To:
US Forest Service -GMUG Planning Team
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From:
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19 November 2021

Dear Planning Team;

What follows is my detailed review of the Draft US Forest Service Draft Resource Management Plan for the Grand Mesa, Uncompahgre and Gunnison National Forest dated August 2021. I direct my comments to you for consideration.

My qualifications:
I earned my Bachelor's degree in Biology and Natural History from the University of California Santa Cruz, Master's degree in Wildlife Ecology from Yale University, and Ph.D. in Ecology and Evolutionary Biology from Cornell University. My postdoctoral experience included research at the University of Colorado, Boulder as a USDA postdoctoral fellow, and the Center for Reproduction of Endangered Species at the San Diego Zoo. I have been conducting research on ecology, evolution, and conservation of mountain sheep since 1981. That research includes a wide variety of conservation-related questions on desert, Sierra Nevada, and Rocky Mountain bighorn sheep in North America, and genetics of argali, Urial, and snow sheep in Asia. My doctoral dissertation research was on the population structure, systematics, and evolution of mountain sheep. Later research included host specificity and the evolution of virulence in parasites and bacterial pathogens in bighorn, evolution of the mammalian gut microbiome, as well as the population genetics, phylogenetics, trace element nutrition, population dynamics, and translocation strategies affecting the conservation of North American mountain sheep. With colleagues, I pioneered the live-capture of Argali sheep on the Mongolian steppe, the development of non-invasive fecal DNA technology for genetic research on the endangered Sierra Nevada bighorn sheep, and the concept of metapopulation management to desert bighorn sheep. I have published research on the natural and human-caused factors affecting the population dynamics of bighorn sheep, greater sage grouse, and the critically endangered delta smelt in California

My experience includes work with raptors as well. I surveyed for, observed, and climbed into active nests of peregrine falcons and California condors for research and to recover eggs for captive incubation, at a time when those species were on the brink of extinction. I have climbed to numerous active peregrine falcon nests to aid species recovery,

including two high on the face of El Capitan in Yosemite to retrieve eggs thinned by DDE and foster captive reared chicks into the nests. Projects have included collecting eggshells from peregrine nests for DDE research on remote cliffs in Zion and Canyonlands National Parks, and Lake Powell National Recreation Area. At the request of the National Park Service, I made a 12-day ascent to a peregrine nest on the most overhanging section of the northwest face of Half Dome to determine the cause of nest failure. I have also surveyed for and climbed into northwestern goshawk nests to collect prey remains as a wildlife biologist on Inyo National Forest. And for the past 20 years, I have conducted early season observations for Arapaho National Forest to determine the locations of golden eagle nests so that climbing closures may be targeted to just active nests.

As part of my professional duties, I contribute as an ad hoc peer reviewer for a wide variety of scientific journals, as well as habitat conservation plans, endangered species recovery plans, BLM resource management plans, USFS land use plans, environmental impact statements, biological opinions, city and county conservation plans, a habitat exchange habitat quantification tool, research reports, draft scientific manuscripts, grant proposals, and proposed federal rules.

In my spare time, I conduct field research with colleagues on the behavioral ecology, population dynamics, and conservation of African elephants in the northern Namib Desert.

My CV is attached.

1) The DEIS demonstrate bias in favor of big game hunting over other types of recreational forest use

Proposed recreational access restrictions in the DEIS for wildlife management areas and route density prescriptions for "wildlife" that favor elk and mule deer hunting are based upon the simplistic assumption that recreational activity is the primary limiting factor to wildlife populations while ignoring other natural and human-caused factors. Instead, decades of research have consistently shown that factors other than recreational activity affect the demography of wildlife populations including: disease, predation, competition, invasive species, climatic variation, wildfire, residential/agricultural/oil and gas development, and the effects of density-dependence (i.e. population density feedbacks affect population growth rate), and hunting.

The DEIS exhibits an explicit bias favoring big game hunters over recreational trail users. This bias is demonstrated throughout the DEIS through its emphasis on "big game" (elk and mule deer), along with proposed designation of wildlife management areas (especially alternatives C and D) that favor unrestricted recreational hunting access over all other forms of recreation. This is demonstrated by statements such as:

> "**Though some forms of recreation may be limited or excluded from wildlife management areas (MA-STND-WLDF-02), other forms of hunting-based recreation could be enhanced by the protection of important habitat for big game and other species**. The fragmentation of habitat by roads and trails can lead to a decrease in big game and associated hunting opportunities. So, by restricting new trail

or road construction above a certain density threshold, **certain benefits may be seen by the hunting community**. (p351)."

Moreover the DEIS can provide no data from credible research that shows a quantifiable negative effect by roads and trails on big game and associated of hunting opportunities. It has been our experience that many big game hunters utilize ATVs and 4x4 vehicles to access hunting areas and for packing out their harvested game. Thus, the DEIS must acknowledge that road and trail restrictions will harm recreational hunting access as well as the general recreating public.

The DEIS alternatives C and D favor the creation of areas that exclude recreational use of trails and roads where benign (non-hunting) activities can allow animals to habituate but can be hunted 2-3 months of the year while ignoring the fact that animals are not just being disturbed by hunters stalking them, they are being killed by hunters. The DEIS bias in favor of hunting over other non-hunting uses, is inconsistent with the multiple use policy of USFS land.

2) Hunted wildlife tend to avoid humans

It is pertinent to point out that elk and deer both readily tolerate human presence on foot, on bicycle, on horseback, and in vehicles in areas where they have not been hunted. For example, in Rocky Mountain National Park and the surrounding area of Estes Park, elk routinely inhabit neighborhoods, walk down roads, and are encountered on trails such that hikers have to walk around the elk. They spend weeks on the local golf course, unperturbed by humans. "Elk-jams" (traffic jams caused by elk on or a near a road) in Rocky Mountain National Park are common. This is all a result of habituation due to the simple fact that they are not hunted.

The aversive conditioning through hunting, and the avoidance behavior it evokes has been reported in many other species (Goumas et al. 2020; Zanette and Clinchy 2020). Therefore, if a goal of the USFS is to use the best available science to encourage elk, mule deer, and bighorn populations to react less to recreational use of trails and roads by humans, the solution is simple: stop hunting them. That is why parks the world over tend to be populated with animals that have habituated to sharing their environment with humans exhibiting predictable and non-threatening behaviors. If there is any avoidance by elk, mule deer, or bighorn to non-hunting recreational activities on trails and roads on GMUG national forests, it is primarily due to their learned response hunting, and therefore, a problem of CPW's and USFS's own creation.

Literature Cited

Goumas M, Lee VE, Boogert NJ, Kelley LA, Thornton A. 2020. The role of animal cognition in human-wildlife interactions. *Frontiers in Psychology* 11:589978. doi: 10.3389/fpsyg.2020.589978

Zanette LY, Clinchy M. 2020. Ecology and neurobiology of fear in free-living wildlife. *Annual Review of Ecology, Evolution, and Systematics* 51:297–318. https://doi.org/10.1146/annurev-ecolsys-011720-124613

3) The DEIS misrepresented the results of the studies by Wisdom et al. 2018, Preisler et al. 2013, Ciuti et al. 2012, Rogala et al. 2011, Naylor et al. 2009, Wisdom et al. 2005, and Hebblewhite 2008. These studies do not justify proposed actions in the DEIS.

For example, on page 225 the DEIS states:

> "Depending on the mode of travel and frequency of use, big game species may be disturbed or displaced from using habitat adjacent to roads and trails when human use occurs. Studies (primarily on elk) estimate avoidance distances from trails and roads depending on the type of use (Wisdom et al. 2018, Preisler et al. 2013, Ciuti et al. 2012, Rogala et al. 2011, Naylor et al. 2009, Wisdom et al. 2005). Forestwide Desired Condition FW-DC-SPEC-12 is based on these study findings. In 2018, the GMUG National Forests coordinated with Colorado Parks and Wildlife on a spatial analysis identifying road and trail displacement distances on mule deer and elk, informed from the peer-reviewed scientific publications referenced above. Displacement distances were applied to all open routes in the GMUG National Forests."

Wisdom et al. (2018) made management recommendations for the USFS regarding closures of roads and trails based on reactions of radio-collared elk to recreationalists on ATVs, horseback, bicycles, and on foot), and which were relied upon in the DEIS However, Wisdom et al.'s (2018) results were all obtained in a highly artificial fenced-in study population at the Starkey Research Station in eastern Oregon, which renders their recommendations, both erroneous and inapplicable to the wild. More fundamentally, Wisdom et al. (2018) failed the litmus test of science in three ways: 1) the authors considered only one hypothesis, 2) they failed to acknowledge how other critical factors would have influenced their results, and 3) they failed to make their data public, even though 17 years have elapsed since their experiments concluded. Therefore, their results are not reproducible and recommendations that are based upon those results are erroneous and not applicable to management of wild elk populations or other species.

By designing a study that only considered one hypothesis and ignored multiple other factors that could bias their results, Wisdom et al. (2018) exhibited the classic signs of confirmation bias. Confirmation bias is the deliberate or unwitting "seeking or interpreting of evidence in ways that are partial to existing beliefs, expectations, or a hypothesis in hand" (Nickerson 1998). In contrast, strong inference in science (i.e. the scientific method) requires testing among alternative hypotheses rather then setting out to gather data to "support" a single favored hypothesis (see Platt 1964; Betini et al. 2017). It is unconscionable that Wisdom et al. (2018), a USDA-USFS research team, could be guilty of such a basic scientific failing, as well as the additional ones described below.

Wisdom et al. (2018) failed to acknowledge critical factors that influenced their results and conclusions. These errors of omission are as follows:

a) Elk were adversely conditioned to ATVs prior to the study. Research staff at Starkey used ATVs to drive elk into traps where they were captured, handled and radio collared. This capture method, as described in Rowland et al. (1997) would have strongly biased elk against any subsequent exposure to ATVs as well as humans. Similarly, capture using baited clover traps and/or net gun or darting from helicopters,

would have also adversely conditioned elk to humans in general, leading to greater avoidance of humans. The following excerpts are from Rowland et al. (1997):

"Elk are herded with personnel on all terrain vehicles down the alleyway toward the handling facility. There they are held in pens and quickly moved singly into a series of chutes and then into the surges-handling building " [Clover traps were also used.]

"... a large proportion of the Starkey elk are trapped each year."

"Population estimates for Northeast [where the study was conducted] are more precise than those for some years, nearly all (more than 95 percent) elk in Northeast are trapped in the winter area, allowing virtually complete enumeration"

b) Elk were hunted in the Northeastern study enclosure up to and including the fall hunting season of 1996, just 6.5 years before the Wisdom et al. (2018) study began which, given the life span of elk, would have virtually guaranteed that being stalked and hunted was within herd memory at the time of the study by Wisdom et al. (2018). Elk within the Starkey enclosure that had last experienced hunting would have included both immature animals and surviving adults (for life expectancies see: https://www.fs.fed.us/database/feis/animals/mammal/ceel/all.html#230)).

An additional factor not mentioned by Wisdom et al. (2018) was the fact that hunters were allowed inside the Northeast enclosure *in vehicles*, which would have resulted in further adverse conditioning to motorized vehicles and humans hunting them. Again, the following excerpt is from Rowland et al. (1997):

> "Compared to the period before timber harvest, hunter success improved and the number of hunter days per harvested animal declined during and after timber harvest (Table 2). The highest hunter success and the lowest number of hunting days required to take an animal occurred in 1996, when postharvest, open conditions existed together with **unlimited vehicle access**."

c) The elk had no ability to escape human activity because they were in an elk-proof fenced enclosure (called the Northeast) that has a very high density of roads at 3.6 miles of road per square mile (a 5.6 square mile enclosure, with 20 miles of roads). That area was further divided in half with an elk-proof cross-fence, meaning that the elk were constrained in even smaller areas while being exposed to stimuli associated with being captured or hunted. Clearly, a fenced enclosure is a far different situation than one would find in the wild.

d) Although Wisdom et al. (2018) mentioned a timber sale that took place in their study enclosure, they failed to acknowledge that the timber sale (from 1992-1994) resulted in a heavily modified landscape of clearcut patches that are depicted in Figure 1 from Rowland et al. (1997). That also did not acknowledge the scale of the timber harvest: *6-million board feet.* With numerous clearings and a high density of

access roads, the Northeast enclosure would have hardly resembled natural condition, even a decade later when Wisdom et al. began their experiments."

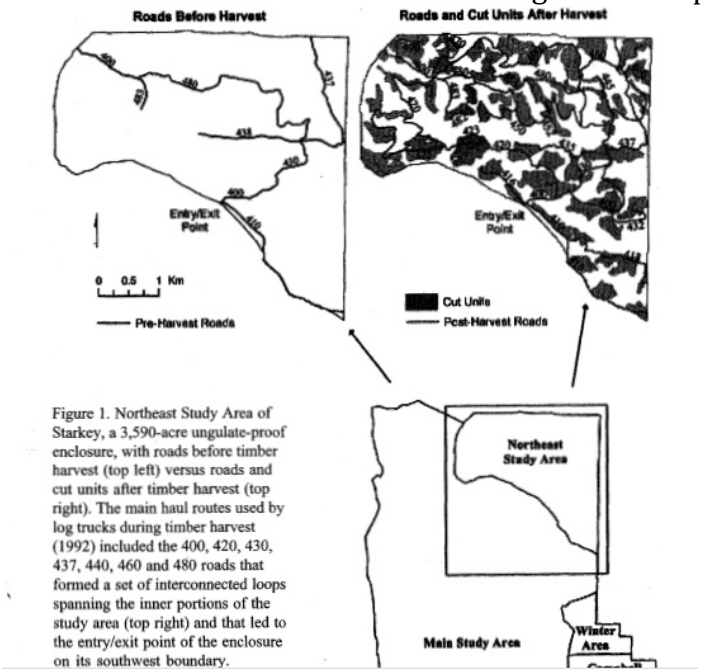

Figure 1. Northeast Study Area of Starkey, a 3,590-acre ungulate-proof enclosure, with roads before timber harvest (top left) versus roads and cut units after timber harvest (top right). The main haul routes used by log trucks during timber harvest (1992) included the 400, 420, 430, 437, 440, 460 and 480 roads that formed a set of interconnected loops spanning the inner portions of the study area (top right) and that led to the entry/exit point of the enclosure on its southwest boundary.

Clearly, the combination of a fenced-in study population, coupled with adversely-conditioned elk from repeated capture (including capture using ATVs, hunting, and a heavily modified timber-sale landscape), cannot reasonably be considered the underlying science for USFS policy in the wild. However, the DEIS states:

"Studies (primarily on elk) estimate avoidance distances from trails and roads depending on the type of use (Wisdom et al. 2018, Preisler et al. 2013, Ciuti et al. 2012, Rogala et al. 2011, Naylor et al. 2009, Wisdom et al. 2005). Forestwide Desired Condition FW-DC-SPEC-12 is based on these study findings."

Furthermore, the DEIS does not acknowledge that the same issues described above, that plague Wisdom et al. (2018) also apply to three other papers cited in the DEIS that were conducted by the same researchers, on the same elk, in the same enclosure, at the same time (2003 to 2004), using the same data as Wisdom et al. (2018). Those studies include Wisdom et al. (2005), Naylor et al. (2009), and Preisler et al. (2013).

Data not publicly available

Although the research published by Wisdom et al. 2005, 2018; Naylor 2009, and Preisler et al. 2013) was conducted over 15 years ago, the authors have still not made their data public. For example, Wisdom et al. 2018 state under Appendix A. Supplementary material:

"Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.foreco.2018.01.032."

However, no data are available in the online version. Instead, the message under Appendix A. Supplementary material reads:

> "We will be sharing the data used in this manuscript in early 2019, following publication of an additional manuscript that uses many of these same data."

When Wisdom was contacted via email with a request for data, the data was not provided. Instead, four higher resolution figures were sent, along with the following message from Wisdom:

> "The attached material [figures] was intended to provide more detail beyond Fig. 4. No actual data were provided, as we are still conducting our final analysis for our final paper and then will post all data for others to use."

In simple words, the data used by Wisdom et al. 2018 is not publicly available, and therefore their results are not reproducible. For this reason alone, the research by Wisdom et al. (2018) fails the basic requirements of the Information Quality Act (IQA). When other issues identified above are also taken into account, the failure of Wisdom et al. (2018) to meet IQA standards is clear. Furthermore, the USFS cannot use the excuse that peer review ensures information quality because since 2002 IQA guidelines issued by the Office of Management and Budget set a higher standard for federal agencies. They require that studies be reproducible and provide a rebuttable presumption that peer-review of the studies was adequate (OMB 2002).

Similarly, no data are available from Wisdom et al., 2005, Naylor 2009, and Preisler et al. (2013). In the case of Preisler et al. (2013), rather than data, the Supplemental Materials only provide an "R script [computer code] and resulting output for estimating the potential surface described in Eq. 3 with data from elk during ATV treatment days."

Finally, we note that the study by Hebblewhite (2008) is misrepresented in the DEIS as being applicable to recreational disturbance to elk when the study was instead, *"A Literature Review of the Effects of Energy Development on Ungulates: Implications for Central and Eastern Montana."* There is simply no rational comparison between benign recreation activities and the type and intensity of human activities associated with energy development. The former includes hiking, horseback riding, biking, ATV riding, and hunting, whereas the later includes seismic exploration, road construction for heavy equipment (such as drilling rigs), the noise and night lighting associated with oil and gas well drilling, pipeline construction and burial, condensate trucking, well overhaul and other maintenance, compressor station operation, and regular crew changes. It is therefore an overreach for the DEIS to have cited Hebblewhite (2008) as a basis for recreational management and reference to Hebblewhite (2008) needs to be deleted in the FEIS.

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Wisdom MJ, Ager AA, Preisler HK, Cimon NJ, Johnson BK. 2005. Effects of off-road recreation on mule deer and elk. Pages 67-80 *in:* Wisdom, M.J. (ed.). The Starkey Project: A Synthesis of Long-Term Studies of Elk and Mule Deer. Reprinted from the 2004 Transactions of the North American Wildlife and Natural Resources Conference, Alliance Communications Group, Lawrence, Kansas.

Wisdom MJ, Preisler HK, Naylor LM, Anthony RG, Johnson BK, Rowland MM. 2018. Elk responses to trail-based recreation on public forests. *Forest Ecology and Management,* 411(223-233). https://doi.org/10.1016/j.foreco.2018.01.032

4) The DEIS makes no mention of the effects of the coming wolf reintroduction on elk and mule deer population dynamics and behavior: this is a significant omission.
All sections of the DEIS that deal with the interaction of wildlife and recreation will become obsolete as written because there has been no accounting for the coming ecological changes in western Colorado, and the GMUG forests in particular, with the reintroduction of wolves into Colorado. Those reintroductions will begin no later than December 2023 following the passage of Proposition 114 in 2020. Based upon the data from Yellowstone and surrounding multiple use lands, changes will be particularly acute for the elk and mule deer populations that can be expected to use habitat differently to avoid predation by wolves (Boyce 2018). Secondary effects on the structure of ecosystems can also be expected (Ripple and Beschta 2004) along with population declines of elk (Boyce 2018).

Quantitative population models were developed following the reintroduction of wolves to Yellowstone in 1995 and these models can be adapted to predict the responses of elk and mule deer populations to wolf predation under different management scenarios in the GMUG area (see Boyce 2018 for examples). Drawing upon these models, and data from Yellowstone is surrounding multiple use landscapes, while also addressing the expected changes in elk and mule deer populations, would produce a scientifically sound and policy-relevant FEIS.

Without incorporating the predicted impact of wolves on mule deer and elk, it is our concern that any declines will instead be erroneously assumed to be due to recreational use, which will only result in additional, unnecessary and counterproductive restrictions on public access to GMUG forest lands. Furthermore, we urge the USFS to recognize the fact that elk will seek refuge from wolves just as they seek out refuge from human predation (hunters). And finally, for the reasons detailed elsewhere in our comments, the FEIS must acknowledge the fact that there are no published studies or data that have documented a negative demographic effect of recreation use on mule deer and elk populations, yet there is clear evidence that wolves impact those populations. All of the studies cited in the DEIS on recreational avoidance by elk only reported temporary avoidance, and some of those were biased due to unacknowledged confounding factors (i.e. Wisdom et al. 2018). Assuming a negative demographic effect is very different than demonstrating one with data and analyses that exclude other factors. Unless the FEIS

addresses and rectifies these issues, it will be wholly irrelevant when the ink dries on the signatures of its Record of Decision.

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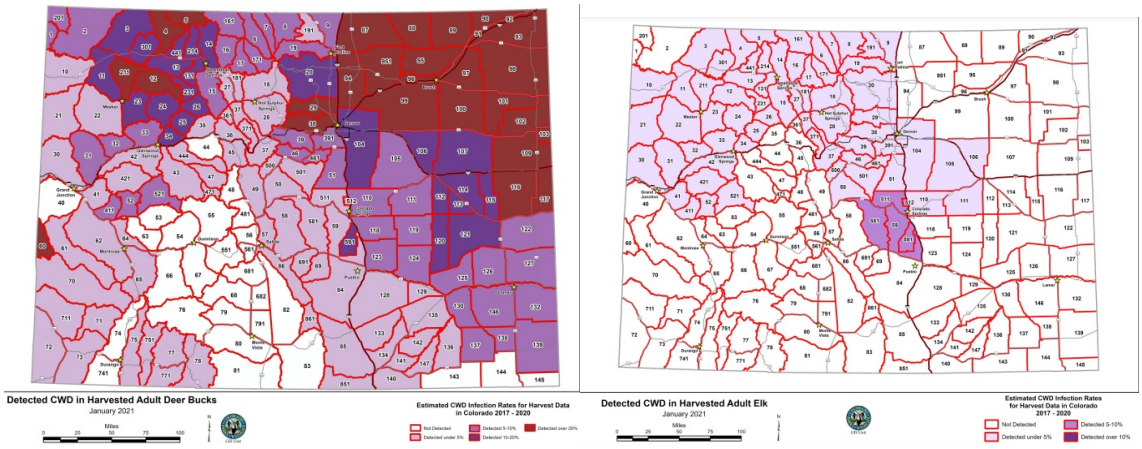
5) The DEIS makes no acknowledgement of the negative demographic effects of Chronic Wasting Disease on elk and mule deer populations: This is a significant omission.

Chronic Wasting Disease **(**CWD) is an emerging infectious disease in the family of transmissible spongiform encephalopathies (TSEs) found in mammals. It is spreading northwest across Colorado as well as 25 other states, 3 Canadian provinces, as well as South Korea, Finland, Norway, and Sweden. In North America it infects four species of cervids: elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), white-tailed deer (*O. virginianus*), and moose (*Alces alces*). Although the TSEs are sometimes given different names in different species, it is caused by a similar conformational corruption (misfolding) of the same cellular prion protein (PrP^{C}) into its infective, pathogenic form (PrP^{Sc}). CWD, like all TSE infections are 100% fatal.

Based on published studies, population declines in deer and elk can be expected as the disease becomes more prevalent, and will be severe in coming decades as CWD spreads, contaminates the environment, and becomes endemic (Miller et al. 2008; Monello et al. 2014, 2017; Edmunds et al. 2016; Almberg et al. 2011; Andersen et al. 2017; DeVito et al. 2017; Zabel and Ortega 2017; Mysterud and Edmunds 2019). Data from Colorado Parks and Wildlife (figures below) show CWD spreading across the state and it is only a matter of time before it spreads into all of GMUG national forests.



We raise this as a significant land management issue that should have been addressed in

the DEIS because declines, especially in mule deer, will occur over the coming decades, and recreational management of any sort, including that proposed in the DEIS alternatives B, C, and D will do nothing to stop these declines. However, we are concerned that the uncritical assumption behind recreational management in the DEIS, that it recreational use of trails is deleterious to elk and deer populations, will be used as an excuse to add additional, unjustified restrictions in the future. We further note that the GMUG national forests cannot ignore this issue by claiming that CPW's management of CWD will prevent such declines because CPW admits that: "Since eradication of CWD is unrealistic, Colorado must accept some level of additive adult female mortality caused by CWD that will contribute to the statewide population decline until statewide average vital rates improve." This amounts to nothing more than monitoring its spread.

What is needed in the FEIS, is a clear problem analysis of the factors that affect the demography of the wildlife populations of concern, both currently and in the foreseeable future. Management needs to prioritize those factors that data (not surmise and opinion) show to have the greatest measurable positive effect on demography. The current focus on recreation as the primary factor affecting wildlife populations, and a simplistic GIS-based, one-size-fits all habitat management approach in the DEIS, prevents consideration of scientifically sound and more effective conservation measures. There may be other reasons to limit recreational access, but wildlife is not currently or in the foreseeable future, one of them.

Literature Cited

Almberg ES, Cross PC, Johnson CJ, Heisey DM, Richards BJ. 2011. Modeling routes of chronic wasting disease transmission: environmental prion persistence promotes deer population decline and extinction. *PLoS One* 6:e19896

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Zabel M, Ortega A. 2017. The ecology of prions. *Microbiology and Molecular Biology Reviews* 81:e00001-17. https://doi.org/10.1128/MMBR.00001-17.

6) The DEIS's One-size-fits-all GIS-based approach to wildlife security areas, avoidance buffers, and wildlife habitat management areas is based on false premises and misrepresentations

The DEIS proposes use of a one-size-fits-all GIS-based approach to replace its previously used habitat effectiveness standards for managing recreational use of forest lands. This approach introduced the concept of "wildlife security areas" along with its new prescriptions for "wildlife management areas" that include buffers and a travel route density standard. However, this new, one-size-fits-all GIS-based approach is built upon false premises and factual misrepresentations of and omissions from the scientific literature. These are described in detail, below.

False premise #1: The primary wildlife species, elk and mule deer, that the are the supposed to benefit from the trail and road density scheme, are habitat-limited, their movement patterns are disrupted, and/or habitat connectivity is compromised. The cited studies in DEIS provide no data with which to support this premise. This is purely surmise and speculation by the authors of the DEIS, and as a result, must be removed from the DEIS.

False premise #2: Any avoidance of trails or roads by elk or mule deer, even if temporary, will result in habitat loss, habitat modification, and/or the loss of connectivity among populations. An unstated assumption of the DEIS is that any avoidance will result in population declines. However, none of the cited studies reported any population declines, all of the studies simply reported reaction distances to human activity, and the studies from the Starkey research enclosure were under highly artificial conditions (see review of Wisdom et al. 2018 in our comments above).

False premise #3: The cited scientific literature supports a 660 meter buffer for nonmotorized use and a 1,000 meter buffer for motorized use as a basis of wildlife security areas. Yet nowhere in Wisdom et al. (2018) or other cited research is there any reference to either as a recommended buffer distance. Both of these buffers are arbitrary and capricious inventions of the DEIS authors and need to be dropped from inclusion in the FEIS.

7) The DEIS relies on speculation to assert that wildlife habitat, connectivity, and species viability in the plan area are threatened

The DEIS states on page 229 that, "Given current trends in human population growth and development in Colorado and in communities in or around the plan area, increased development of private lands is likely. Increased population growth and development also leads to increased public land visitation, which elevates the need to continue to provide for wildlife habitat, connectivity, and species viability in the plan area."

However, the DEIS does not provide any data that show trends of increased public land visitation, nor data on type, intensity, and season of use on the GMUG National Forests. The DEIS provides no credible supporting scientific evidence that can be backed up by publicly accessible data, that "wildlife habitat, connectivity, and species viability in the plan area" are currently compromised or in imminent danger of being compromised. The supposed population-level impacts of recreation to wildlife species viability are entirely based on surmise and opinion. Federal policy cannot be based on surmise and opinion.

Reference to "wildlife security areas" is pseudoscientific and therefore needs to be removed if the FEIS is to be viewed by the public as a document exhibiting scientific integrity. It fundamentally does not matter if animals demonstrate some avoidance of humans so long as there is no negative effect on productivity, survivorship, or overall population trend. Furthermore, it is intellectually dishonest and a failure of the USFS obligations under the Information Quality Act to rely on speculation as the basis for forest policy and management. None of the studies cited in the DEIS demonstrate any quantifiable negative demographic effect on the elk population studied. And finally, a search of the scientific literature for the term "wildlife security area" reveals a notable absence of scientific papers with the exception of one about wildlife poaching in Kenya (Karanya 2012). We hope that the USFS recognizes that the nation of Kenya does not have any elk and that use of the term "wildlife security area" has a very different meaning in that published literature than how it is used in the DEIS.

The DEIS misrepresents the factual basis of Wisdom et al. (2018) and other articles cited in support of "wildlife security areas." As noted in our review of Wisdome et al. (2018) several of these papers were published by the same Starkey research group using the same captive herd and data, and therefore their results are compromised by the same methodological flaws. Those cited papers include Wisdom et al. 2005, Preisler et al. (2013), Naylor et al. (2009). Reliance on information from these papers in the FEIS would be a transgression of the Information Quality Act, and therefore, use of them and policies that rely on them must be removed from the final FEIS.

Proposed buffers and "wildlife security areas" are identified without regard to the quality of the habitat, its successional state, or the species involved and their conservation status. Instead, the focus is entirely on big game (with an emphasis on elk), yet the DEIS provides no evidence that the species is in decline below historic levels anywhere on the GMUG forest lands. In fact, statements in the DEIS refute other assertions in the DEIS that populations are in a state of decline. For example, on page 342 the DEIS states,

> "Deer and elk hunting occurs extensively across the entire plan area and adjacent lands. In total, these game management units support approximately 49,000 elk (17.5 percent of the statewide population estimate) and 99,000 deer, based on 2016 post-hunt population estimates. **Hunted species populations are considered stable**."

If the populations are stable, which CPW's own data show for virtually all game management units on the GMUG, there is no justification for management actions that would restrict forest access to a non-hunting recreating public. It is symptomatic of a pro-hunting bias in the DEIS that there is no mention of the population status of non-hunted species.

Literature Cited

Karanya D. 2012. The role of the Kenya Wildlife Service in protecting Kenya's wildlife. *The George Wright Forum* 29(1): 74-80.

8) Changing land use prescriptions for areas inhabited by Gunnison sage grouse may require an Endangered Species Act Section 7 consultation with the U.S. Fish and Wildlife Service, making proposed changes in the DEIS premature.

Regarding Gunnison sage grouse, that species is protected by a critical habitat designation and recovery guided by an approved recovery plan as a result of its being listed as a threatened species under the Endangered Species Act. Therefore, it is premature for the USFS to propose any new federal land management scheme in Gunnison sage grouse habitat without first obtaining a Section 7 consultation with the U.S. Fish and Wildlife Servic

9) Speculative language is no substitute for data in a regulatory document

The DEIS and studies used in support of it are rife with speculative language, including the terms "could", "may", or "possibly" regarding recreational use of trails or roads as having a negative effect on elk, bighorn, and mule deer populations. The USFS's use in the DEIS of such vague and broad terms that are without the scientific underpinnings of data, is not becoming of a federal land management agency. To be scientifically credible, use of these terms must be replaced with specific statements and credible data to back them up. The following statements are illustrative of this issue.

> "Standards MA-STND-WLDN-08, STND-WLDN-09, and STND-WLDN-10 would have ancillary benefits to Gunnison sage-grouse by requiring dogs to be leashed and/or under verbal control, limiting group sizes, and prohibiting drones. These activities, not otherwise managed, **could** disturb, stress, and displace sage-grouse, or in extreme cases cause sage-grouse mortality."

After an extensive search of scientific literature and consulting with a published expert, we have been unable to find any reference to any data or scientific research documenting cases of dogs, groups of people, or drones resulting in disturbance, stress, displacement, or sage-grouse mortality.

> "Outside of seasonal closure periods, use of existing, designated routes will not reduce sage-grouse habitat but indirectly **could** affect habitat quality and resiliency due to the risk roads pose as vectors for invasive plants. Use of existing roads **may** incidentally disturb birds."

Such a statement is speculative. What plant species and what roads have been documented to have an invasive species problem on GMUG national forests? What bird species have been "disturbed" and what is the nature and ultimate result of that disturbance? Has it resulted in lower individual fitness (productivity or survival) or a population-level declines?

> "The main threat to this species [Uncompahgre fritillary butterfly] **appears** to be climate change. If changing climatic conditions lead to less snow accumulation, less time that snow persists on the ground, and generally drier conditions, this species **could** be at risk of habitat loss, leading to reduced population persistence. Other factors **could** exacerbate climate change effects, such as trail impacts and associated recreation effects that impact snow willow habitat. Butterfly collection, while not thought to be a current threat, **could** have a direct impact on population persistence if it were to occur."

What are the specific "trail impacts" referred to regarding the butterfly? In our experience, trails generally avoid traversing concentrations of willows as they are dense, so please be specific where this has been documented to occur. Also, has butterfly collection of this species been documented on any of the GMUG national forests, and if so, how many times?

> "Areas with this designation **might** receive more wildlife habitat damage and experience more wildlife harassment than pristine or primitive areas because visitor use is expected to be higher. Such impacts **could** include harassment of wildlife, trampling of wildlife habitat, and littering. Some wildlife in this area **may** experience enough visitor contact to alter their behavior, such as marmots who learn to beg for food. This **could** happen anywhere but increases in probability as visitor use increases. Relative to pristine and primitive, ease of access to semi-primitive areas **may** result in less self-selection of visitors and thus more damage per visitor."

Where is the research on visitors to pristine and primitive areas being less damaging to resources than visitors to semi-primitive areas?
Is there a documented increase in cases of marmots begging for food in semi-primitive areas? Has limited marmot food-begging behavior spread to and overtaken the rest of the population?

> "For those few special management areas that allow new motorized and mechanized route construction without restrictions, impacts to wildlife **could** include reduced wildlife security areas, reduced connectivity causing changes in species distribution and movement patterns, habitat impacts (new routes could add vectors for invasive plants), and species avoidance depending on frequency and timing of route use."

Where are the specific areas that are presumed to be impacted? What species on GMUG national forests have been documented altering their movement patterns and connectivity? What specific habitat impacts have been identified with frequency and timing of route use? And where are the data to support such assertions?