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Dear Forest Plan Revision Team,

I am pleased to see your work on the Forest Plan for the Grand Mesa, Uncompahgre, and Gunnison National Forests. In particular, I would like to compliment the accessibility and proactivity of your staff, and the inclusion of some of the questions and criteria on which you are asking for comment. Below are my comments on your poster which are intended provide my professional opinion and recent research on the great work you are already doing. Thank you for your work on this project.

Stubble Height

I am glad to see the move away from utilization to stubble height, which may result in more efficient and objective monitoring. In my experience, utilization is difficult and subjective to measure. However, like utilization, stubble height will not reflect rangeland trend, so as the Forest Service already does, I encourage coupling stubble height with long-term trend monitoring. Further, if used to monitor riparian areas, I encourage using stubble height in conjunction with the best available science as expressed in Bryant et al. 2006[1].

Another important consideration is that with stubble height there is unlikely to be a "one size fits all" standard for the diverse types of land in the Grand Mesa, Uncompahgre and Gunnison National Forests. I recommend establishing height criteria relative to ecological site, annual precipitation, and selecting a key species for each area. This is because stubble heights may be very short, even with no grazing, on a clayey soil, or in a drought year[1]. "Average" stubble height may differ considerably in potential even with a small region. For example, average grass height in eastern Moffat County was 8-11 inches on Rolling Loam sites, versus 4-7 inches in western Moffat county on Loamy sites (Rolling Loam ecological sites were sampled over 3 years (2013-2015) on 59 plots 164 -164 ft. plots with light utilization, and Loamy ecological sites were sampled 2014-2015 on 52 plots with light utilization) (Timmer and Bruegger, unpublished data). Finally, stubble height measurements are highly dependent on the type of grass monitored, and should not average across species. For example, Sandberg's bluegrass versus Needle-and-Thread grass would yield very different "average" stubble heights. I think it is important that stubble height criteria reflect the variability in the landscape and climate, and that the Forest does not use a one-size-fits all approach with this indicator.

Adaptive Management

I am also pleased to see the mention of adaptive management versus prescriptive management. Adaptive management allows that proactive changes can be made as new information comes along, and for more flexibility that can benefit livestock producers and natural resources. However, adaptive management requires information on trend in order to make decisions. Trend monitoring on rangelands is sometimes difficult to accomplish because of time and labor constraints. In my role at CSU Extension, I would be interested in exploring how the Forest and CSU Extension might be able to work together to accomplish monitoring and data analysis on the National Forest. I would welcome the opportunity to explore building a more formal relationship between Extension and the Grand Mesa, Uncompahgre, and Gunnison National Forest that would help facilitate monitoring and use of monitoring data.

I also have some specific suggests with regards to monitoring. First, I suggest that if new monitoring sites are established on permits, they are established in conjunction with input from ranchers. I believe that working with rancher to decide on the monitoring site helps to build trust, transparency, and buy-in. Second, I also suggest that monitoring is as inclusive as possible. I know that many Districts are already proactively engaging ranchers, and that efforts, such as the Colorado Resource Initiative are ongoing. I think these efforts are important and must continue, and I would like to explore ways of making them even more effective for all parties.

Finally, as recreation increases on many areas of the Forest, I encourage proactively designing monitoring that yields information about recreation impacts on resources, in addition to livestock impacts. While data is only once piece of the puzzle, it is essential for understanding changes, backing-up decisions, and creating a neutral source of information that everyone has access to.

Beyond monitoring, adaptive management depends on planning and setting goals. In this regard, I have two suggestions. One, I suggest that setting goals, including the definition of what "healthy rangeland" are, be an inclusive process that recruits input from permittees. Grazing permittees have long term knowledge about landscapes[2; 3]. Further, getting permittee and Forest service staff on the same page about what the target is a great way to prevent conflict in the future.

Secondly, I suggest that goals for rangeland health be based on what is reasonable to expect from the landscape given site potential. Soil, topography and climate may limit what a site produces, and new findings in Colorado[4; 5] suggest that some ecosystem changes are not easily reversed (even if we'd like to reverse them as managers). I encourage the Forest to consider inherent properties of the ecosystem, or ecological site, and set management goals *within* the limitations of the site. A "healthy" threshold for grass cover varies drastically from one ecological site to another, and some vegetation states may not be reversible. For example, there are few known management actions that can reduce crested wheatgrass cover. In sites we studied in Moffat County, crested wheatgrass that was planted in the 1950's, burned in wildfires around 2008-2010, and then reseeded with native species, were still crested wheatgrass [6]. Other studies confirm the persist quality of crested wheatgrass [7]. Thus I suggest that management goals consider the likely potential of the site, the state the site is in, and how

effective management actions are likely to be given best available knowledge (for example, given what we know, a management goal to reduce crested wheatgrass is not very realistic). Goals for adaptive management should consider what is possible and likely given site potential.

Finally, in response to your question about data on the poster, I have data on vegetation and aspen regeneration data collected in 2016 in the Gunnison National Forest on Grand Mesa that I'd be willing to share. Data were collected as part of the Learning from the Land research project.

Citizen Science

I am excited to see citizen science mentioned in your poster. I would be interested in participating in my professional and personal capacity.

Range of Seral Stages

I am pleased to see that you are considering managing for a range of seral stages. Heterogeneity across the landscape benefits wildlife [8; 9] and allows for disturbances which may ultimately benefit Forest health.

Improvements in Range Health

Your poster shows improvement in range health in the last since 1987, with a much higher percentage of lands (67%) classified as in "good" condition in 2016. I commend the Forest Service on this improvement, and encourage the Forest to recognize and reward behaviors that have promoted improved conditions. F

Endangered Species and Livestock Grazing

I encourage the Forest to look for compatibilities in managing for livestock and threatened, endangered, or species of concern. Recent research suggests that cutting livestock numbers alone may not benefit endangered species[10]. Further, livestock may be managed for creating heterogeneity in the landscape that may *benefit* species of concern [9]. Instead of a blanket approach to cutting livestock numbers in response to species of concern /threatened/endangered species, there is ample opportunity to find management options that promote compatibility among uses. This should be the first line of defense. If livestock numbers are cut, I encourage the Forest Service to use an adaptive management approach to actively revisit whether or not the reduction in stocking rate had the intended effect on the desired species. If no, then I encourage the Forest Service to reconsider the livestock cuts and look for alternative causes of decline.

Fire Effects

New understandings have emerged related to grazing following prescribed burns, which I would like to highlight. Grazing deferment after fire may not be necessary in all cases. A recent study on the sagebrush steppe [11] found that vegetation characteristics such as cover, density, composition, annual yield, and bare ground did not differ comparing un-grazed sites, and sites that were grazed the following year, after a fall prescribed burn. Sites were monitored for 3 years following fire. In other

cases, grazing following a burn may be desirable depending on the management objectives[12]. For example, grazing immediately after a wildfire may facilitate the recovery of sagebrush because grazing reduces the competition with perennial grasses. If recovery of sagebrush is the goal, grazing following fire may be an appropriate management action. As the Forest Service already does, I encourage actively revisiting new information as it is produced to evaluate assumptions and pursue management actions that are likely to have the intended effects.

In conclusion, livestock grazing on the National Forest is important to me because it provides necessary forage for livestock producers, and is an ecologically sustainable use of these lands when managed well. Livestock producers also add value to public lands through maintaining infrastructure, which can benefit wildlife[13]. The ability to use public lands is necessary for many livestock producers to stay in business. Thus, public lands grazing also plays an essential role in maintaining communities, and the rural nature of western Colorado. With increasing recreational use in the future, I encourage the Forest Service to balance uses and continue to support using Forest lands for grazing.

Thank you for your time and consideration.

Sincerely,

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Citations

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