

MEMORANDUM

TO: Garfield County Board of County Commissioners

FROM: Dr. Rob Roy Ramey, Wildlife Science International, Inc.

RE: Issues of fundamental importance to the scientific integrity and data quality of the BLM's Northwest Colorado Greater Sage Grouse Draft Resource Management Plan and Draft Environmental Impact Statement (DEIS)

Date: November 26, 2013

Section I. The following issues above cut across all alternatives in the DEIS.

- 1) Reliance on disturbance caps that have no demonstrable conservation benefit to sage grouse, do not mitigate the cause and effect mechanisms of purported threats, and are based upon opinion rather than data, whether these disturbance caps are 1, 3, or 5%, or one well per section.
- 2) Prohibition on surface disturbance within 4 miles of a lek in PPH, including during the lekking and early brood-rearing period when there is no specific cause and effect mechanism cited and the prohibition is solely based upon the subjective opinion of the NTT and opinions expressed in selected reports and publications. The DEIS effectively proposes "protecting" large areas (~50 square miles) of non-habitat and marginal habitat surrounding each lek without any demonstrable benefit to sage grouse populations, ignoring more appropriate conservation actions suited to local ecological conditions, and basing the presumed benefits of this recommendation upon speculation.
- 3) Ignores predation as the primary demonstrable source of mortality to sage grouse, in favor of an approach that relies on a series of land use setbacks, disturbance caps, and restrictions based around speculative benefits to sage grouse that have not been shown to be effective by any data.
- 4) Reliance on archaic and statistically invalid lek-count data collection to estimate sage grouse population trends as a basis for management. The lack of resolution in these data, their non-random sampling, and fact that sage grouse populations are known to fluctuate, means that it would be impossible to discern any pattern in the data that could be used to guide management actions in a timely manner, or that would be scientifically defensible. This would result in a virtual state of paralysis imposed on almost all land use activities.

The BLM's approach is to rely on an undefined assessment of whether sage grouse populations are healthy, stable, or increasing. As an example, none of the population trend diagrams in the DEIS contain any confidence intervals around population estimates. This renders the interpretation of any trends derived from those data as meaningless.

- 5) Reliance on outdated data and opinion in reports and papers, rather than more current data and information.

- 6) Reliance on recommendations in the NTT that were influenced by special interest groups involved in litigation rather than a transparent and inclusive public process.
- 7) The DEIS elevates speculative benefits of management prescriptions for sage grouse above other land use activities, in clear violation of the BLM's multiple use mandate.
- 8) Ignores the substance of local conservation plans, especially the Garfield County sage grouse plan, in favor of one-size fits all restrictions in its alternatives, in clear contrast to the stated position of the BLM. The DEIS lacks a comprehensive and objectively informative analysis of locally-appropriate conservation alternatives that could be used to guide management of BLM lands, while addressing specific threats to sage grouse.
- 9) The DEIS is deficient in that it does not include conservation strategy for analyzing treats or their specific cause and effect mechanisms, and then mitigating the mechanisms that underlie each threat within the BLM's adaptive management framework. That approach for sage grouse was clearly articulated in the publication by Ramey, Brown, and Blackgoat (2011).

Section II. The following section comprises comments regarding more specific components of the DEIS

1) The BLM's rationale for 4-mile buffers is based on erroneous information.

The scientific justification for requiring 4-mile buffers and surface disturbance caps (whether they are 1, 3, or 5%) is entirely based on the opinions of selected authors (some of whom were NTT members) and the erroneous assumption that a local and temporary displacement of sage grouse from an area of development means that a population decline has occurred. However, none of the cited studies actually ever documented a population decline. One of the most frequently cited studies, the unpublished dissertation by Holloran (2005), was wrong in all of its predicted population declines. To the contrary, recent data from the state of Wyoming has documented that the sage grouse population in Pinedale actually experienced an overall increase from 1990 to 2012. Throughout that time period, it has consistently been above statewide averages and has the highest density of sage grouse in the state.

In the field of science when the observations do not match the predictions of a hypothesis or theory, the hypothesis is falsified (i.e., it is wrong). The BLM cannot rely on research that has been found to be wrong. Holloran (2005) is one of the most widely cited studies in the DEIS, yet his predictions have been unfounded.

Furthermore, the BLM cannot rely on research whose authors relied on belief to reach their conclusions when the results lacked any statistical significance. One of the key studies cited in the NTT Report did exactly that: Lyon and Anderson (2003) erroneously characterized oil and gas development as having a negative effect on sage grouse nest initiation rates. That unsupported opinion, clearly contrary to the available data and analysis, has subsequently been cited by the BLM as a scientifically valid conclusion in the NTT Report, which portrays all oil and gas development in a negative light. The DEIS (page 516) then cites the NTT Report in support of its

statements that negative effects have been reported 4-miles from oil and gas development: "Recent studies have consistently demonstrated that oil and gas development and its infrastructure influence GRSG behavior and demographics at distances of up to 4 miles (NTT 2011). This prompts declines in lek persistence and male attendance, yearling and adult hen survival, and nest initiation rates. It also elicits strong avoidance response in yearling age classes, nesting/brooding hens, and wintering birds." However, as the following quotation indicates, the study by Lyon and Anderson (2003) relied on belief (rather than statistically significant results) to reach their conclusions: *"Finally, even though nest initiation between disturbed and undisturbed hens was not statistically significant, we believe lower initiation rates for disturbed hens were biologically significant and could result in lower overall sage grouse productivity."* Additionally, Holloran (2005) reported that nest success that was virtually identical and not significantly different between disturbed and undisturbed areas, using a much larger sample size compared to Lyon and Anderson (i.e., n=213 used by Holloran vs. n=77 used by Lyon and Anderson). Clearly, the BLM cannot base its management decisions on the basis of belief and opinion, while disregarding contrary results.

The DEIS needs to acknowledge the alternative hypothesis that sage grouse, like other animals, may be disturbed by human activity and will sometimes move away from it but that does not mean that they suffer a populations decline. The birds may have simply responded by relocating, or coexisting with human activity (i.e. habituation). Neither the DEIS or the NTT Report acknowledge that that there has been no population-level decline reported in any of the cited studies, only decreased lek attendance in affected areas. The DEIS needs to be revised to explicitly acknowledge these facts and alternative hypotheses that are consistent with the data.

The DEIS and the NTT Report does not acknowledge that Holloran (2005) reported results that the probability of sage grouse survival was *higher* (61.5 \pm 6.4%) in disturbed areas compared to less impacted areas (29.6 \pm 18.1%), or control areas (48.5 \pm 14.4%). These results refute Holloran's (2005) own statements regarding population impacts. Furthermore, neither the DEIS or the NTT Report acknowledge that Holloran's (2005) predicted sage grouse population declines in the Pinedale area, of -8.7 to -24-4% annually, have not occurred. Instead, publicly available lek count data from the State of Wyoming show the population has been steadily increasing. The BLM rely on a study whose predictions have been so clearly falsified.

The Information Quality Act (IQA) requires that information used by agencies, including the BLM, be based upon verifiable data and reproducible results, and not based upon opinion. Moreover, the NTT Report cannot selectively use results from Lyon and Anderson (2003), or Holloran (2005) to support its recommendations, while failing to state that they were statistically insignificant and/or contrary to more recent and comprehensive data. And finally, Holloran (2005) did not use any hypothesis testing in his research. Instead, Holloran (2005) relied upon interpretation of data and results (rather than hypothesis testing), speculated on potential mechanisms that could cause a population decline, and did not provide any data that a population decline had actually occurred in the population in the Pinedale area.

The following two excerpts from Holloran (2005) best illustrate these issues (the underlining added for emphasis is ours):

"The results from this study suggest that dispersal from developed areas could be contributing to population declines. Although the proportion of potentially displaced

adult and yearling males and yearling females breeding and nesting in areas removed from gas field infrastructure is unknown, offsite populations could be artificially enhanced by gas development. Because of potential density-dependent influences on breeding and nesting success probabilities (LaMontagne et al. 2002, Holloran and Anderson 2005), maintenance of these enhanced populations could require increasing the carrying capacity of offsite habitats." And, "adult male displacement and low juvenile male recruitment appear to contribute to declines in the number of breeding males on impacted leks. Additionally, avoidance of gas field development by predators could be responsible for decreased male survival probabilities on leks situated near the edges of developing fields (i.e., lightly impacted leks). Although site-tenacious adult females did not engage in breeding dispersal in response to increased levels of gas development, subsequent generations avoided gas fields, as suggested by the temporal shift in nesting habitat selection and differences in habitat selection by yearling and adult females. This suggests that the nesting population response is delayed avoidance of natural gas development. The results suggest that male and female greater sage-grouse displacement from developing natural gas fields contributes to breeding population declines."

Rather than being as conclusive as suggested by the DEIS and the NTT Report, this study was speculative (note use of the terms *could*, *suggested*, and *potentially*) and assumed that hypothetical worst-case scenarios would occur. The BLM cannot rely on the speculative opinion of Holloran (2005) as the basis for its DEIS.

2) The supposed need for a 3% anthropogenic disturbance threshold is based upon subjective opinion rather than data.

The presumed need for a 3% disturbance cap originated with opinion expressed by Walker et al. (2007) in the discussion of their paper. They stated, "...we believe the conservation strategy most likely to meet the objective of maintaining or increasing sage-grouse distribution and abundance is to exclude energy development and other large scale disturbances from priority habitats, and where valid existing rights exist, minimize those impacts by keeping disturbances to 1 per section with direct surface disturbance impacts held to 3% of the area or less." However, Walker et al. (2007), like Holloran (2005), who had previously proposed a restriction of one well per section, never actually tested the effectiveness of these disturbance caps. Instead they modeled sage grouse response in lek attendance in terms of distance(s) from potential sources of disturbance. Therefore, the need for a 3% disturbance cap (or 1% or 5% caps, and one-well per section) in the NTT Report and DEIS, represents nothing more than the opinions of Holloran (2005) and Walker et al. (2007) that were stated in the conclusions of their papers, and by the NTT members, at least one of whom was an author of the NTT report. The BLM cannot rely on such untested opinion as a basis for its alternatives in DEIS. If it does, it will have effectively replaced the scientific method in implementation of the NEPA (i.e., data, hypothesis testing, and reproducible results) with the opinions expressed by the authors of the cited studies, especially when those opinions are erroneously represented by the BLM as if they were rigorously tested against the data.

3) The DEIS ignores management of raven predation on sage grouse eggs and broods as a conservation strategy despite the fact that predation has been shown to be a major issue for sage grouse and that the State of Wyoming, in collaboration with the USDA-APHIS, has recently undertaken a major raven management program.

Sage grouse eggs are preyed upon by a wide variety of predators including red foxes, coyotes, badgers, black-billed magpies, and ravens. Juvenile and adult sage grouse predators include golden eagles, prairie falcons, coyotes, badgers, and bobcats. Sage grouse broods are preyed to ravens, red foxes, raptors, ground squirrels, snakes, and weasels. However, of the predators above, ravens are the most ubiquitous. Research (Coates 2007; Coates and Delehanty. 2004; Coates et al. 2008; Coates and Delehanty 2010; Christiansen 2011) and more recent data gathered by the USDA, has shown that ravens have the greatest impact on sage grouse and that their numbers are far in excess of historic levels (Christiansen 2011).

The DEIS and NTT Report ignore the management of ravens as a conservation priority to reduce predation on sage grouse eggs and broods (and thereby a viable management strategy to increase overall survivorship and recruitment of sage grouse). The only mention of ravens in these documents is that their numbers are the result of human activities, and that transmission lines and tanks provide predator roosting opportunities (and therefore sage grouse avoid these structures.) There is an implicit assumption that ravens can be managed indirectly through the regulation of human activities. This is an unproven strategy and is unlikely to be effective at reducing raven predation on sage grouse unless coupled with active / lethal control of ravens to reduce the size their populations (Coates and Delehanty 2010). There is abundant research on raven predation on sage grouse and other species, yet the DEIS all but ignores the importance of this threat (Boarman 1993; Boarman 2003; Boarman et al. 1995; Boarman and Heinrich 1999; Boarman et al. 2006; Bedrosian and Craighead 2010; Bui 2009; Cagney et al. 2010; Coates 2007; Coates and Delehanty 2004; Coates et al. 2008; Coates and Delehanty 2010; Conover et al. 2010; Cote and Sutherland 1997; DeLong 1995; Gregg et al. 1994; Heinrich et al. 1994; Moynahan et al. 2007; Preston 2005; Ramey, Brown, and Blackgoat 2011; Schroeder and Baydack 2001; Snyder et al. 1986, Sovada et al. 1995; Watters et al. 2002; and Webb et al. 2009). The DEIS must include in each alternative a raven management program such as the one undertaken by the USDA-APHIS Animal Damage Control at landfills across southern Wyoming at the request of the Wyoming Game and Fish Dept. (Wyoming Game and Fish 2012, USDA/APHIS/Wildlife Services 2013).

4) The DEIS relies on an archaic and statistically invalid lek-count data collection system to estimate sage grouse population trends as a basis for management.

The DEIS, under Adaptive Management and Monitoring (page 193), describes an “effectiveness monitoring component” to “*identify any changes in habitat conditions related to the goals and objectives of the plan and other range-wide conservation strategies (U.S. Department of the Interior 2004; Stiver et al. 2006; U.S. Fish and Wildlife Service 2013). When available from WAFWA and/or state wildlife agencies, information about population trends will be considered with effectiveness monitoring data (taking into consideration the lag effect response of populations to habitat changes [Garton et al. 2011]). The information collected through the Monitoring Framework Plan outlined in Appendix J will be used by the BLM/FS to determine when adaptive management hard and soft triggers (discussed below) are met.*” However, what the DEIS does not acknowledge is that male lek count data is not randomly sampled and is a

statistically invalid measure of population trends, and that the 95% confidence intervals surrounding the estimates are generally larger than the estimates themselves (WAFWA 2008; Ramey et al. *in press*). Therefore, the adaptive management strategy proposed in the DEIS cannot be based upon these statistically invalid measures.

Receiving any mitigation credit is also virtually impossible because it is impossible to produce scientifically defensible trend estimates. Case in point, the DEIS (on page 258) states, "*The populations naturally fluctuate, so it is difficult to determine at any given time if a population is increasing, decreasing, or staying stable.*" With this being acknowledged, it is virtually guaranteed that no mitigation credit will be given by the BLM in implementation of the DEIS. Therefore, the DEIS must award mitigation credit based upon the type and extent of mitigation implemented (i.e., see Ramey, Brown, and Blackgoat).

The DEIS adaptive management strategy must take into account the fact that any statistically valid and scientifically defensible trend estimate must also take into account the fact that sage grouse populations naturally fluctuate (i.e., the data must be normalized to account for regional fluctuations).

And finally, the DEIS provides no reproducible, quantitative definition for what is determined to be a "healthy, stable, or increasing" population. This lack of definitional basis puts the BLM squarely in violation of the Information Quality Act and its management decisions under the DEIS are outside the realm of science.

5) The DEIS presents a negative view of virtually all oil and gas development and is biased in its presentation of outdated information.

The DEIS and its cited supporting studies failed to mention the existence of: 1) up to date information on the extensive mitigation and restoration efforts in the Pinedale Planning Area and elsewhere (see <http://www.wy.blm.gov/jio-papo/index.htm>); 2) advances in technology and efficiency available on the BLM's own website and in the BLM presentations to the NTT ("Managing Oil and Gas" and "Best Management Practices" available in Appendix 5, pp 48-55 of the August 29 to September 2, 2011 NTT meeting summary); and 3) more efficient operations and mitigation efforts further documented in Ramey, Brown, and Blackgoat (2011). And finally, neither the DEIS nor the NTT Report that it relies upon, acknowledges that nearly all of these measures have been implemented in the years since Holloran's (2005) data gathering occurred (from 1997 to 2003). The BLM cannot rely on a selective presentation of outdated information as the basis of its DEIS alternatives. It must rely on data and information that is current.

6) The DEIS relies on recommendations in the NTT Report but does not acknowledge that these recommendations were influenced by special-interest litigants involved in settlement negotiations with the BLM.

Publicly available records, including e-mails obtained under FOIA from the State of Idaho (excerpt below from a December 13, 2011 e-mail from the NTT lead for the BLM) reveal that special interest influence, rather than a transparent, inclusive, and scientifically defensible public process, was used in producing the NTT Report's recommendations:

*“Our timeframe is to complete the “updated” draft NTT report by COB tomorrow so I can ship it back to DC. Due to concerns by solicitors in DC the NTT report will look different. However the content is generally the same and due to the science review we did make changes to the Goals and Objectives section, some conservation measure in fluid minerals have been updated (i.e. 2.5% has been changed to 3% with rationale). The Policy recommendation change has undergone significant clarification again based on solicitor concerns in DC. **The solicitor concerns with the Policy recommendation piece stems from ongoing litigation discussions they currently having with litigants over BLM’s recently completed LUPs.**”*

Clearly, the BLM cannot rely on such tainted sources as a basis for its analysis and alternatives in the DEIS.

7) The DEIS lacks a comprehensive and objectively informative analysis of locally-appropriate conservation alternatives that could be used to guide management of BLM lands, while addressing specific threats to sage grouse.

By ignoring the substance of local conservation plans, especially Garfield County’s sage grouse plan, in favor of one-size fits all restrictions, the DEIS elevates speculative benefits of one-size fits all management prescriptions for sage grouse (recommended by the NTT and so-called conservation groups) above other land use activities, in clear violation of the BLM’s multiple use mandate.

The DEIS is deficient in that it does not include conservation strategy (like that in the Garfield County sage grouse plan) for analyzing treats, their specific cause and effect mechanisms, and then mitigating each threat within the BLM’s adaptive management framework.

Section III. Key differences that make the Garfield County Greater Sage Grouse Plan a more effective conservation tool than those proposed by federal agencies.

1) High-resolution habitat mapping

The habitat mapping provided by State and Federal agencies in 2012 for Greater Sage-Grouse in the Plan Area was at a landscape level that did not accurately address the unique topography of the Roan Plateau, or provide planning information at resolution accurate enough for County to use in the Plan, and for relevant land-use planning activities potentially occurring within the Plan area, including protection of sage grouse habitat. Because of the significant implications on land use and ongoing land management, the Board of County Commissioners deemed that most accurate delineation of habitat was deemed necessary.

This habitat mapping process followed the latest and most relevant peer-reviewed habitat mapping process available for mapping large and diverse areas, using the highest resolution data available (with a two-meter resolution, as compared to the one kilometer, landscape-level resolution used by the agencies).

The sage-grouse habitat in Garfield County is naturally fragmented, as a result of topography and the patchy nature of sagebrush, non-sagebrush shrubs, meadows, aspen, and conifers in the Plan area.

Expanses of contiguous sagebrush, necessary to support a large stable population (as described by the Fish and Wildlife Service in their 2010 candidate determination notice), do not exist in Garfield County. Additionally, the sage-grouse population inhabiting Garfield County is a peripheral population located on the far southeastern edge of the species range. As a result, the stewardship of the population requires detailed knowledge of local conditions, including accurate mapping of its habitat.

Conservation measures are tailored to local circumstances Rather than rely on one-size-fits-all regulatory prescriptions, such as four mile buffers and three percent anthropogenic disturbance thresholds proposed by the BLM's National Technical Team (NTT), the County has taken a more effective approach: tailoring conservation measures to address specific threats to sage grouse and local circumstances that are unique to Garfield County (i.e. predation and a naturally fragmented habitat). The significance of this strategy to sage grouse conservation is that it allows for a more efficient allocation of conservation effort by focusing on threats that matter most in this sage grouse population.

Voluntary conservation efforts on private land In contrast to the NTT report, where the proposed conservation measures assume that private land management is inferior to federal land management, and requires a regulatory "command and control" approach, the Garfield County Plan recognizes and builds upon the importance of voluntary conservation by private landowners. The importance of voluntary conservation on private land is recognized by many scholars of the Endangered Species Act, including the current Deputy Assistant Secretary of Fish and Wildlife and Parks, Michael Bean, who has authored multiple papers on the subject.

2) Annual Review and adaptive management

Recognizing that local governments can be more nimble than federal agencies, the Garfield County Plan includes a required annual coordination review with the federal and state agencies that have habitat or species responsibilities within the Plan Area. (A review may also be initiated based on important new information.) This review process will evaluate the availability and condition of habitats, direct and indirect impacts, conservation measures, policies and best management practices being implemented by each agency for their effectiveness and applicability to the Plan Area. Also incorporated in this coordination review is any new scientific information and, if warranted, modifications to the best management practices, policies, and conservation incentives within the Plan. The County will also initiate meetings with private property owners in the Plan Area for the purpose of analyzing their conservation efforts and effectiveness, as well as any new scientific data. The annual coordination review will ensure that Plan updates are timely, adaptive, and based on the best available scientific and commercial data.

3) Consistency with the Information Quality Act

The Garfield County Plan ensures that sage-grouse habitat management decisions shall be made based on the best available scientific information that is applicable to sage-grouse habitat in Garfield County. The scientific information used will be consistent with standards of the Information Quality Act (Quality, Objectivity, Utility and Integrity), as determined by the County. In contrast to the interpretation of the Act by some federal agencies, this means that the data collected by state and federal agencies, or used in published scientific research relied upon by those agencies, must be provided to the County.

The Garfield County Plan acknowledges that many of the purported "universal" negative impacts of fluid mineral development, an important economic activity on the Roan Plateau and Piceance Basin, are based upon outdated information and/or overstated. In fact, none of the studies cited in the NTT report can definitively point to an actual population decline rather than temporary displacement of sage grouse from areas immediately affected by current fluid mineral development. Instead, the extraction of fluid minerals in Garfield County (and increasingly elsewhere) is accomplished using increasingly advanced technologies, more efficient operations, avoidance of important habitat, more effective mitigation measures, and interim habitat restoration, than in the past. As a result, surface disturbances that potentially affect sage grouse tend to be minimal and temporary in nature. The fast pace of these technological developments and more efficient operations has meant that the primary literature on the impacts of fluid mineral extraction on sage grouse in Wyoming is inconsistent with current practices used in Garfield County. It is anticipated that the more advanced technologies under development will continue to allow the efficient extraction of resources while further avoiding or minimizing impacts to sage grouse and other species.

A balance of harms approach ensures responsible stewardship of natural and human resources in Garfield County

In contrast to the approach proposed in the NTT report, that focuses solely on the welfare of sage grouse, the Garfield County Plan requires that the balance of impacts to other species and to human welfare must be weighed prior to approval and implementation.

Section IV. Literature citations that support the issues specifically identified in the forgoing sections

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