adverse impact" because of the small percentage of total project area directly exposed

to ground disturbance is a pervasive assumption throughout the DEIS.

What the DEIS recognizes, but fails to explore in any depth, is that the impacts of disturbance on wildlife cannot be assessed solely on the basis of the relative area of habitat disturbed. The DEIS recognizes that fragmentation and cumulative effects, for example, should be evaluated. At numerous locations in Chapter 4 the DEIS acknowledges the potential adverse effects of habitat fragmentation, but then states that the “determinant factors” needed to assess the potential effects of fragmentation are unknown so that it is difficult to assess its effects. However, even in the context of acknowledged uncertainty and lack of data, the DEIS nevertheless concludes that it is unlikely that fragmentation would result in significant adverse effects because of the widespread occurrence of habitat elsewhere in the Project Area. This logic is inconsistent since the conclusion does not follow from the premise. The relevance of fragmentation as a process affecting wildlife populations rests on the understanding that information on habitat amount alone may be insufficient to predict the status of a species. When habitat area is potentially limiting, then information on the spatial pattern of the habitat may be equally or more relevant than information on habitat amount.

The importance of incorporating spatial data into effects analysis cannot be over-emphasized. Knowledge of where on the landscape habitat loss will occur and in what spatial pattern is essential before one can conclude no significant adverse effects. The importance of a spatially explicit analysis of impacts can be illustrated by a simple example. For seasonally migratory species (e.g., deer and elk) that have distinct summer and winter ranges, even small amounts of habitat loss in critical locations such as historic migration routes between these ranges can have disproportionately large effects. In this example, failure to assess where habitat loss is occurring on the landscape could lead to grossly underestimating adverse impacts.

In the DEIS there is a pattern of first asserting a lack of data as a rationale for no quantitative analysis and then concluding no adverse effects. The usual reasoning is that the scale of impact is small relative to the total Project Area. Such questionable logic is not restricted to the assessment of potential fragmentation effects. Similar arguments are put forth in the DEIS for the effects, or assumed lack of, of human disturbance, pipelines, roads, and water control structures. Such easy dismissal of potential impacts is indefensible given a requirement to use the best available scientific information in your assessment. Within the last 10 years a large number of publications have documented adverse effects to wildlife and their habitats as a consequence of habitat fragmentation, human disturbance, roads, and changes in land cover. . In the absence of data and high uncertainty, logic would suggest a slow and incremental approach to CBM development coupled with close monitoring to detect possible adverse impacts. The public expects responsible resource managers to implement monitoring and adaptive management in an incremental fashion when irrevocable or irreversible outcomes are possible.

In the following discussion I will discuss more specific factors that I believe should have been addressed, or addressed in more detail, in the DEIS. My greatest concern over the adequacy of the DEIS is encapsulated in a statement from the DEIS on page 4-118. On this page the DEIS states: "The alteration and potential loss of biodiversity associated with project related activities is difficult to quantify, but is not expected to have any substantial effect on biodiversity in the Project Area as a whole or within each sub-watershed". The DEIS does not present sufficient data or provide convincing analyses to justify this conclusion. Such a sweeping conclusion is unwarranted and misleading. There is a pervasive pattern of failure in the DEIS to honestly state the uncertainty associated with the short- and long-term consequences of CBM development on wildlife populations.

SPECIFIC ISSUES:

The DEIS Systematically Underestimates the Area Impacted by CBM Development

For almost all wildlife species discussed, the DEIS concludes that the proportion of habitat in the Project Area is so small that adverse effects are inconsequential.

The DEIS estimates, for example, that only 1-2% of pronghorn, white-tailed deer, and mule deer winter range would be disturbed and only 3-4% of elk winter range. If these percent disturbance estimates were computed from the area of habitat directly affected by ground activities divided by the total project area, then the estimate of percent disturbance is biased low. Bias arises because the numerator is underestimated and the denominator is over-estimated. The numerator is under-estimated because the actual areal impacts of habitat loss following disturbance almost always exceed the area directly disturbed. That is, the effective area of the remaining patches of suitable habitat following project activities (installation of wells, compressors, water handling facilities, roads, pipelines, etc) may be substantially smaller than their map-based areas. This occurs because a number of ecological processes are fundamentally changed at the boundary between the remaining habitat and the CBM well footprint. These include changes in micro-climate (followed by changes in vegetation structure and composition), increased levels of predation or parasitism, behavioral avoidance of boundaries because of human disturbance, changes in the distribution and abundance of food resources, or invasion by exotic organisms that decrease habitat quality.

The numerator is subject to over-estimation if it is based on total project area. For each species, the numerator should be based just on those acres within the project area that are suitable habitat for that species. This requires an accurate mapping of suitable habitat for each species in the Project Area. It was not clear to me from my reading of the DEIS that species-specific habitat maps had been generated, and verified, for all species of concern. If such maps were not created, then the estimates

of percent of habitat area impacted are biased and unreliable.

The DEIS also significantly underestimates potential impacts by not fully considering CBM development on private lands and by ignoring parallel CBM development proposed for adjoining lands in Montana. Treating political or ownership boundaries as if actions on these lands have no impacts on the lands considered in the DEIS is indefensible. All ecological systems are open to flows of matter (e.g., humans, exotic plants, predators) and energy (e.g., natural and human-induced disturbance processes). Disturbance events occurring on lands not explicitly considered in the DEIS will likely accumulate in an additive if not multiplicative fashion with the direct effects of CBM development. The combined effects of inadequate analysis and failure to consider land cover changes occurring outside of, but adjacent to, the Powder River watershed leads me to conclude that cumulative adverse impacts of CBM development may be significantly underestimated.

The DEIS Fails to Evaluate, Adverse Effects of CBM Development on Wildlife Populations

The DEIS lists a number of potential sources of stress on wildlife populations following CBM well projects. These include 1) disturbance by human activities; 2) loss of certain habitats (particularly big game winter range); 3) habitat fragmentation; 4) increased raptor predation (resulting from an increased number of perch sites); 5) increased hunting pressure; 6) increased wildlife harassment; and 7) direct, project-induced increases in mortality rates. However, after listing these multiple sources of stress, no quantitative, or even thorough qualitative, analysis is conducted. Further, there is no analysis of the possible cumulative or synergistic (combined effects are greater than the sum of the parts) effects that can arise from multiple stressors acting simultaneously on a wildlife species. Simply stating the possible adverse effects of project development is not a substitute for thorough analysis, even if such analyses must be qualitative.

I found it very difficult to determine how the impacts of CBM well development were estimated. On page 4-141 the DEIS states: “Direct effects resulting from construction of proposed CBM wells, compressors, non-CBM wells, and associated water handling methods were estimated by applying facility-specific disturbance factors to the proposed number of each type. The facility-specific disturbance factors were then summed and used to estimate the potential number of acres disturbed for each range type.” In order to evaluate these methods, the DEIS must clearly define “facility-specific disturbance factors”, indicate how they were computed, and justify the methods used for their computation. The absence of this information suggests that the environmental analysis of impacts is incomplete.

In addition to the CBM projects discussed in the DEIS, other ongoing disturbances include coal and uranium mining, sand, gravel and scoria mining, ranching, agriculture, road and railroad construction, and rural and urban development.

All of these disturbances have the potential to interact with CBM project activities in such a way that the collective effects are significantly greater than the sum of the individual affected areas. It is my understanding that federal agencies must consider all proposed development projects, not just those occurring on federal lands. Even though there is now an extensive scientific literature documenting the existence of significant cumulative arising from multiple disturbance processes, no defensible cumulative effects analysis is discussed in this DEIS. This is unacceptable.

The DEIS Fails To Adequately Assess the Effects of Habitat Fragmentation

The general spatial pattern of the proposed CBM drill sites (numerous, widely dispersed 80-acre “holes” within the Powder River watershed) will result in both habitat loss and habitat fragmentation. Even though habitat fragmentation can only occur after habitat loss, these two factors can interact in complex ways to affect wildlife populations. Changes in the spatial pattern of habitat can have significant effects when habitat may already be limiting (e.g., for an endangered, threatened, or sensitive species). In this case, the relationship between a species’ likelihood of persistence and habitat amount and pattern can be strongly non-linear, and be characterized by steep threshold declines to local extinction. For species that are currently listed or candidates for listing under the Endangered Species Act, some sort of population viability analysis (PVA) should have been conducted. A minimal analysis requires, for each species, a definition of suitable habitat, a mapping of the spatial distribution of the habitat, an estimate of local population sizes, and general information on the movement and dispersal ability of the species. This information is required not only for a minimal PVA but also to conclude, as was done repeatedly in the DEIS, that “the relative amount of habitat loss would be outweighed by the availability and widespread occurrence of suitable habitat throughout the Project Area.” Analyses leading to a conclusion of no threats to viability have the same data requirements as analyses that conclude a significant threat exists. In the absence of this information, an honest assessment of impacts would admit to a great deal of uncertainty about outcome, and the responsible management decision would be to proceed slowly and cautiously.

The DEIS lists fragmentation as a potential adverse effect arising from the CBM projects but dismisses it because the presumed habitat area remaining is large relative to the area fragmented. This cursory consideration fails to acknowledge that the nature of the fragmenting agent is critical to understanding a species response. Fragmentation effects arising from natural disturbance events are much less likely to adversely affect a species than those arising from novel disturbances. The reason is that species have evolved in the context of natural disturbance events and it is unlikely that such events would regularly surpass their adaptational limits. In contrast, novel sources of fragmentation, such as those arising from road construction, are unlikely to be part of a species evolutionary history. These sources of fragmentation are likely to have more severe adverse consequences and should be evaluated in greater detail.

Even in the absence of detailed life history and behavioral data to assess fragmentation effects, general conservation principles are often useful. For example, it is possible to ordinally rank species on the basis of their degree of risk to habitat loss and fragmentation based solely on general information on ecology and life history or similarities to well-studied species. For example, if a species is known to occur in distinct local populations and to have limited dispersal capabilities, then it is likely to be a greater risk than a common species that can disperse long distances. Several schemes for ranking the relative risks to persistence faced by species with diverse ecological characteristics have been developed by state, federal, and non-government organizations. One of these ranking schemes should have been used in this DEIS as a way of identify those species required more detailed assessment.

Fragmentation results in an increase in edge or boundary effects. The potential magnitude of such effects is often measured as some function of the perimeter to area ratio of the residual habitat patches. The edge to area ratio is also a useful metric to categorize the agents or processes that fragment landscapes. Agents with large edge to area ratios, such as roads and pipelines, result in a greater degree of fragmentation than agents with lower values of this ratio. Importantly, the major fragmenting agent in the proposed activities are the roads and pipelines which can be expected to have effects that are disproportionately large relative to the total area disturbed.

Fragmentation effects are not uniformly negative. Some species or birds, for example, have increased abundance near habitat edges. To understand the likely response of a species to fragmentation, therefore, requires additional evaluation. Factors to consider include the fragmenting agent, whether the disturbance leading to fragmentation is natural or human-induced, and the likely events that follow a given type of fragmentation. The events that follow fragmentation can be roughly categorized as positive or negative. Positive edge effects can arise, for example, from resource supplementation into the habitat patch, or by increases in available resources in the adjacent, disturbed habitat. In contrast, negative effects arise when events originating in the disturbed habitat decrease resources or increase mortality rates. Given that the fragmenting agents in the proposed CBM project will remove native vegetation, introduce exotic plants, increase the amount of bare and compacted soil, and increase levels of harassment, it is highly unlikely that any effects will be positive.

For the reasons mentioned above and the fact that a substantial portion of the watershed has already been fragmented by agriculture, it is my opinion that the DEIS has systematically underestimated the adverse effects of fragmentation on wildlife populations.

The DEIS Fails To Adequately Assess the Adverse, Long-Term Effect of Roads

Many thousands of miles of roads will be built under all proposed alternatives. Roads represent unnatural disturbances, are highly fragmenting, and, for reasons

discussed above, are expected to have uniformly negative effects on wildlife habitat. The DEIS acknowledges some of the adverse impacts of roads on wildlife and their habitats. For example, direct effects due to vehicle collisions, modifications of animal behavior, and pathways for the spread of exotic and invasive species are mentioned but then dismissed as insignificant. As is typical of this DEIS, no formal analyses, quantitative or qualitative, were conducted to justify these conclusions.

In addition to road impacts acknowledged by the DEIS, there are many additional adverse, long-term effects. Roads displace native habitat and replace it with bare ground (or impervious surfaces), increase soil compaction and significantly alter the physical environment. Physical changes include increased variability in soil water content, changes in surface water flow routing, and increased runoff leading to higher rates of sedimentation and erosion. These physical changes directly eliminate habitat from the road surface and decrease habitat quality for some distance beyond the boundary of the road itself. The extent of edge effects depends on the magnitude of change in microclimate, hydrology, and animal behavior. For some species, such as sage grouse, road impacts may extend for miles beyond the road boundary.

Roads also adversely affect wildlife and their habitats because they alter human behavior patterns. In addition to increased human-induced disturbance, roads allow increased access for hunting (both legal and illegal), increased recreational access (particularly for off-highway vehicles), increased disturbance frequency (due to increased traffic) and lead to further habitat loss because humans do not restrict their activities just to the roads.

Roads are particularly destructive when they are adjacent to streams, wetlands, or riparian areas. On page 4-136 of the DEIS the BLM acknowledges that such effects will occur-- "Large contiguous areas of wetland/riparian vegetation would be fragmented by the construction of roads, pipeline corridors, and other linear facilities if such areas must be disturbed." Roads in these locations increase sedimentation, increase the magnitude and frequency of peak flows, and disrupt natural, regenerative disturbance processes. When such unnatural disturbances are focused in habitats with the greatest biological diversity (e.g., riparian zones), adverse impacts are much greater than what is estimated from a simple calculation of the area directly impacted.

The collective and cumulative effects of these impacts on wildlife and wildlife habitat can be grossly underestimated if computed solely on the basis of the area disturbed by the road. In addition, the history of roads in the United States is that once they become established, they are seldom removed. Thus, roads created by CBM development will probably become permanent transformations of the landscape, represented permanent losses of habitat and permanent sources of fragmentation and negative edge effects. This point is directly acknowledged in the DEIS—".. an unknown percent of roads would not be reclaimed resulting in permanent habitat loss" (page 4-139). This is one of the most sobering statements in the DEIS.

Optimistic Assumptions in Regards to Mitigation

It is my understanding from reading the DEIS that the majority of CBM well development will occur on private lands within the Powder River Watershed. This is a critical point that deserves clarification because mandatory mitigation efforts are restricted to federal lands. Thus, the vast majority of the potential adverse effects of CBM well development on wildlife will go unmitigated. Thus, they may represent permanent losses whose effects will accumulate overtime as additional habitat loss occurs in the watershed.

If my understanding is correct, even on federal lands, the nature of the proposed mitigation efforts have only short-term positive effects because they represent “timing limitations” only. That is, CBM well disturbance at a given site is temporarily put on hold to protect a sensitive species for a relative short time interval during a given year. After that interval, the activity can proceed, leading to temporary or long-term habitat loss. For example, elk calving areas potentially disturbed by CBM projects have a seasonal closure from 5/1 – 6/30 in a given year. After that time period, development activities at a site near calving habitat may be re-initiated. The end result is that next year there is a high likelihood this site will no longer be suitable. This is not meaningful mitigation. This policy simply delays an inevitable loss of habitat. Such incremental decisions will accumulate over time and may represent a significant, incremental loss of habitat. If suitable habitat for calving becomes limiting, such incremental and apparently benign decisions may eventually compromise the viability of the species in the watershed.

Similar to timing limitations are “controlled surface use restrictions” that only provide a short-term positive effect. For example, it is my understanding from the DEIS that sage grouse lek sites restrictions only occur if the site is currently in use. If the site is not being used in a given year, or CBM project activities are planned outside the breeding season, use restrictions are relaxed. Similar to timing limitations, the net effect of these mitigation efforts is delayed but leads to inevitable loss of habitat. In my opinion, it is misleading to refer to these policies as mitigation actions.

Optimistic Assumptions in Regards to Reclamation

The DEIS fails to adequately acknowledge the uncertainty associated with the likelihood of successfully reclaiming CBM sites after well lifetime. This uncertainty arises from two sources. First, is whether the desire, funds, and enforcement will exist to follow through with reclamation efforts after the methane has been exploited. There are many, many examples in the western United States where significant environmental damage has accompanied resource extraction, but no effort has been made for restoration follow resource depletion. Second, is the uncertainty associated with our ability to restore degraded lands even when we have the will to do so. Restoration/reclamation ecology is in its infancy with respect to proven methods of recovery. It is highly unlikely that any reclamation effort will be able to restore the

diverse plant community that existed on these sites prior to CBM development. This will have unknown consequences for wildlife habitat quality over the long-term. The uncertainty of reclamation success and the risks of failure need to be made explicit in the DEIS.

CONCLUSIONS

The DEIS is characterized by an unjustified, optimistic speculation that impacts of CBM development will have minimal adverse impacts of wildlife and wildlife habitat.

What impacts are acknowledged are assumed to be temporary or insignificant because they represent only a small proportion of the total Project Area. Such conclusions are indefensible because little or no credible analysis of impacts was reported in the DEIS. It is my opinion that the potential adverse impacts of full CBM development on wildlife populations in the Powder River Basin have been grossly underestimated.