19 Nov 2019

TO:   Paulina District Range Staff

VIA: [https://cara.ecosystem-management.org/Public//CommentInput?Project=56602](https://cara.ecosystem-management.org/Public/CommentInput?Project=56602)

**Subject: Sunflower Cluster Grazing Authorization — scoping comments**

Please accept the following scoping comments from Oregon Wild concerning the Sunflower Cluster Grazing Authorization, <https://www.fs.usda.gov/project/?project=56602>. Oregon Wild represents 20,000 members and supporters who share our mission to protect and restore Oregon’s wildlands, wildlife, and water as an enduring legacy. Our goal is to protect areas that remain intact while striving to restore areas that have been degraded. This can be accomplished by moving over-represented ecosystem elements (such as grazed, logged and roaded areas) toward characteristics that are currently under-represented (such as ungrazed, roadless areas and complex old forest).

The proposed action alternative involves:

* reauthorization of livestock grazing on the Dry Comer, Sunflower, and Wind Creek grazing allotments, a cluster of allotments covering 51,530 acres;
* closing 62 miles of roads to improve water quality and fish & wildlife habitat;
* Stream restoration in Columbus Creek.

We support efforts to improve livestock management on public lands. We strongly support road closures to protect water quality, fish, and wildlife.

We urge the Forest Service to revise grazing schedules to give more frequent and extended rest to each pasture. This will allow plants to recover, flower, set seed, etc. Which will help conserve botanical resources, stabilize soil, and improve water quality.

We urge the Forest Service to adopt livestock management requirements that will protect better streams, springs, wetlands, and wildflower meadows from the adverse effects of livestock. There should not be any sacrifice areas.

## Grazing and Wolves

The FS should plan for the arrival of wolves in the project area by adopting specific management requirements that will become operative when wolves take up residence in or near the project area. The following common sense measures should be included to minimize wolf/livestock conflicts:

* Livestock should not be released within one mile of known den and rendezvous sites. Presence should be assumed at recently used (within the last 5-years) sites unless proactive monitoring by agency staff at the appropriate time indicates absence).
* Prohibit the turnout of sick and injured livestock to reduce the risk of attracting or being preyed upon by wolves and other native carnivores. Require the removal of sick, injured, or otherwise vulnerable livestock.
* Require prompt removal and disposal of livestock carcasses.
* Prohibit salt and other livestock attractants within one mile of known wolf dens, rendezvous sites, and regular travel routs.
* Prohibit wolf attractants in pastures occupied by wolves.
* Ensure agency personnel regularly consult with wildlife agencies to help reduce conflict with wolves. That includes requiring compliance with state requirements for non-lethal conflict deterrence.
* Prohibit turnout of pregnant cows and calves under 200 pounds.

## Recommendations for Improved Management of Livestock Grazing

* The NEPA analysis should provide site-specific analysis of known problem areas in terms of livestock management, and other areas have high ecological value and potential adverse impact from livestock, such as wet meadows, floodplains, and key stream reaches.
* Bunch grasses evolved with different kinds of herbivory and are not suitable for livestock grazing. Grazing should be eliminated or grazing seasons should be very short in order to prevent irreversible damage to drought-stressed plants and it will significantly impact the ability of plants to set seeds.
* Please provide for long-term viability of native plants by allowing plants to fulfill their full lifecycle including flowering, seed set, and sexual or asexual reproduction without significant interference by livestock grazing.
* "Improving livestock distribution" is not necessarily a good thing because it spreads the effects of livestock to areas that are currently spared the adverse effects of livestock grazing. Improved distribution homogenizes grazing effects and expands the ecological stress caused by livestock grazing. Maybe it would be better to just limit livestock numbers.
* Fencing has ecological consequences that should be considered and minimized or avoided when possible. Fences can kill or harm birds and other wildlife. It many cases it may be preferable to just remove livestock from the area. Floyd Reed, retired FS Range staff, says that “fencing is a sign of management failure.” Fencing fragments the forest landscape adversely impacting landscape connectivity and is harmful to wildlife. Fencing is very expensive and difficult to impossible to maintain especially in forested terrain. Fencing is designed to facilitate more intensive commercial livestock management which surveys have shown is not among the values the wider American public holds for public lands. Fencing is for the convenience of a small number of private commercial livestock operators privileged to hold public land grazing privileges at little cost to themselves, but huge costs to other values. Fencing requires gates and cattleguards are often difficult to negotiate by both wildlife and the public. A study released in October 2009 shows that during a seven month period the Wyoming Game and Fish Department documented 146 instances of finding sage-grouse feathers or carcasses on or near a 4.7-mile section of barbed-wire fence. <http://world-wire.com/news/0912160001.html>. Also, the Colorado Division of Wildlife has prepared a report on the impacts of fences and how to mitigate them. Hanophy, W. 2009. Fencing with Wildlife in Mind. Colorado Division of Wildlife, Denver, CO. 36 pp <http://web.archive.org/web/20110101134309/http://wildlife.state.co.us/NR/rdonlyres/20D5C775-55DD-4C6D-A5CF-C9B83FCEA69E/0/DOWFencingWithWildlifeInMind.pdf>. This report asks the important question, “Do you really need a fence?” because “… the best fence for wildlife is no fence at all.” Remember the option of removing livestock instead of building fences.

See also, Bryan S. Stevens 2011. IMPACTS OF FENCES ON GREATER SAGE-GROUSE IN IDAHO: COLLISION, MITIGATION, AND SPATIAL ECOLOGY. University of Idaho Masters Thesis. May 2011. (“Increasing terrain ruggedness reduced probability of collision presence, whereas increasing fence length per km2 increased probability of collision. Broad-scale modeling also suggested collision counts per km2 were influenced by distance to nearest active sage-grouse lek, where increasing distance reduced expected collision counts. These data suggest 2 km mitigation buffers around leks in high risk areas may be necessary… ”)

* Consider and avoid impacts to wildlife, including big game, ground nesting birds, uncommon plants, pollinators, and aquatic species. Ensure that livestock grazing is not impairing the maintenance of viable populations including well-distributed plant and animal communities with healthy age-class distributions. Focus on species that are sensitive to livestock grazing such as aspen and other highly palatable plants, and animals that live near the ground such as ground-nesting birds, amphibians, mollusks, etc... Grazing is known to have significant adverse impacts on ground nesting birds. Glenn E. Walsberg 2005. Cattle Grazing in a National Forest Greatly Reduces Nesting Success in a Ground-nesting Sparrow. The Condor Volume 107, No. 3. August, 2005. See also, Sara Jane Wagoner 2011. The Effects Of Spring Cattle Grazing On The Nutritional Ecology Of Mule Deer (*Odocoileus Hemionus*) In Eastern Washington. Masters Thesis. Washington State University. May 2011. (“Our results suggest that moderate spring cattle grazing in dry-stony ecological sites reduced the amount of digestible nutrients available to mule deer during the year of grazing.”)
* Consider and minimize adverse impacts of livestock grazing on pollinators. On June 20, 2014, the White House released a “Presidential Memorandum—Creating a Federal Strategy To Promote the Health of Honey Bees and Other Pollinators.” <https://www.fs.fed.us/wildflowers/pollinators/documents/PresMemoJune2014/PresidentialMemo-PromoteHealthPollinators.pdf>, which states “Over the past few decades, there has been a significant loss of pollinators, including honey bees, native bees, birds, bats, and butterflies, from the environment. The problem is serious and requires immediate attention to ensure the sustainability of our food production systems, avoid additional economic impact on the agricultural sector, and protect the health of the environment. … Given the breadth, severity, and persistence of pollinator losses, it is critical to expand Federal efforts and take new steps to reverse pollinator losses and help restore populations to healthy levels.” Further, Section 3 calls for “Increasing and Improving Pollinator Habitat … (e) The Departments of Agriculture and the Interior shall… develop best management practices for executive departments and agencies to enhance pollinator habitat on Federal lands.” A statement released by Bob Periciasepe, Deputy Administrator, Environmental Protection Agency, and Krysta Harden, Deputy Secretary, U.S. Department of Agriculture (USDA), emphasized: “The memorandum also requires federal agencies to lead by example, taking specific measures to substantially expand pollinator habitat on federal lands and to build on feder­al efforts with public-private partnerships.” <https://www.fs.fed.us/wildflowers/pollinators/BMPs/>. With this direction, U.S. Department of Agriculture and U.S. Department of Interior, issue this timely and critically needed document, Pollinator-Friendly Best Management Practices for Federal Lands, May 11, 2015. <https://www.fs.fed.us/wildflowers/pollinators/BMPs/documents/PollinatorFriendlyBMPsFederalLands05152015.pdf>. (“Objective: To reduce the impact to pollinators from livestock grazing. Explanation: Livestock grazing alters the structure, diversity, and growth pattern of vegetation, which affects the associated insect community. Grazing during a time when flowers are already scarce may result in insufficient forage for pollinators. Grazing when butterfly larvae are active on host plants can result in larval mortality and high intensity grazing can cause local loss of forb abundance and diversity. Implementation: The following actions should be considered in rangelands when livestock grazing is present: • Determine which types of pollinators and which pollinator habitat elements are affected by grazing livestock. • Assess if grazing is compatible with the specific needs of target pollinator species on site, including targeted butterfly species. • Prevent trampling ground-nesting sites by implementing practices to minimize hoof action of grazing animals, which causes soil compaction or erosion in pollinator nesting and shelter patches. • Minimize livestock concentrations in one area by rotating livestock grazing timing and location to help maintain open, herbaceous plant communities that are capable of supporting a wide diversity of butterflies and other pollinators. • Protect the current season’s growth in grazed areas by striving to retain at least 50% of the annual vegetative growth on all plants. • Enhance the growth of forbs to ensure their ability to reproduce and to provide nectar and pollen throughout the growing season by setting grazing levels to allow forbs to flower and set seed. • Leave nearby ungrazed areas to provide reserves for pollinator populations. • Prevent grazing during periods when flowers are already scarce (e.g., midsummer) to maintain forage for pollinators, especially for bumble bee species. • In important butterfly areas, avoid grazing when butterfly eggs, larvae, and in some cases pupae are on host plants. • Consider the needs of pollinators when placing range improvements and structures on the landscape. • Ensure that fencing is adequate and well maintained. • Include protection of pollinator species in grazing management plans.”)
* Manage livestock to avoid conflicts with predators. Special attention should be given to facilitate recovery of ecologically functional populations of threatened gray wolves. Some allotments may need to be closed to give predator populations an opportunity to expand thrive while minimizing risks of human conflicts. Where grazing will continue in areas frequented by predators, permitees should be required to take all necessary steps to avoid conflicts and use non-lethal methods to prevent and limit depredation of livestock. See ODFW Non-Lethal Measures to Minimize Wolf-Livestock Conflict, <http://dfw.state.or.us/Wolves/docs/ODFW_Non-lethal_Measures_130719.pdf>, <http://dfw.state.or.us/Wolves/non-lethal_methods.asp>
* Livestock are naturally prone to cause adverse impacts because they spend a disproportionate amount of time in sensitive areas such as meadows, wetlands, and riparian areas. Livestock don’t move when we want them to. It takes significant resources to ensure that range conditions are monitored and livestock are moved. If the agency and the permittee fail to commit necessary resources for range monitoring and moving animals, livestock grazing should be terminated. UNAUTHORIZED GRAZING: Actions Needed to Improve Tracking and Deterrence Efforts. GAO-16-559: Published: Jul 7, 2016. <http://www.gao.gov/assets/680/678292.pdf>
* Protect springs, streams, and wetlands from the impacts of livestock (and restoration of areas already degraded) are of utmost important because they represent a small subset of the landscape, they provide disproportionately important ecosystem services, and they suffer disproportionate adverse impact from livestock grazing. The adverse effects of livestock on water quality are well documented. Lindsey Myers, Brenda Whited. 2012. The Impact of Cattle Grazing in High Elevation Sierra Nevada Mountain Meadows over Widely Variable Annual Climatic Conditions. Journal of Environmental Protection, 2012, 3, 823-837. doi:10.4236/jep.2012.328097. <http://www.scirp.org/journal/PaperInformation.aspx?paperID=21784>.
* Take to heart current policy requiring agencies to avoid actions that would slow attainment of aquatic objectives (e.g. “do not retard” language in PACIFISH/INFISH and NWFP). Continued livestock grazing with only minor modifications is unlikely to avoid retarding recovery. Riparian vegetation that is ungrazed will provide better shade, better bank stability, better nutrient cycling. Riparian areas that are grazed will have more erosion, less bank stability, less shade, less tightly coupled nutrient cycles, lower water quality, more soil compaction and faster run-off. “[N]atural restorative processes should be used wherever possible; in fact, natural processes may be sufficient once the degrading influences have been removed. Because the process of restoration is progressive, the criteria of success are not easy to define. The most important point is that ecosystem development should be on an unrestricted upward path.” A.D. Bradshaw 1996. Underlying principles of restoration.. Can. J. Fish. Aquat. Sci. 53(Suppl. 1): 3–9 (1996). <http://www.globalrestorationnetwork.org/uploads/files/LiteratureAttachments/353_underlying-principles-of-restoration.pdf>. Other important public policy objectives near streams include protection of beneficial uses of water, conserving ESA listed fish & wildlife, avoiding future listings by maintaining viable populations of native species, and meeting treaty obligations related to fish & wildlife. In most cases this will require excluding livestock from sensitive meadows and streamside areas. Livestock conflicts with water quality goals are highlighted by recent research showing that E. coli bacteria from livestock can survive in stream sediments for months. Anne Perry 2011. E. coli: Alive and Well, Probably in a Streambed Near You. Agricultural Research l July 2011. <http://www.ars.usda.gov/is/AR/archive/jul11/Ecoli0711.pdf>.
* The agency has not prepared a legally adequate grazing suitability analysis based on economic and environmental considerations as required by NFMA. Heiken D., 1995. RIGHT PLACE -- WRONG ANIMAL: Determining Grazing Suitability Based on Desired Ecosystem Outcomes for the Interior Columbia River Basin. Association of Forest Service Employees for Environmental Ethics. May 1995. <https://www.dropbox.com/s/ucw50hhs8xsiz2k/AFSEEE%20Grazing%20Suitability%20Report.doc?dl=0>
* The ecosystem will store more carbon and help mitigate climate change if they remain ungrazed. The agency needs to help mitigate climate change by managing all living systems to capture and storage optimal levels of carbon. Livestock grazing reduces carbon storage in vegetation and soil at an ecosystem scale and grazing must be reduced to help mitigate climate change.
* Climate change is a new and added stress on native ecosystems. Climate change is expected to increase winter storms, summer droughts, reduce snowpack and summer streamflows, and cause earlier spring snowmelt and run-off. This adds stress to plants, animals, and streams that are also stressed by grazing. To avoid cumulative impacts from the combination of climate stress and anthropogenic stresses such as grazing, the agency needs to reduce anthropogenic stress from livestock grazing. Here are a few concrete examples. First, livestock trample and destabilize streambanks and expose streambanks to erosion. Such streambanks are vulnerable to erosion during peak flows. Climate change is expected to bring bigger precipitation events which will increase the erosive power of peak flows resulting in adverse cumulative interactions between climate change and grazing. Second, plants are stressed by summer dry periods which limits their ability to set seed, set buds, and store nutrients in woody parts and roots. These life functions are directly related to their survival. Climate change is expected increase the intensity and duration of summer droughts resulting in another adverse cumulative interaction between grazing and climate change. In order to help ecosystems cope with climate stress, the agency should reduce or eliminate anthropogenic stresses such as livestock grazing. In the absence of livestock grazing streambanks will be better protected by plant roots and plants will be able to store more energy reserves which will help them be more resistant and resilient in the face of climate change.
* We strongly encourage the agency to make contingency plans that require the removal of livestock during droughts, and after droughts the agency should provide for long periods of rest and recovery before livestock are allowed to return so that plants can rebuild soil cover, biomass, and energy stores both above and below ground.
* Consider and avoid the effects of livestock grazing on the fire regime. Livestock grazing shifts the plant community composition from palatable grasses and forbs toward unpalatable conifers. This is contrary to current policy goals related to forest which urge us to avoid creating more ladder fuels. Livestock decrease the abundance of fine fuels which are necessary to carry periodic, low intensity surface fires. This reduces the frequency of fires, but increases their severity. See Kirsten Stade, MS, and Mark Salvo, JD. 2009. Ponderosa Pine in Peril: Assessing Public Lands Livestock Grazing in Ponderosa Pine Forests. Wild Earth Guardians. <http://www.wildearthguardians.org/Portals/0/support_docs/report-ponderosa-pine-08-09.pdf>; Belsky, A.J., Blumenthal, D.M., “Effects of Livestock Grazing on Stand Dynamics and Soils in Upland Forest of the Interior West,” Conservation Biology, 11(2), April 1997. [http://web.archive.org/web/20030409094020/http://www.onda.org/library/papers/standdynamics.pdf](http://web.archive.org/web/20030409094020/http:/www.onda.org/library/papers/standdynamics.pdf#_blank). See also Wuerthner, George. Livestock Grazing and Fire. January, 2003. <http://web.archive.org/web/20040107135236/http://www.onda.org/library/papers/Livestock_Grazing_and_Fire.pdf>; and Michael H. Madany, and Niel E. West. Livestock Grazing-Fire Regime Interactions within Montane Forests of Zion National Park, Utah. Ecology: Vol. 64, No. 4, pp. 661-667. Comparing grazed and ungrazed areas of Zion National Park this study found “… the increased understory density of plateau stands should not be attributed primarily to cessation of fires. Instead, heavy grazing by livestock and associated reduction of the herbaceous groundlayer promoted the establishment of less palatable tree and shrub seedlings…”
* The agency should protect and restore biotic soil crusts that help prevent erosion, fix nitrogen, cycle nutrients, and increase site productivity. Livestock grazing conflicts with the maintenance and recovery of biotic soil crusts. “Comparison of grazed and long-ungrazed sites revealed lower cover of biotic crusts, nitrogen-fixing lichens, crust-dominated soil surface roughness, and lower species richness in the grazed transects. There was more bare ground in the grazed transects…” Jeanne M. Ponzetti and Bruce P. McCune. 2001. Biotic Soil Crusts of Oregon's Shrub Steppe: Community Composition in Relation to Soil Chemistry, Climate, and Livestock Activity. The Bryologist 104(2):212-225. 2001.
* Grazing spreads weeds that alter vegetation structure, habitat, hydrology, and fire regimes. Weeds are a slow motion explosion that are adversely affecting native plant communities and entire ecosystems. By reducing the vigor of native plants, reducing soil cover, and exposing mineral soil, livestock grazing has a strong tendency to spread invasive weeds and exacerbate this problem. The agency should limit or exclude livestock in order to help prevent the spread of weeds. Michael D. Reisner, James B. Grace, David A. Pyke and Paul S. Doesche 2013. Conditions favouring *Bromus tectorum* dominance of endangered sagebrush steppe ecosystems. Journal of Applied Ecology 2013 doi: 10.1111/1365-2664.12097. <http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/38539/jpe_12097_Rev_EV.pdf> (“Evidence suggests abundant bunchgrasses limit invasions by limiting the size and connectivity of gaps between vegetation, and [biological soil crusts] appear to limit invasions within gaps. Results also suggest that cattle grazing reduces invasion resistance by decreasing bunchgrass abundance, shifting bunchgrass composition, and thereby increasing connectivity of gaps between perennial plants while trampling further reduces resistance by reducing [biological soil crusts]. … Grazing exacerbates *Bromus tectorum* dominance in one of North America’s most endangered ecosystems by adversely impacting key mechanisms mediating resistance to invasion. If the goal is to conserve and restore resistance of these systems, managers should consider maintaining or restoring: (i) high bunchgrass cover and structure characterized by spatially dispersed bunchgrasses and small gaps between them; (ii) a diverse assemblage of bunchgrass species to maximize competitive interactions with *B. tectorum* in time and space; and (iii) biological soil crusts to limit B. tectorum establishment. Passive restoration by reducing cumulative cattle grazing may be one of the most effective means of achieving these three goals.”) Consider reducing grazing and restoring native grasses and forbs. Gucker & Shaw 2019. Western Forbs: Biology, Ecology, and Use in Restoration, <http://greatbasinfirescience.org/western-forbs-restoration/?_sf_s=western+forbs>
* Do not allow livestock grazing in existing ecosystems that are healthy and largely ungrazed. Let’s not extend the harm to grazing to ecosystems that have been spared up to now. Similarly, please take steps to permanently terminate grazing authorizations in existing vacant or inactive allotments.
* The NEPA analysis for the applicable RMP is no longer current and adequate to support this proposed grazing decision. The agency cannot tier to that document because things have changed significantly, such as climate change and forest health concerns which are now paramount and were not addressed in that plan.
* Please mitigate all the significant ecological impacts of livestock grazing described in Fleischner, T.L. 2010. Livestock grazing and wildlife conservation in the American West: historical, policy, and conservation biology perspectives. Pages 235-265 in J. DuToit, R. Kock, and J. Deutsch, eds. Wild Rangelands: Conserving Wildlife While Maintaining Livestock in Semi-Arid Ecosystems. Zoological Society of London/ Blackwell Publishing Ltd., Oxford, UK. and Fleischner, T. 1994. Ecological Costs of Livestock Grazing in Western North America. Conservation Biology. Volume 8 Issue 3, Pages 629 – 644. <http://www.rmrs.nau.edu/awa/ripthreatbib/fleishner_ecocosts.pdf>.
* The agency should not misunderstand their responsibilities under the multiple-use laws. The agency is not required to allow livestock grazing everywhere, nor everywhere they have historically or currently allowed grazing. The agency’s highest priority is to meet the requirements of substantive requirements of the Clean Water Act and Endangered Species Act even if it means curtailing grazing. The agency should strongly weigh the moral imperative of mitigating climate change by storing more carbon in ungrazed ecosystems. People who choose to raise cattle should bear the full costs of their business operation. Grazing should occur primarily on private lands where the costs are internalized, rather than on public lands where the public is forced to bear the ecological costs and someone else gets to pocket the profits.
* Portions of these grazing allotments may occur in inventoried roadless area or unroaded areas larger than 1000 acres. Such areas are rare on the landscape and contribute disproportionately to ecological values and ecosystem services. Enhanced efforts toward conservation of ecological values are appropriate in such areas.
* Questions for the NEPA analysis: (i) How much has the agency spent in this permit area in the last ten years? Specifically, how much on fencing? How much of that expenditure was on materials and how much was on labor? What contributions were made by the permittees? (ii) How many of the boundaries are soft versus fenced? (iii) As Oregon struggles with water quality, quantity, and broken systems, what has the agency done and what will they do to protect seeps, springs, water retention, and maintaining and restoring the water table in this permit area?
* George Wuerthner describes a variety of adverse effects from livestock grazing on public lands. The NEPA analysis should address each of these and propose alternative ways to avoid, minimize, and mitigate adverse effects.

1. Dewatering of streams to the detriment of aquatic ecosystems.

2. Conversion of native riparian habitat and sage brush steppe to hay pastures of exotic grasses.

3. Trampling of biological crusts and contribution to soil erosion.

4. Trampling of biocrusts which facilitate cheatgrass invasion.

5. Soil compaction which decreases water infiltration.

6. The trampling of riparian areas and springs reduces it’s ability to soak up water and store for late season flows. It also destroys habitat for native mollucks.

7. Water troughs are breeding grounds for mosquitoes that carry west nile virus (and harm sage grouse).

8. Fences block migration and are a major source of mortality for sage grouse.

9. We kill all kill all kinds of predators and other wildlife (like prairie dogs) as pests and “varmints”.

10. The eating of riparian vegetation eliminates hiding cover and habitat for many species from songbirds to sage grouse chicks.

11. Forage competition. On many public lands, the vast majority of forage is allotted to domestic livestock. Many wet meadows, etc. are grazed to golf course height to the detriment of native wildlife.

12. Disease transfer such as occurs with domestic sheep and wild bighorns.

13. Weed invasion–grazing of native perennials and trampling and disturbance of soils favors weedy invasions.

14. Even where grasses are meeting “objectives” like 4 inch stubble height that is not enough to hide ground nesting birds. For instance, grouse require at least 10 inches of stubble height which you seldom see where there is significant grazing.

15. Effects on fire regimes. The invasion of cheatgrass, created by livestock disturbance, is a major factor in the burnout of sage brush habitat. Similarly, grazing can enhance conifer establishment in the ponderosa zone, including stand densities, again affecting fire regimes.

16, Cows are a major source of methane and thus GHG emissions contributing to global warming. Worse than all the transportation put together.

17. Most of the dams built-in the West are for water storage to provide for irrigation. These dams change the water characteristics of rivers and block migration (think of salmon). While you might say a few situations where dams have created trout habitat below them as “good”, this doesn’t account for the numerous losses imposed by dams.

18. Grazing favors invasives and exotics over native plants. Grazing has dramatically altered many native plant communities.

GEORGE WUERTHNER, Critique of Montana Outdoors proposed “Green” Grazing article. The Wildlife News. AUGUST 14, 2017 <http://www.thewildlifenews.com/2017/08/14/critique-of-montana-outdoors-proposed-green-grazing-article/>

* Consider the grazing standards in Appendix 2 of AFSEEE’s 1995 Grazing Suitability Report. We consider these to be minimum standards to meet the agency’s legal requirements under NFMA, ESA, MBTA, NEPA, etc.

**APPENDIX TWO**

**DETERMINING GRAZING SUITABILITY BASED ON DESIRED ECOSYSTEM OUTCOMES**

AFSEEE proposes that the Interior Columbia Basin planning team fulfill the grazing suitability requirement as follows:

(1) Define "Desired Ecosystem Outcomes" and "Ecosystem Management Standards" for Columbia Basin ecosystems affected by livestock grazing;

(2) Determine grazing suitability for particular land areas based on whether livestock grazing would prevent or retard the attainment desired ecosystem outcomes or violate ecosystem management standards;

(3) Manage livestock grazing on suitable lands consistent with management standards to rapidly attain desired outcomes for Columbia Basin ecosystems; and

(4) Monitor to assure compliance with Ecosystem Management Standards and achievement of Desired Ecosystem Outcomes.

In an effort to stimulate open dialogue about appropriate definitions of Desired Ecosystem Outcomes, Ecosystem Management Standards, and standards for determining grazing suitability, AFSEEE proposes the following language be included in the Interior Columbia River Basin Record(s) of Decision:56

**1. Desired Ecosystem Outcomes.**

Upland, riparian, and aquatic ecosystems on National Forest System lands in the Interior Columbia Basin shall be managed to achieve ecosystem health and integrity. Ecosystem health and integrity will be indicated by the presence of ecosystem components, structures, processes, and functions described below. Ecosystem health and integrity will be indicated when the described characteristics attain wide distribution and site-potential.57 These ecosystem characteristics will be heterogenous, dynamic, and resilient. A healthy and integral ecosystem will not deviate greatly, over long periods of time or over large spatial areas, from the mean of the long-term range of natural variability.

Achievement of this desired outcome will include rapid attainment, and ongoing maintenance of at least the following indicators of ecosystem health and integrity:58

**Soil**

a. Fully functioning soil, including intact O-horizons and A-horizons, well-developed microbiotic components, and high capacity for water infiltration and water retention;

b. Nutrient cycling leading to stored supplies of carbon, nitrogen and other nutrients adequate for productive, fertile soils;

c. Plant litter accumulation adequate to help protect soil, retain moisture, provide habitat complexity, provide safe sites for germination of indigenous plants, and help carry low-intensity ground fire;

**Vegetation**

d. Plant distribution, age-class diversity, and species diversity are adequate for perpetuating healthy and diverse indigenous plant communities;

e. Complete vegetative and reproductive life cycles for indigenous plant species, including viable rooting throughout the available soil profile, normal vegetative growth forms, and maximum seed production;

f. Adequate germination micro-sites (safe sites) available for regeneration of indigenous plant species;

g. Photosynthetic activity occurs throughout the period suitable for growth of indigenous plants;

h. Undesirable influences from non-indigenous plants are prevented and eliminated;

i. "Park-like" forest stands that are resilient to disturbances such as fire, drought, insects, and disease are maintained where appropriate via maintenance of herbaceous plants and litter adequate to carry low-intensity fire along the ground and compete with and prevent excessive establishment of woody species.

**Wildlife**

j. Terrestrial and aquatic micro- and macro-invertebrates are present in adequate numbers and diversity to break down detritus and provide food for viable populations of indigenous fish, birds, reptiles, amphibians, mammals, and other wildlife;

k. Fully functioning upland, riparian, and aquatic habitats in the proper ratio and configuration to maintain viable populations of all indigenous species;

l. Minimum human intervention in the dynamic relationship between populations of predators and prey;

**Water/Hydrology**

m. Indigenous riparian vegetation, both woody and herbaceous, that contributes to bank stability, sediment trapping, shade, and habitat for diverse and well-distributed populations of riparian-associated indigenous species, including invertebrates and viable populations of vertebrates;

n. Optimum water quality for all beneficial uses, including domestic and municipal water supply, recreation, and the maintenance of well-distributed, viable populations of indigenous aquatic and other species. This subsumes water quality that is legally compliant as to temperature, sediment/turbidity, coliform bacteria, pH, dissolved oxygen, phosphates, nitrates, sulfates, and specific conductance;

o. Beneficial conditions of water flow, including moderated peak flows and extended late season flows; p. Cumulative impacts from livestock and existing populations (or planned reintroductions) of beaver will not adversely affect woody riparian vegetation and normal fluvial processes.

q. Stream habitat features indicating fully-functioning fluvial systems, including: stable undercut banks, pool frequency, channel type, width-to-depth ratio, substrate particle size and distribution, bed load transport, migrating stream channels, and energy dissipation characteristics;

r. Restored riparian/wetland functions, including timing and variability of water table elevation, groundwater recharge, and the ability to route flood waters;

**2. Determining Grazing Suitability**.

a. National Forest System lands may be designated suitable for livestock grazing only where the applicable forest plan makes a documented affirmative finding that maintenance of livestock numbers necessary to support a viable livestock operation59 will not prevent or retard attainment60 of all Desired Ecosystem Outcomes, listed under 1 above, nor lead to any violation of Ecosystem Management Standards, listed under 3 below.

b. In each area considered for possible livestock grazing, the resources most sensitive to degradation by livestock must be given special consideration in the suitability determination.

c. To support a grazing suitability determination the deciding officer must make a finding that livestock grazing in areas to be designated as suitable for grazing is consistent with the principle of multiple-use. To wit--

i. Management of all the various renewable resources of the national forest, including but not limited to livestock grazing, recreation, fish & wildlife habitat, water resources, and timber, are utilized in the combination that best meet the needs of the American people; and

ii. Upon consideration of all the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output, livestock grazing is harmonious with other uses, and will not impair the productivity of the land for other uses.

d. The standards of this part apply equally to areas where grazing occurred in the past, areas where grazing is currently being permitted, and areas where grazing is being newly proposed.

e. Before the deciding officer may rely upon the effectiveness of existing or planned livestock management developments (such as fences and alternative water sources) to support a grazing suitability determination, the deciding officer must first find:

i. That the direct, indirect, and cumulative impacts of existing, planned, and necessary additional developments will not violate Ecosystem Management Standards, nor prevent or retard the attainment of Desired Ecosystem Outcomes or the restoration of past resource damage from any cause;

ii. That all structural developments and administrative efforts necessary to ensure attainment of Desired Ecosystem Outcomes and prevent violations of Ecosystem Management Standards will be diligently maintained for the duration of the grazing permit, and the risk that the structural developments and administrative efforts will be ineffective is insubstantial.

f. Where lands that are otherwise suitable for grazing are mingled with unsuitable lands in such a way that livestock use of the unsuitable lands is reasonably foreseeable, the whole area including the suitable lands shall be designated unsuitable.61

g. Grazing suitability must be considered in light of the capability of land areas to provide habitat for Management Indicator Species,62 the requirement to provide habitat for viable populations of all native and desired non-native vertebrate species,63 and the obligation to provide habitat contributing to the recovery of species listed under the Endangered Species Act.64

i. Indicator species must be selected based on their sensitivity to livestock impacts.

ii. In determining grazing suitability, population viability analyses should be conducted on populations of special status species most likely to be adversely affected by livestock grazing.

h. Lands harboring significant cultural resources that are likely to be damaged or destroyed by livestock shall be designated unsuitable for livestock grazing.

**3. Ecosystem Management Standards**

**General**

a. Authorized officers shall authorize grazing only on lands determined suitable for livestock grazing in the applicable forest plan. Livestock shall not be permitted to graze on National Forest System lands unless such lands are specifically designated suitable for livestock grazing in the applicable forest plan. Forest Service personnel shall take immediate and aggressive action to prevent livestock from trespassing on unsuitable lands and shall enforce all applicable rules against unauthorized use of public lands by domestic livestock.

b. Adjust grazing to eliminate impacts that retard or prevent the attainment of Desired Ecosystem Outcomes listed under 1 above, or cause a violation of any applicable law, regulation, rule, or management standard. Where adjustments are not effective, eliminate livestock.

c. Where monitoring or other evidence shows that lands are not suitable for grazing, livestock shall be prohibited from grazing such lands whether or not such lands are determined in the applicable forest plan to be suitable for grazing.

**Soil**

d. Livestock shall not cause, contribute to, or accelerate noticeable soil movement, such as pedestaling, rills, gullies, scouring, sheet erosion, sedimentation or dunes.

e. Livestock shall not increase the existing rate of soil loss or retard the rate of soil recovery that would be expected in the absence of livestock.

f. Livestock shall not cause physical displacement of historic artifacts or otherwise cause loss of the information value of such artifacts by, among other things, disturbing the soil in or near historic sites.

**Vegetation**

g. Livestock shall not introduce or spread non-indigenous plants.

h. When conducted for the purpose of benefiting livestock, large-scale environmental manipulation, such as chaining of pinon-juniper,65 treatment of brush with herbicides, or conversion of indigenous plant communities shall be prohibited.

i. Livestock shall not reduce herbaceous plant cover and litter to such an extent that low-intensity fire is significantly suppressed or to such an extent that understory competition for water and nutrients significantly favors establishment of fire-intolerant woody species.66

**Wildlife**

j. Livestock shall not present a risk of disease transmission to indigenous wildlife (e.g., bighorn sheep); nor render an identified wildlife reintroduction site unsuitable for wildlife reintroduction (e.g., beaver and bighorn sheep).

k. Livestock shall not interfere with the maintenance of well-distributed, viable wildlife populations via social displacement, reduction in cover, or competition for food. l. Livestock shall not alter normal relationships between predators and prey (e.g., coyote and waterfowl); parasites and hosts (e.g., cowbirds and neotropical migratory songbirds); specific pollinators and dependent plants; or specific dispersal mechanisms and dependent indigenous organisms.

m. Livestock shall not alter habitat to such an extent that the geographic range of wildlife species is altered.

n. Lethal control, for the benefit of livestock, of indigenous predators (e.g., coyote and cougar), and competing indigenous herbivores (e.g., rodents and grasshoppers) shall be prohibited.

o. Livestock, in combination with existing populations or planned reintroductions of beaver, shall not prevent or retard the attainment of a fully-functioning stream system, including healthy and diverse woody riparian vegetation component.

**Economics**

p. Before livestock grazing is authorized, the deciding officer must prepare a comparative economic analysis which displays the market and non-market costs and benefits to society over time "with" grazing and "without" grazing.

q. Consistent with the principle of multiple use, the deciding officer must thoroughly consider market and non-market costs and benefits to determine whether the needs of the American people are best served with grazing or without grazing, based not on the greatest dollar return or the greatest unit output.

r. The analysis shall consider and disclose the value of alternative uses forgone when an area is grazed by domestic livestock compared to when an area is not grazed.

s. Consider and disclose the economic impact of grazing from several perspectives: federal treasury, permittees, agency budget, county revenues, recreationists.

t. The anticipated costs of administering livestock grazing and the costs of livestock-related investments such as fences and water tanks necessary to protect environmental quality shall be disclosed. In consideration of livestock management limitations, the relative risk of environmental harm with and without grazing shall be disclosed.

**4. Monitoring**

a. Ecosystem components, structures, processes, and functions shall be measured on a regular basis to evaluate attainment (or lack of attainment) of Desired Ecosystem Outcomes.

b. If monitoring cannot be conducted, for any reason including lack of funding, in sufficient detail and frequency to inform management and the interested public about the potential impacts of grazing, then livestock shall be removed from the area until monitoring shows significant progress toward attainment of Desired Ecosystem Outcomes.

c. Utilization standards shall be established in terms of stubble height, percent of leaders browsed, and percent of stream banks disturbed. Livestock utilization on suitable lands shall be monitored and necessary adjustments made to maintain suitability by promptly removing livestock when utilization limits are reached.

*/footnotes/*

56 Keep in mind that the desired ecosystem outcomes described in this appendix are not inclusive of all ecosystem values. They have been developed with livestock grazing in mind. For instance, although old-growth habitat values will be an important issue in the overall regional plan, they may not be fully represented in this paper because there is only limited association between livestock grazing and old-growth habitat characteristics.

57 The qualifiers "wide distribution" and "site potential" apply to all the of the attainment goals listed. "Wide distribution" means both spatial (e.g., distribution of plants across a site) and temporal (e.g., photosynthetic activity occurs throughout the period suitable for plant growth). "Site potential" refers to conditions which would be present in the absence of human caused disturbances (e.g., livestock grazing), or human caused suppression of natural disturbances (e.g., fire). Site potential is not "pristine" or steady-state climax, but rather the dynamic mosaic of conditions which would be expected near the mean within the range of natural variability for a given set of climatic and landform conditions.

58 Outcomes a. through g. are indicators of rangeland health adapted from National Research Council, Committee on Rangeland Classification. 1994. Rangeland Health: New Methods to Classify, Inventory, and Monitor Rangelands, National Academy Press. Note: the Committee on Rangeland Classification included Jack Ward Thomas-- then a USDA research scientist, now the Chief of the Forest Service.

59 The regulations require that the Forest Service consider suitability under an "assumed set of management practices and at a given level of management intensity." 36 CFR § 219.3. The inclusion of an assumed "viable livestock operation" is intended to exclude from the suitable land base lands that could only support a small number of livestock. Granting a permit for such small numbers would not make sense administratively for the Forest Service nor economically for the livestock operator. This standard also invokes economic criteria as required by 36 CFR § 219.3. This analysis is much like the validity examinations done on mining claims. The government does not want to support potentially damaging activities on the public lands that do not meet a simple test of profitability. The public interest is not served by a policy that would use the National Forests to support small non-commercial livestock operations, e.g. hobby farms.

60 The clause "prevent or retard attainment of... " is derived from the standards and guidelines for attaining Aquatic Conservation Strategy objectives on federal lands west of the Cascades. See USDA/FS and USDI/BLM, Record of Decision and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl, April 1994 at pages B-11 and C-33. This approach will also likely be used in the "PACFISH" aquatic conservation strategy. See October 11, 1994 consultation letter from Gray Reynolds (USFS) and Al Wright (BLM) to Rolland Schmitten (NOAA/NMFS) concerning the joint Environmental Assessment for the Implementation of Interim Strategies for Managing Anadromous-Fish Producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California, March 1994. This "prevent or retard" standard is becoming a standard approach to achieve ecosystem-based desired future conditions. Where proper ecosystem processes are lacking on public lands, private livestock use must not be permitted to prevent or retard the ability of natural recovery mechanisms to achieve healthy conditions.

61 According to some Forest Service professionals, "no grazing system has been devised for assuring proper use of small riparian meadows with extensive upland range. In addition, the most recent information on grazing uplands suggests that although conventional grazing systems have great intuitive appeal, they are less effective at maintaining ecological quality and livestock production than previously thought." Clary, W.P., and B.F. Webster, Managing Grazing of Riparian Areas in the Intermountain Region, USDA Forest Service, Intermountain Research Station, GTR INT-263, May 1989, page 1. In such cases, effective management of the whole area may be rendered infeasible due to prohibitive administrative costs such as riding, herding, fencing, and monitoring, or due to conflicts with other resources such as recreation, wildlife and fish.

62 36 CFR § 219.20.

63 36 CFR § 219.27(a)(6).

64 16 USC §1536(a).

65 See A.J. Belsky, Viewpoint on Western Juniper Expansion: Is it a Threat to Arid Northwestern Ecosystems?, Journal of Range Management, in press.

66 Belsky, A.J., letter to EEMP Project Leader Jeff Blackwood, September 23, 1994. This letter cites numerous well-respected range scientists whose studies contradict the suggestions of the draft issue paper, "Paleoecological Relationships..."

Heiken D., 1995. RIGHT PLACE -- WRONG ANIMAL: Determining Grazing Suitability Based on Desired Ecosystem Outcomes for the Interior Columbia River Basin. Association of Forest Service Employees for Environmental Ethics. May 1995. <https://www.dropbox.com/s/ucw50hhs8xsiz2k/AFSEEE%20Grazing%20Suitability%20Report.doc?dl=0> .

## Grazing and Climate Change

​​The agency should do more to incorporate concerns about climate change into all of its management decisions. Ruminant livestock not only cause direct emission of greenhouse gases but livestock grazing also suppresses vegetation growth and prevents the landscape from storing as much carbon as it could. Livestock also make the landscape less resilient to the biophysical changes brought by global climate change. Plants are less healthy, have shallower roots, reduced above-ground and below-ground energy reserves, fewer seeds, and are consequently less resilient to drought stress. Grazed watersheds also have less vegetation cover, more exposed soil, degraded stream conditions, and are less resilient to the amplification of the water cycle and increased storm intensity expected as a result of climate change.

Climate change is an over-arching concern that all agencies must immediately reorient their missions to address. The agency should analyze proposed grazing from at least three perspectives relative to global climate change.

First, NEPA analyses must account for the fact that livestock grazing combined with climate change will result in compound and cumulative adverse effects. See Beschta, R. L., Donahue, D. L., DellaSala, D. A., Rhodes, J. J., Karr, J. R., O'Brien, M. H., Fleischner, T. L., & Deacon-Williams, C. (2012). Adapting to Climate Change on Western Public Lands: Addressing the Ecological Effects of Domestic, Wild, and Feral Ungulates. Environmental Management. DOI 10.1007/s00267-012-9964-9. [https://web.archive.org/web/20170811144342/http://fes.forestry.oregonstate.edu/sites/fes.forestry.oregonstate.edu/files/PDFs/Beschta/Beschta\_2012EnvMan.pdf](https://web.archive.org/web/20170811144342/http:/fes.forestry.oregonstate.edu/sites/fes.forestry.oregonstate.edu/files/PDFs/Beschta/Beschta_2012EnvMan.pdf) Climate change is expected to increase winter storms, summer droughts, reduce snowpack and summer streamflows, cause earlier spring snowmelt and run-off, and may increase the prevalence of herbivorous insects. All these add stress to plants and streams that are also stressed by grazing. To avoid cumulative impacts from the combination of climate stress and anthropogenic stress, we need to reduce anthropogenic stress from livestock grazing. Here are a few concrete examples. First, livestock trample and destabilize streambanks and expose streambanks to erosion. Such streambanks are vulnerable to erosion during peak flows. Climate change is expected to bring bigger precipitation events which will increase the erosive power of streams results in adverse cumulative interactions between climate change and grazing. Second, plants are stressed by summer dry periods which limits their ability to set seed, set buds, and store nutrients in woody parts and roots. These life functions are directly related to their survival. Climate change is expected increase the intensity and duration of summer droughts resulting in another adverse cumulative interaction between grazing and climate change.

“Primary [climate change] adaptation strategies to address changing hydrology in the Blue Mountains include restoring the function of watersheds, connecting floodplains, reducing drainage efficiency, maximizing valley storage, …. Tactics include adding wood to streams, restoring beaver populations, modifying livestock management, …” Halofsky, J.E.; Peterson, D.L., eds. 2016. Climate change vulnerability and adaptation in the Blue Mountains. Gen. Tech. Rep. PNW-GTR-xxx. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. <http://adaptationpartners.org/bmap/docs/BMAP_final.pdf>

“Moderate and high levels of uncharacteristic grazing effects currently occur on well over half (64 percent) of the FS- and BLM-administered lands in the ICBEMP management region.” Miles A. Hemstrom, Wendel J. Hann, Rebecca A. Gravenmier, Jerome J. Korol. 2000. [SAG] Landscape Effects Analysis of the [ICBEMP] SDEIS Alternatives. USDA/USDI, *draft* March 2000.

Second, the agency needs to account for the direct emission of potent greenhouse gases from ruminant livestock, such as cattle:

**Efforts to curb climate change require greater emphasis on livestock**

12/20/2013

CORVALLIS, Ore. – While climate change negotiators struggle to agree on ways to reduce carbon dioxide (CO2) emissions, they have paid inadequate attention to other greenhouse gases associated with livestock, according to an analysis by an international research team.

A reduction in non-CO2 greenhouse gases will be required to abate climate change, the researchers said. Cutting releases of methane and nitrous oxide, two gases that pound-for-pound trap more heat than does CO2, should be considered alongside the challenge of reducing fossil fuel use.

The researchers’ analysis, “Ruminants, Climate Change, and Climate Policy,” is being published today as an opinion commentary in Nature Climate Change, a professional journal. [See link below.]

…

“Because the Earth’s climate may be near a tipping point to major climate change, multiple approaches are needed for mitigation,” said Ripple. “We clearly need to reduce the burning of fossil fuels to cut CO2 emissions. But that addresses only part of the problem. We also need to reduce non-CO2 greenhouse gases to lessen the likelihood of us crossing this climatic threshold.”

Methane is the second most abundant greenhouse gas, and a recent report estimated that in the United States methane releases from all sources could be much higher than previously thought. Among the largest human-related sources of methane are ruminant animals (cattle, sheep, goats, and buffalo) and fossil fuel extraction and combustion.

One of the most effective ways to cut methane, the researchers wrote, is to reduce global populations of ruminant livestock, especially cattle. Ruminants are estimated to comprise the largest single human-related source of methane.

OSU Press Release, Dec. 2013. <http://oregonstate.edu/ua/ncs/archives/2013/dec/efforts-curb-climate-change-require-greater-emphasis-livestock>. The referenced article is: William J. Ripple, Pete Smith, Helmut Haberl, Stephen A. Montzka, Clive McAlpine and Douglas H. Boucher 2014. COMMENTARY: Ruminants, climate change and climate policy. NATURE CLIMATE CHANGE | VOL 4 | JANUARY 2014. <https://newyork2.sierraclub.org/sites/newyork.sierraclub.org/files/documents/2014/01/Ripple%20et%20al%202014%20Ruminants%20climate%20change.pdf>.

“Greenhouse gas (GHG) emissions associated with [livestock] production are estimated to account for over 14.5 percent of the global total. This is more than the emissions produced from powering all the world’s road vehicles, trains, ships and aeroplanes combined. It is considerably more than the emissions produced by the world’s largest national economy, the United States. … Recent analyses have shown that it is unlikely global temperature rises can be kept below two degrees Celsius without a shift in global meat and dairy consumption. … Intensive rearing of cattle on feedlots is less emissions-intensive than pasture-based grazing systems because grass-fed cows tend to produce more methane and take longer to reach slaughter weight.” Bob Bailey, Antony Froggatt and Laura Wellesley. 2014. Livestock – Climate Change’s Forgotten Sector Global Public Opinion on Meat and Dairy Consumption. Chatham House Research Paper. December 2014.

<http://www.chathamhouse.org/sites/files/chathamhouse/field/field_document/20141203LivestockClimateChangeBaileyFroggattWellesleyUpdate.pdf>. See also, Chatham House 3-31-2017 response to some industry critics. <https://www.chathamhouse.org/sites/files/chathamhouse/publications/2017-04-05-ResponsetoIEABioenergy.pdf>

Large herbivores were once a common sight in all of Earth’s habitable continents. However, hundreds of years of intensive livestock farming has contributed to steep declines in native herbivores and large increases in cattle. Today, there are around 1.5bn cows on Earth.

The replacement of native animals with cattle has caused steep rises in emissions of methane – a greenhouse gas that is 34 times more potent than CO2 over a 100-year period.

This is because cows are “ruminants” – meaning that they have specialised stomachs capable of digesting tough and fibrous material, such as grass through fermentation. The digestive process causes cows to belch out high amounts of methane.

Native herbivores, on the other hand, can have much smaller methane footprints.

Dunne, D. 2018. In-depth: Could ‘rewilding’ help to tackle climate change? Carbon Brief. <https://www.carbonbrief.org/in-depth-could-rewilding-help-tackle-climate-change> *citing* Phil. Trans. R. Soc. B. Theme issue ‘Trophic rewilding: consequences for ecosystems under global change’ organized and edited by Elisabeth S. Bakker and Jens-Christian Svenning. 05 December 2018; volume 373, issue 1761 <http://rstb.royalsocietypublishing.org/content/373/1761>

Third, the agency needs to help mitigate climate change by managing all living systems to capture and store as much carbon as possible. Livestock grazing reduces carbon storage in vegetation biomass, microbes, and soil at an ecosystem scale and must be reduced to help mitigate climate change. See:

* Dong Wang, Gao-Lin Wu, Yuan-Jun Zhu, Zhi-Hua Shi. 2014. Grazing exclusion effects on above- and below-ground C and N pools of typical grassland on the Loess Plateau (China). Catena 123 (2014) 113–120. [https://web.archive.org/web/20170808225058/http://lab.yangling.cn/UploadFile/ea\_201482785433.pdf](https://web.archive.org/web/20170808225058/http:/lab.yangling.cn/UploadFile/ea_201482785433.pdf) (“Results showed that soil carbon content in the topsoil, plant biomass and diversity, and grasses increased, while bulk density, pH and forbs decreased after grazing exclusion. The increases in soil carbon content, the cumulative organic carbon pool and the rate of change in the cumulative organic carbon pool mainly occurred in the upper 20 cm soil layer after 8 years of grazing exclusion. Our study suggested that the 8-year grazing exclusion had a great influence on the carbon pools …”)
* Lei Deng, Zhinan Zhang, Zhouping Shangguan 2014. Long-term fencing effects on plant diversity and soil properties in China. Soil & Tillage Research 137 (2014) 7–15. <http://skl.iswc.cas.cn/zhxw/xslw/201406/P020140827338584586146.pdf> (“Long-term fencing also led to marked increases in soil organic carbon (SOC), soil total nitrogen (TN), the carbon: phosphorus (C/P) and nitrogen: phosphorus (N/P) ratios, as well as soil C and N storage within 0–100 cm soil profile.”)
* Wu Xing, LI Zongshan, FU Bojie, LU Fei , WANG Dongbo, LIU Huifeng, LIU Guohua 2014. Effects of Grazing Exclusion on Soil Carbon and Nitrogen Storage in

Semi-arid Grassland in Inner Mongolia, China. Chin. Geogra. Sci. 2014 Vol. 24 No. 4 pp. 479-487. <http://egeoscien.neigae.ac.cn/fileup/PDF/20140411.pdf> (“The results show that removal of grazing for six years resulted in a significant recovery in vegetation with higher above and below-ground biomass, but a lower soil bulk density and pH value. After six years of grazing exclusion, soil organic C and total N storage increased by 13.9% and 17. 1%, respectively, which could be partly explained by decreased loss and increased input of C and N to soil. The effects of grazing exclusion on soil C and N concentration and storage primarily occurred in the upper soil depths.”)

* Xing Wu, Zongshan Li, Bojie Fu, Wangming Zhou, Huifeng Liu, Guohua Liu. 2014. Restoration of ecosystem carbon and nitrogen storage and microbial biomass after grazing exclusion in semi-arid grasslands of Inner Mongolia. Ecological Engineering, Volume 73, Issue null, Pages 395-403. (“Highlights: \* Grazing exclusion resulted in a substantial increase of ecosystem C and N storage. \* The restoration of ecosystem C and N were mainly due to the increase of C and N in soil.”)
* Dingpeng Xionga, Peili Shi, Xianzhou Zhang, Chris B. Zou. 2016. Effects of grazing exclusion on carbon sequestration and plant diversity in grasslands of China—A meta-analysis. Ecological Engineering 94 (2016) 647–655. (“We conducted a meta-analysis of 447 entries from 78 papers to analyze the spatiotemporal effects of grazing exclusion on plant diversity, productivity and soil carbon sequestration … Our comprehensive meta-analysis demonstrated a consistent positive overall effect of grazing exclusion on grassland biomass and soil carbon stocks. … Our results showed that, compared with the grazed sites, grazing exclusion significantly increased carbon stored in aboveground biomass, litter mass, belowground biomass and soils by 84.7%, 111.6%, 25.5% and 14.4%, respectively.”)
* Bruce Myers 2014. Livestock’s Hoof Print. ENVIRONMENTAL LAW INSTITUTE • POLICY BRIEF NO. 8 • FEBRUARY 2014. <http://www.eli.org/sites/default/files/docs/policy_brief_8.pdf> (“According to the United Nations Food and Agriculture Organization (FAO), 14.5 percent of all heat-trapping GHGs emitted into the atmosphere through human activity is attributable, directly or indirectly, to the livestock sector. By 2050, meat production is projected to double due to increasing population and growing per capita demand … [N]ow is the time to lay the policy groundwork for how best to take on GHG emissions from livestock production.”)
* D. G. Milchunas W. K. Lauenroth 1993. Quantitative Effects of Grazing on Vegetation and Soils Over a Global Range of Environments. Ecological Archives M063-001; <https://doi.org/10.2307/2937150> (“... most effects of grazing on ANPP [above-ground net primary productivity] were negative ... the statistical models predicted increases in ANPP with grazing under conditions of long evolutionary history, low consumption, few years of treatment, and low ANPP” These conditions are highly atypical for public land grazing allotments with a long-history of heavy grazing.)

The agency should consider changes in grazing, such as dramatically reduced utilization, as a mitigation alternative that helps address climate change.

We estimate that adjustments in grazing pressure, from current forage offtake rates to rates that maximize forage production, can sequester 148.4 Tg CO2 yr -1 (Tables 2 and 3) in grazing lands worldwide. … [A]rid areas account[] for just over half of the total sequestration potential due to their dominant share of the total amenable rangeland area …

Benjamin B. Henderson, Pierre J. Gerber, Tom E. Hilinski, Alessandra Falcucci, Dennis S. Ojima, Mirella Salvatore, Richard T. Conant 2015. Greenhouse gas mitigation potential of the world’s grazing lands: Modeling soil carbon and nitrogen fluxes of mitigation practices. Agriculture, Ecosystems & Environment. Volume 207, 1 September 2015, Pages 91–100. <http://authors.elsevier.com/a/1QrWKcA-IJPyp>, <https://animalscience.psu.edu/fnn/current-research/nature-climate-2925-paper-published-march-16>. This study also notes that demand reduction can help. (“Reduced [meat] consumption could have substantial beneficial effects largely through its ability to create ‘spare land’ that can be used for either bioenergy or C sequestration by afforestation.”) Fedeal agencies that manage grazing allotments can help that process along by limiting the supply.

We urge the agency to avoid minimizing the effects of grazing on climate change. To admit that grazing will reduce biogenic carbon storage but then say that the scale is too small to make a difference is an improper way to look at carbon and climate. ALL carbon emissions are minimal *if they are looked at individually*. The problem is one of cumulative effects, and no emissions should be excluded from that calculus. Global climate change is made better or worse by millions of small decisions about whether or not to cause emissions. Climate change must be addressed by millions of decision-makers around the world, including federal agency line officers making decisions on individual land management actions.

The cause of climate change is from cumulative emmissions from all sources, so there is no silver bullet solution, where one or a few people can decide to take discreet actions to fix the problem. “[T]here is absolutely NO SILVER BULLET to climate change. None. Policy alone won’t do it. Markets alone won’t either. Nor will our actions at home. We need them all. Think SILVER BUCKSHOT, not silver bullet.” <https://twitter.com/GlobalEcoGuy/status/1033016301319405570>. Nor can we rely on negative emissions technology. “You can rule out a silver bullet,” said Prof John Shepherd, at the University of Southampton, UK, and an author of the report. “Negative emissions technologies are very interesting but they are not an alternative to deep and rapid emissions reductions. These remain the safest and most reliable option that we have.” Damian Carrington 2/1/2018. ‘Silver bullet’ to suck CO2 from air and halt climate change ruled out - Scientists say climate targets cannot be met using the technologies, which either risk huge damage to the environment or are very costly <https://www.theguardian.com/environment/2018/feb/01/silver-bullet-to-suck-co2-from-air-and-halt-climate-change-ruled-out?CMP=twt_a-environment_b-gdneco> *citing*

Negative emission technologies: What role in meeting Paris Agreement targets? European Academies' Science Advisory Council. EASAC policy report 35. February 2018. <https://easac.eu/fileadmin/PDF_s/reports_statements/Negative_Carbon/EASAC_Report_on_Negative_Emission_Technologies.pdf>.

The agency cannot argue that grazing this area won’t make a difference in the global scheme of the climate problem, because, as Voltaire said, "No snowflake in an avalanche ever feels responsible.” The NEPA analysis must recognize that global warming will not be solved by one miraculous technological fix or by changing one behavior or one economic activity. The whole global carbon cycle must be managed to reduce carbon emissions and increase carbon uptake. Recent evidence supports the conclusions that all net emissions of greenhouse gases are adverse to the climate. None can be considered *de minimus*. “We show first that a single pulse of carbon released into the atmosphere increases globally averaged surface temperature by an amount that remains approximately constant for several centuries, even in the absence of additional emissions. We then show that to hold climate constant at a given global temperature requires near- zero future carbon emissions. Our results suggest that future anthropogenic emissions would need to be eliminated in order to stabilize global-mean temperatures. As a consequence, any future anthropogenic emissions will commit the climate system to warming that is essentially irreversible on centennial timescales.” H. Damon Matthews and Ken Caldeira. 2009. Stabilizing climate requires near-zero emissions. Nature Vol 455 | 18 September 2008 | doi:10.1038/nature07296.

Former D.C. Circuit Judge Wald wrote in a 1990 dissenting opinion, which was recently quoted with unanimous approval by the Ninth Circuit in Center *for Biological Diversity v. NHTSA*:

[W]e cannot afford to ignore even modest contributions to global warming. If global warming is the result of the cumulative contributions of myriad sources, any one modest in itself, is there not a danger of losing the forest by closing our eyes to the felling of the individual trees?

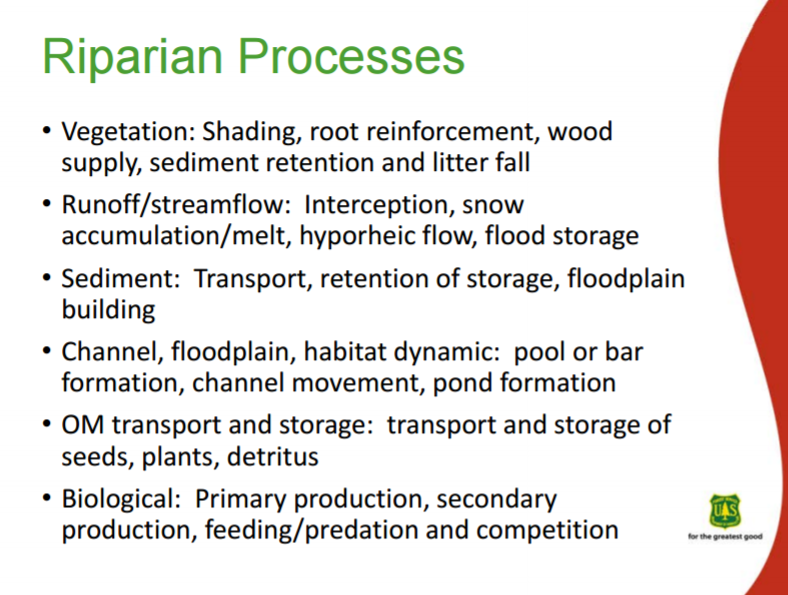
538 F.3d at 1217. Similarly, the US Supreme Court has already rejected the argument that the agency is making. The Supreme Court’s decision in *Massachusetts v. EPA* noted that one cannot avoid responsibility to reduce and mitigate the climate problem by attempting to minimize the scale of one’s contribution to the problem. ("While it may be true that regulating motor-vehicle emissions will not by itself reverse global warming, it by no means follows that we lack jurisdiction to decide whether EPA has a duty to take steps to slow or reduce it.... In sum, … [t]he risk of catastrophic harm, though remote, is nevertheless real. That risk would be reduced to some extent if petitioners received the relief they seek." 127 S.Ct. 1438, 1455 (2007) [http://web.archive.org/web/20080610172128/http://www.supremecourtus.gov/opinions/06pdf/05-1120.pdf](http://web.archive.org/web/20080610172128/http:/www.supremecourtus.gov/opinions/06pdf/05-1120.pdf))

## Grazing and Water Quality/Hydrology

The Forest Service Organic Act establishes a duty to secure and maintain “favorable conditions of water flow.” This should mean stable stream banks, cool shaded streams, no loss of soil water holding capacity via erosion or compaction, high instream flows, connection of streams to floodplains, large wood instream, etc. Grazing will often degrade these favorable water conditions. The agency has a duty to fix it, by removing livestock if necessary.

Per PACFISH/INFISH (and the Northwest Forest Plan - Aquatic Conservation Strategy), the FS must not allow livestock to retard attainment of aquatic or riparian management objectives.





BMFP 2017. Riparian ppt.

The agency should clearly disclose the location, timing and content of the monitoring data they have and explain how it was used in the analysis and project design. A map of monitoring sites would be helpful.

Provide a map showing where streams are perennial vs. intermittent and where grazing impacts are causing the most problems.

A number of studies conclude that attempts to lure livestock to uplands and away from riparian areas generally fail to do so given livestock’s preference for moist, shady areas. See L.D. Bryant, Response of Livestock to Riparian Zone Exclusion, Journal of Range Management, Vol. 35, No. 6 (Nov. 1982), pp. 780-785 (concluding that “Neither salt placement nor alternate water location away from the riparian zone influenced livestock distribution appreciably.”). See also J. Carter et al. Upland Water and Deferred Rotation Effects on Cattle Use in Riparian and Upland Areas, Rangelands, Vol. 39 (2017), 112, 117 (concluding, based on a four year study of an allotment in Utah that “Upland water developments and supplements do not overcome the propensity of cattle to linger in riparian areas, resulting in overgrazing and stream damage, and therefore do not lead to recovery of these damaged systems.”); R.L. Gillen, Cattle Distribution on Mountain Rangeland in Northeastern Oregon, Journal Of Range Management 37(6), November 1964, pp. 549-53 (“Water distribution was not correlated with grazing patterns in uplan[d] plant communities.”). Failure to address this scientific literature would constitute a separate NEPA violation. See 40 C.F.R. § 1502.9(b) (requiring that each final EIS respond to “any responsible opposing view which was not adequately discussed in the draft statement.”); Ctr. for Biological Diversity v. U.S. Forest Serv., 349 F.3d 1157, 1168 (9th Cir. 2003) (finding Forest Service’s failure to disclose and respond to evidence and opinions challenging EIS’s scientific assumptions violated NEPA); Seattle Audubon Soc’y v. Moseley, 798 F. Supp. 1473, 1482 (W.D. Wash. 1992) (“The agency’s explanation is insufficient under NEPA – not because experts disagree, but because the FEIS lacks reasoned discussion of major scientific objections.”), aff’d sub nom. Seattle Audubon Soc’y v. Espy, 998 F.2d 699, 704 (9th Cir. 1993) (“[i]t would not further NEPA’s aims for environmental protection to allow the Forest Service to ignore reputable scientific criticisms that have surfaced”).

The agency needs to plan for large storms, especially in light of climate change that will amplify the hydrologic cycle. Dense deeply rooted vegetation is needed to hold stream banks together during floods and high water events. Grazing tends to degrade the vigor of stream side vegetation and significantly increase the risk of bank damager during storms.

Storm flows should interact with floodplains and help store water on the flooplain, not send water downstream where it will cause even more erosion and damage.

OAR 340-041-0011 Biocriteria says "Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities." Livestock grazing causes a variety of adverse effects on stream functions that support biological communities, including excess nutrient loads, increased stream temperature, bank erosion and sedimentation, lack of vegetation cover, lack of dead wood, etc.

The adverse effects of grazing are inconsistent with the biocriteria and federal land managers have a duty under the Clean Water Act to prevent these adverse effects. Any proposal to allow grazing in streamside areas must address these factors, develop clear goals, and provide clear linkages between proposed actions and desired outcomes.

## Consider the Effects of Livestock Grazing on Forest Health

Livestock grazing has a direct influence on the vegetation structure that this project is designed to address. The agency must analyze the effect of past and future grazing which will tend to reduce palatable fine fuels like grasses and shift the plant community toward less palatable shrubs and trees which are more hazardous as ladder fuels. Livestock grazing probably contributed to the development of plant communities where grass and forbs are underrepresented and small conifers are over-represented. Grazing also likely contributes to the spread of juniper. Future livestock grazing will tend to cause these same trends, so the NEPA analysis must consider the connected and cumulative impacts of livestock grazing.

This project should take steps to address the threat that livestock grazing causes to forest health. There is little point in the agency’s efforts to mechanically reduce tree density unless other underlying causes of overstocking are dealt with, e.g. livestock grazing. The NEPA document describes the effects “on” range resources (e.g., fences and transitory range) but fails to disclose or analyze the effects “of” livestock on forest health and the desired future condition of vegetation composition. The Council on Environmental Quality directs agencies to analyze actions together when the actions are similar in timing or geography, when doing so is the best way to assess the combined impacts of the actions (40 CFR §1508.25). As recognized by BLM, “Evaluating both actions in the same EA allows BLM to better assess the combined effects and to consider complementary design features to reduce potential conflicts among potentially competing uses.” Thurston Hills Trails and Foret Management EA, <https://eplanning.blm.gov/epl-front-office/projects/nepa/75350/142227/174633/2018_04_23_THills_EA_Final_Print.pdf>

Grazing reduces the density and vigor of grasses which usually outcompete tree seedlings, leading to dense stands of fire-prone small trees. Cows also decrease the abundance of fine fuels which are necessary to carry periodic, low intensity surface fires. This reduces the frequency of fires, but increases their severity. See Belsky, A.J., Blumenthal, D.M., “Effects of Livestock Grazing on Stand Dynamics and Soils in Upland Forest of the Interior West,” Conservation Biology, 11(2), April 1997. <http://web.archive.org/web/20030409094020/http://www.onda.org/library/papers/standdynamics.pdf>. See also Wuerthner, George. Livestock Grazing and Fire. January, 2003. <http://web.archive.org/web/20040107135236/http://www.onda.org/library/papers/Livestock_Grazing_and_Fire.pdf>.

The NEPA document needs to address these issues and consider alternative ways of avoiding these impacts by not grazing. The combination of fire suppression, past high-grading, and livestock grazing together caused the overstocked condition of the stands in the analysis area. Logging and prescribed fire will only partially address the problem. To be effective, livestock grazing must also be eliminated. Grazing and logging cause cumulative effects that must be considered together in one NEPA document.

The court’s decision in League of Wilderness Defenders v. USFS, Civil No. 04--488—HA. 2004 U.S. Dist. LEXIS 24413. November 19, 2004, makes clear that the agency has a duty to take a hard look at the effects of grazing in the context of making timber sale decisions. The agency must disclose cumulative impacts and cannot compartmentalize.

Further evidence of the adverse forest health effects of livestock are presented in Madany et al (1983):

Abstract. Major differences were found between the vegetation structure of ponderosa pine-dominated communities on the Horse Pasture Plateau and those on the nearby but isolated Church and Greatheart Mesas in Zion National Park. The Horse Pasture Plateau was heavily grazed by livestock in the late 19th and early 20th centuries, while the mesas were never grazed. Conditions on the mesas now approximate the pre-European situation of the region as described in the earliest written accounts. Pine, oak, and juniper sapling density and cover were much higher on the formerly grazed plateau than on the relict mesas. Herbaceous species dominated the groundlayer in mesa ponderosa pine savanna stands, while grass and forb cover was low on analogous sites of the plateau. Age-class distributions of major tree species further substantiated that major physiognomic changes have occurred on the plateau since the arrival of European man. Analysis of fire scars showed that prior to 1881, the mean fire-free interval for ponderosa pine stands on the plateau was 4 to 7 yr, while the interval for Church Mesa was 69 yr. Since there were no recorded fires on Church Mesa between 1892 and 1964, and yet no corresponding increase in sapling density, the increased understory density of plateau stands should not be attributed primarily to cessation of fires. Instead, heavy grazing by livestock and associated reduction of the herbaceous groundlayer promoted the establishment of less palatable tree and shrub seedlings, Fire, however, played an important secondary role in maintaining savanna and woodland communities.

Michael H. Madany, and Niel E. West. 1983. Livestock Grazing-Fire Regime Interactions within Montane Forests of Zion National Park, Utah. Ecology: Vol. 64, No. 4, pp. 661-667.

Grazing is also known to have significant adverse impacts on ground nesting birds. Cattle Grazing in a National Forest Greatly Reduces Nesting Success in a Ground-nesting Sparrow. Glenn E. Walsberg. The Condor. Volume 107, No. 3. August, 2005.

The agency often erroneously concludes that livestock grazing will not affect upland vegetation of fuel profiles because fire suppressed stands are too dense to allow livestock access, but this is a gross oversimplification. The agency is conducting so-called “restoration” projects to reduce fuels and vegetation density which has and will allow livestock use. The NEPA document must disclose how livestock grazing interacts with the so-called forest restoration projects. The goal of restoration is a more open stand, and the agency wants more grass and forbs and fewer conifers, but grazing in those “restored” stands will cause the opposite effect – more conifers and less grass and forbs – thereby conflicting with the restoration objectives.

Each substantive issue discussed in these comments should be (i) incorporated into the purpose and need for the project, (ii) incorporated into a NEPA alternative, (iii) carefully analyzed as part of the effects analysis, and (iv) considered for mitigation.

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Sincerely,



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