

**A. William Alldredge, Ph.D.
2518 Owl Creek Road
Thermopolis, Wyoming 82443
(307) 867-2518**

11 March 2007

Mr. Matt Anderson, Project Lead
Bureau Of Land Management
Pinedale Field Office
P.O. Box 768
Pinedale, WY 82941

Dear Mr. Anderson:

My name is Bill Alldredge. I am a resident of Wyoming concerned about management of our natural resources. At the request of The Wyoming Outdoor Council and The Wilderness Society, I offer my comments on the Supplemental Environmental Impact Statement for the Pinedale Anticline Oil and Gas Exploration and Development Project (PASEIS) in hopes that they will be interpreted constructively and be useful in drafting the final management plan. I have been a professional wildlife biologist all my adult life, spent much of my career conducting research on large wild mammals and their habitats, and taught university level courses in ecology, big game management and integrated ecosystems management. I am familiar with the Pinedale area having conducted studies there during the 1970s for El Paso Natural Gas Company on their proposed Project Wagon Wheel. My brief "CV" is provided with this letter. My comments concern mule deer and pronghorn antelope populations and their habitats.

The PASEIS and associated appendices portray considerable effort by the BLM and the proponents to describe alternatives, discuss the affected environment and disclose impacts. I applaud the use of site-specific studies and current scientific literature. That said, however, it is my professional opinion that the document fails to meet the standards under NEPA for a scientifically credible and supportable documentation of impacts resulting from a project and presentation of means by which those impacts can be reduced. Additionally, the almost single-minded focus on energy extraction appears to violate the requirements of FLPMA.

Specifically the PASEIS:

- **Fails to consider any alternatives that do not include intense energy development at the expense of multiple use and other environmental values.**
- **Fails to take a "hard look" at the direct, indirect and cumulative environmental consequences for indigenous populations of mule deer and pronghorn.**
- **Underestimates impacts to wildlife habitats and overestimates reclamation potential for these habitats.**
- **Fails to present a detailed monitoring plan for reclamation or for impacts to mule deer and pronghorn populations and their habitats.**
- **Fails to provide any triggers and/or actions necessary for prudent adaptive management.**
- **Inadequately plans for or considers clearly specified mitigation of impacts to mule deer and pronghorn populations and their habitats.**

These shortcomings cause me to conclude that the analysis in the Pinedale Anticline SEIS is scientifically deficient.

Alternatives

The "No Action Alternative," the "Preferred Alternative" in the 2000 PAPA ROD (USDI BLM 2000) required timing limitations on drilling to protected critical wildlife habitats. But, by their own admission (Appendix K, p. 2) the BLM relaxed this requirement and essentially eliminated timing limitations by approving all or parts of 267 requests for exceptions to development within big game crucial winter ranges. Only 12% of requested exceptions were denied. As illustrated in Map 3.22-1 and Map 3.22-2, energy development on the Mesa through 2005, occurred in the heart of crucial pronghorn and mule deer crucial winter range and resulted in direct removal of over 1300 acres of that range (Sawyer et al. 2006) and an un-reported amount of indirect removal from fragmentation and habitat avoidance. Scientifically credible, site-specific research (Sawyer et al. 2005a, 2006) reports significant impacts to mule deer populations, a 46% reduction in deer densities on the Mesa and major shifts in habitat use, as a result of implementation of the past, preferred alternative (now the No Action Alternative). These impacts were observed through the first 5 years of development with an estimated 2% direct habitat loss and an average well pad density of less than 4 wells per section (Sawyer, personal communication to A. W. Alldredge). Because studies were not initiated in time, we have limited data for pronghorn, but their behavioral characteristics and my own research experience with these animals suggests that we could expect at least similar impacts to have been experienced by pronghorn (Alldredge and Deblinger 1988). Berger et al. (2006) did report a difference in survival rates for pronghorn of 69.3% for animals that were exposed to natural gas development as opposed to 95% for those not so exposed. Studies with a design and statistical power similar to that of Sawyer et al. (2006) should have been initiated earlier to evaluate impacts to pronghorn.

The PASEIS presents 3 intense energy development scenarios for the Pinedale Anticline and does not discuss any alternatives that might allow for energy development and conservation of other environmental values. The BLM has failed to consider the recommendations from site-specific studies (Sawyer et al. 2006) wherein they stated that the only way to reduce the significant impacts to mule deer was by limiting the number of roads, well pads and pipelines. Although clustering development, using a central condensate facility and remotely monitoring wells via telemetry are steps in the right direction, these actions, as presented in the PASEIS are not enough to reduce impacts to mule deer, pronghorn and their habitats. Impacts to mule deer and pronghorn populations and their habitats from implementation of the Preferred Alternative in the 2000 PAPA ROD (current No Action Alternative) exceeded predictions. Because of this, the BLM must consider an alternative that will actually reduce impacts and develop more scientifically credible means for estimating impacts. **Scientifically based means exist to develop an alternative that allows for energy resource extraction while reducing impacts to mule deer and pronghorn, thus the BLM has an obligation under NEPA and FLPMA to consider and present such an alternative.** This alternative would likely necessitate decelerated energy extraction allowing time for successful reclamation to be achieved and for wildlife populations to respond prior to initiation of new developments.

The "Proposed Alternative," Alternative B, is an attempt by proponents to portray an energy development scenario that will reduce impacts to the environment. Although this alternative does cluster development, use directional drilling and central condensate collection facilities, it, too, imposes massive development impacts on the best of crucial big game winter range on the Mesa. Furthermore, there are no assurances that drilling activities will be limited to the designated core areas (p. 2-23,25). Drilling activities outside the core area would be subject to timing limitations to protect wildlife during critical periods of the year. But even with

EMP-13-03 07/10/05

these restrictions, drilling outside the core area could occur and thus much of the value of clustering drilling and other measures would largely be lost. Furthermore, timing limitations only limit periods of activity during development phases, they do not protect habitats, nor do they afford wildlife populations and protection during the production phase. Under Alternative B, winter timing restrictions will be essentially eliminated for at least 5 years, and possibly more, to allow drilling within the core development areas (CDA), albeit the document terms these "temporary" (p. 2-23). The elimination of seasonal timing restrictions appears to be more an economic consideration for energy companies rather than an ecologic consideration for resident wildlife populations. Studies (summarized in Sawyer et al. 2006) have already demonstrated that development and production with a relaxation of winter timing restrictions have significantly impacted wintering mule deer populations. The PASEIS also needs to clarify what exactly constitutes the development phase and the production phase and who makes this decision. **The BLM should provide unequivocal assurances that drilling will not occur outside CDAs until habitats within the CDAs have been successfully reclaimed to a functional sagebrush community and big game populations have demonstrated a positive response to this reclamation. The BLM should also provide a better definition of what is meant by "temporary relaxation."**

Alternative B purports to leave "large contiguous blocks of land and corridors available for wildlife without active natural gas development" (p. 2-23). Much of the same is true for Alternative C. There is no indication in the document as to how large these blocks will be or where they will be located. Preliminary data from Berger et al. (2006) indicate that these blocks need to be at least 600 acres to be used by pronghorn. **The BLM should specify the location and size of habitat blocks described in Alternative B and C with assurance that they will not be disturbed by future energy extraction.** Also included in Alternative B is a proposal "to develop a 10-year rolling development plan" and that "each year the operators would review these plans with BLM and WGFD (Wyoming Game and Fish Department) to seek improvements to the development plan in an attempt to further reduce impacts" (p. 2-23). This is a good way to communicate between the operators and management agencies, but it will not, however, be of much value in reducing impacts to big game populations. There is often a lag time between the occurrence of an impact and manifestation of its effects in population performance (p. 4-132). By the time a measurable effect is observed in mule deer and pronghorn populations it will likely be too late to remedy that situation. Furthermore, as I state below, the failure to include any monitoring negates adaptive management and the basic premise of the proposed meetings. **Meetings may serve the purpose of sharing information with involved parties, but they will do little good in ameliorating impacts to populations of mule deer and pronghorn.**

An assumption inherent in both Alternatives B and C is that, as drilling progresses across the CDAs, reclamation will proceed in areas where drilling has been completed. The reader is led to believe that because of this reclamation, impacts to mule deer and pronghorn will be significantly reduced. Page 2-28 states that "initial disturbance associated with well pads would be reclaimed to a LOP disturbance of 40%." The document further claims that there is little disturbance with pipelines because the entire disturbed area is reclaimed following construction (p. 2-28). The fallacy in this assertion is that reclamation will be with grasses and forbs and not the shrubs vital to wintering big game animals. Grasses and forbs provide very little nutritional benefit to mule deer and pronghorn during winter, and on the Mesa, these animals depend on shrubs, predominantly sagebrush, that remain available above snow. Reclamation to a functional sagebrush community may take on the order of 50-120 years (Baker 2006), if in fact it can be achieved at all. The BLM should have monitoring data from other surface disturbance actions to provide a more plausible description of problems

RC-2
W-3
EG-13-4

associated with reclamation of sagebrush communities. Reclamation will not compensate for this habitat loss within the LOP and implications of this habitat loss to mule deer and pronghorn populations, based on existing site-specific data, appears significant. **The BLM must acknowledge that reclamation in this sagebrush ecosystem will not compensate for habitat losses during the LOP and provide a more scientifically credible estimate of impacts to mule deer and pronghorn populations.**

W-4
EG-13-5

Alternative C (BLM's Preferred Alternative p.2 Dear Reader letter) appears to be disclosure by the BLM of what has actually occurred on the Mesa since 2000 PAPA ROD (USDI BLM 2000) and is nearly the same as Alternative B (p. 2-29). Alternative C does offer some assurance that, if drilling outside CDAs occurs during critical periods for wildlife, it will be subject to timing limitations. Based on the BLM's past history of granting exemptions of these limitations, I remain skeptical that they will be enforced. Alternative C (2-33) will allow year-round drilling within 2-mile wide areas (north to south) in DA-1. If I am interpreting Map 2.4-5 correctly, DA-1 is essentially all comprised of crucial mule deer winter range and contains a significant portion of pronghorn winter range. If we apply data from Sawyer et al. (2006) for deer avoidance of an area 3-4 miles from gas development sites, one can only conclude that almost all the crucial mule deer winter range will be impacted as will most of pronghorn crucial winter range. Once DA-1 is fully "developed" the remainder of deer and pronghorn crucial winter ranges will be sacrificed as drilling commences in DA-2. Aside from that, Alternative C has many of the same issues as Alternative B. Alternatives B and C will exacerbate a situation, created by Alternative A (No Action Alternative) that is already severely impacting mule deer and pronghorn populations. **The BLM should acknowledge that with all alternatives, they are going to sacrifice a significant portion of mule deer and pronghorn winter ranges and, thus, their populations for many years to come.**

Environmental Consequences

EG-13-6

My professional opinion is that the BLM has underestimated environmental consequences potentially resulting from implementation of any of their alternatives. On page 1-127, the BLM acknowledges that with implementation of the past Preferred Alternative (now No Action Alternative), "functions of some wildlife habitats, those classified as "vital" or "high value" by WGFD have declined as wellfield developments have progressed." And that "since issuance of the PAPA DEIS (USDI BLM 1999), many of the impacts to wildlife that were predicted have been substantiated by wildlife studies...." The essence of these statements is diminished by also stating that, although lost habitat function may have a direct impact on populations, "such direct impact has not been conclusively demonstrated" (p. 4-127). Sawyer et al. (2006) concluded that only 48% of areas considered "high use" prior to wellfield development were considered "high use" after 5 years of development. Those authors also reported a 46% reduction in mule deer densities on the Mesa during the first 5 years of wellfield development and conservatively estimate that of this total mortality, 19% could have been ambient leaving 27% additional mortality associated with gas/oil development (Sawyer et al. 2006). Appendix K of the PASEIS presents additional survival data for mule deer in the Sublette Herd and results of that work demonstrate inherent variability in estimating population parameters for large free-ranging animals and the need for a commitment to scientifically credible, long term studies. The perceived anomaly in the 2005-2006 fawn survival data is not well explained in that report. Conceivably, the best explanations are that the model used to predict fawn survival from climatological data is simply incorrect or data used to drive the model do not reflect actual environmental conditions being experienced by wintering deer (K-12). Alternatively, one might conclude that reductions in deer density on the Mesa resulting from gas/oil developments, reduced competition for the fewer deer remaining on that winter range. Reduced competition allowed the remaining animals to experience higher survival rates during a somewhat severe

winter. In essence what might have been more of a density independent population impact became a density dependent reflection of reduced deer numbers (Bartmann et al 1992). The conclusions of Sawyer et al. (2006) are inescapable: "The weight of evidence suggests the observed deer decline in the treatment area (Mesa) was due primarily to reduced survival rates associated with development activities and secondarily to limited amounts of emigration." Possibly the BLM does not consider this "conclusive," but it certainly seems strongly suggestive. **The BLM should be more forthright in acknowledging the magnitude of impacts to mule deer and pronghorn populations and habitats. Existing scientific literature allows this forthright acknowledgement of impacts, thus the BLM must present this full disclosure of information if it is to meet its scientific obligations under NEPA.**

Habitat fragmentation, a most important consideration, is discussed on page 4-128. If, in fact some 2% of mule deer winter range has been directly impacted by energy development, then the measured impacts to deer populations (Sawyer et al. 2006) must largely be associated with indirect habitat losses and habitat fragmentation. To assess fragmentation, miles of edge created by road and well pad development were calculated. This approach to assessing habitat fragmentation is scientifically unacceptable. Franklin et al. (2002) define habitat fragmentation as "the discontinuity, resulting from a given set of mechanisms, in the spatial distribution of resources and conditions present in an area at a given scale that affects occupancy, reproduction or survival in a particular species." Thus a measure of fragmentation must consider scale, time and species of interest. Edges associated with well pads and roads are hardly this measure (see also D'Eon et al. 2002). Given that, the BLM acknowledges that their calculations are conservative because they were made by using well pads of 11-17.6 acres with the assumption that perimeters of these pads are the average of the perimeter of a circle and a square (p. 4-128) when, in fact, they are likely to be rectangles and size is reported elsewhere as being 19-21 acres or more (i.e. p.2-25). These erroneous assumptions have led to an underestimation of edge that may be in error by 50% or more. Results from studies by Sawyer et al. (2006) and Berger et al. (2006) show population declines, changes in habitat use and habitat avoidance all resulting from a surface disturbance of about 2% of the Mesa winter range. Certainly surface disturbance is a contributor to direct impacts on mule deer and pronghorn populations but secondary impacts from habitat avoidance and fragmentation are also important. Energy development activities on the Mesa resulting from implementation of the current Preferred Alternative appear to have effectively bisected crucial winter ranges and actions associated with Alternatives B and C will only further fragment these habitats. Existing scientific literature and GIS capabilities would allow a better assessment of fragmentation with little additional expense (consider the above references and also McGarigal and Cushman 2002, and Jaeger 2000). **The BLM must provide a more accurate assessment of habitat fragmentation and its potential impacts on populations of mule deer and pronghorn.**

In my professional opinion the BLM has underestimated impacts to mule deer and pronghorn habitats (p. 4-130-131). As currently reported, acres of habitat loss reflect only that directly disturbed by well pads and roads and purposely exclude pipeline corridors. Because of reclamation problems I noted above, acres associated with pipelines should also be included in this estimation. Reclamation of any disturbed sites (pipelines, roads, well pads) on the Mesa with grasses and forbs does not provide necessary nutritional components for pronghorn and mule deer during winter. Sawyer et al. (2006) as cited on page 4-132, report that mule deer avoid areas of human disturbance for as much as 3 to 4 miles. The BLM calls this indirect habitat loss, but does not include it in their assessment of impacts. Considering Maps 3.22-1, 3.22-2, 2.4-3 and 2.4-5, and applying the 3 to 4 mile avoidance figure to areas slated for wellfield development leads me to conclude with both Alternatives B and C, that vast majority of crucial winter range for mule deer and pronghorn on the Mesa will experience major impacts.

W-7
EG-13-8

Weller et al. (2002) emphasize that the ecological footprint of oil and gas development is much larger than the physical infrastructure footprint. In the PASEIS, the BLM has provided an underestimate for an infrastructure footprint and ignored site-specific data from scientifically credible studies that would have allowed them to more accurately portray the ecological footprint. It is especially important to consider these impacts to mule deer using Mesa winter ranges because this population appears to be a sub-population of the Sublette Mule Deer Herd that illustrates a strong fidelity to a unique migration route and inter-mixes very little with animals using other portions of the Herd Unit (Sawyer et al. 2005 b and 2006). Regretfully we do not have similar data for pronghorn populations, but again Sawyer et al (2005b) demonstrated unique migration patterns in these animals, thus it would seem prudent to also consider them as a distinct sub-population. **The BLM must provide a realistic assessment of both direct and indirect habitat losses for mule deer and pronghorn by utilizing data for habitat avoidance from site-specific studies and the scientific literature, and at least attempt to relate habitat impacts to population impacts.**

W-10 W-9W-8
EG-13-9

Discussion of cumulative impacts to mule deer and pronghorn using habitats on the Pinedale Anticline (4-143,144,145) present estimates for acreages of habitat that have been impacted by activities other than wellfield development on the Pinedale Anticline. This analysis should be expanded to include impacts to migration routes and other habitats, including transition ranges, for the Sublette Herd Unit for mule deer and pronghorn. Deer and pronghorn wintering on the Mesa travel distances in excess of 150 miles to summer habitats (Sawyer et al. 2005b). During this migration and on transition and summer ranges they experience impacts that should be considered in the cumulative analysis. Transition ranges are extremely important to mule deer wintering on the Mesa (Sawyer et al. 2006) as has been demonstrated in other areas (Garrott et al. 1987). Consideration should also be given to impacts resulting from increased traffic, recreation and poaching. These impacts should be related to current and predicted population trends and can be done with little added expense. **The BLM should expand the scope of their cumulative impact analysis to consider all integrated environmental impacts encountered by migrating of mule deer and pronghorn.**

T-2 T-1
EG-13-10

Mitigation

W-11

The brief section on impact mitigation (4.20.5) provides minimal information regarding mitigation that would be required for habitat disturbances on the Mesa. The proponents mitigation plan, Appendix C contains a number of good suggestions for mitigating some impacts resulting from wellfield development on the Pinedale Anticline. This plan is, however, filled with phrases like "where applicable," "if needed," and "to the extent possible," with very little in the way of commitment to assure that mitigation is carried out. Additionally, nowhere do I find any indication regarding who will make the decisions if mitigation is needed and decide what is to be done and where; there simply is not a designation of a responsible party. Pages C-8-9 indicate that the proponents "will make a reasonable effort" to reduce traffic volume by busing crews to worksites during winter. If it is feasible to bus personnel to work during winter it should be even more feasible to do so in summer and this should be done. Computer assisted remote monitoring of producing wells should be mandatory to reduce traffic volumes. Furthermore, it is my understanding that unless a problem arises, telemetry monitoring of producing wells eliminates the need for any visits to wells. Proponents also indicate (p. C-10) they will advise "project-related personnel and vendors of traffic activity restrictions and rules of conduct" which include no stopping to observe wildlife, no harassment of wildlife, no firearms and no pets outside a vehicle. These are all good regulations, but who will enforce these and what will be penalties for violations? **The BLM should make all recommendations for mitigating impacts to wildlife in Appendix C mandatory regardless of which alternative they select and define enforcement measures, associated penalties for violations and decision**

2011-10-05 11:10:05

W-11
EG-13-10

points for habitat mitigation requirements.

RC-4

EG-13-11

The Reclamation Plan (Appendix C) provides very little information as to just what seed mix will be used and no verification that any of this will be successful. It is also not clear if this reclamation plan applies to all alternatives or only the Proposed Alternative. It is wise to quickly begin reclamation, but the claim that interim reclamation "will increase habitat patch sizes and reduce habitat fragmentation for sagebrush-obligate species," is misleading. Sagebrush obligate species are intimately linked to functioning sagebrush communities not fragmented sagebrush communities with extensive patches of grasses and forbs. Reclamation of habitats on the Pinedale Anticline to functional sagebrush communities, necessary for sagebrush-obligate species, will take 10-20 years according to the BLM (p. 4-99) but more realistically may take 50-120 years (Baker 2006). The wheels of ecological succession grind slowly in arid environs such as found on the Pinedale Anticline especially when soil profiles are disturbed such as is the case with wellfield development. It is unreasonable to claim that reclamation will reduce impacts from lost crucial big game winter range within the LOP timeframe. **The BLM must provide details for required reclamation procedures, indicating seed mix, a reasonable time frame for achievement and measurable endpoints for reclamation success.**

W-12
W-13

EG-13-12

To compensate for impacts, the proponents have "agreed to a 3:1 acre off-site mitigation ratio in the event that offsite mitigation is required to compensate for loss of on-site habitat..."(C-34). Albeit this is an admirable commitment, the document fails to provide any insights as to what sorts of improvements will be required, where this mitigation would take place, what will trigger this mitigation ("in the event that offsite mitigation is required") and who makes the decision if it will be required. Furthermore, there is no assurance in this PASEIS or the Pinedale RMP (USDI 2007) that these areas of potentially improved habitat will be protected from future energy development or other anthropogenic perturbations. Deer and pronghorn have for centuries selected habitats on the Mesa because they are best available for meeting winter survival needs. There is little or no scientific basis to conclude that large segments of poorer quality habitats can be improved to a level that will approach those historically available and used by mule deer and pronghorn on the Mesa. Sawyer et al (2006) and the PASEIS indicate that there is minimal emigration of mule on the Mesa during winter. Thus, improving marginal habitat somewhere else may have no benefit for mule deer or pronghorn on the Mesa because the animals simply would not find these new areas. Sawyer et al. (2006) suggest that habitats along the migration route that parallels the base of the Wind River Range would be a good area for mitigation. The SEIS makes no mention of this suggestion. Although mitigation in this area might help one segment of the Sublette Mule Deer Herd, animals wintering on the Mesa do not use this migration route (Sawyer et al. 2006), thus, habitat improvements here would have little benefit for the Mesa mule deer population. The BLM should also ensure that part of off-site mitigation is permanent protection of other habitats known to be important to big game animals. **The BLM should require the proponents to provide a detailed habitat mitigation plan prior to the SEIS ROD release. This plan should indicate what habitat improvements will be conducted, the location of areas to be improved, the movement corridor or area that will allow deer and pronghorn to access the improved habitats and assurance that these habitats will be protected for perpetuity.**

W-14

EG-13-13

Monitoring

The word "monitoring" appears in a number of places in the SEIS but I was unable to find any discussion of how impacts to mule deer and pronghorn from wellfield development would be monitored. There is a commitment to a five-year pronghorn study that is in its first year and a commitment to one more year of a mule deer study (p. C-35). BLM and the

2007-10-06 10:06

W-14
EG-13-13
proponents should commit to long term monitoring studies on both pronghorn and mule deer associated with wellfield development on the Pinedale Anticline. As currently presented monitoring of impacts to big game animals is inadequate and as such, there is no way for industry or management agencies to ascertain what is happening to populations of mule deer and pronghorn that utilize Mesa habitats. Without documentation of impacts it would seem that the planning meetings proposed as a mitigation measure (p. C-23, C-34) would be of little consequence. Monitoring is essential for evaluation of thresholds for any adaptive management strategy. In fact the Pinedale RMP (p. 2-14, USDI 2007) provides an argument for why monitoring is essential to the planning process.

W-15
W-16
EG-13-14
Currently the only mention of thresholds and adaptive management strategies I find is on page 2-4 and that covers well pad thresholds. The BLM should develop thresholds that would trigger a response for adaptive management strategies for big game populations. One appropriate threshold for mule deer and pronghorn would be reduction of over winter fawn survival, which can be fairly precisely measured using telemetered animals in a treatment/control design (White et al. 1987). Certainly there is the potential to develop thresholds that are less species specific and would provide an integrated measure of impacts to the sagebrush community at large. Thresholds themselves are not enough; the BLM must also identify the sorts of actions that would be triggered if thresholds were reached. **The BLM must develop a scientifically valid monitoring plan that will document impacts to mule deer and pronghorn populations and their habitats and results of monitoring must be used to determine thresholds for adaptive management strategies.**

RC-5
EG-13-15
Invasive weeds are a continual problem whenever habitats are disturbed with roads, pipeline corridors and well pads. Invasive weeds can have significant impacts on reclamation efforts, plant succession and ultimately quality of wildlife habitats. **The BLM must assure that an invasive weed monitoring and management plan is established and this plan must include methods, triggers and remediation actions and identification of responsible parties.**

Conclusions

For the reasons I have enumerated, I believe that the PASIES fails to meet the mandates of NEPA and violates FLPMA. All alternatives evaluated in the PASEIS include intensive energy development with little or no regard for multiple use or other environmental values. Environmental consequences have been incorrectly estimated and are inadequately presented. There is not enough detail provided about mitigation, nor are there assurances that mitigation will be achieved. Monitoring of reclamation and impacts to mule deer and pronghorn populations and habitats is not discussed in adequate detail and there are no thresholds, triggers or actions for adaptive management strategies. Before the PASEIS is acceptable these shortcomings must be remedied. I further summarize my comments in the attached Appendix A. If the BLM disagrees with my comments, please provide reasons for this disagreement. Thank you for considering my comments.

Respectfully,

A. William Alldredge, Ph.D.
Professor Emeritus, Wildlife Biology

2007 MAR 30 11:10:05

Literature Cited

- Allredge, A. W. and R. D. Deblinger. 1988. Great Divide Basin pronghorn antelope study. Union Oil/Minerals Exploration Company. Rawlins WY.
- Baker, W. L. 2006. Fire and restoration of sagebrush ecosystems. *Wildlife Society Bulletin*. 34(1):177-185.
- Bartmann, R. M., G. C. White and L. H. Carpenter. 1992. Compensatory mortality in a Colorado mule deer population. *Wildlife Monographs* 121.
- Berger, J., K. Berger and J. Beckman. 200g. *Wildlife and Energy Development: Pronghorn of the Upper Green River Basin – Year 1 Summary*. The Wildlife Conservation Society. Jackson, Wyoming.
- D'Eon, G. G. , S. M. Glenn, I. Parfitt and M. J. Fortin. 2002. Landscape connectivity as a function of scale and organism vagality in a real forest landscape. *Conservation Ecology*. 6(2):10. (online) URL:
- Franklin, A. B., B. R. Noon and T. L. George. 2002. What is habitat fragmentation? *Studies in Avian Biology*. 20:20-29.
- Garrott, R. A., C. C. White, R. M. Bartmann, L. H. Carpenter and A. W. Allredge 1987 . Movements of female mule deer in northwest Colorado. *Journal of Wildlife Management*. 51:634-643.
- Jaeger, J. A. G. 2000. Landscape division, splitting index and effective mesh size: New measures of landscape fragmentation. *Landscape Ecology* 15:115-130.
- McGarigal, K. and S. A. Cushman. 2002. Comparative evaluation of experimental approaches to the study of habitat fragmentation effects. *Ecological Applications*. 12(2):335-345.
- Sawyer, H., R. Neilson, and L. McDonald. 2005a. 2005 Annual Report. Sublette Mule Deer Study (Phase II): Long-term Monitoring Plan to Assess Potential Impacts of Energy Development on Mule Deer in the Pinedale Anticline Project Area. Western Ecosystems Technology, Inc. Cheyenne, Wyoming.
- Sawyer, H. F. Lindzey and D. McWhirter. 2005b. Mule deer and pronghorn migration in western Wyoming. *Wildlife Society Bulletin*. 33:1266-1273.
- Sawyer, H., R. Neilson, and L. McDonald. 2006. 2006 Annual Report. Sublette Mule Deer Study (Phase II): Long-term Monitoring Plan to Assess Potential Impacts of Energy Development on Mule Deer in the Pinedale Anticline Project Area. Western Ecosystems Technology, Inc. Cheyenne, Wyoming.
- USDI Bureau of Land Management 1999. Draft Environmental Impact Statement for the Pinedale Anticline Exploration and Development Project, Sublette County, Wyoming. DEIS-00-018. Pinedale Field Office. Pinedale, Wyoming.
- USDI Bureau of Land Management. 2000. Record of Decision for the Final Environmental

Impact Statement for the Pinedale Anticline Oil and Gas Exploration and Development Project Sublette County, Wyoming. Pinedale Field Office. Pinedale, Wyoming. EIS-00-018.

USDI Bureau of Land Management. 2007. Draft Environmental Impact Statement for the Pinedale Resource Management Plan. Pinedale Field Office. Pinedale, Wyoming.

Weller, C. J. Thompson, P. Morton and G. Aplet. 2002. A spatial analysis of a Wyoming gas field. The Wilderness Society. Denver, Colorado.

White, G. C., R. A. Garrott, R. M. Bartmann, L. H. Carpenter and A. W. Alldredge. 1987. Survival of mule deer in northwest Colorado. Journal of Wildlife Management. 51:852-859.

2007 MAR 30 09:10:05

Appendix A Summary of Comments by A. W. Alldredge

- AL-1
EG-13-16 | Scientifically based means exist to develop an alternative that allows for energy resource extraction while reducing impacts to mule deer and pronghorn, thus the BLM has an obligation under NEPA and FLPMA to consider and present such an alternative.
- G-4
PA-1
EG-13-17 | The BLM should provide unequivocal assurances that drilling will not occur outside CDAs until habitats within the CDAs have been successfully reclaimed to a functional sagebrush community and big game populations have demonstrated a positive response to this reclamation. The BLM should also provide a better definition of what is meant by "temporary relaxation."
- PA-2
EG-13-18 | The BLM should specify the location and size of habitat blocks described in Alternative B and C with assurance that they will not be disturbed by future energy extraction.
- G-5
EG-13-19 | Meetings may serve the purpose of sharing information with involved parties, but they will do little good in ameliorating impacts to populations of mule deer and pronghorn.
- RC-6
EG-13-20 | The BLM must acknowledge that reclamation in this sagebrush ecosystem will not compensate for habit losses during the LOP and provide a more scientifically credible estimate of impacts to mule deer and pronghorn populations.
- W-17
EG-13-21 | The BLM should acknowledge that with all alternatives, they are going to sacrifice a significant portion of mule deer and pronghorn winter ranges and, thus, their populations for many years to come.
- W-18
EG-13-22 | The BLM should be more forthright in acknowledging the magnitude of impacts to mule deer and pronghorn populations and habitats. Existing scientific literature allows this forthright acknowledgement of impacts, thus the BLM must present this full disclosure of information if it is to meet its scientific obligations under NEPA.
- W-19
EG-13-23 | The BLM must provide a more accurate assessment of habitat fragmentation and its potential impacts on populations of mule deer and pronghorn.
- W-20
EG-13-24 | The BLM must provide a realistic assessment of both direct and indirect habitat losses for mule deer and pronghorn by utilizing data for habitat avoidance from site-specific studies and the scientific literature, and at least attempt to relate habitat impacts to population impacts.
- CU-1
EG-13-25 | The BLM should expand the scope of their cumulative impact analysis to consider all integrated environmental impacts encountered by migrating of mule deer and pronghorn.
- W-21
EG-13-26 | The BLM should make all recommendations for mitigating impacts to wildlife in the Appendix C mandatory regardless of which alternative they select and define enforcement measures, associated penalties for violations and decision points for habitat mitigation requirements.
- RC-7
EG-13-27 | The BLM must provide details for required reclamation procedures, indicating seed mix, a reasonable time frame for achievement and measurable endpoints for reclamation success.
The BLM should require the proponents to provide a detailed habitat mitigation plan prior

20071122 11:06

RC-8
EG-13-28

to the SEIS ROD release. This plan should indicate what habitat improvements will be conducted, the location of areas to be improved, the movement corridor or area that will allow deer and pronghorn to access the improved habitats and assurance that these habitats will be protected for perpetuity.

W-22

EG-13-29

The BLM must develop a scientifically valid monitoring plan that will document impacts to mule deer and pronghorn populations and their habitats and results of monitoring must be used to determine thresholds for adaptive management strategies.

RC-9

EG-13-30

The BLM must assure that an invasive weed monitoring and management plan is established and this plan must include methods, triggers and remediation actions and identification of responsible parties.

2007 MAR 30 11:10:06

RESUME

A. WILLIAM ALLDREDGE

Born: 10 November 1946

EDUCATION

B. S. 1969 Wildlife Biology, Colorado State University
 M. S. 1971 Radiation Ecology, Colorado State University
 Ph.D. 1977 Earth Resources, Colorado State University

MILITARY SERVICE: Honorable Discharge
 US Army 1968

EXPERIENCE

2006-Present Wildlife Consultant for Williams Production, Parachute, CO
 2005-Present Wildlife consultant for Bellvedere Property Management, Trinidad, CO.
 2004-Present Big Game Consultant for The Wilderness Society, National Wildlife Federation and Wyoming Outdoor Council
 2001 - Professor Emeritus - Retired.
 1999-2001 Chairman of Wildlife Biology Major, Colorado State University
 1992 -94 Director, CSU Center for Ecological Risk Assessment and Management
 1987-2001 Professor, Department of Fishery and Wildlife Biology, Colorado State University. Responsibilities as listed below.
 1982-87 Tenured Associate Professor, Department of Fishery and Wildlife Biology, Colorado State University. Responsibility for teaching ecology, resource management, big game management and other courses at the graduate and undergraduate levels, and conducting research in ungulate trophic and population dynamics. Direction of masters and doctoral students, and advise undergraduates in wildlife biology.
 1980-82 Assistant Professor, Departments of Fishery and Wildlife Biology and Radiology and Radiation Biology, Colorado State University. In addition to the above I also taught courses in radiation ecology and nuclear technology and conducted radioecological research. Graduate student supervision.
 1978-80 Assistant Professor, Department of Radiology and Radiation Biology, Colorado State University. Teaching, research and administrative responsibilities in the area of wildlife and radiation ecology. Graduate student supervision.
 1971-78 Research Associate, Department of Radiology and Radiation Biology, Colorado State University. Conducted and supervised research projects in wildlife and radiation ecology. Member of the graduate faculty. Teaching experience in radiation ecology and radioisotope techniques, developed and taught a course entitled, "Nuclear Technology and Society."
 1974-86 Lecturer in Wildlife Ecology Alpine Ecology for The National Wildlife Federation.
 1976-86 Lecturer in Wildlife Ecology and Alpine Ecology for The Rocky Mountain Nature Association.
 1976-89 Wildlife Consultant for Union Oil/Minerals Exploration Company, Rawlins, Wyoming.
 1980 Wildlife Consultant for Union Oil/Molycorp Inc., Los Angeles, CA.
 1975-76 Consultant, E.G.&G. Environmental Consultants, Denver, Colorado. Conducted an environmental inventory for a portion of Wyoming's Red Desert that was being considered for uranium mining development.
 1973-76 Consultant, El Paso Natural Gas Company, El Paso, Texas. Wildlife inventory and analysis of environmental impacts for a nuclear fracturing experiment in Wyoming, and a biotic inventory for a coal lease on the Kaiparowits Plateau of Utah.
 1973 Consultant, CER Geonuclear Corporation, Las Vegas, Nevada. Conducted studies on the immediate environmental effects resulting from the Rio Blanco nuclear fracturing experiment in Colorado.

20071023 00 11:10:05

Aldredge Resume

Page 2

- 1967-71 Research Technician, Department of Radiology and Radiation Biology, Colorado State University. Worked on radioecological research associated with plants, mammals and aquatic systems. Chief responsibility for care and maintenance of a mule deer research facility.
- 1986 Expert witness testimony, National Wildlife Federation. Testified in Federal District Court, Cheyenne, Wyoming.
- 1987 Expert opinion for National Wildlife Federation in cases against the US Forest Service over issuance of permits for ski area development.
- 1988-92 Wildlife Consultant - O. R. Goltra Sheep Mountain Quarry Project
- 1988-Present Consultant on wildlife and ski areas for Vail Associates Inc. Vail, Colorado.

COURSES TAUGHT

Introductory Ecology
 Integrated Ecosystems Management
 Conservation and Management of Large Mammals
 Alpine Ecology

PROFESSIONAL MEMBERSHIPS AND HONORARY SOCIETIES

American Society of Mammalogists
 The Wildlife Society (National, Sectional and State Chapters)
 Faculty Adviser to Colo State Univ. Student Chapter 1982-2000

AWARDS AND SPECIAL RECOGNITION

Colorado Chapter of The Wildlife Society, Special Recognition in Education, 1982
 Phi Kappa Phi Faculty Honor Initiate, Colorado State University 1982
 Alumni Association Award for Outstanding Faculty Member College of Forestry and Natural Resources, Colorado State University 1983.
 Harry E. Troxell Award for Outstanding Educator, College of Forestry and Natural Resources, Colorado State University, 1987.
 College of Forestry and Natural Resources Top Student Adviser Award, Colorado State University, 1987.
 College of Forestry and Natural Resources Mortar Board Rose Award Recipient for Outstanding Educator, Fall 1987, Colorado State University.
 Colorado State University Tau Iota Omega Chapter Mortar Board Rose Award Recipient for Outstanding Professor, 1989-1990.
 State Board of Land Commissioners - CSU Superior Performance Award 1989 for Integrated Resource Management (NR-420) Class.
 Colorado State University College of Natural Resources Outstanding Faculty Member 1997-1998
 Colorado State University College of Natural Resources 1999 Winter Graduation Commencement Speaker
 Colorado State University Cermak Award- Outstanding Adviser College of Natural Resources 2000
 Harry E. Troxell Award -Outstanding Educator, College of Natural Resources, Colorado State University, 2000
 College of Natural Resources, Department of Fishery and Wildlife Biology Favorite Professor, 2000
 CSU Student Chapter of The Wildlife Society - Most Dedicated Advisor Award 2000
 Colorado Chapter of The Wildlife Society - Honorary Membership 2001
 Colorado State University, Dept. of Fishery and Wildlife Biology Favorite Professor 2001
 Colorado Chapter of The Wildlife Society - Douglas L. Gilbert Award for Professional Excellence 2002

Publications: Author or coauthor of over 35 peer reviewed publications and Over 100 technical reports and scientific presentations.

2007 MAR 30 11:10:05