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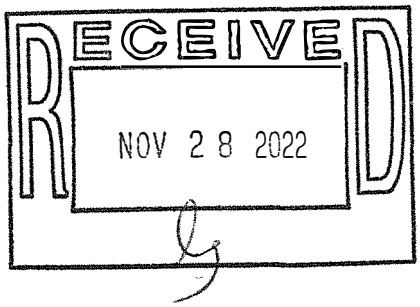

November 25, 2022

Forest Service

Ashland Ranger District, c/o Ronald Hecker

PO Box 168

Ashland, MT 59003

RE: 30 DAY COMMENTS ON THE DRAFT ENVIRONMENTAL ASSESSMENT FOR THE SOUTH OTTER LANDSCAPE RESTORATION AND RESILENCEY PROJECT

Hello,

Native Ecosystems Council and the Alliance for the Wild Rockies would like to provide the following comments for the proposed South Otter Landscape and Resiliency Project (hereafter "South Otter Project"). We have included one additional report, titled "Fuel Reduction" Logging Increases Fire Intensity," by the John Muir Project. This is a summary of the current best science regarding fire management on National Forest lands, as is planned for the South Otter Project. We are requesting that this current best science be addressed with this project, including the inclusion of an action alternative that is consistent with this science.

The following are summaries of the issues and concerns we have with various National Environmental Policy Act (NEPA) and National Forest Act Management Act (NFMA) documents that relate to the South Otter Project, including the Land Management Plan for the Custer-Gallatin National Forest (GC LMP) and the NEPA documents included for the project record of the South Otter Project.

Environmental Assessment (EA) for the South Otter Project

1. There is no map provided of all the proposed temporary roads.
2. There are no maps provided that identify each proposed treatment unit for the project, including acres and treatment type; basically, the tiny maps that are provided for proposed treatments are unreadable, so the public cannot actually see how local landscapes will be impacted by the project.
3. There is no map identifying the roads that were decommissioned in the travel plan in 2009; what is the status of implementing the 2009 travel plan?.
4. There is no map identifying the 291 miles of "coincident administrative road" designations for expanding these motorized trails into roads; these changes require an amendment to the travel plan via NEPA, and public involvement; this also needs to define any impacts on IRAs.
5. There is no NEPA process identified for changing the 2009 Ashland Travel Plan.
6. There is no map identifying the 18 miles of previously-closed roads in the project area.
7. There is no map identifying the 26.5 miles of private roads that will be used for the project.
8. There is no map identifying the location of 168 miles of planned temporary roads.
9. There is no information as to how the public will be kept off the new roads built for the project, including during project activities.
10. There is no information as to the use of motorized trails converted to project use as per continued public use.
11. There is no analysis of the habitat effectiveness levels that will occur during project activities for the 9 sub-project levels; project impacts of motorized activity on wildlife are not provided to the public.
12. There is no map of security for big game provided for the project area based on the current best science; project impacts on security are not provided to the public.

13. There is no science or monitoring data provided to support the agency's claim that logging and burning will increase forage for big game species, including the 2013 collaborative recommendations between the CG, HLC, and Montana Fish, Wildlife and Parks, or the 15 year elk-logging study by Lyon and others.
14. There is no map or information provided on the current old growth in the project area, and there is no information provided as to how these stands will be treated.
15. The CG LMP and the EA for the South Otter Project do not provide the science as to why logging and burning old growth will maintain values for wildlife.
16. There is no analysis as to how the project will impact hiding cover in the 9 sub-project areas.
17. There is no published science or published management recommendations cited in the draft EA or CG LMP to show there is a scientific consensus that a 40% canopy cover provides valid hiding cover for elk, mule deer and whitetail deer; use of an agency "white paper" is not peer-reviewed and as such does not qualify as the current best science.
18. The project EA did not provide any photo demonstrations as to the hiding cover value of various forest stands with various canopy cover levels, from 10% or greater, to demonstrate to the public the claims of hiding cover values are valid.
19. The EA does not map the Wildland Urban Interface (WUI), including by the definitions of interface and intermix communities.
20. The desired conditions for each vegetation community type are not defined for the project area, or compared to current conditions; the need for change is therefore no provided to the public.
21. The stated purpose for the project is to achieve desired conditions, but there are never defined as per the Historical Range of Variation (HRV); the public is not shown specifically what HRV is, what the current conditions are that need to be changed, or how the project will achieve HRV.
22. The EA repeatedly refers to achieving "resilience," but there are no criteria ever provided for resilience; the public has no information provided as to how specifically the project will achieve resilience for vegetation; what is the current measure of resilience for vegetation proposed for treatment,

and what will the resilience measure after treatment be for each of the proposed general categories of treatment units?

23. The definition of resilience does not apparently refer to wildlife; how is wildlife management included in the goal for resilience?
24. The CG LMP does not define any association between HRV and desired conditions for vegetation and wildlife; how are wildlife populations going to be maintained by achieving HRV, including the South Otter Project Area?
25. The CG LMP does not define how wildlife will be maintained by vegetation desired conditions; where is the analysis that HRV will maintain wildlife populations?
26. The CG LMP is violating the 2012 planning rule by failing to include conservation strategies for wildlife species of concern, including those identified by the Montana Natural Heritage Program and Montana Fish, Wildlife and Parks, or by the U.S. Fish and Wildlife Service Birds of Conservation Concern; the South Otter project cannot legally go forward until this flaw of the CG LMP is corrected through an amendment and public involvement.
27. The desired conditions for wildlife are never defined for the South Otter Project; since attaining desired conditions is a purpose of the project, how will these be met for wildlife?
28. No science is ever provided as to why the proposed treatments will reduce fire risk; what body of current best science supports this agency claim, and what current best science does not support this agency claim?
29. The project EA does not address what the desired condition is for old growth in the project area, or how it will be met.
30. The CG LMP does not have a valid management strategy for ponderosa pine and savanna old growth, in spite of the many bird and mammal species that rely on old growth forests; the CG LMP has no supporting analysis as to why only 1-6% old growth will be provided in ponderosa pine forests; the CG LMP cannot be implemented in any projects until this failure to ensure a diversity of wildlife is corrected with a valid conservation strategy for ponderosa pine old growth, including in the South Otter Project Area.
31. The desired condition for the project is to reduce stand density; this desired condition eliminates limited, essential habitat for a large number of

neotropical migratory birds; what is the conservation strategy for dense forests for wildlife?

32. The Ashland Ranger District has previously developed guidelines for management of mule deer and whitetail deer habitat; however, these guidelines were not applied to the South Otter Project; are these guidelines no longer considered relevant, and if not, when was this determined?
33. The South Otter Project claims that management of elk will ensure management of mule deer and whitetail deer; what science is available to indicate habitat management needs of all these species are covered by elk management?
34. There is no mapping of mule deer and whitetail deer winter ranges in the South Otter Project Area; why isn't deer winter range considered an important habitat management factor for these 2 species?
35. There are no maps provided of juniper habitats in the South Otter Project Area, even though juniper is critical for mule deer and many neotropical migratory birds.
36. There is no information provided in the project EA as to how many acres of juniper trees will be burned, or how this will impact wildlife; the desired condition for juniper habitats is never identifie4.
37. The map showing the location in the project EA for the 2 inventoried roadless areas that occur in the project area, the Kings Mountain and Tongue River Breaks, does not identify if and when any current roads and motorized trails will be used for the South Otter Project; the agency needs to provide large-scale maps that demonstrate exactly how management will affect these 2 IRAs, including any conversion of trails to roads, and any road improvements that will occur; although the agency claims no treatments will occur in these IRAs, the map shows commercial treatments are planned.
38. A stated purpose of the project is to reduce insects and disease; since these factors are critical to wildlife habitat, this contradiction in desired conditions needs to be addressed; how is wildlife diversity maintained as a desired condition when the desired condition for vegetation (no insects and disease) is the agency's objective?
39. The CG LMP has no valid conservation strategy for forested snag habitat, and as such, cannot meet the requirements of the NFMA to ensure a

diversity of wildlife; until this flaw of the CG LMP is corrected via an amendment, no vegetation management projects can be legally implemented.

40. The draft EA at 16 has a list of primary objectives for the project; none of them include wildlife; how can the desired conditions to maintain wildlife in the CG LMP be met without any wildlife objectives for the South Otter Project?
41. There are Montana Species of Concern, and Birds of Conservation Concern, that are associated with riparian areas; the CG LMP has no wildlife management objectives for riparian areas; without an amendment to the LMP, no treatments of riparian areas can legally be implemented, including the South Otter Project.
42. There is no information on the acreage and distribution of sagebrush in the project area; how many acres remain, and where are these located in the Project Area? How many acres will be burned in the project? What Montana SOC and BCC occur in these sagebrush areas, and why will burning sagebrush maintain or improve their populations, as is claimed in the wildlife report?
43. Where are the sharp-tailed grouse populations located in the project area, and how may acres of their habitat will be treated with this project? How will their habitat be maintained with the proposed treatments, and what is the current science and/or monitoring that demonstrates this outcome?
44. There is no analysis of the effects of livestock grazing on deciduous vegetation in the project area. How many acres of deciduous vegetation occur in the project area, where re these areas located? What is the current livestock utilization levels on this deciduous vegetation? Why will vegetation treatments reduce livestock use on this deciduous vegetation, and thus improve it for wildlife?
45. There have been no wildlife surveys done for the South Otter project, including for Montana SOC and USFWS BCC; the agency has not demonstrated to the public how wildlife mitigations through surveys have been designed, so that the public can review the effectiveness of these mitigation measures, including for forest raptors as well as Montana SOC and USFWS BCC.

46. The lack of current surveys for wildlife means that the South Otter project has been designed without any habitat needs for wildlife, in violation of the NFMA and the CG LMP, which has a desired condition to maintain wildlife populations; without planning via wildlife surveys, this is not possible.
47. The project EA does not define how the existing personnel, including wildlife and weed management personnel, will be able to complete the massive increased need for wildlife and weed monitoring surveys, including new weed infestations that will occur along all the new temporary roads and motorized trails; how will this be achieved by the agency in order to meet the survey and monitoring needs of the South Otter Project? If funding is not available, how will these required activities be completed?
48. The agency is planning a long-range and massive project without knowing that the funding will be available to meet implement all the mitigation measures for road management and weeds; if project funding is not ensured, how can environmental impacts be assessed?
49. What are the expected increased costs in herbicide use, and is funding ensured over the project completion?
50. There is no information provided on specifically when each sub-project area will be implemented; this is important information for the public; the agency needs to provide the public with a valid timeline for when each portion of the project area is going to be treated, when the roads will be built, when the roads will be closed, etc.
51. The agency misrepresented why an alternative requested by the public for no new roads was actually being considered (project EA at 21), when in fact expansive new roads will be constructed for the project; the agency needs to include a valid alternative that does not create any new temporary roads, including conversion of motorized trails to logging roads.
52. The agency is violating the NEPA by failing to identify that the proposed burning program, including of sagebrush and juniper, on the 28 grazing allotments that occur on 99% of the project area; prescribed burning has been a long-standing treatment to increase forage for cows; the draft EA repeatedly claims that forage will be increased for big game, without any actual science to support that claim; this project is a livestock management project, and this needs to be fully defined to the public.

53. There is no information in the project EA about each of the 28 grazing allotments; how is the proposed burning effects being incorporated into the current EAs for these grazing allotments? How will this project affect the management of these 28 allotments?
54. The EA notes that there is over-browsing of deciduous vegetation (aspen, wooded draws, cottonwoods in riparian areas) by livestock and wildlife; there is no other information provided on this; why isn't the desired condition for grazing allotments included in the project analysis, since the entire project area is being grazed by livestock? What are the objectives for these allotments, including "resilience" of deciduous vegetation to livestock use? What is the current livestock utilization levels on deciduous vegetation, and how does this meet desired conditions?
55. There is no information in the EA about prairie dogs and how they are being managed, including as a Montana SOC.
56. The draft EA at 39 again notes that forest stand densities are too high, and need to be reduced, for fire and insect and disease risks; this is a direct conflict with the CG LMP desired conditions for wildlife; this conflict is never addressed in the FEIS for the LMP or in the draft EA for the South Otter Project; at a minimum, this conflict requires that wildlife alternatives be developed in order to meet all the desired conditions of the CG LMP, instead of just the desired conditions for vegetation; otherwise the agency is arbitrarily implemented the CG LMP.
57. No surveys have yet been done for the golden eagle, northern goshawk, prairie falcon, and merlin; how has the project therefore been designed to meet the needs of these species? The agency needs to provide the results of wildlife surveys in the draft EA, so that this important information is provided to the public, including how nesting areas for raptors have been designed for protection in the project.
58. The draft EA at 41 states that elk management covers management of mule deer and white-tailed, without providing any science that supports this claim; a detailed analysis of both deer species is required for this project, including use of the Ashland Ranger District deer guidelines developed in the previous planning period, as these guidelines represent the best science for management of these deer species in this landscape.

59. The draft EA at 42 claims that forage is currently limiting to big game populations, and the increase in forage with treatments will improve big game populations; the impact of livestock grazing is never addressed; if forage for big game is limiting, why isn't a change proposed in livestock use?
60. The draft EA never defines how much of the expected increase in forage from logging and burning will be taken by livestock as opposed to wildlife?
61. Since no wildlife surveys have yet been done for raptors, how has the agency determined that current populations have not already been significantly reduced due to fires in this landscape? There is no information provided on the desired condition for raptors, and if these conditions are currently being met; it seems likely that significant adverse impacts already exist for these raptors due to past fires, and additional impacts from massive addition forest removal will certainly exacerbate these impacts; how has the agency determined existing and planned habitat impacts will not be significant for these raptors?
62. The draft EA at 42 again claims that burning and logging will increase the recovery rate of vegetation if it should burn in a wild fire; no references were ever provided for this claim, even though it is a stated purpose of the project; the agency needs to specifically define why logged and burned areas will recover faster from a wild fire than if they have not already been thinned with treatments; how has this been determined for the various vegetation communities that will be treated by this project?
63. The draft EA claims that trees are encroaching into meadows; the habitat types for these encroachment areas are never defined; it is unclear how trees can regenerate in an area if it is not a tree habitat type; what are the habitat types for these meadows, and why can trees grow there is it is not a tree habitat type?
64. The management of goshawk habitat is not actually defined as per maintaining habitat conditions; please provide what the habitat objectives are for the nesting, postfledging and foraging areas; where are each of these areas currently for goshawks in the South Otter Project Area, and how will these 3 areas be changed with the project?
65. How many goshawk territories were lost due to fires in the South Otter Project Area, and what impact has this had on the local population?

66. The draft EA at 44 states that impacts to migratory birds would be too minor to affect their populations; since there is no actual analysis of impacts of treatments on hundreds of thousands of their habitat, this conclusion is invalid; it is also a violation of the Administrative Procedures Act (APA) because it is completely implausible.
67. Again, we would like to note that due to any surveys for any raptor species, the sharp-tailed, as well a Montana SOC and USFWS BCC, there is no action alternative for any of the 9 opportunity areas that include the CG LMP desired condition for maintaining wildlife, as is required by the NEPA as well as the extensive issues that have already been identified to the agency for other projects immediately adjacent to the South Otter Project, including the Ash Creek Fire and Three Mile logging/burning projects.
68. The draft EA at 44 states that the projects would create a mosaic of structural stages, but these are not actually defined, or why the revised conditions will promote wildlife, including big game and migratory birds.
69. The draft EA at 45 states that the project will create temporary impacts on security for big game, and that these impacts will eliminated once the projects are complete; this is demonstrated in Table 11 defining secure areas for each opportunity area; the agency is violating the NEPA by providing a false definition of elk security, where no cover is required; as such, there is no valid analysis of project impacts on elk security; this failure also creates a violation of the CG LMP, which requires that security habitat be managed to promote big game species; if it is not measured correctly, it cannot be managed.
70. Even by the invalid definition for security, the agency notes that the false security areas in the South Otter project will be reduced from 29% to 19%; there was no amendment to the CG LMP to allow this violation.
71. The draft EA notes that a minimum of 30% security is recommended by biologists as per the Hillis Paradigm; the claim that the project area nearly meets this level, at 30%, in a misrepresentation of habitat conditions to the public; there is no possible way the project area contains 29% security; 66% of the project area is openings, which means at best, there is only 33% cover of any type; the potential that almost all this cover exists in blocks of at least 250 acres is extremely unlikely; it appears that there is almost no

valid security in the project area, and this needs to be correctly defined to the public, as is required by the NEPA.

72. Elk calving areas are not mapped, even though there is an ongoing elk research project in this landscape; elk calving and nursery areas need to be mapped in order that they can be managed as is required by the CG LMP.
73. The draft EA at 47 claims that logging and burning will increase forage for big game, even though 66% of the area is already open; there is no analysis to define why the emphasis for big game is forage management, when the current levels of hiding cover are stated to be only 27%, and actual valid security is likely almost nonexistent as per the Hillis Paradigm, or more recent published science; what analysis has demonstrated that forage is the primary management need for big game, instead of security?
74. The draft EA at 47 states that road activity from the South Otter and other 2 planned projects (Ash Creek and Three Mile) will not create any significant cumulative effects on elk; however, there was no analysis provided on the habitat effectiveness levels and security in these 3 project areas during implementation; so there is no actual basis for this claim.
75. With over half of the Ashland Ranger District being burned in wild fires in the last several decades, it is not clear in the South Otter NEPA analysis as to why dense older forest stands are outside the HRV, and need to be reduced; where is the data for this conclusion? Where has the HRV for dense ponderosa pine stands actually identified in the draft EA? What is the current level of dense ponderosa pine forest, what was the historical level of dense ponderosa pine forests, and how will the project move the area to HRV for dense forests?
76. Table 13 of the draft EA notes that only 32,000 acres in the 292,000 acre project area have forest stands with a canopy cover level of 40-60%; this is only 11%; the analysis never defines why this prevents the landscape from meeting the desired conditions for wildlife as per the CG LMP; why does this condition create adverse habitat conditions for wildlife?
77. Given that only 32,000 acres of the project area, or 11%, provide hiding cover based on canopy cover, it is clear that big game security cannot possibly be 29%, as is falsely claimed by the agency in Table 11.
78. The section of the EA on fuels and fire behavior suggest that fuels are the driving factor in wild fires, and thus the South Otter project requires

reduction of fuels; the references for fire cycles were outdated, with no more recent science cited after 2002, or 20 years ago; we have provided a summary of science, over past and more recent reports/publications, that do not support the agency's proposed action to log and burn to reduce fire risk, fire spread and fire intensity; NEPA requires a discussion by the agency of conflicting science presented by the public; this is required for the South Otter project on the information we have submitted as per the John Muir report of 2022.

79. The draft EA at 51 notes that the area is sparsely population; this means that most of the project area is not a WUI, where protection of privates areas of interface and intermix communities within 1.5 miles of the Forest Service boundary are needed for protection of private property and lives.
80. The current best science on fire cycles in ponderosa pine forests and savanna need to be correctly provided.
81. Rocky mountain juniper is a highly valuable tree for wildlife; there is no analysis of how burning of this tree will impact wildlife, including a number of Montana SOC and USFWS BCC, as well as mule deer; the draft EA at 55 defines this highly valuable tree species as a "fire risk" that needs to be removed, without any analysis of how it will impact wildlife.
82. Although the agency claims the project is required to achieve the HRV, there is no information ever provided as to why the various vegetation types exceed fuel levels as per that habitat type, and thus are creating unnatural conditions for fuels and hence fire risk; the public is not provided with any actual information as to why existing fuel levels have increased above those that occur within the given habitat type; as per the NEPA, the basis for unnatural fuel levels present in various habitat types in the project area need to be provided; also, once the area is logged or burned, how will vegetation volume, including basal area, correspond to these conditions as per habitat type?
83. Again, the draft EA at 56 discusses that treatments will improve resilience, but the criteria for existing and proposed resilience are never provided to the public; so the public cannot assess the validity of this claim, even though it is one of the main purposes of the project; current and corrected levels of resiliency for the various vegetation types need to be provided to the public as is required by the NEPA.

84. The draft EA at 60 states that use of motorized trails for project implementation states that public use will remain the same as current; as such, how will these motorized trails be managed for elk security, since they will not eliminate public use during project implementation?
85. The draft EA at 62-63 states that the project will have no significant impacts; this would include direct, indirect, and cumulative; there was no actual analysis ever completed, however, as to direct, indirect, and cumulative impacts on wildlife, including Montana SOC, USFWS BCC, habitat effectiveness, hiding cover, and big game security, including due to the combined connected landscape impacts of three projects:

Ash Creek Fire Project: 110,273 acre project area.

Three Mile Project: 32,924 acre project area

South Otter Project: 292,000 acre project area

Total connected acres: 435,197 acres, 680 square miles

Ash Creek Fire Project: 110,066 treated acres

Three Mile Project: 7,175 treated acres

South Otter Project: 226,196 treated acres

Total treated Acres: 343,437 acres, 537 square miles

The claim that the direct, indirect and cumulative impacts on wildlife will be insignificant for treatment of 226,196 acres in the South Otter Project (253 square miles of modification of wildlife habitat), and that the cumulative impacts of treatment on 343,437 acres, or 537 square miles from the combined connected treatment landscape of all 3 projects, will not have any significant adverse impacts on wildlife is never supported with any analysis and as such is a violation of the NEPA.

Silviculturist Report for the South Otter Project

1. This report at page 1 recognizes Pfister et al. (1977) that defines forest habitat types. Yet there is no identification of forest habitat types for any of the proposed treatments, including "encroachment" into meadows and draws. The term encroachment is invalid, as if trees can grow there, these are a forest habitat type, and trees are not "unnatural" and have to be removed.
2. The report at page 1 states that stand density is an indicator of forest health; in many respects, this is actually true for wildlife, given that a large number of birds require relatively dense forest stands; claiming that such high quality habitat for birds indicates poor forest health is a clear demonstration that the South Otter Project is just a logging and burning project, with no planning for wildlife.
3. Figure 1 in the repo9rt at page 2 is unreadable; this is not providing important information to the public; the public should not have to use a magnifying glass to understand project maps.
4. Table 1 of this report notes that dense forest habitat, with a canopy cover over 60%, are "deficient" in the project area; as such, it is unclear why almost all remaining forest stands needed to be thinned to achieve HRV.
5. The report at 4 notes that due to past fires, there is an under-representation of large trees; somehow, logging more large trees will increase their representation, but how logging will increase the number of large trees in the project area is never defined; the public needs to know how logging big trees will increase their representation in the project area.
6. The report at 4 states that dense forest stands are an overall forest health risk due to the potential for insects and disease; it is not clear how the agency has determined that birds don't eat insects, or use dead trees for nesting; it is unclear why wildlife forage and nesting habitat create unhealthy forests; this needs to be explained to the public.
7. Surely, with 66% of the project area being recently burned or grasslands, it is not clear how the remaining forests are at a high risk for insects and disease; apparently all mature dense forests will have to be removed so that they cannot die of insects and disease.

8. The report claims that trees will be saved by killing a significant number of them so that they don't die of insect pests; however, there is no analysis that defines what the expected mortality will be of trees from insects and disease, versus what the mortality level will be from logging; this comparison is important to provide good information to the public.
9. This report at 5 states that large blocks of closed forests need to be broken up and reduced to achieve HRV; this seems to claim that this landscape never had viable populations of a large number of forest birds who require older forest interior habitat; how was this determined?
10. Given that a large percentage of the project area has burned and older dense forests are only about 11% of the landscape, it is unclear why such habitat is overrepresented in the project area and needs to be reduced as per large tracts of denser forests; why is 11% too high for HRV?
11. The report at 5 also repeats the CG LMP projection that saving a few large trees in forests is sufficient to provide wildlife habitat and potential late seral forests; what is not addressed is why these stands do not currently provide late seral forest habitat for wildlife, or why logging out many of the bigger older trees will improve the development of old growth as opposed to not logging and removing these trees; it is unclear how this can actually be done, and needs to be defined more clearly to the public.
12. This report at 5 notes that the CG LMP direction for old growth in ponderosa pine savanna is 1-6%, while the current condition is stated to be 3%, although there is no old growth in the South Otter project area; the CG LMP does not define why as little as 1% old growth will provide viable populations of associated species; the CG LMP is clearly in violation of the NFMA because there are a number of Montana SOC and USFWS BCC that require old growth habitats for viability, including up to 20-25% old growth; providing as little as 1% ponderosa pine old growth ensures nonviable populations of a considerable number of wildlife species, in violation of the NFMA.
13. The South Otter Project does not provide any information as to how the CG LMP snag guideline will be met; simply saying a project will implement the LMP does not qualify as a NEPA analysis.
14. The CG LMP snag direction is invalid, and outdated by over 30 years; there was no analysis in the Final Environmental Impact Statement (FEIS) for the

CG LMP to demonstrate that previous LMP direction, which was generally being carried forward into the new LMP, ensured persistence of associated wildlife; the FEIS did not provide any analysis as to why the snag direction in the new LMP would meet the needs of wildlife; retaining some snags in harvest units is not a valid conservation strategy for wildlife, and as such, the CG LMP is in violation of the NFMA by failing to ensue this large group of wildlife will be maintained as viable populations on the CG; until an amendment is completed for this LMP, no vegetation treatments can be legally completed on the CG, including the South Otter Project.

15. There are so many "exceptions" to the CG LMP snag direction that even the retention level of snags in harvest units could not have been determined in the FEIS; in effect, no actual snag numbers are required on the CG in harvest units; so this guidelines cannot be used to measure impacts on associated wildlife, because the direction is actually optional.
16. This report at 6 repeats the CG LMP direction that old growth forests can be logged to increase their "resilience." The CG LMP does not provide any science to indicate that logging protects old growth forests from fire, or promote recovery after fire; the CG LMP also does not provide any analysis that shows logging old growth will retain its wildlife values; logging old growth is to promote timber production, not wildlife habitat; this needs to be correctly identified in the CG LMP FEIS.
17. The required number of large trees to be retained in harvest units also has exceptions for this guideline; the South Otter project does not define how the direction for large trees and snags will be applied to each logging unit, and whether or not exceptions will be allowed.
18. Figure 4 in this report at 8 is unreadable as per canopy cover levels in the project area.
19. The report at 8 states that there is an overabundance of older forest stands in the project area that have reduced growth and vigor due to maturity and dense canopies (40-60%); Table 2 shows there are 32,000 acres of forests with a canopy cover level of 40-60%; this is 21% of the 155,000 acres in the project area capable of forest vegetation; the HRV for older, dense stands is never provided, however; it is unknown how historical levels of older forests with higher canopy levels compare to current conditions.

20. The report at 9 claims that the project will promote wildlife by creating a diversity of forest age classes; yet there are only 32,000 acres of older, dense forests (40-60% canopy cover) in the project area (Table 2); this is only 11% of the project area; yet there will be commercial thinning of 26,350 acres; this is almost all of what remains of denser older forest habitat; older dense forest habitat will be reduced to less than 2% of the project area, and only 3.6% of potential forest vegetation; it is unclear why almost total elimination of this type of habitat represents an increase in habitat diversity for wildlife or as well, an indicator of landscape health; why is the almost total lack of older, more dense forests habitat an indicator of good forest health?
21. Figure 5 of this report shows what is clearly an old growth ponderosa pine forest; this stand is proposed for thinning and burning to protect it from insects and disease and fire; this will also increase the vigor of remaining trees; logging this old growth will be to promote timber production.
22. Figure 6 of this report also shows an old growth ponderosa pine forest which is proposed for thinning; this thinning will supposedly "re-introduce disturbance and contribute to the structure and function desired on these sites;" this is a good example of the CG LMP direction for old growth, in that it can be logged to achieve objectives other than wildlife, which means it is not actually being provided for wildlife; this lack of any requirements to provide wildlife old growth in the CG LMP is not identified to the public, not were the impacts of this strategy ever evaluated in the CG LMP FEIS; thus the effects of the CG LMP on old growth habitats, and associated wildlife species, remains unknown, and undisclosed to the public; any treatments in old growth stands are thus illegal until this lack of analysis and disclosure to the public is rectified via a Forest Plan amendment
23. Figure 7 in the report at page 12 is unreadable.
24. The report at 12 states that the lack of fire in this landscape has contributed to the presence of insects and disease; since a large percentage of this landscape, as well as on the Ashland Ranger District, has recently burned, it is not clear how the fire cycle has been interrupted.
25. This report at 13 states that logging forest stands will increase their resilience to disturbance; logging is a disturbance; so the agency is claiming that disturbance is required so that forests can withstand disturbance; it is

unclear how a forest stand can recover from 2 disturbances faster than it could recover from one disturbance; the science behind this claim was not provided; the agency needs to define how recovery is being measured, and provide examples of how logged versus unlogged forest stands attained this recovery faster.

26. The report at 13 acknowledges that old growth stands will be logged; the level of old growth in the landscape is unknown, but largely nonexistent (small patches of 5-20 trees); the agency claims that HRV for old growth cannot be determined; given this, how is HRV for old growth being established as the desired condition? The desired condition for old growth is never identified; post project, old growth will be further reduced to potentially non-existent levels; yet the agency claims a purpose of the project is to develop a diversity of age classes; large tree habitat is not consistent with old growth habitat; this was never demonstrated in the CG LMP FEIS.
27. The report at 13 claims that logging will "benefit" old growth by promoting the growth of remaining trees; this acknowledges that old growth on the CG is being managed for timber production, not wildlife; again, as we noted previously, this was never disclosed in the CG LMP FEIS; an amendment is required to disclose this important management strategy to the public, as well as to evaluate the impacts on a host of old growth-associated wildlife.
28. The report at 14 states that trees may die if stand densities are not reduced; but to reduce stand densities, trees will die; no comparisons are ever provided as to how many trees will die in either case; it is unclear why more trees will be saved with logging than due to insect infestations; since this is a stated purpose of treatments, this issue needs to be fully evaluated and disclosed to the public; which process kills more trees, and why is this a forest benefit?
29. The impacts of natural mortality versus logging mortality on wildlife are never addressed in this report; natural mortality retains trees, while logging mortality removes the trees; the effects on wildlife from these two methods of forest management are hugely different, but are not recognized in this report.
30. The report demonstrates that the function of managing forests is to maximize timber production, with almost no considerations for wildlife; this

project exemplifies implementation of the CG LMP, which lacks any viable strategy for wildlife.

31. The report at 14 states that the treatments are intended to reduce insects and disease to promote tree vigor; this is a timber production objective, which indicates that the claim that desired conditions will restore HRV are not actually intended; this explains why the HRV for the project area is never actually defined; it is not an actual desired condition, as is falsely claimed by the agency.
32. The report at page 15, including Table 4, also indicates that the claim that the desired conditions are to achieve HRV are false; the objectives of the project are to promote timber production, not achieve HRV; timber production is being promoted by reducing insects and disease, and reducing stand densities.
33. The claims that this project is being implemented to achieve HRV is also demonstrated to be false because the historic level of denser mature forest in this landscape is never identified; why is 11% dense forest too high as compared to HRV? What needs to be done to achieve HRV? This information is never provided.
34. Figure 8 shows the level of smoke that is created from prescribed fire; the effect of this smoke on forest birds is likely severe; these costs of burning to achieve HRV are never addressed in the CG LMP FEIS, even though these impacts may be severe across burned landscape and migratory bird populations.

Project Wildlife Report

1. This report at 4 states that the goal of the project is to improve wildlife habitat along with restoring the NRV of forests and grasslands, so that they can recover from disturbances (after they are disturbed by agency management actions; the project is being implemented to establish "desired conditions," but what these are for wildlife, and why this would improve wildlife habitat, is never defined.

2. The percent of land cover by forests in the project area has been reduced from about 50% to about 25% due to fire; how this compares to HRV is never identified.
3. This report at 6 states there is an opportunity to benefit wildlife habitat while at the same time managing for fuels and fire hazard; specific wildlife benefits are not identified.
4. A desired condition for wildlife management is attaining the NRV as per the CG LMP; however, why HRV promotes wildlife and habitat is never defined in the LMP FEIS.
5. There is a desired condition for wildlife to promote habitat security.
6. Again the wildlife report at 7 states that providing HRV ensures maintaining viable populations of wildlife; the FEIS for the CG LMP never defined how this would be achieved, however.
7. The wildlife report at 8 notes that the Bald and Golden Eagle Protection Act requires that breeding activities and productivity not be substantially interfered with; this would be prevented for the golden eagle if nest sites are identified and buffered at a half-mile; no surveys have been done for this Montana SOC, so buffering of nest sites has not been achieved to date.
8. Ponderosa pine forests represent 33%, or 108,000 acres of the project area; how this compares to the desired conditions, or HRV, is never defined, even though the purpose of the project is to achieve HRV.
9. The report at 9 states that insects and disease levels are higher than desired in dense forest stands; reducing densities is a direct conflict with migratory birds; the CG LMP FEIS does not address how this conflict is to be resolved as per HRV; an HRV with little to no insects and disease in forest stands will not provide habitat for the large number of wildlife species that depend upon insects and snags as habitat; thus the Desired condition for forests cannot achieve the desired condition for wildlife; how these opposing desired conditions is resolved at the project level is never defined in the CG LMP.
10. Table 1 of this report shows that the desired condition for dense mature forest is 5-25%, while the existing condition in the project area is 2%; the NEPA documents do not define why the project will achieve HRV by reducing dense forest habitat below estimated HRV.

11. The agency has not defined why the desired HRV for large trees is 55-95%, (Table 1) but the existing condition for large trees is 6%; how can logging increase the acreage of large trees to meet RNV?
12. This report at 9 states that the purpose of the project is to provide wildlife habitat for diverse species by imitating RNV; yet the proposed treatments will depart further from HRV for large trees and dense forest stands; so this claim is false.
13. The wildlife report at 10 notes that 47% of the Ashland Ranger District has burned in recent years, reducing forest cover by 47%; wildlife habitat will also have been reduced for wildlife species that use dense green forest habitat, as well as hiding cover required for security.
14. Again, the report at 10 states that the purpose of the project includes the need to improve or maintain wildlife habitat; nowhere in the report or draft EA does the agency define what habitat for what species will be improved with the project, so this is an unsupported claim, and a misrepresentation to the public of the need for the project.
15. The silviculture report at 9 shows there are 32,000 acres of more dense forest (40-60% canopy cover) in the project area; the wildlife report at 11 shows there will be 26,346 acres of commercial harvest; thus most of the dense forest habitat that remains after fires will be removed with logging; the impacts on a large number of wildlife species that require denser forest habitat, including Montana SOC and USFWS BCC are never defined; it is also never define as to why this extreme departure of RNV is consistent with the claimed purpose of the project.
16. After logging, prescribed fire will be use to burn up coarse woody and understory trees; this will exacerbate the habitat loss for wildlife from large tree removal; it is unclear how this benefits wildlife habitat.
17. Commercial thinning will b done to reduce stand potential for bark beetles; the wildlife report does not define why this is habitat improvement for wildlife.
18. The wildlife report at 13 clearly notes this is a logging project, with RNV used as a cover; it is noted that the purpose of reducing tree density is to concentrate growth on remaining trees; this would promote timber production, but not wildlife.

19. The wildlife report at 13 claims that aspen and other deciduous trees in woody draws will be improved with logging; it does not define why logging will reduce the adverse browsing impacts of livestock.
20. The wildlife report notes that one purpose of the project is to remove trees from meadows; given that only 33% of the project has trees, it is not clear why further reduction is needed for wildlife or to achieve RNV; no information on this was provided.
21. The report notes that maintenance burning of past burned areas will be done to reduce fuels; it is not clear how this would benefit wildlife or address fires; it is more likely that these burns are being done to improve access for livestock; it is also not clear why this is required to achieve RNV; apparently burned trees did not occur historically in wild fires.
22. Riparian areas will be burned; no information is provided as to why this is needed for RNV or for wildlife, including Montana SOC and USFWS BCC.
23. The wildlife report at 14 states that burning sagebrush will occur to "restore" and enhance habitat for wildlife; the wildlife species that will be restored or enhanced are not defined; this will be highly detrimental for a host of Montana SOC and USFWS BBC, so it is not clear why this represent habitat management for these species.
24. The wildlife report at 14 states that after logging, big game security will return to pre-project levels once roads are closed; this requires that security does not require hiding cover; the reference for the lack of a cover requirement in big game security was not provided in the wildlife report.
25. The wildlife report at 15 notes that the CG LMP concluded that management of the forest at RNV will maintain all wildlife species; there was never any analysis for this claim in the associated FEIS, so it is an unsupported claim that cannot be carried forward into site-specific projects without substantiation at this project level; no such substantiation occurred for the South Otter Project, however.
26. The wildlife report at 16 notes that the Montana Natural Heritage Program was used to search for occupancy of various wildlife species in the South Otter Project; however, the Montana SOC identified by this Natural Heritage Program, and the Montana Department of Fish, Wildlife and Parks, were not used for the project; since the 2012 planning rule requires that species of conservation concern have individual conservation programs

established in the LMP, the many Montana SPC and USFWS BCC need to have conservation strategies included in the LMP; without these conservation strategies, site-specific projects, such as South Otter, are in violation of the 2012 planning rule; the CG LMP needs to be amended to include conservation strategies for a host of Montana SOC and USFWS BCC before any further vegetation projects are implemented, including the South Otter Project.

27. The wildlife report notes that the web site for the Montana Natural Heritage Program is the repository for the best available information regarding species distributions; yet the agency does not use the SOC identified by this program; the rationale for not using these SOC was never defined in the CG LMP or associated FEIS; the reasons why the SOC identified in the Montana Natural Heritage Program are invalid was never identified by the CG in the LMP and associated FEIS.
28. The CG LMP does not include any desired conditions for wildlife; so there is no basis for managing wildlife in this geographic area; the lack of any desired conditions for wildlife in this landscape is unknown, and was not addressed for the South Otter Project.
29. The wildlife report at 18 notes that the 2012 planning rule requires species-specific plans for wildlife whose needs are not met by the coarse filter approach(i.e., species of conservation concern); this clearly includes Montana SOC and USFWS BCC, which are identified as "species of conservation concern"; however, none are identified in the CG LMP or for the South Otter project, in violation of the 2012 planning rule.
30. The wildlife report at 19 states that forest cover in the project area is roughly 27%.
31. The wildlife report at 20 states that maintaining forest resiliency Is a critical component of maintaining and improving wildlife habitat; why this is so is never defined, however; how resiliency is measured is never defined, along with the scientific references the definition is based on; since it cannot be measured, changes in resiliency for the project area unknown, including why these changes are critical for wildlife.
32. The guideline regarding wildlife security does not actually define a guideline, other than some level of security will be present.

33. The standard claim that a "mosaic" of sagebrush age classes is needed for wildlife is cited in the wildlife report at 21; no references were provided including this need by Montana SOC and USFWS BCC.
34. There are no conservation strategies identified for various bats that are Montana SOC; given the extent of proposed logging, the impacts to bats are unknown but likely severe.
35. There is no information on the ongoing impact of livestock on cottonwoods, aspen, or green ash, or shrubs in riparian habitats; how can management of vegetation be done without any monitoring basis for ungulate browsing and damage? Why isn't livestock management of these woody plants a part of this RNV program? Do current conditions of these woody plants resemble historical conditions? It is highly unlikely that they do, but this is never addressed in the proposed project. The wildlife report at 23 notes that browsing of woody vegetation by wildlife and cows is a problem, but this problem is not measured nor are any actions recommended for correction.
36. The claimed wildlife surveys that will be done for the project assume a 100% detection probability will occur, but since these surveys have not yet been done, their effectiveness to the public is unknown; the public needs an opportunity to review wildlife surveys to get an understanding of the quality of these surveys, as well as where wildlife currently occur in the project area, including bat roosting areas and hibernacula.
37. The wildlife report at 25 states that buffers for nesting raptors will be based on the current best science; however, what these are, and the science they are based on, is never provided to the public; surveys and mitigation measures, including project designs, need to be provided to the public during project planning, not once a decision is made; post—project survey and mitigation information essentially removes the public from this process, in violation of the NEPA.
38. The agency needs to provide maps of all locations of golden eagle, goshawk, prairie falcon, and merlin nesting sites to the public prior to a decision being made; such information also requires mapping and descriptions of mitigation measures that have been established for these nesting sites.

39. There was no conservation strategy defined for the goshawk, a Montana SOC; given the loss of forests due to past fires, remaining forest habitat will be critical to goshawk persistence; the current best science (not agency white papers as Brewer et al, define management requirements for goshawk territories; these requirements need to be implemented for the South Otter project in order to meet the requirements of the 2012 planning rule.
40. The provision of wildlife survey results during project planning is important information to the public as it defines what current wildlife conditions are in the project area, and as well, how wildlife occurrences were considered in project designs.
41. The wildlife report at 26 states that a 420 acre buffer will be established in goshawk postfledging areas "if PFA characteristics are found to be limiting." What does this mean? This indicates that PFA requirement as defined by the current best science need to be defined for goshawk breeding territories, but these are never actually defined. It is not clear how goshawk territories will be managed to ensure persistence.
42. Logging will be detrimental to goshawks by eliminated prey species. Yet almost all the dense forest habitat in the project area is slated for logging. It is clear there are no actual conservation measures being implemented for this Montana SOC, in violation of the 2012 planning rule.
43. The wildlife report does not identify any management actions for forest raptors other than a buffer area during nesting; what about these nesting areas outside of the nesting period; are they going to be retained, and if not, how does this promote their persistence?
44. The wildlife report at 27 recognized the classification of Montana SOC; however, none of these are actually identified or evaluated for the South Otter Project, other than the goshawk; it is unclear why Montana SOC are bit considered as species of conservation concern that require specific management direction, as required by the 2012 planning rule.
45. There is no analysis of migratory birds, many which are in decline; this is a violation of the Migratory Bird Treaty Act (MBTA), which requires assessments of project impacts on these species.

46. The silviculture report has Figure 8 showing how prescribed burning creates lots of smoke; yet there is no analysis in the wildlife report of EA as to how burning affects birds, given that smoke is highly toxic to bird.
47. The wildlife report notes that burning will occur outside the general nesting season for birds, although this appears to be optional; in nturn, there is no such restriction for logging; what is the basis for this difference?
48. There is no estimate of the number of birds that will be killed with logging and prescribed burning; this impact needs to be defined to the public, and s well, measured as per the level of impact on birds as per the MIBTA.
49. What is the management strategy for sharp-tailed grouse in the South Otter Project Area? Will their habitat be burned, and if so, why? What research indicates burning improves their habitat, including shrubs.
50. The wildlife report claims that attainment of the RNV will provide viable populations of all wildlife species; the collaborative recommendations for elk appear to be the citation, which is inaccurate; we are not aware of any actual analysis completed anywhere to demonstrate RNV maintains all wildlife species.
51. The wildlife report repeatedly claims that burning will increase forage for big game, and thus benefit big game; the impacts of burning on mule deer and whitetailed deer are not specifically defined; the Ashland deer guidelines are not referenced as to how improvement will occur for mule deer and whitetailed deer; the 2013 collaborative study with the Forest Service and MFWP do not make this claim, but instead say forage will be reduced late summer due to desiccation in openings; the 15 year Montana elk logging study also reported that clearcuts do not benefit elk by creating forage; the basis for this claim for South Otter was never cited; in turn, given that security and hiding cover are severely limited in the Project Area, it is not clear why the agency has determined for forage for big game is the primary management concern; it is not clear why grazing levels of livestock were not addressed in regards to forage needs for wildlife.
52. The wildlife report at 30 notes there is an ongoing elk research project being implemented in the landscape of the South Otter project; as such, why aren't elk calving and nursery areas mapped? Where are elk using security areas in the fall hunting season? Are they leaving the national

forest for adjacent private lands? The current information available for this research project needs to be included in the wildlife report.

53. The wildlife report at 30 cites increasing elk numbers as good habitat management in this herd unit; this is a clear misrepresentation of management impacts on elk; the lack of security on public lands causes elk to move to private lands in the hunting season, where population control is limited; increasing elk populations are an indicator of a lack of security, not good habitat.
54. The wildlife report at 30 notes that mule deer management was not evaluated because it was covered by elk management; this is not possible, given the mule deer have an average home range size of up to 500 acres, while the average home range size of elk is up to 10,000 acres or more; mule deer are highly dependent upon local forage and cover conditions, as was noted in the Ashland deer management guidelines; these guidelines need to be used to evaluate project impacts on mule and white-tailed deer, unless they have been updated and revised, in which case the revision should be used.
55. Winter ranges for mule deer need to mapped, defined, and managed as per the Ashland deer management guidelines.
56. There is no analysis of elk displacement to private lands in the hunting season, even though this is a problem recognized in the collaborative recommendations developed by the HLC/CG and MFWP; this issue needs to be fully evaluated, along with projected project and cumulative impacts for all projects proposed on the Ashland Ranger District.
57. The wildlife report at 32 attempts to get away from the hiding cover requirement of Hillis; it is true some security is enhanced by topography, but Hillis clearly defines security as "contiguous blocks of forest cover." The type of forest in these cover blocks does not matter; the failure of the agency to evaluate project impacts on security by accepted methodology means that no valid analysis has been done, in spite of elk security being a well-documented public issue.
58. The wildlife report noted that road impacts on elk is important, but there was no analysis of habitat effectiveness for elk based on planned motorized route densities for this project; it is likely that severe displacement impacts

will result, which can be classified by HE recommendations as significant adverse impacts on elk if HE is below 50%.

59. There is no analysis of how the project will impact hiding cover for big game; it is clearly severely limited in the project area, at 24%, and will be reduced down to 11%; it is not clear why this impact is not evaluated, as it appears to be highly significant as per impacts on all big game species except maybe antelope; there is no analysis of why burning sagebrush will benefit antelope.
60. The wildlife report at 33 notes that juniper provides important cover for big game, but juniper will be burned in this project; the amount of hiding cover to be removed by burning juniper is never identified.
61. It is not clear how the CG LMP guideline to maintain the functionality of key big game habitats, which would include winter range, will be met with the South Otter project; winter ranges are not mapped or evaluated.
62. A guideline in the CG LMP requires that security habitat not be reduced when it is limiting in the project area; for the South Otter project, security will be reduced from an claimed 29% to 19%; actual levels of security are unknown, as are likely reductions; security may be close to zero, and certainly will be zero after project implementation.
63. There is no analysis made between the proposed loss of security from logging and roads and elk displacement and loss of public hunting opportunity; what amount is elk displacement expected to increase from this project, and why isn't this considered significant?
64. Figure 1 in the wildlife report clearly shows that the measurements of elk security are invalid, as hiding cover is not included; this method eliminates the agency's need to consider the importance of hiding cover in the management of security, in violation of the NEPA.
65. The analysis of unit impacts is not provided to the public; the wildlife report at 38 states that post-project hiding cover levels cannot be determined; it is not clear why this is the case; impacts on canopy cover can be identified, and the wildlife report uses canopy cover as a measure of hiding cover.
66. Suitable hiding cover, or stands with a 40% canopy, are only 12% of the project area; claims that canopy cover down to 10% provide hiding cover for big game were not supported with any peer-reviewed reports; research that has identified lower canopy stands (down to 13%) as elk cover also

noted that much greater distances from active motorized routes are required. If low canopy stands are going to be claimed to -provide elk security, the distance of roads of these types of stands also needs to be applied.

67. Figure 2 in the wildlife report is unreadable.
68. The wildlife report at 42 states that losses of big game security are temporary, because of roads; again, the agency's invalid measure of security, where cover is not included, allows this false claim to be made; logging impacts and loss of hiding cover will not be temporary, unless this is defined as 20 or more years; during the interim, security will be reduced.
69. We request that the agency provide examples of forest stands with various canopy cover levels, to demonstrate the hiding cover value of these stands for big game.
70. The design feature to maintain hiding cover along open roads is not specifically defined; where does this cover exist? What road mileage of the total mileage can this measure be provided? Will it make a significant difference on project impacts to wildlife along the vast road mileage to be required for this project?
71. The level of hiding cover has in fact been identified for big game, which is 66% good levels, and under 33% as poor hiding cover by the 15 year elk logging study; it is not clear why this long-term research result could not define good hiding cover for elk; it is clear that the South Otter project area has very poor hiding cover for big game, at only 24%.
72. The wildlife report again notes at page 46 that juniper will be burned in forest stands, and likely elsewhere; this impact on migratory birds and mule deer is never evaluated; how many acres of juniper will be removed, and what is the estimated habitat loss for wildlife? Why is this habitat loss not considered to be significant?
73. If calving, fawning and nursery areas change every year, how will these be identified and managed?

Conclusion

Given that the South Otter Project will impact 226,196 acres of wildlife habitat, that the Three Mile project will impact 7,175 acres of wildlife habitat, and the Ash Creek Fire Project will impact 110,066 acres of wildlife habitat, along with almost half of this landscape being already burned by wild fires, it is difficult to determine how the agency has concluded that these impacts on wildlife have not been significant; the agency needs to define how planned changes of wildlife habitat over 537 square miles will not affect any wildlife species in this landscape.

Given that the CG LMP is in violation of the 2012 planning rule by failing to provide conservation strategies for at-risk wildlife, and a failure of this LMP to make a single connection between attaining RNV and desired conditions for vegetation with providing viable populations of any wildlife species, this LMP cannot be legally implemented in any site-specific projects. Until this LMP is amended to address these severe flaws, no site-specific projects can legally be implemented.

Regards,

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"Fuel Reduction" Logging Increases Wildfire Intensity

A large and growing body of scientific evidence and opinion concludes that commercial thinning and post-fire logging/clearcutting makes wildfires spread faster and/or burn more severely, and this puts nearby communities at greater risk.

Morris, W.G. (**U.S. Forest Service**). 1940. Fire weather on clearcut, partly cut, and virgin timber areas at Westfir, Oregon. Timberman 42: 20-28.

> "This study is concerned with one of these factors - the fire-weather conditions near ground level - on a single operation during the first summer following logging. These conditions were found to be more severe in the clear-cut area than in either the heavy or light partial cutting areas and more severe in the latter areas than in virgin timber."

Countryman, C.M. (**U.S. Forest Service**). 1956. Old-growth conversion also converts fire climate. Fire Control Notes 17: 15-19.

> "Although the general relations between weather factors, fuel moisture, and fire behavior are fairly well known, the importance of these changes following conversion and their combined effect on fire behavior and control is not generally recognized. The term 'fireclimate,' as used here, designates the environmental conditions of weather and fuel moisture that affect fire behavior. It does not consider fuel created by slash because regardless of what forest managers do with slash, they still have to deal with the new fireclimate. In fact, the changes in wind, temperature, humidity, air structure, and fuel

moisture may result in greater changes in fire behavior and size of control job than does the addition of more fuel in the form of slash."

"Conversion which opens up the canopy by removal of trees permits freer air movement and more sunlight to reach the ground. The increased solar radiation in turn results in higher temperatures, lower humidity, and lower fuel moisture. The magnitude of these changes can be illustrated by comparing the fireclimate in the open with that in a dense stand."

"A mature, closed stand has a fireclimate strikingly different from that in the open. Here nearly all of the solar radiation is intercepted by the crowns. Some is reflected back to space and the rest is converted to heat and distributed in depth through the crowns. Air within the stand is warmed by contact with the crowns, and the ground fuels are in turn warmed only by contact with the air. The temperature of fuels on the ground thus usually approximates air temperature within the stand."

"Temperature profiles in a dense, mixed conifer stand illustrate this process (fig. 2). By 8 o'clock in the morning, air within the crowns had warmed to 68° F. Air temperature near the ground was only 50°. By 10 o'clock temperatures within the crowns had reached 82° and, although the heat had penetrated to lower levels, air near the surface at 77° was still cooler than at any other level. At 2:00 p.m., air temperature within the stand had become virtually uniform at 87°. In the open less than one-half mile away, however, the temperature at the surface of pine litter reached 153° at 2:00 p.m."

"Because of the lower temperature and higher humidity, fuels within the closed stand are more moist than those in the open under ordinary weather conditions. Typically, when moisture content is 3 percent in the open, 8 percent can be expected in the stand."

"Moisture and temperature differences between open and closed stands have a great effect on both the inception and the behavior of fire. For example, fine fuel at 8-percent moisture content will require nearly one-third more heat for ignition than will the same fuel at 3-percent moisture content. Thus, firebrands that do not contain enough heat to start a fire in a closed stand may readily start one in the open."

"When a standard fire weather station in the open indicates a temperature of 85° F., fuel moisture of 4 percent, and a wind velocity of 15 m.p.h.--not unusual burning conditions in the West--a fire starting on a moderate slope will spread 4.5 times as fast in the open as in a closed stand. The size of the suppression job, however, increases even more drastically."

"Greater rate of spread and intensity of burning require control lines farther from the actual fire, increasing the length of fireline. Line width also must be increased to contain the hotter fire. Less production per man and delays in getting additional crews complicate the control problem on a fast-moving fire. It has been estimated that the size of the suppression job increases nearly as the square of the rate of forward spread. Thus, fire in the open will require 20 times more suppression effort. In other words, for each man

required to control a surface fire in a mature stand burning under these conditions, 20 men will be required if the area is clear cut."

"Methods other than clear cutting, of course, may bring a less drastic change in fireclimate. Nevertheless, the change resulting from partial cutting can have important effects on fire. The moderating effect that a dense stand has on the fireclimate usually results in slow-burning fires. Ordinarily, in dense timber only a few days a year have the extreme burning conditions under which surface fires produce heat rapidly enough to carry the fire into the crowns. Partial cutting can increase the severity of the fireclimate enough to materially increase the number of days when disastrous crown fires can occur."

SNEP (**co-authored by U.S. Forest Service**). 1996. Sierra Nevada Ecosystem Project, Final Report to Congress: Status of the Sierra Nevada. Vol. I: Assessment summaries and management strategies. Davis, CA: University of California, Davis, Center for Water and Wildland Resources.

"Timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any other recent human activity."

"[I]n areas where the larger trees (greater than 12 inches in diameter breast height) have been removed, stand-replacing fires are more likely to occur."

Beschta, R.L.; Frissell, C.A.; Gresswell, R.; Hauer, R.; Karr, J.R.; Minshall, G.W.; Perry, D.A.; Rhodes, J.J. 1995. Wildfire and salvage logging. Eugene, OR: Pacific Rivers Council.

"We also need to accept that in many drier forest types throughout the region, forest management may have set the stage for fires larger and more intense than have occurred in at least the last few hundred years."

"With respect to the need for management treatments after fires, there is generally no need for urgency, nor is there a universal, ecologically-based need to act at all. By acting quickly, we run the risk of creating new problems before we solve the old ones."

"[S]ome argue that salvage logging is needed because of the perceived increased likelihood that an area may reburn. It is the fine fuels that carry fire, not the large dead woody material. We are aware of no evidence supporting the contention that leaving large dead woody material significantly increases the probability of reburn."

Chen, J., et al. (**co-authored by U.S. Forest Service**). 1999. Microclimate in forest ecosystem and landscape ecology: Variations in local climate can be used to monitor and compare the effects of different management regimes. BioScience 49: 288–297.

When moving from open forest areas, resulting from logging, and into dense forests with high canopy cover, "there is generally a decrease in daytime summer temperatures but an increase in humidity..."

The authors reported a 5° C difference in ambient air temperature between a closed-canopy mature forest and a forest with partial cutting, like a commercial thinning unit (Fig. 4b), and noted that such differences are even greater than the increases in temperature predicted due to anthropogenic climate change.

Dombeck, M. (**U.S. Forest Service Chief**). 2001. How Can We Reduce the Fire Danger in the Interior West. Fire Management Today 61: 5-13.

"Some argue that more commercial timber harvest is needed to remove small-diameter trees and brush that are fueling our worst wildlands fires in the interior West. However, small-diameter trees and brush typically have little or no commercial value. To offset losses from their removal, a commercial operator would have to remove large, merchantable trees in the overstory. Overstory removal lets more light reach the forest floor, promoting vigorous forest regeneration. Where the overstory has been entirely removed, regeneration produces thickets of 2,000 to 10,000 small trees per acre, precisely the small-diameter materials that are causing our worst fire problems. In fact, many large fires in 2000 burned in previously logged areas laced with roads. It seems unlikely that commercial timber harvest can solve our forest health problems."

Morrison, P.H. and K.J. Harma. 2002. Analysis of Land Ownership and Prior Land Management Activities Within the Rodeo & Chediski Fires, Arizona. Pacific Biodiversity Institute, Winthrop, WA. 13 pp.

Previous logging was associated with higher fire severity.

Donato DC, Fontaine JB, Campbell JL, Robinson WD, Kauffman JB, Law BE. 2006. *Science* 311: 352.

"In terms of short-term fire risk, a reburn in [postfire] logged stands would likely exhibit elevated rates of fire spread, fireline intensity, and soil heating impacts...Postfire logging alone was notably incongruent with fuel reduction goals."

Hanson, C.T., Odion, D.C. 2006. Fire Severity in mechanically thinned versus unthinned forests of the Sierra Nevada, California. In: Proceedings of the 3rd International Fire Ecology and Management Congress, November 13-17, 2006, San Diego, CA.

"In all seven sites, combined mortality [thinning and fire] was higher in thinned than in unthinned units. In six of seven sites, fire-induced mortality was higher in thinned than in

unthinned units...Mechanical thinning increased fire severity on the sites currently available for study on national forests of the Sierra Nevada."

Platt, R.V., et al. 2006. Are wildfire mitigation and restoration of historic forest structure compatible? A spatial modeling assessment. Annals of the Assoc. Amer. Geographers 96: 455-470.

"Compared with the original conditions, a closed canopy would result in a 10 percent reduction in the area of high or extreme fireline intensity. In contrast, an open canopy [from thinning] has the opposite effect, increasing the area exposed to high or extreme fireline intensity by 36 percent. Though it may appear counterintuitive, when all else is equal open canopies lead to reduced fuel moisture and increased midflame windspeed, which increase potential fireline intensity."

Thompson, J.R., Spies, T.A., Ganio, L.M. (**co-authored by U.S. Forest Service**). 2007. Reburn severity in managed and unmanaged vegetation in a large wildfire. Proceedings of the National Academy of Sciences of the United States of America 104: 10743–10748.

"Areas that were salvage-logged and planted after the initial fire burned more severely than comparable unmanaged areas."

Cruz, M.G, and M.E. Alexander. 2010. Assessing crown fire potential in coniferous forests of western North America: A critique of current approaches and recent simulation studies. Int. J. Wildl. Fire. 19: 377–398.

The fire models used by the U.S. Forest Service falsely predict effective reduction in crown fire potential from thinning:

"Simulation studies that use certain fire modelling systems (i.e. NEXUS, FlamMap, FARSITE, FFE-FVS (Fire and Fuels Extension to the Forest Vegetation Simulator), Fuel Management Analyst (FMAPlus), BehavePlus) based on separate implementations or direct integration of Rothermel's surface and crown rate of fire spread models with Van Wagner's crown fire transition and propagation models are shown to have a significant underprediction bias when used in assessing potential crown fire behaviour in conifer forests of western North America. The principal sources of this underprediction bias are shown to include: (i) incompatible model linkages; (ii) use of surface and crown fire rate of spread models that have an inherent underprediction bias; and (iii) reduction in crown fire rate of spread based on the use of unsubstantiated crown fraction burned functions. The use of uncalibrated custom fuel models to represent surface fuelbeds is a fourth potential source of bias."

Thompson, J., and T.A. Spies (**co-authored by U.S. Forest Service**). 2010. Exploring Patterns of Burn Severity in the Biscuit Fire in Southwestern Oregon. Fire Science Brief 88: 1-6.

> "Areas that burned with high severity...in a previous wildfire (in 1987, 15 years prior) were more likely to burn with high severity again in the 2002 Biscuit Fire. Areas that were salvage-logged and planted following the 1987 fire burned with somewhat higher fire severity than equivalent areas that had not been logged and planted."

Graham, R., et al. (**U.S. Forest Service**). 2012. Fourmile Canyon Fire Findings. Gen. Tech. Rep. RMRS-GTR-289. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 110 p.

> Thinned forests "were burned more severely than neighboring areas where the fuels were not treated", and 162 homes were destroyed by the Fourmile Canyon Fire (see Figs. 45 and 46).

DellaSala et al. (2013) (letter from over 200 scientists):

> "Numerous studies also document the cumulative impacts of post-fire logging on natural ecosystems, including...accumulation of logging slash that can add to future fire risks..."

DellaSala et al. (2015) (letter from over 200 scientists):

> "Post-fire logging has been shown to eliminate habitat for many bird species that depend on snags, compact soils, remove biological legacies (snags and downed logs) that are essential in supporting new forest growth, and spread invasive species that outcompete native vegetation and, in some cases, increase the flammability of the new forest. While it is often claimed that such logging is needed to restore conifer growth and lower fuel hazards after a fire, many studies have shown that logging tractors often kill most conifer seedlings and other important re-establishing vegetation and actually increases flammable logging slash left on site. Increased chronic sedimentation to streams due to the extensive road network and runoff from logging on steep slopes degrades aquatic organisms and water quality."

North, M.P., S.L. Stephens, B.M. Collins, J.K. Agee, G. Aplet, J.F. Franklin, and P.Z. Fule (**co-authored by U.S. Forest Service**). 2015. Reform forest fire management. Science 349: 1280-1281.

> "...fire is usually more efficient, cost-effective, and ecologically beneficial than mechanical treatments."

Bradley, C.M. C.T. Hanson, and D.A. DellaSala. 2016. Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western USA? Ecosphere 7: article e01492.

> In the largest study on this subject ever conducted in western North American, the authors found that the more trees that are removed from forests through logging, the higher the fire severity overall:
>
> "We investigated the relationship between protected status and fire severity using the Random Forests algorithm applied to 1500 fires affecting 9.5 million hectares between 1984 and 2014 in pine (*Pinus ponderosa*, *Pinus jeffreyi*) and mixed-conifer forests of western United States, accounting for key topographic and climate variables. We found forests with higher levels of protection [from logging] had lower severity values even though they are generally identified as having the highest overall levels of biomass and fuel loading."

Lesmeister, D.B., et al. (**co-authored by U.S. Forest Service**). 2019. Mixed-severity wildfire and habitat of an old-forest obligate. Ecosphere10: Article e02696.

> Denser, older forests with high canopy cover had lower fire severity.

Dunn, C.J., et al. 2020. How does tree regeneration respond to mixed-severity fire in the western Oregon Cascades, USA? Ecosphere 11: Article e03003.

> Forests that burned at high-severity had lower, not higher, overall pre-fire tree densities.

Meigs, G.W., et al. (**co-authored by U.S. Forest Service**). 2020. Influence of topography and fuels on fire refugia probability under varying fire weather in forests of the US Pacific Northwest. Canadian Journal of Forest Research 50: 636-647.

> Forests with higher pre-fire biomass are more likely to experience low-severity fire.

Moomaw et al. (2020) (letter from over 200 scientists: https://johnmuirproject.org/2020/05/breaking-news-over-200-top-u-s-climate-and-forest-scientists-urge-congress-protect-forests-to-mitigate-climate-crisis/):

> "Troublingly, to make thinning operations economically attractive to logging companies, commercial logging of larger, more fire-resistant trees often occurs across large areas. Importantly, mechanical thinning results in a substantial net loss of forest carbon storage, and a net increase in carbon emissions that can substantially exceed those of wildfire

emissions (Hudiburg et al. 2013, Campbell et al. 2012). Reduced forest protections and increased logging tend to make wildland fires burn *more* intensely (Bradley et al. 2016). This can also occur with commercial thinning, where mature trees are removed (Cruz et al. 2008, Cruz et al. 2014). As an example, logging in U.S. forests emits 10 times more carbon than fire and native insects combined (Harris et al. 2016). And, unlike logging, fire cycles nutrients and helps increase new forest growth."

Moomaw et al. (2021) (letter from over 200 scientists: https://bit.ly/3BFtIAg):

"[C]ommercial logging conducted under the guise of "thinning" and "fuel reduction" typically removes mature, fire-resistant trees that are needed for forest resilience. We have watched as one large wildfire after another has swept through tens of thousands of acres where commercial thinning had previously occurred due to extreme fire weather driven by climate change. Removing trees can alter a forest's microclimate, and can often increase fire intensity. In contrast, forests protected from logging, and those with high carbon biomass and carbon storage, more often burn at equal or lower intensities when fires do occur."

Lesmeister, D.B., et al. (**co-authored by U.S. Forest Service**). 2021. Northern spotted owl nesting forests as fire refugia: a 30-year synthesis of large wildfires. Fire Ecology 17: Article 32.

More open forests with lower biomass had higher fire severity, because the type of open, lower-biomass forests resulting from thinning and other logging activities have "hotter, drier, and windier microclimates, and those conditions decrease dramatically over relatively short distances into the interior of older forests with multi-layer canopies and high tree density…"

Stephens, S.L., et al. (**co-authored by U.S. Forest Service**). 2021. Forest Restoration and Fuels Reduction: Convergent or Divergent? BioScience 71: 85-101.

While the authors continued to promote commercial thinning, they acknowledged that commercial thinning causes wildfires to move faster and become larger more quickly:

"Interestingly, surface fire rate of spread increased after restoration and fuel treatments [commercial thinning] relative to the untreated stand. This increased fire rate of spread following both treatment types is due to a combination of higher mid-flame wind speeds and a greater proportion of grass fuels, which result from reductions to canopy cover."

Hanson, C.T. 2021. Is "Fuel Reduction" Justified as Fire Management in Spotted Owl Habitat? Birds 2: 395-403.

"Within the forest types inhabited by California Spotted Owls, high-severity fire occurrence was not higher overall in unmanaged forests and was not associated with the density of pre-fire snags from recent drought in the Creek Fire, contrary to expectations under the fuel reduction hypothesis. Moreover, fuel-reduction logging in California Spotted Owl habitats was associated with higher fire severity in most cases. The highest levels of high-severity fire were in the categories with commercial logging (post-fire logging, private commercial timberlands, and commercial thinning), while the three categories with lower levels of high-severity fire were in forests with no recent forest management or wildfire, less intensive noncommercial management, and unmanaged forests with re-burning of mixed-severity wildfire, respectively."

Hanson, C.T. 2022. Cumulative severity of thinned and unthinned forests in a large California wildfire. Land 11: Article 373.

"Using published data regarding the percent basal area mortality for each commercial thinning unit that burned in the Antelope fire, combined with percent basal area mortality due to the fire itself from post-fire satellite imagery, it was found that commercial thinning was associated with significantly higher overall tree mortality levels (cumulative severity)."

Baker, B.C., and C.T. Hanson. 2022. Cumulative tree mortality from commercial thinning and a large wildfire in the Sierra Nevada, California. Land 11: Article 995.

"Similar to the findings of Hanson (2022) in the Antelope Fire of 2021 in northern California, in our investigation of the Caldor Fire of 2021 we found significantly higher cumulative severity in forests with commercial thinning than in unthinned forests, indicating that commercial thinning killed significantly more trees than it prevented from being killed in the Caldor Fire...Despite controversy regarding thinning, there is a body of scientific literature that suggests commercial thinning should be scaled up across western US forest landscapes as a wildfire management strategy. This raises an important question: what accounts for the discrepancy on this issue in the scientific literature? We believe several factors are likely to largely explain this discrepancy. First and foremost, because most previous research has not accounted for tree mortality from thinning itself, prior to the wildfire-related mortality, such research has underreported tree mortality in commercial thinning areas relative to unthinned forests. Second, some prior studies have not controlled for vegetation type, which can lead to a mismatch when comparing severity in thinned areas to the rest of the fire area given that thinning necessarily occurs in conifer forests but unthinned areas can include large expanses of non-conifer vegetation types that burn almost exclusively at high severity, such as grasslands and chaparral. Third, some research reporting effectiveness of commercial thinning in terms of reducing fire severity has been based on the subjective location of comparison sample points between thinned and adjacent unthinned forests. Fourth, reported results have often been based on theoretical models, which subsequent research has found to overestimate the effectiveness of thinning. Last, several case studies draw conclusions

about the effectiveness of thinning as a wildfire management strategy when the results of those studies do not support such a conclusion, as reviewed in DellaSala et al. (2022)." (internal citations omitted)

Prichard, S.J., et al. (**co-authored by U.S. Forest Service**). 2021. Adapting western US forests to wild-fires and climate change: 10 key questions. Ecological Applications 31: Article e02433.

In a study primarily authored by U.S. Forest Service scientists, and scientists funded by the Forest Service, the authors state that "There is little doubt that fuel reduction treatments can be effective at reducing fire severity..." yet these authors repeatedly contradict their own proposition, acknowledging that thinning can cause "higher surface fuel loads," which "can contribute to high-intensity surface fires and elevated levels of associated tree mortality," and mastication of such surface fuels "can cause deep soil heating" and "elevated fire intensities." The authors also acknowledge that thinning "can lead to increased surface wind speed and fuel heating, which allows for increased rates of fire spread in thinned forests," and even the combination of thinning and prescribed fire "may increase the risk of fire by increasing sunlight exposure to the forest floor, drying vegetation, promoting understory growth, and increasing wind speeds."

Mast.

Despite these admissions, contradicting their promotion of thinning, the authors cite to several U.S. Forest Service-funded studies for the proposition that thinning can effectively reduce fire severity, but a subsequent analysis of those same studies found that the results of these articles do not support that conclusion, and often contradict it, as detailed in Section 5.2 of DellaSala et al. (2022) (see below).

DellaSala, D.A., B.C. Baker, C.T. Hanson, L. Ruediger, and W.L. Baker. 2022. Have western USA fire suppression and megafire active management approaches become a contemporary Sisyphus? Biological Conservation 268: Article 109499.

With regard to a previous U.S. Forest Service study claiming that commercial thinning effectively reduced fire severity in the large Wallow fire of 2011 in Arizona, DellaSala et al. (2022, Section 5.1) conducted a detailed accuracy check and found that the previous analysis had dramatically underreported high-severity fire in commercial thinning units, and forests with commercial thinning in fact had higher fire severity, overall.

DellaSala et al. (2022, Section 5.2) also reviewed several U.S. Forest Service studies relied upon by Prichard et al. (2021) for the claim that commercial thinning is an effective fire management approach and found that the actual results of these cited studies did not support that conclusion.

Bartowitz, K.J., et al. 2022. Forest Carbon Emission Sources Are Not Equal: Putting Fire, Harvest, and Fossil Fuel Emissions in Context. Front. For. Glob. Change 5: Article 867112.

The authors found that logging conducted as commercial thinning, which involves removal of some mature trees, substantially increases carbon emissions relative to wildfire alone, and commercial thinning "causes a higher rate of tree mortality than wildfire."

Evers, C., et al. 2022. Extreme Winds Alter Influence of Fuels and Topography on Megafire Burn Severity in Seasonal Temperate Rainforests under Record Fuel Aridity. Fire 5: Article 41.

The authors found that dense, mature/old forests with high biomass and canopy cover tended to have lower fire severity, while more open forests with lower canopy cover and less biomass burned more severely.

USFS (U.S. Forest Service) (2022). Gallinas-Las Dispensas Prescribed Fire Declared Wildfire Review. U.S. Forest Service, Office of the Chief, Washington, D.C.

"A thinning project in the burn area opened the canopy in some areas, allowing more sunlight which led to lower fuel moistures. Heavy ground fuels resulting from the construction of fireline for the burn project added to the fuel loading. This contributed to higher fire intensities, torching, spotting, and higher resistance-to-control."

The only effective way to protect homes from fire is home-hardening and defensible space pruning within 100 to 200 feet of homes or less.

Cohen, J.D. (**U.S. Forest Service**). 2000. Preventing disaster: home ignitability in the wildland-urban interface. Journal of Forestry 98: 15-21.

The only relevant zone to protect homes from wildland fire is within approximately 135 feet or less from each home—not out in wildland forests.

Gibbons P, van Bommel L, Gill MA, Cary GJ, Driscoll DA, Bradstock RA, Knight E, Moritz MA, Stephens SL, Lindenmayer DB (2012) Land management practices associated with house loss in wildfires. PLoS ONE 7: Article e29212.

Defensible space pruning within less than 130 feet from homes was effective at protecting homes from wildfires, while vegetation management in remote wildlands was not. A modest additional benefit for home safety was provided by prescribed burning less than 500 meters (less than 1641 feet) from homes.

Syphard, A.D., T.J. Brennan, and J.E. Keeley. 2014. The role of defensible space for residential structure protection during wildfires. Intl. J. Wildland Fire 23: 1165-1175.

Vegetation management and removal beyond approximately 100 feet from homes provides no additional benefit in terms of protecting homes from wildfires.

Tree removal is not necessary prior to conducting prescribed fire as an additional community safety buffer.

Decades of scientific studies have proven that, even in the densest forests that have not experienced fire in many decades, prescribed fire can be applied without prior tree removal, as demonstrated in the following studies:

Knapp EE, Keeley JE, Ballenger EA, Brennan TJ. 2005. Fuel reduction and coarse woody debris dynamics with early season and late season prescribed fire in a Sierra Nevada mixed conifer forest. Forest Ecology and Management 208: 383–397.

Knapp, E.E., and Keeley, J.E. 2006. Heterogeneity in fire severity within early season and late season prescribed burns in a mixed-conifer forest. Int. J. Wildland Fire 15: 37--45.

Knapp, E.E., Schwilk, D.W., Kane, J.M., Keeley, J.E., 2007. Role of burning on initial understory vegetation response to prescribed fire in a mixed conifer forest. Canadian Journal of Forest Research 37: 11–22.

van Mantgem, P.J., A.C. Caprio, N.L. Stephenson, and A.J. Das. 2016. Does prescribed fire promote resistance to drought in low elevation forests of the Sierra Nevada, California, USA? Fire Ecology 12: 13-25.

van Mantgem, P.J., N.L. Stephenson, J.J. Battles, E.K. Knapp, and J.E. Keeley. 2011. Long-term effects of prescribed fire on mixed conifer forest structure in the Sierra Nevada, California. Forest Ecology and Management 261: 989–994.