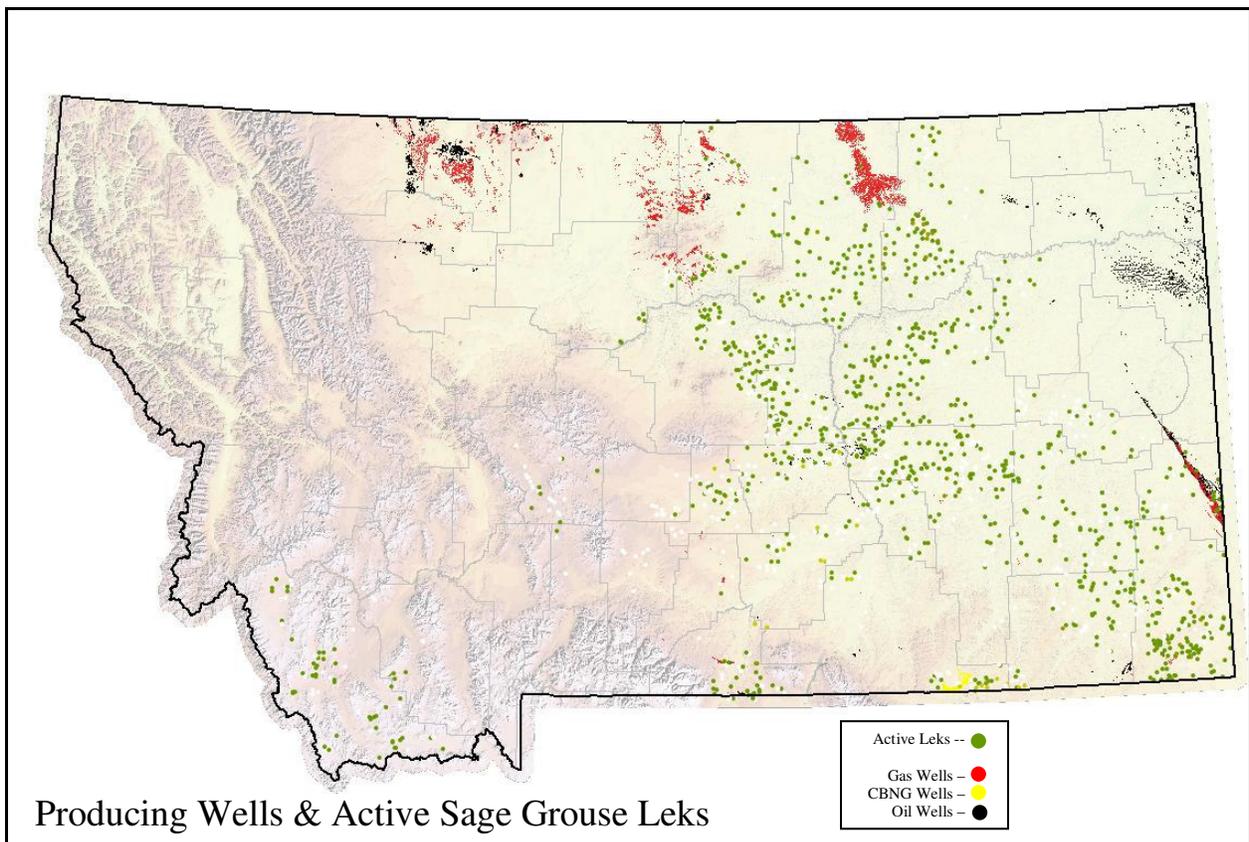


**Sage Grouse Mitigation
for
Oil & Gas Operations on State School Trust Lands**

**Montana Department of Natural Resources & Conservation
Trust Land Management Division**

November 19, 2007



Executive Summary

The DNRC is responsible for managing 6.2 million acres of mineral estate on behalf of the various school trust beneficiaries. As part of our management, we interact with a variety of state and federal regulatory, land and wildlife management agencies.

The DNRC and other state and federal agencies participated in the development of the 2005 Montana Sage Grouse Management Plan (Plan). This Plan was produced by the Sage Grouse Work Group (Work Group), an interagency and interdisciplinary group of wildlife biologists, resource managers and stakeholders. Both DNRC and DFWP are signatories to the Plan. Since that time, DNRC has utilized the Plan's sage grouse BMP mitigations for oil and gas development as have other agencies and private entities.

More recently, DFWP has expressed concern that the BMP mitigations outlined in the Plan "appear insufficient to effectively mitigate intensive development." DFWP cites the rate of oil & gas leasing on federal and state lands, and research prepared by Dr. David Naugle, et al. (University of Montana) to recommend immediate implementation of a number of management approaches related to full-scale CBNG production. Some recommendations restate BMP mitigations already in place. One recommendation proposes dramatically increasing the no surface occupancy (NSO) lek buffer from 125 acres to 2,000 - 6,500 acres, and increasing the timing buffer from the Plan's 8,000 acres to 32,000 acres. The magnitude of the areas encompassed in these buffer recommendations inhibit or prevent development of school trust resources over a large area around sage grouse leks. In some cases, DNRC would be unable to protect state oil & gas resources from drainage by adjacent mineral owners.

This document reviews the information referenced by DFWP in support of their statement that the 2005 Sage Grouse Management Plan mitigations appear insufficient. There is currently not broad agreement among agencies and stakeholders regarding current or DFWP's proposed mitigation measures. An inconsistent application of mitigations would negate the effectiveness of such efforts and cause drainage concerns. Dr. Naugle and other's are continuing to develop and publish new research. The Sage Grouse Work Group that developed the current management plan has not been reconvened so that agencies and stakeholders can collectively review all research now available. DNRC therefore believes the 2005 Montana Sage Grouse Management Plan continues to represent a responsible and collaborative effort by wildlife biologists, resource managers and stakeholders. In the interim, DNRC will proactively and responsibly mitigate potential impacts to sage grouse through the following processes:

- review oil and gas activities proposed on state school trust land for presence of active sage grouse leks on or adjacent to the proposed activity;
- consult with and seek comments, and/or recommendations from DFWP; and
- apply appropriate sage grouse mitigation measures consistent with the department's sage grouse lease stipulation and 2005 Montana Sage Grouse Management Plan.

Background

Sage grouse have become a species of concern across the region due to declining numbers relative to their historical range and populations. In 2005, the United States Fish & Wildlife Service (USFWS) evaluated a petition for listing on the Endangered Species List, and found the request “not warranted.” That decision is currently in litigation.

In Montana, the Department of Fish, Wildlife and Parks (DFWP) reports the sage grouse population is healthy and stable, with increases noted over the last two years.

“We have been monitoring sage grouse populations for more than 20 years, and this is the second or third best year we’ve had since then. Hunters should see plenty of older birds, and I’d expect good numbers of this year’s chicks too.”¹

The DFWP is concerned that Montana’s sage grouse population remain healthy and stable. If efforts to list sage grouse progress in the future, a healthy population may provide a strong basis for separating Montana from an ESA listing.

The DNRC and DFWP developed a stipulation, which is placed on eligible oil & gas tracts nominated for auction. The complete stipulation is as follows:²

“Active sage grouse lek(s) have been identified on or adjacent to this tract. No activities shall occur on the tract until the proposed action has been approved in writing by the Director of the Department. If surface activity is proposed on the tract, the department will consult with the Director of the Department of Fish, Wildlife and Parks for his or her comments, concerns and recommendations. Additional mitigation measures may be required, including no-surface occupancy buffers and/or timing restrictions, which may encompass part or all of the tract.”

This stipulation does not represent a substantive change from the existing review process or application of BMP mitigations for active sage grouse leks on or adjacent to state oil & gas leases. Other provisions of the state’s oil & gas lease already require a site specific environmental review of the proposed activity, followed by application of specific mitigation measures. This stipulation does formalize engagement of the DFWP Director in the comment and consultation process. DNRC will continue to work with DFWP field staff as appropriate for site-specific comments or recommendations.

Sage Grouse Working Group and Management Plan - 2005

The Sage Grouse Management Plan is a comprehensive, 200-page report prepared by the Montana Sage Grouse Work Group. Work Group members consist of wildlife biologists and resource managers from federal, state, and private entities, including: Montana Department of

¹ Harold Wentland, DFWP Northeast Montana Wildlife Manager, Rocky Mountain Fishing & Hunting News, August 23, 2007 Edition.

² DNRC master stipulation list.

Fish, Wildlife and Parks; Montana Department of Natural Resources and Conservation; United States Forest Service; Natural Resource Conservation Service; Federal Bureau of Land Management; National Wildlife Refuge; United States Fish & Wildlife Service; National Wildlife Federation; Montana Wildlife Federation; Montana Falconers Association; Montana Petroleum Association; and Mark Goetz, CVO Research & Consulting.

The Plan examined and characterized key aspects of seasonal habitat, and identified twelve issues relevant to sage grouse conservation. The Work Group evaluated each of these twelve areas/activities in terms of their potential impact on sage grouse and the implications posed by the risks themselves. The result was the development of conservation actions designed to reduce these risks. These twelve areas are:

- Fire Management
- Grazing Management
- Harvest Management
- Noxious Weed Management
- Mining and Energy Development
- Outreach and Education
- Power Lines and Generation Facilities
- Predation
- Recreational Disturbance
- Roads and Motorized Vehicles
- Vegetation
- Managing Other Wildlife in Sage Grouse Habitat

The Plan was completed in 2005. Both the DNRC and DFWP participated in the Work Group, and both agencies are signatories to the Plan document. The Plan recommends an NSO buffer around an active lek encompassing a 0.25-mile radius and a timing buffer restricting surface activity around an active lek encompassing a 2-mile radius. The timing restriction applies between March 1 and June 15, coinciding with mating and nesting periods.

The Plan's recommendations are not binding on participants, but the DNRC has voluntarily utilized these sage grouse mitigation standards when evaluating oil & gas activity proposals.

DFWP Agency Position – 2007

The DFWP developed a May 2007 agency position paper on sage grouse mitigations. This followed agency presentations and articles informing the public, land management agencies, and interested parties of their concerns. The agency position paper asserts the BMPs recommended by the 2005 Plan appear insufficient, and urges adoption of DFWP's new recommendations. Some recommendations are general while others restate existing BMPs already utilized on state lands. However, one recommendation would significantly increase NSO and timing restriction buffers. The magnitude of the areas encompassed by these buffers can inhibit or prevent development of school trust resources. In some cases, DNRC would be unable to protect state oil & gas resources from drainage by adjacent mineral owners.

The 2005 Sage Grouse Management Plan recommends a 0.25-mile radius (125 acres) NSO buffer and a 2-mile radius (8,000 acres) timing restriction between March 1 and June 15. The DFWP's May 2007 agency position paper recommends an NSO buffer radius of 1 to 1.8 miles, and a timing restriction extending 4 miles from the lek. The DFWP NSO and timing recommendation would apply to existing leks regardless of status, whereas the 2005 Plan applies the buffer restrictions to active leks. In terms of area, DFWP's recommendation would prohibit all activity on 3 to 10 sections of land around the lek, and place timing restrictions for new activity on 50 sections around the lek.³

The DFWP cites new research and the significant rate of recent efforts to lease both federal and state mineral resources, as the basis for their review and conclusion that the 2005 Sage Grouse Management Plan mitigations appear insufficient to effectively mitigate intensive development.⁴

Review of DFWP Information

Application of Research to Lek/Infrastructure Buffers

The basis for DFWP's position draws from their review of research prepared after the development of the 2005 Sage Grouse Management Plan. Research conducted by Dr. David Naugle et al. (University of Montana) became available in 2006 and 2007. DFWP cites this research to assert the 2005 Plan mitigations appear insufficient and urge adoption of DFWP's buffer recommended increases in NSO and timing buffers.

Dr. Naugle conducted a statistical analysis of datasets provided by the Montana DFWP and Wyoming Game & Fish Department covering coal bed natural gas operations in the Powder River Basin (PRB) of Wyoming and Montana. Dr. Naugle characterized the area affected by CBNG development by assuming 1) a 350 meter buffer around the CBNG well to represent the area of development, and 2) a 3.2 kilometer buffer around the lek to represent the area of influence to the lek. A spatial overlay utilizing these assumptions allows Dr. Naugle to separate sage grouse leks into three categories: those within CBNG development, those adjacent to or on the edge of CBNG development, and those outside of CBNG development.⁵ Correlating lek count data to these categories allowed Dr. Naugle to analyze the three categories for differences in sage grouse lek count response over time.

Dr. Naugle did not analyze each sage grouse lek to correlate specific actual surface disturbance by distance with changes in lek count or activity, and did not have such data to utilize in the development of his model. Dr. Naugle explains this in his discussion on methodology:

*“We selected a 350-m buffer around roads, power lines, and CBNG wells for 2 reasons. First, **quantitative estimates of the distance at which infrastructure affects habitat use or vital rates of sage-grouse were not available**, and 350-m is a reasonable distance over which to expect impacts to occur, such as increased*

³ A section of land covers a square 1 mile long on each side – or approximately 640 acres.

⁴ DFWP Agency Position cover letter dated May 24, 2007.

⁵ Naugle, et al., Sage Grouse Population Response to CBNG Development in the PRB, Interim Progress Report on Region-wide Lek-count Analyses, May 26, 2006.

*risk of predation near power lines or increased risk of vehicle collisions near roads. Second, we also wished to maintain a consistent relationship between well, road, and power line variables and the amount of area affected by each feature.” [emphasis added]*⁶

Site-specific analysis of leks based on actual buffer area around them was therefore not the focus of Dr. Naugle’s research cited by DFWP. While Dr. Naugle’s research may provide a model for broad-scale discussions, it does not focus on the fundamental issue we face as a land management agency – reasonable site-specific set-backs for CBNG infrastructure based on quantitative analysis of impacts.

Sage Grouse Population Impacts

Dr. Naugle notes that their preliminary work supports previous findings that region-wide populations in Wyoming declined severely in 1990-1995, followed by stable trends around a lower population equilibrium from 1995-2005.

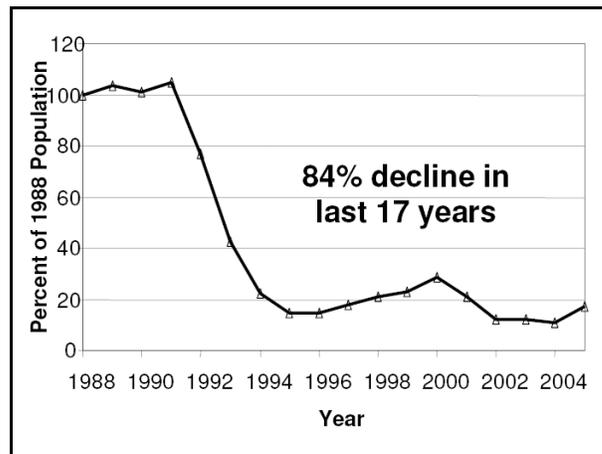


Figure 1: DFWP PowerPoint

CBNG development in the PRB did not begin in earnest until about 1997. Figure 1 is sometimes used in general discussions on sage grouse population and CBNG development, but Dr. Naugle does not apply Figure 1 to CBNG-related impacts. Figure 2 below clarifies this distinction between pre-CBNG and post-CBNG development by including CBNG well count (red dashed line) within the timeframe portrayed in Figure 1. Figure 1 and 2 apply to Wyoming’s sage grouse population. Montana did not experience such a decline.⁷

⁶ pg 12: Greater Sage Grouse Population Response to Energy Development and Habitat Loss, Pre-Print In-Press, June 25, 2007.

⁷ Montana DFWP.

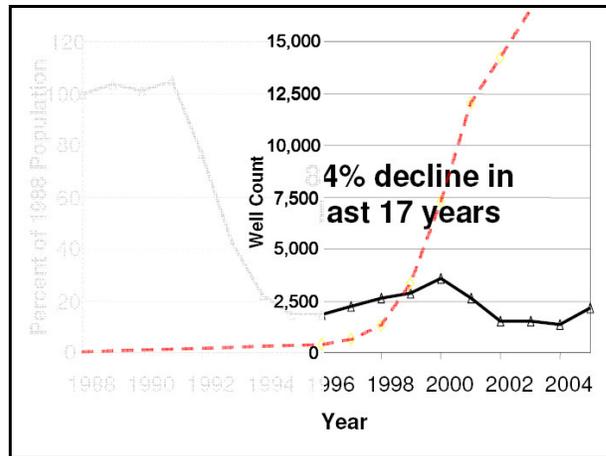


Figure 2

Dr. Naugle’s research ultimately focused on data within the 2001-2005 time period. Within that timeframe, Dr. Naugle used the 350 meter development-buffer methodology discussed above to look for differences in sage grouse population response over time (via lek count data) at a landscape level. This produced Figure 3 below, which portrays the relative change in population as a percentage of 2001 population for two lek categories – inside and outside CBNG.

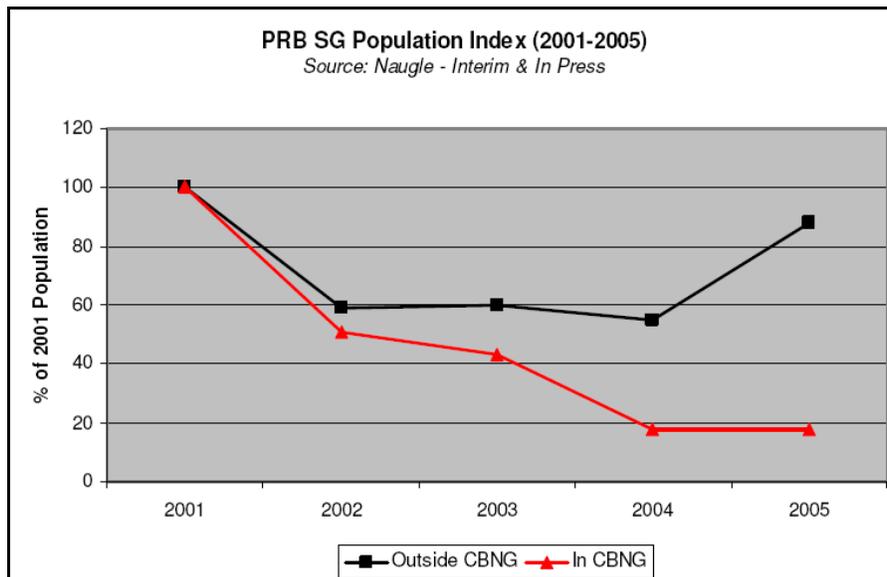


Figure 3

This data has been cited by DFWP and others to support a statement that CBNG development caused a population decline of 82%. However, Dr. Naugle expressly associates the 82% decline only to those leks he considered inside CBNG development - not all potentially affected leks. This is a key distinction. Dr. Naugle laid out his research objectives in the 2006 Interim Progress Report. Objective No. 1 was to test population trends in areas inside, adjacent to, and outside CBNG development. The interim report includes Dr. Naugle’s more detailed analysis and discussion related to this test objective. By looking at these three categories, Dr. Naugle was able to separately show population indices for leks inside and adjacent to CBNG development, as

well as for those leks outside CBNG development. Figure 4 shows the more detailed breakdown presented by Dr. Naugle in the 2006 Interim Progress Report (presented as a percentage of 2001 population, consistent with Dr. Naugle’s 2007 report).

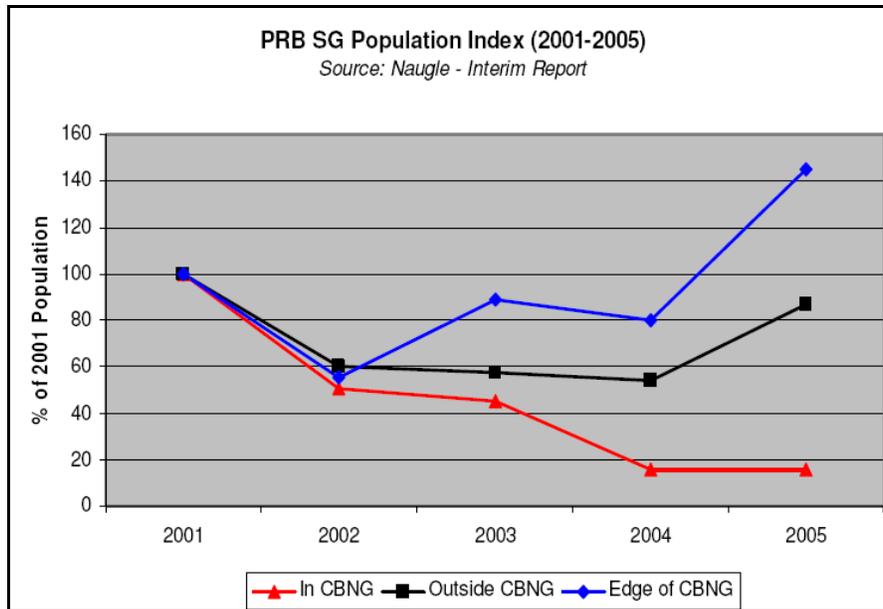


Figure 4

Dr. Naugle summarized his objective and results as follows:

“To test the hypothesis that sage-grouse avoid CBNG development, we examined trends in population indices at leks adjacent to CBNG development. We predicted that such leks should show increased population size relative to leks entirely outside of development because males from areas with development would move into adjacent undeveloped habitat and attend leks in those areas. As predicted, leks along the edge of CBNG development showed higher population indices than leks further away.”⁸

Dr. Naugle’s data shows a decrease in population for leks within CBNG development and an increase in population for leks adjacent to or on the edge of CBNG development. Therefore, the net population impact that Dr. Naugle’s data attributes to CBNG development consists of changes his analysis indicated on leks within and adjacent to CBNG activity. Figure 5 below shows the net changes in leks potentially affected by CBNG (in and adjacent to the development), and compares that to the control population (outside CBNG activity).

When all potentially impacted leks are compared to the control population, Dr. Naugle’s research does not show an 82% difference in population index over the 2001-2005 analysis period. Instead, the impacted population exhibits redistribution and a smaller net decrease. The

⁸ Naugle, et al., Sage Grouse Population Response to CBNG Development in the PRB, Interim Progress Report on Region-wide Lek-count Analyses, May 26, 2006.

impacted population also shows environmental factors (i.e. non-CBNG) affecting both impacted and control populations similarly and more significantly over the analysis period.

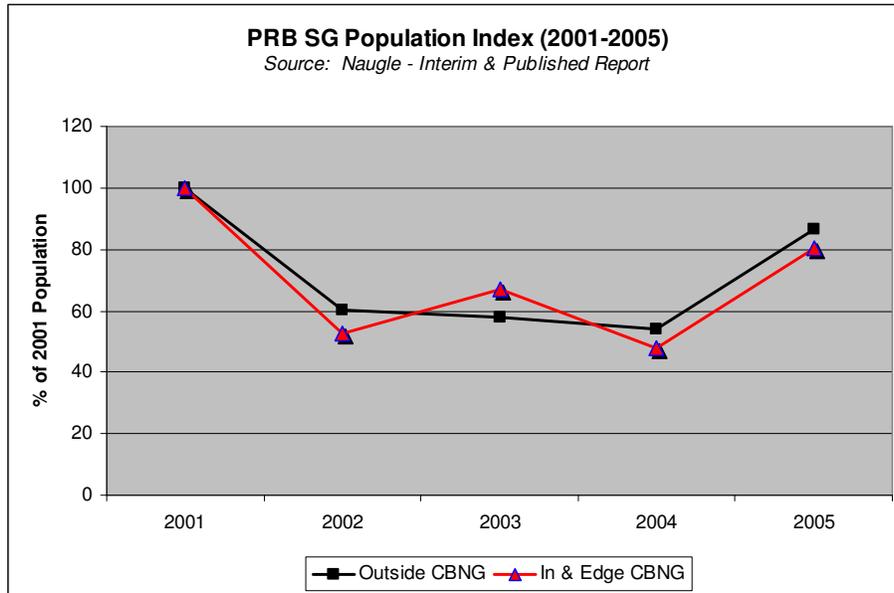


Figure 5

Dr. Naugle's 2007 paper excludes his lek attendance hypothesis, discussion and conclusions. The edge lek data that showed positive population trends relative to the control population is not presented. Instead, Dr. Naugle's 2007 paper merges edge lek data into the control dataset. The larger size of the control population group overwhelms the edge lek population data, and its inclusion in the control group is imperceptible on the graph in the published paper.

In recent discussions with DFWP and DNRC, Dr. Naugle cited confidence interval issues with the group of leks located on the edge of CBNG development.⁹ He maintains that treating these leks as part of the control group (i.e. the group not affected by CBNG development) is valid. As revised, leks can have CBNG development impacting up to 40% of the area around them and still be considered part of the control dataset. Dr. Naugle's revised definition for the control dataset differs from that utilized in other recent research.¹⁰

Dr. Naugle advises more research is needed to evaluate the response of edge leks to CBNG development, and that this effort is part of his ongoing research. However, based on his datasets through 2005, he is limiting the discussion and conclusions to leks within CBNG development and excluding discussion of population redistribution to adjacent leks.

In recent discussions, Dr. Naugle also asserted that application of mitigation strategies need to be across landownerships to be effective. DNRC believe that interagency/interdisciplinary review process established by the Sage Grouse Working Group remains an important step in gaining a consistent, broadly-based approach for effective mitigation.

⁹ Meeting with Dr. Naugle, November 7, 2007.

¹⁰ Doherty (2007), Taylor (2007), Holleran (2005)

Anticipated Scope of CBNG Development in Montana

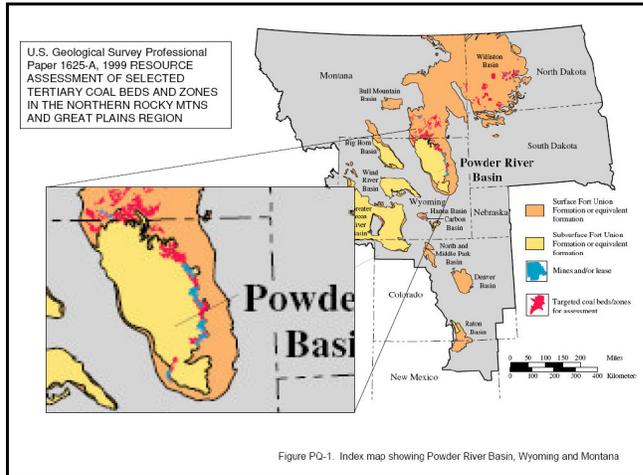


Figure 7a

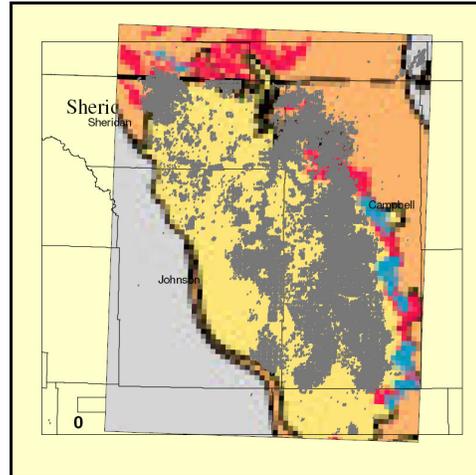


Figure 7b

The location of the PRB is based on geology, and the location has always been in Wyoming, with only the northern end crossing over into Montana. Commercial CBNG development in Montana and Wyoming correspond to formations primarily located in Wyoming. Not surprisingly, CBNG activity in Montana is nowhere near the magnitude of that seen in Wyoming.

Rate of Development in Montana

The DFWP also cites rate of development as a cause of concern. The May 24, 2007 agency cover letter to their Agency Position document states:

“Recent efforts to lease both federal and state mineral resources for potential oil and gas development are occurring at a significant scale across the state. Existing conservation strategies as outlined in the plan appear insufficient to effectively mitigate intensive development.”

Leasing is generally done on a broader scale to develop a land position within which to explore for oil and gas. As a result, many leases are issued and cancelled or dropped without a well being drilled, let alone a commercial well being completed. From statehood through FYE 2007, the DNRC (and its predecessor Department of State Lands) has issued nearly 38,000 oil & gas leases. Of those, only 583 are currently productive for oil and/or gas. DFWP provides no data correlating the rate of leasing activity to the effectiveness of the 2005 Plan BMP mitigations.

DNRC Trust Land Ownership and Management Responsibility

The Trust Land Management Division of DNRC manages approximately 5.1 million acres of surface and 6.2 million acres of mineral estate on behalf of the various school trusts and other institutions. The DNRC manages these resources to produce revenues for the trust beneficiaries while considering environmental factors and protecting the future income-generating capacity of

the land. These properties are scattered across Montana, with the mineral estate ownership comprising about 6.5 percent of the state.

If DNRC were to adopt the DFWP NSO buffer recommendation, exploration and development could be prohibited on state lands located anywhere within a 2,000 to 6,500 acre area around a lek. The DFWP timing restriction recommendation would restrict new activity for several weeks each year on state lands located up to 4 miles away from a lek. These mitigations would apply to the state school trust land, but would not apply to adjacent privately-owned mineral estate. The magnitude of the DFWP recommendations are such that oil & gas development could be significantly impaired or totally prohibited on state ownership, but would continue on adjacent property. It is essential to apply any new mitigation strategies across all ownerships to be effective and avoid impact to state ownership.

The potential for adverse impacts to state trust resources and beneficiaries, coupled with questionable effectiveness of a mitigation applied only to scattered tracts of land, generates a responsibility to encourage a collaborative approach in implementation of any new mitigation approaches.

DNRC Position

The agency position paper distributed by DFWP does not appear to fully explore the efficacy of the 2005 Sage Grouse Management Plan recommendations regarding sage grouse mitigations for oil & gas development.

Dr. Naugle's work advises that quantitative research is currently unavailable to determine the distances at which various types of infrastructure are shown to impact leks. Dr. Naugle also advises that inconsistent application of mitigation measures would not be effective. Dr. Naugle's interim report presented and confirmed his hypothesis that sage grouse would relocate from within CBNG development to leks adjacent to CBNG development. Citing confidence interval issues, Dr. Naugle limited his 2007 published paper to an examination of interior leks. However, Dr. Naugle is continuing his research on edge lek response and is examining lek data for 2006 and 2007.

DFWP expands their application of Dr. Naugle's research to non-CBNG development. The infrastructure needed for deep and other shallow natural gas development is different from that utilized for CBNG. Even if DNRC saw support for DFWP's position in the information they cite, it would not automatically extend to non-CBNG development elsewhere in Montana.

The DNRC concurs with DFWP's philosophy of basing mitigations on research, science, and collaboration. However, DFWP has not demonstrated the existing BMP mitigations to be inadequate, and has not demonstrated a correlation between leasing activity and mitigation effectiveness. DFWP's own data confirms a healthy, stable, and increasing sage grouse population. DFWP has not demonstrated the need for, or the effectiveness of, the dramatic increases recommended for no surface occupancy or timing buffers, particularly if the mitigations are not consistent across all ownerships.

The DFWP represents its May 2007 Agency Position document as justification for changing the existing sage grouse BMP mitigations:

“Incorporating this information into more appropriately designed conservation measures will necessitate both fine and large-scale modifications to existing approaches. FWP looks forward to working with Plan partners to accomplish this task.”

Based on our review of the DFWP document, the DNRC believes the Sage Grouse Work Group is the proper venue for critical review of new information. Researchers advise of the need for additional research, and research is ongoing. DNRC therefore continues to request the reactivation of the Sage Grouse Work Group.

In the interim, DNRC will proactively and responsibly mitigate potential impacts to sage grouse through the following processes:

- review oil and gas activities proposed on state school trust land for presence of active sage grouse leks on or adjacent to the proposed activity;
- consult with and seek comments, and/or recommendations from DFWP; and
- apply appropriate sage grouse mitigation measures consistent with the department’s sage grouse lease stipulation and 2005 Montana Sage Grouse Management