Objections to LaVA F I N A L Environmental Impact Statement

May 14, 2019

Jason A. Lillegraven, PhD
[representing only myself]
[redacted]

USDA Forest Service, Region 2
Rocky Mountain Region
Attn.: Objection Reviewing Officer
Regional Forester
1617 Cole Boulevard, Building 17
Golden, CO 80401

Ref.: 36 CFR 218 — Project Level Pre-decisional Administrative Review Process for LaVA

Dear Objection Reviewing Officer:

The name of the proposed project is:
Medicine Bow Landscape Vegetation Analysis Project [LaVA]
Final Environmental Impact Statement
Albany and Carbon Counties, Wyoming.

The name and title of the responsible official and name of involved forest is:
Russell M. Bacon, Forest Supervisor
Medicine Bow–Routt National Forests
2468 Jackson Street
Laramie, Wyoming 82070.

Descriptions of aspects of the proposed project addressed by my objections are presented in the following pages. As specified on page 2 of Forest Supervisor Bacon's letter of April 16, 2019 (File Code 1950): "Issues raised in objections must be based on previously submitted specific written comments regarding the proposed project or activity and attributed to the objector . . . ." As shown on page 3 of LaVA's Appendix B (Response to Comments) of the Final Environmental Impact Statement (FEIS), I am a Commenter (with surname misspelled) by way of Letter #120 (dated August 15, 2018). I have appended a full copy of that letter to the present document.

From Letter #120, USFS personnel recognized 19 of my comments as being appropriate for inclusion in LaVA's FEIS 'Appendix B: Response to Comments.' The following is a listing of the formal issues, as recognized by responsible USFS personnel. The issues are variously linked in my Letter #120 to my 15 numbered examples of informational omissions within the DEIS. In some cases two or more of these 15 examples may be relevant to a single USFS comment in Appendix B. These comments, of course, refer only to the DRAFT EIS. They are, however, the essential stepping-stones to evaluating the status of any revisions that may characterize the FINAL EIS. The Responses provided by personnel of the USFS sometimes are helpful in making the transition from consideration of the DEIS to evaluation of the FEIS. It is often the case, however, that because of the uniqueness of individual commenters' concerns, the USFS-provided responses do not adequately apply to what commenters have presented.

Sequence for Items of Discussion

Comment 801: National Environmental Policy Act (NEPA)
- 800.03: Lack of Site Specificity — NEPA
  - 801.0305: Temporary Roads
    - Comment 1 and USFS Response (p. 13–14 of FEIS Appendix B)
- 801.04: Cumulative Effects — NEPA
  - Comment 1 and USFS Response (p. 17 of FEIS Appendix B)

Comment 805: No-Action Alternative
- 805.01: Support No-Action Alternative
  - Comment 1 and USFS Response (p. 34–35 of FEIS Appendix B)

Comment 806: Modified Proposed Action
- 806.02: Oppose Modified Proposed Action
  - Comment 1 and USFS Response (p. 46 of FEIS Appendix B)
- 806.05: Project Timeline — Modified Proposed Action
  - Comment 3 and USFS Response (p. 50 of FEIS Appendix B)
- 806.08: Maps — Modified Proposed Action
  - Comment 5 and USFS Response (p. 52 of FEIS Appendix B)

Comment 810: Climate Change
- 810.01: General — Climate Change
  - Comment 1 and USFS Response (p. 64 of FEIS Appendix B)

Comment 811: Economics
- 811.02: Impacts to Other Resources — Economics
  - Comment 1 and USFS Response (p. 67 of FEIS Appendix B)
- 811.03: Cost/Benefit Analysis — Economics
  - Comment 3 and USFS Response (p. 68–69 of FEIS Appendix B)
  - Comment 5 and USFS Response (p. 69 of FEIS Appendix B)

Comment 820: Soils
- 820.01: General — Soils
  - Comment 2 and USFS Response (p. 106 of FEIS Appendix B)

Comment 821: Timber Management
- 821.01: Regeneration — Timber Management
  - Comment 1 and USFS Response (p. 108–109 of FEIS Appendix B)
- 821.08: Forest Products — Timber Management
  - Comment 1 and USFS Response (p. 114–115 of FEIS Appendix B)
- 821.11: Engelmann Spruce — Timber Management
  - Comment 1 and USFS Response (p. 116 of FEIS Appendix B)

Comment 823: Wildlife
- 823.04: Sheep Mountain Federal Game Refuge — Wildlife
  - Comment 1 and USFS Response (p. 127 of FEIS Appendix B)
- 823.11: Bats — Wildlife
  - Comment 1 and USFS Response (p. 130 of FEIS Appendix B)

Comment 824: Best Available Science
- 824.01: Reference Citations — Best Available Science
  - Comment 1 and USFS Response (p. 130 of FEIS Appendix B)
- 824.02: Best Available Science — Best Available Science
  - Comment 1 and USFS Response (p. 131 of FEIS Appendix B)

Comment 825: Document Suggestions
- 825.06: General — Document Suggestions
  - Comment 2 and USFS Response (p. 133 of FEIS Appendix B)

As initiated in LaVA's Appendix B of the FEIS, the above sequence of appearance is maintained in my responses, below. In each of the above specific items, I variously make clear either agreement or disagreement with the Forest Service's responses made in Appendix B. Please consider each of my 'disagreements' as an 'objection.' Where needed, I have attempted to

consider the extents to which each of my objections should be considered warranted and/or appropriate.

Before getting into the specifics of my relevant USFS-recognized comments on the DRAFT EIS, I must point out that, even as of this writing, I hold legal standing in this case. The process at hand deals with evaluation of LaVA's *FINAL* EIS. I raise that point because in April 2019 the Forest Supervisor released to the general public a DRAFT version of his Record of Decision (DRoD). The Forest Supervisor therein formally announced his intention to select 'alternative 2' (the 'modified proposed action') prior to receipt of input of potential importance to the FEIS from citizens with legal standing.

That early announcement, in my opinion, was inappropriately made; inevitably it would actively discourage input of objections from a forever-unknown number of fully eligible potential commenters. I am aware that when ". . . an objection is received, the final record of decision will not be signed until the close of the objection resolution process (36 CFR 218.12(a))." But as a citizen holding standing in the case, I am singularly dissatisfied with the process that is now coming to pass. Assuredly, the process of logically premature announcement puts firmly 'into their places' those who originally cared enough to participate in what was assumed to be an open-review process.

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SPECIAL NOTE: My Letter #120 contains four numbered examples (1 and 6–8, reproduced verbatim, below) of omissions relevant to USFS Comment 1 within 801.0305.

Comment 801: National Environmental Policy Act (NEPA)
800.03: Lack of Site Specificity — NEPA
801.0305: Temporary Roads
Comment 1 and USFS Response (p. 13–14 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 801.0305:

"**COMMENT 1:** Without any indication of where any of the proposed temporary roads would be located, and no meaningful analysis of impacts of additional roads on numerous forest values, the DEIS does not meet NEPA requirements through its failure to adequately analyze and disclose the impacts of this level of new road construction." [underline added]

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

1. This DEIS proposes profound reshaping of the Medicine Bow National Forest (MBNF), spread across an effective duration of 15 to 20 years. As written, the document depends upon an assumption that the present levels of personnel and facilities will be adequate to make the proposed forest modifications possible. Such assertions are highly unrealistic. The DEIS is fatally devoid of analysis of finances required to accomplish the specified tasks.

6. The DEIS, including its multiplicity of maps, is devoid of information about the location of segments of the 600 miles of recommended 'temporary roads.' Apparently, this represents a failure of relevant planning, even though 'temporary road construction' is planned to commence in 2019.

7. The costs of securely closing 'temporary roads' (against use by unauthorized vehicles) and then followed by the decommissioning of roads to natural contours would be prohibitively high. Such costs would exist both in dollars and as linked to mustering added personnel. The costs are not considered in the DEIS.

8. Although not overtly stated in the DEIS, it seems that the extensive 'temporary road' system would function principally in expansion of commercial logging within ever-more-limited areas presently lacking access for heavy vehicles. Whatever the functions, the newly graded roads could involve fully a quarter of the total area of the Medicine Bow National Forest and two-thirds of its 360,000 acres planned for 'treatment' by reductions during the conduct of LaVA. Logging, even when dominated by harvesting weakened or parasite-killed trees, clearly is to take precedence over diverse-species' habitat protection, general forest-ecological recovery, human recreation, or scenic resources.

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

My comments 1 and 6–8 made in Letter #120 all pertain specifically to economic resources related to temporary roads. Relevant issues span the gamut from planning for road siting, actual development of the roads, their protection during use and downtimes, and their ultimate post-treatment elimination. What follows maintains those considerations on the narrow subject of temporary roads. But in the process of evaluating first the DRAFT EIS and subsequently all of the diverse components of the FINAL EIS, my views of the total project have become much broader. I wish to explain those changes in perception within the paragraphs that follow.

In developing any major project it is one thing to have thought through all possible contingencies that might arise through the totality of the project—as one expects prior to the launch of a manned flight to Mars. Rest assured that I was not expecting anything even vaguely comparable to that level of preparedness within documentation for the LaVA proposal. I was, however, expecting to see the basic elements of information that would be essential to competent evaluation of the very workability of the project. What I encountered, however, is essentially an extensive litany of excessively optimistic statements (i.e., virtual assurances) that nearly everything is in hand and ready to roll, starting as early as 2019. Most certainly that is not the case, whether you are looking at planning something relatively simple such as placement of temporary-roads or something extraordinarily complex such as designing and gathering commitments through a commercial partner for qualified personnel to conduct season-long forest treatments a year or more down the road.

I accept as true that, when dealing with almost any of the diverse 'No Action' alternatives within the LaVA project, it is appropriate to assume that almost all full-time members of the USFS staff already have been, and will continue to be, working at full capacity. With that assumption, it must be the case that when major new tasks are asked of the staff via most 'modified proposed actions,' the situation absolutely must require additional personnel, enhanced infrastructure, new materials, and possibly substantial new or modified equipment. That's fine, reviewers definitely do need to know that, and they also need to have seen enough solid evidence to believe that the new project truly has legs and should be supported.

First let's look at the question of temporary roads, where they should be placed, personnel needs for their construction, maintenance, removal, and reclamation of the affected forest floor. The FINAL EIS has been modified from the DRAFT EIS in specifying where the temporary roads will *not* be developed. That is a step in the right direction in terms of specificity. But it remains clear that the total of road-restricted areas is small when compared with the total area remaining open for emplacement temporary-road-treatment opportunities. Even if we select the USFS-favored silviculture (rather than a system that favors health of native-species' biodiversity) and take into account issues such as forest-floor complexities of elevation, substrate chemical compositions and soil moisture levels, complexities of wetlands, and consider susceptibilities to excessive erosion, that combination of *essential* concerns will preclude road development across large areas of the total forest. In the LaVA project's current status, not even one single site for a temporary road has been selected. Neither has a model been established that would aid in bringing together ways to address expected problems in choosing a site, surveying the path, estimating the necessary nature and duration of field-worker involvement, or the range

of needs for special equipment. Establishing such a model could at least provide a credible *range* of projected costs per mile of temporary roads. With up to 600 miles of temporary roads being considered, we are looking at a major new array of costs beyond the No Action alternative. Presently, reviewers have almost nothing concrete on which to consider planning for costs even of temporary roads.

Parallel kinds of effort in gathering basic information about essential costs of personnel, realities of commercial contracts, administration of those contracts, hazard avoidance, necessary materials, and modes plus durations of equipment usage should have been done such that reviewers would have *a credible range of expected costs* upon which to judge feasibility of the project. That is not easy, of course, but committing the effort itself would provide quantitatively specific data that would be vastly more useful than simply stating: "Future budgets and staffing levels are unknown and are largely determined by Congressional appropriations" (Comment 811.02 in LaVA FEIS, Appendix B, p. 67). That statement provides little more than a sense of hopelessness, combined with thoughts that everything is completely out of local control. A similar vein exists within the following statement: "From a financial efficiency perspective, the agency [i.e., the USFS Medicine Bow District] would spend more to implement the project [i.e., LaVA] than it would receive in revenue from stumpage receipts" (LaVA FEIS, p. 327). How large would that disparity be, and how serious are the probable *ranges* of financial loss among such broad cost/benefit procedures?

To help answer the above question, the LaVA FINAL EIS (p. 327) encourages us to see the 'Specialist Report' (one of a series) titled 'Social and Economic Report' (dated April 27, 2019; un-paginated). Its coin of the realm is scaled in *volumes* of wood (unit abbreviated 'CCF'; under older nomenclature 'Centrum Cubic Feet') harvested in the forest. As used today by the USFS, 1 CCF = one hundred cubic feet ≈ a cord of wood, and 2 CCFs (i.e., 200 ft^3) are equivalent to 1,000 board feet of lumber. The essential components used within the Social and Economic Report are much simpler than what was ideally asked for in the first sentence of the preceding paragraph. Nevertheless, the report does compare the annual volume of timber harvested commercially in Carbon and Albany counties combined (valued in 2017 dollars) between the 'No Action' alternative and Alternative 2 *for the present LaVA project* using IMPLAN® software. The following is my basic synthesis of the comparative outcomes:

No Action

Potential timber volume annually to be harvested commercially:

Between 40 and 50 x 10^3 CCF timber

Of that, between 35 to 45 x 10^3 CCF is sawtimber materials and 5 x 10^3 CCF is products other than logs

Existing conditions would annually support ca. 190–250 (direct as well as indirect and induced) already-existing jobs (full-time, part-time, salaried and self employed), earning ca. \$7.7–9.8 x 10^6 as labor income and also lead each year to \$10–12.7 x 10^6 (direct plus indirect and induced) for local economy from timber harvest (sales)

Alternative 2 — Modified Proposed Action

Potential timber volume annually to be harvested commercially:

Between 45 and 50 x 10^3 CCF timber

Of that, between 40 and 45 x 10^3 CCF is sawtimber materials and 5 x 10^3 CCF is products other than logs

Existing conditions would annually support ca. 220–250 jobs (direct as well as indirect and induced; full-time, part-time, salaried and self-employed), earning ca. \$8.7–9.8 x 10^6 as labor income* and also lead each year to \$11.4–12.7 x 10^6 (direct plus indirect and induced) for local economy from timber harvest (sales)

* [The following is a direct quote from the unpaginated Specialist Report, Alternative 2, *Regional Economic Contributions*]:
"It is important to note that these may or may not be new jobs or income, but rather existing jobs and income in the regional economy that are supported or sustained by National Forest timber management. It must also be stressed that the economic contributions estimated here cannot be viewed or described as *economic benefits*" [italics original].

Comparisons of values of annual commercial timber harvests:

No Action — 40–50 x 10^3 CCF (35–45 x 10^3 CCF sawtimber materials; 5 x 10^3 CCF products other than woods)
Alternative 2 — 45–50 x 10^3 CCF (40–45 x 10^3 CCF sawtimber materials; 5 x 10^3 CCF products other than woods)

No Action — 190–250 already-existing jobs earning ca. \$7.7–9.8 x 10^6 as labor income
Alternative 2 — 220–250 jobs* earning ca. \$8.7–9.8 x 10^6 as labor income
* See direct quote above from report, suggesting that most added jobs would come from National Forest timber management

No Action — \$10–12.7 x 10^6 for local economy from timber harvest (sales)
Alternative 2 — \$11.4–12.7 x 10^6 for local economy from timber harvest (sales)

Summary:
Maximum values in all comparisons (i.e., volumes of timber harvests for sawtimber materials and products other than woods; numbers of jobs; and dollars for local economy from timber harvests) are the same for both alternatives.
Minimum values in all comparisons are modestly higher in Alternative 2 than in the No Action alternative.
Very few new jobs will become available during the course of Alternative 2.

The discussion and cost/benefit synthesis presented above represents essentially everything that *the entirety* of the FEIS and its multiple associated documents has to say about economics of the LaVA project. We are not told anything concrete about the magnitude of the disparity between spending by the USFS Medicine Bow District and revenue from stumpage receipts. Letters from cooperating agencies or other entities provide almost no specific information about the proposed nature of their cooperation with the Forest Service—and nothing whatever exists about their plans for financial assistance to the LaVA project or even specifics for proposed economic matching across potential common projects. The text of the FINAL EIS for the LaVA project does not propose a simple 15-year extension of the existing rate of activity across the 850,000-acre Medicine Bow National Forest. Quite to the contrary, it projects markedly expanded activities per unit time in treating up to 360,000 acres (i.e., equivalent to 42 percent of the total Forest Service's area), applying the full range of treatments across most of that area. In every single one of the fourteen accounting units within the Medicine Bow National Forest the plans for use of the full suite of tools for forest reduction dwarfs the areas planned for use of the 'limited suite of tools.' But we don't know, even vaguely, how much these additional activities will cost, either in terms of additional personnel or in terms of strengthened infrastructure. Without any further beating of a dead horse, I must conclude that, as a serious reviewer of this whole process, the USFS itself does not know how—or if—its promises have any hope to be kept. The project's success depends upon its degree of financial support.

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Comment 801: National Environmental Policy Act (NEPA)
801.04: Cumulative Effects — NEPA
Comment 1 and USFS Response (p. 17 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 801.04:

"**COMMENT 1:** There is little discussion of the cumulative impacts of this level of intensive vegetation manipulation over a 15 year time period over the entire project area, with impacts to the above mentioned values lasting 50 or more years. In its failure to fully disclose the cumulative loss of these values, the DEIS fails to meet the requirement of the National Environmental Policy Act (NEPA), which is to fully disclose the extent and duration across the entire project area of these significant environmental impacts."

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

2. This DEIS does not adequately take into account the combined, negative influences across the MBNF of historic timber harvests, mining, over-grazing, excessive hunting, and introductions of exotic species. Those activities have profoundly stressed the original forest system to the extent that today it should be characterized as almost completely within '*recovery* mode.' As considered below, even special, functionally recognized forest areas are to be subjected forthwith to renewed stress through application of the full suite of forest-reduction tools.

3. The MBNF today is *functionally* subdivided into 23 categories of specifically numbered 'Forest Plan Management Areas' (FPMAs). As specified in the DEIS, all but six of the designated FPMAs are to be authorized to apply the full suite of tools intended for forest reduction (from handwork upward through application of heavily mechanized equipment). Applications of those tools are scheduled to involve even the following, unusually sensitive, numbered categories: seasonal and year-around 'Backcountry Recreation' areas (categories 1.31, 1.33, 3.31, and 3.33); 'Scenic Rivers' (of the National River System; 3.4); 'Forest Flora and Fauna Habitats' (3.5); 'Special Wildlife Areas' (3.54); 'Crucial Deer & Elk Winter Range' (3.58); 'Scenery' (4.2); 'General Forest and Rangeland Vegetation Emphasis' (5.12); 'Forest Products, Ecological Restoration' (5.15); and 'Deer and Elk Winter Range' (5.41).

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

Text within the USFS-selected citizen's comment 1 for issue 801.04 in the LaVA project's Appendix B is not closely related to the comments numbered 2 and 3 from my Letter #120. Nevertheless, I do suggest that my two comments are best included in this particular slot. Very little difference exists in this case between the DRAFT EIS and the FINAL EIS.

It is certainly true that the landscape within the LaVA project's area has endured more than a century of severely negative influences deriving from excessive timber harvests, mining, over-grazing, unbridled hunting, and introductions of exotic species. Even now most of the Medicine Bow National Forest remains in 'recovery mode.' Just as one example among many others available, observe Figure 57 of the FEIS (p. 257). Across the total area of the Sierra Madre and Medicine Bow Mountains, areas in which overall watershed is functioning properly are geometrically trivial (16 out of 70 sixth-level watersheds). Everywhere else within the Medicine Bow National Forest (54 of 70 sixth level watersheds) they are characterized as 'functioning at risk.' What that means is: "Physical, chemical, and biologic conditions suggest soil, aquatic, and riparian systems are at risk in being able to support beneficial uses" (FEIS p. 257). That questionable status was inherited from combined effects of the sorts of forest abuse that started more than a century ago as listed in the first sentence of this paragraph.

It is difficult to argue against an assertion that 'Mother Nature knows best' about how to heal long-standing effects of human-generated ill-treatment of the forest. For the most part, however, what helps the most is simply to leave the forest alone to its own devices, even as it often becomes a victim of unfortunate chance. An example of what I believe does *not* work to the long-term benefit of our forest is presented as the second bulleted statement for the Summary of the LaVA project (FEIS p. *i*):

> "The expansive tree mortality [mainly from recent beetle kills] has moved the Medicine Bow National Forest away from the desired conditions for a suitable timber base in forest plan management areas 5.12, 5.13, and 5.15 (timber emphases). There is a need to treat vegetation to support the future regeneration of merchantable tree species to meet desired conditions, standards, and guidelines for these management areas."

What is desired by some parts of USFS policy is the closest thing possible to a monoculture of lodgepole pines, all trees with basal trunk diameters of at least seven inches, all ready for migration to the mill. "Any deviations from forest plan guidelines would be addressed, documented, and disclosed during the design of individual treatments, as required by Appendix A, the adaptive implementation and monitoring framework" (FEIS, Forest Plan Compliance, p. 7).

In light such procedural requirements, I asked Wikipedia the question: "Does the United States Forest Service have a mission statement?" The immediate answer came back as: The mission of the Forest Service is "To sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations." Thus, at the foundation of the reason for existence of the USFS, one does not expect 'diversity' to be replaced by 'convenient monocultures.' Among the Medicine Bow National Forest's 23 varieties of 'Forest Plan Management Areas' (FPMAs), all but six will be authorized to apply the full suite of tools intended for forest reduction (from handwork upward through application of heavily mechanized equipment). Applications of those tools are scheduled to involve even the following, unusually sensitive, numbered categories: seasonal and year-around 'Backcountry Recreation' areas (categories 1.31, 1.33, 3.31, and 3.33); 'Scenic Rivers' (of the National River System; 3.4); 'Forest Flora and Fauna Habitats' (3.5); 'Special Wildlife Areas' (3.54); 'Crucial Deer & Elk Winter Range' (3.58); 'Scenery' (4.2); 'General Forest and Rangeland Vegetation Emphasis' (5.12); 'Forest Products, Ecological Restoration' (5.15); and 'Deer and Elk Winter Range' (5.41). Such authorizations that obviously reduce biological protections convert the whole process into a cynical joke.

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Comment 805: No-Action Alternative
805.01: Support No-Action Alternative
Comment 1 and USFS Response (p. 34–35 of FEIS Appendix B)

USFS DID NOT SELECT A CITIZEN'S COMMENT FOR 805.01

USFS-SUBSTITUTED COMMENT: "I (i.e., Jason A. Lillegraven) feel strongly that the "No Action" option should be exercised for Medicine Bow Landscape Vegetation Analysis (LaVA) Project #51255."

LILLEGRAVEN'S SUBSTITUTED COMMENT FROM LETTER #120:

Unnumbered. The entirety of my present Letter #120 represents a response that is relevant to the LaVA project's DRAFT and FINAL EIS.

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Comment 806: Modified Proposed Action
806.02: Oppose Modified Proposed Action
Comment 1 and USFS Response (p. 46 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 806.02:

"**COMMENT 1:** This project area encompasses all lands managed by the Medicine Bow National Forest in the Snowy Range and Sierra Madre, totaling about 850,000 acres. The 360,000 acres made available for vegetation treatments under the proposed project amounts to 42% of the Snowy Range and Sierra Madre Range of the Medicine Bow National forest. Under the proposed action, close to one-half of the Snowy Range and Sierra Madre could be intensively and intrusively manipulated by some or all of the proposed vegetation treatments in the next 10 to 15 years. The impacts to recreation (especially quiet, non- motorized recreation), wildlife habitat, and scenic values would be substantial. The draft EIS acknowledges in numerous sections that impacts to wildlife, wildlife habitat, recreation (especially quiet recreation), and scenic values will be impacted to some unspecified extent, and predicts (without substantive evidence) that these impacts would be of short to medium term duration, ranging from 15 to 50 years or more. Fifty or more years of significantly diminished values on nearly 50% of public land on these two mountain ranges is neither minor nor acceptable to many users of the forest.[...]We recognize the role of small, targeted vegetation treatments, including prescribed fire, in forest management, and we do not oppose such activities, as long as the environmental impacts are analyzed and disclosed."

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

My Letter #120 does not have a specific, numbered reaction that would qualify adherence to the above Comment 1. Comment 1 does, however, lead us to bulleted statements on pages 9–12 in LaVA's FEIS Appendix B that summarize existence of 'augmented' relevant baseline data within the main text of the FEIS. Although I do not necessarily disagree with a significant number of augmentations referenced on those four pages, I wholeheartedly agree with the WildEarth Guardian's (reviewer 83) original statement (i.e., Comment 1). That statement was focused on the DEIS, but in my opinion it remains valid for almost all of the FEIS.

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

See statement immediately above.

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806.05: Project Timeline — Modified Proposed Action
Comment 3 and USFS Response (p. 50 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 3 FOR 806.05:

"**COMMENT 3:** Page 29 From the DEIS: "Implementation activities would be completed within approximately 15 to 20 years of the project decision." Is it 15 years or 20 years as it says throughout the EIS?"

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

5. The LaVA project's planned duration is vague (i.e., '15–20 years'), and the DEIS lacks any semblance of a clearly presented temporal-planning schedule. Treatments are to be authorized for 15 years (starting in 2019), but they ". . . would be completed within approximately 20 years of the project decision" (document E4 in the Analysis Folder).

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

I am pleased that the USFS has clarified the FINAL EIS in terms of the project's effective duration.

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806.08: Maps — Modified Proposed Action
Comment 5 and USFS Response (p. 52 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 5 FOR 806.08:

"**COMMENT 5:** All maps provided within the DEIS lack standard geographic coordinates (i.e., latitude/longitude or township/range). Thus it is unnecessarily difficult to reliably determine specific locations of the wealth of unique features or defining patterns seen on the maps."

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

"10. All maps provided within the DEIS lack standard geographic coordinates (i.e., latitude/longitude *or* township/range). Thus it is unnecessarily difficult to reliably determine specific locations of the wealth of unique features or defining patterns seen on the maps."

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

Existence of geographically defining coordinates enhances the long-term effectiveness of nearly any map. Thus I was delighted to see that coordinates in the form of latitude and longitude had been added as updates to all maps provided within the FINAL EIS.

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Comment 810: Climate Change
810.01: General — Climate Change
Comment 1 and USFS Response (p. 64 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 801.01:

"**COMMENT 1:** The Forest Service should provide a full analysis of climate change impacts of the proposed action."

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

13. This DEIS is devoid of anything useful or relevant to tests of the concept of trends in weather or climate change. The following statement (Table 17, p. 54) skirts the entire question, lifelessly pleading immeasurability of temperature-related data as based upon the study's expected duration of 15 years: "The amount of climate change that would occur over that period is within the natural weather disturbance that occur [sic] over a 15-year period, so there would be no measureable change to disclose in the draft environmental impact statement due to climate change." The key to understanding future weather-related history, however, must be linked to knowledge from the past, for which much relevant information now exists within the scientific library. For example, note NASA's graph attached at the end of this letter (publ. Aug. 10, 2018 in *New York Times*). Temperature trends are readily recognizable within 15-year durations, especially beginning at about the year 1910. The vapid path chosen within this project's DEIS is most unfortunate because of the simplicity of intentional avoidance of whatever information might come to the surface within its own data.

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

The subject of 'Air Quality and Climate Change' is given brief consideration in the FINAL EIS (starting on page 283; although as per 'Socioeconomics' it does not exist in the FEIS's table of contents). The wildfire viewpoint on air quality emphasizes a negligible importance in terms of measurability on a global scale, although that certainly is not the case on a local scale. The climate change viewpoint remains almost non-existent and hidden behind the relative importance of manmade deforestation. But in practical terms I think that's about all we'll be likely to get on this subject.

One remaining observation, however, remains cloaked within peculiar subtleties of the English language. In Table 2 (FEIS p. *viii*) and Table 27 (FEIS p. 71) dealing with comparisons of the two procedural alternatives exists the *intended* concept of local fires being 'immeasurable' (i.e., 'not measurable'). The Merriam-Webster definition of 'immeasurable,' however, presents quite a different meaning, as "incapable of being measured *broadly*: indefinitely extensive." That is, the local fires are so grand as to be impossible to measure.

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SPECIAL NOTE: My treatment of the issues of 'Temporary Roads' and general considerations of the LaVA project's 'Economics' have been combined. See '801.0305: Temporary Roads,' above.

Comment 811: Economics

811.02: Impacts to Other Resources — Economics

Comment 1 and USFS Response (p. 67 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 811.02:

"**COMMENT 1:** This DEIS proposes profound reshaping of the Medicine Bow National Forest (MBNF), spread across an effective duration of 15 to 20 years. As written, the document depends upon an assumption that the present levels of personnel and facilities will be adequate to make the proposed forest modifications possible. Such assertions are highly unrealistic. The DEIS is fatally devoid of analysis of finances required to accomplish the specified tasks."

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811.03: Cost/Benefit Analysis — Economics

Comment 3 and USFS Response (p. 68–69 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 3 FOR 811.03:

"**COMMENT 3:** The costs of securely closing 'temporary roads' (against use by unauthorized vehicles) and then followed by the decommissioning of roads to natural contours would be prohibitively high. Such costs would exist both in dollars and as linked to mustering added personnel. The costs are not considered in the DEIS."

Comment 5 and USFS Response (p. 69 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 5 FOR 811.03:

"**COMMENT 5:** How would the USFS manage to monitor and maintain usage of 600 miles of temporary roads over the planned 15-20 years? Also how much time and effort and expense will be involved first to build the roads, second maintain the roads used by heavy equipment, third to return the terrain to its original state?"

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Comment 820: Soils
820.01: General — Soils
Comment 2 and USFS Response (p. 106 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 2 FOR 820.01:

"**COMMENT 2:** Probably the most important factors leading to restoration of a healthy forest include availability of liquid water and the existence of appropriate soil microbes (symbiotic bacteria and fungi). This DEIS holds almost nothing of value in terms of considering the roles of soil microbes in evaluating presence or absence of health of the MBNF. The terms 'bacteria' or 'bacterium' do not exist in the DEIS, 'fungi' or 'fungus' each appear only once (p. 193 and 195, respectively), 'microbe' appears once (p. 164), and nothing of informational substance is contained within any of those occurrences. What grand opportunities are thereby being passed up!"

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

14. Probably the most important factors leading to restoration of a healthy forest include availability of liquid water and the existence of appropriate soil microbes (symbiotic bacteria and fungi). This DEIS holds almost nothing of value in terms of considering the roles of soil microbes in evaluating presence or absence of health of the MBNF. The terms 'bacteria' or 'bacterium' do not exist in the DEIS, 'fungi' or 'fungus' each appear only once (p. 193 and 195, respectively), 'microbe' appears once (p. 164), and nothing of informational substance is contained within any of those occurrences. What grand opportunities are thereby being passed up!

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

There now exist scattered references in the FINAL EIS to the existence of bacteria, fungi, mycorrhizae, and general microbes in the soils of Medicine Bow National Forest. That certainly is a start, and now there are also references to a few recent publications dealing locally with such organisms. My plea here is simply for the USFS to pay close attention to the microbes. Please assist microbial biologists in field aspects of their research. Enormous strides could be attained by learning much more about the incredible links that exist in local forest soils between diverse microbes and the woody species that we routinely exploit for sturdy cellulose. The forest's health and generation of new growth through that kind of knowledge could be greatly enhanced.

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Comment 821: Timber Management
821.01: Regeneration — Timber Management
Comment 1 and USFS Response (p. 108–109 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 821.01:

"**COMMENT 1:** I am concerned with the use of clear cutting as a management technique based upon the scars left on the face of MBNF from past efforts. There is no evidence presented that clear cutting will only be performed in areas where forest regeneration will be successful. MBNF is strewn with areas [of clear-cutting] that have not regenerated and have suffered from enlargement due to aridity or wind."

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

2. This DEIS does not adequately take into account the combined, negative influences across the MBNF of historic timber harvests, mining, over-grazing, excessive hunting, and introductions of exotic species. Those activities have profoundly stressed the original forest system to the extent that today it should be characterized as almost completely within '*recovery* mode.' As considered below, even special, functionally recognized forest areas are to be subjected forthwith to renewed stress through application of the full suite of forest-reduction tools.

Although members of the USFS added my Letter #120 to others that are relevant to Comment 1 of 821.01, I simply had the issue of clear-cutting as ranking among one of many previous, more than century-long biological abuses of the area of Medicine Bow National Forest. I do, however, share the concerns that are expressed in the citizen's Comment 1. I do understand the USFS's required conclusion that clear-cutting represents the most efficacious means toward procedural simplicity and rapid restoration of commercial stands of timber. But at the same time, clear-cutting large areas is death-warmed-over in terms of encouraging moose survival through loss of winter browse and essential cover.

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

I have accepted (but not very happy so) the USFS's silvicultural-based response to the citizen's Comment 1.

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821.08: Forest Products — Timber Management
Comment 1 and USFS Response (p. 114–115 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 821.08:

"**COMMENT 1:** Potential commercial recovery of useful wood products from infected timber stands is limited, and fallen dead trees already are well into decay. Removal of such woody resources requires destruction of living, healthy trees."

This comment was paraphrased (by me) from the original text, seen immediately below, as composed by Dr. Daniel B. Tinker, Associate Professor (of Botany) at the University of Wyoming.

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

"6. Recovery of usable forest products from the stands is limited, at best. Many of the woody resources that were killed by the bark beetles have since fallen to the ground and begun to decompose, crack, and fragment. Removal of these woody resources requires removal of living, healthy trees;"

That sixth comment appeared on page 1 (of 2) in Dr. Tinker's (undated) letter titled "Thoughts related to the Landscape Vegetation Analysis on the Medicine Bow National Forest, Wyoming". In explanation, the following text is excerpted from page 4 of my review (LaVA Letter #120) dated August 15, 2018 (under subtitle of '*A Few Comments in Closing*'):

> "Beyond my own list of examples, however, there exist even broader arrays of salient, science-based items. For example, I refer specifically to comments provided by Dr. Daniel B. Tinker, Associate Professor in the University of Wyoming's Department of Botany. Dr. Tinker is a seasoned researcher who has focused on the MBNF's overall ecological setting. His concerns reinforce a conclusion that this DEIS fails to meet the NEPA-required, full disclosure of the project's environmental impacts. I have, with his permission, attached his contribution to the final pages of the present letter. I will close with the following summary points as paraphrased from Dr. Tinker's review:"

I assume that Dr. Tinker's item 6 appeared in LaVA's Letter #39 (as listed in FEIS, Appendix B, p. 2).

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

By the rules of this objection procedure, it would be inappropriate for me to attribute Dr. Tinker's words to my own items of objection. I regret the ensuing, quite unintended confusion.

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821.11: Engelmann Spruce — Timber Management
Comment 1 and USFS Response (p. 116 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 821.11:

"**COMMENT 1:** It appears that all local species of conifers are becoming eligible for harvesting within LaVA during commercial logging. That includes species such as Engelmann spruce and subalpine fir that tend to be lightly infected by parasitic insects. This new vulnerability of Engelmann spruce to harvesting represents a change from the 2008 U.S. Forest Service's forest-wide decision to preserve that species for beneficial wildlife habitat."

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

9. It appears that *all* local species of conifers are becoming eligible for harvesting within LaVA during commercial logging. That includes species such as Engelmann spruce and subalpine fir that tend to be lightly infected by parasitic insects. This new vulnerability of Engelmann spruce to harvesting represents a change from the 2008 U.S. Forest Service's forest-wide decision to preserve that species for beneficial wildlife habitat.

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

I can understand the desire to reduce or even eliminate all species of conifers and other potential fuels in vicinities within a wildland–urban interface (WUI). But I am deeply puzzled by justification (USDA Forest Service 2008b) allied to protection and conservation of Southern Rockies Canada lynx (*Lynx canadensis*) for spruce forest 'vegetation management' (i.e., logging). Allowed since 2008 is group-tree and individual-tree selection, pre-commercial thinning, and justification for WUI protection.

A pre-settlement map of Wyoming plus the southern Rockies shows no Canada lynx in any part of today's LaVA project. Lynx are dependent on presence of the Snowshoe hare (*Lepus americanus*) as essentially obligate prey, and present distribution of the hares includes both the Sierra Madre and Medicine Bow Mountains of Wyoming and Colorado. Most of the records of radio-collared lynx are in the Medicine Bow Mountains, and they represent dispersing individuals from Colorado. Today the Canada lynx is dominantly a forest-dwelling, montane animal, and arid basins present strong barriers to their dispersal. Only rarely have lynx successfully crossed the Hanna or Laramie Basins (to the north or east, respectively) from the Medicine Bows. Both the Snowshoe hare and Canada lynx are preferentially denizens of dense forest with deep snow and often nearly impenetrable stands of coniferous brambles.

With that information in mind, my primary question is as follows. What is the specific justification, as related to Canada lynx, for selectively removing Englemann spruce and pre-thinning spruce from commercial stands of lodgepole pine? In the short term that process obviously would open up the forest to more sunlight, which would result in reduced snow-depths due to curtailed snow persistence. In the longer term, remember that Engelmann spruce is considerably more resistant to attacks from wood-loving insects. One would predict that, when

looking to the future, spruce-rich coniferous stands would result in enhanced density of standing trees following the next attack from pine beetles. One wag suggested to me that, when looking to that future plague, we might say "Hey, we've *already had* our disaster, so now we can go cut more logs to get more dollars!" Surely that isn't the real nature of the justification I seek for preemptively thinning Engelmann spruce in potential lynx habitat—is it?

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Comment 823: Wildlife
823.04: Sheep Mountain Federal Game Refuge — Wildlife
Comment 1 and USFS Response (p. 127 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 823.04:

"**COMMENT 1:** The Sheep Mountain Federal Game Refuge, established nearly 100 years ago by presidential proclamation, is one of only 20 such refuges in our nation. It is well documented that roads, road density, and mechanical logging diminish the value of wildlife habitat for many species, reducing hiding cover and security habitat, and diminishing use by many species. As acknowledged in the DEIS, roadless areas provide important refugia for a variety of wildlife species. The DEIS also mentions that roadless areas on the forest, including in the Sheep Mountain Federal Game Refuge, contain the highest diversity and frequency of a variety of plant species of varying degrees of rarity. In proposing to open the Sheep Mountain Federal Game Refuge to all vegetation treatment options, including commercial logging and mechanical treatments, the DEIS fails to acknowledge the primary purpose for which the Refuge was established, and utterly fails to acknowledge that the Refuge extends across the Fox Creek Road and includes that additional 3000 acres. The DEIS clearly does not meet NEPA requirements to fully analyze and disclose impacts to the Sheep Mountain Federal Game Refuge from road construction and mechanical vegetation treatments including mechanical logging operations."

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

4. Use of the full suite of forest-reduction tools is even to be permitted on the popular recreation area in western Albany County known as Sheep Mountain. That is the home of the 'Sheep Mountain Game *Refuge*' (*not* the 'Sheep Mountain Game *Reserve*' as cited in the DEIS). This nationally designated game refuge, the only one in Wyoming, was created in 1924. It is relatively intact ecologically, and it is unique within the United States in existing upon an enormous, eastwardly thrusted fault block that developed during the ancient 'Laramide' interval of mountain building. From the perspective of residents of southern Wyoming, despoiling the Sheep Mountain Game Refuge through deforestation would be comparable to doing something similar within the forested highlands of Yellowstone National Park.

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

The issue of potential loss of Sheep Mountain as a nationally designated game refuge and prime outdoor recreation area really caught the attention of those interested in contents of the LaVA project. The many individuals who commented on the refuge's preservation are to be warmly complimented for their actions. But I am equally pleased that the USFS listened closely to the public commentaries and decided that no commercial mechanical 'treatments' will occur on Sheep Mountain.

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823.11: Bats — Wildlife
Comment 1 and USFS Response (p. 130 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 823.11:

"**COMMENT 1:** Similarly, scientific knowledge about life histories of bats (Mammalia, Order Chiroptera), as related to their roles in forest ecology, is burgeoning. Nevertheless, only the Hoary bat is mentioned in the DEIS, thus ignoring the 15 other species that definitely have been recorded in Wyoming forests. And even for the Hoary bat, only its existence across the MBNF is mentioned. The document provides no consequential information about how that species might synergistically add to or subtract from welfare of the forest itself - or how the forest may be essential to welfare of the bat and insect faunas. Again, grand opportunities for the gathering of first-class ecological information from this project will be bypassed."

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

15. Similarly, scientific knowledge about life histories of bats (Mammalia, Order Chiroptera), as related to their roles in forest ecology, is burgeoning. Nevertheless, only the Hoary bat is mentioned in the DEIS, thus ignoring the 15 other species that definitely have been recorded in Wyoming forests. And even for the Hoary bat, only its *existence* across the MBNF is mentioned. The document provides no consequential information about how that species might synergistically add to or subtract from welfare of the forest itself — or how the forest may be essential to welfare of the bat and insect faunas. Again, grand opportunities for the gathering of first-class ecological information from this project will be bypassed.

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

LaVA's Specialist Report presented by S. Loose, S. Harkins, and S. Kozlowski in February 2019 (Biological Evaluation, Management Indicator Species, and Species of Local Concern Report) stated the following (p. 30):

> "No further analysis is needed for species that are not known or suspected to occur in the project area, and for which no suitable habitat is present. The following table documents the rationale for excluding a species. If suitable but unoccupied habitat is present, then potential effects are evaluated."

The table referred to in that quotation is: Table 6. Region 2 Sensitive Species (Terrestrial Wildlife). Within the section dealing with mammals (on p. 32) the table lists four species of bats that are known to occur in Region 2, among which only the Hoary bat (*Lasiurus cinereus*) is stated to be known in suitable habitat within the area encompassed by the LaVA project. It is considered to be a regionally 'sensitive species.' The other three species, ostensibly unknown from the project area, are not considered further. On that basis, the USFS Response (in LaVA's FEIS Appendix B) to Comment 1 (of 823.11: Bats — Wildlife) concludes, in its entirety:

> "**RESPONSE:** All bat species identified as sensitive species by the Forest Service Rocky Mountain Region staff were considered for analysis in the species considered for analysis section of the biological evaluation. *The hoary bat is the only bat determined to occur on the Medicine Bow National Forest and to potentially be impacted by the LaVA project*. The biological evaluation describes the major factors affecting hoary bats and the impacts of LaVA Project implementation to hoary bats." [italics added]

As considered below, the italicized sentence in that Response is in error.

The following, peer-reviewed reference book provides essential new insights to the importance of bats within the overall LaVA project:

Buskirk, S. W., 2016, Wild mammals of Wyoming and Yellowstone National Park: Berkeley, University of California Press, *xv* + 437 p.

As documented by Professor Buskirk, 18 species of the mammalian Order Chiroptera (bats) are known from within boundaries of the State of Wyoming. A full chapter is dedicated to discussions of the status of knowledge those species (with description, systematics, distribution, ecology, notes, and references). Of that level of total bat diversity statewide, eight species have been recorded either in the Medicine Bow or Sierra Madre components of the Medicine Bow National Forest, or in both components. Those species are: *Myotis evotis* (Long-eared myotis); *Myotis lucifugus* (Little brown myotis); *Myotis volans* (Long-legged myotis); *Lasiurus borealis* (Eastern red bat); *Lasiurus cinereus* (Hoary bat); *Lasionycteris noctivagans* (Silver-haired bat); *Perimyotis subflavus* (American perimyotis); and *Eptesicus fuscus* (Big brown bat). Each species has its occurrence(s) documented on a range-map superimposed upon a state physiographic diagram as well as on a smaller-scaled North plus Central American political map. It is very probable that additional species eventually will be recognized as visitors to the LaVA project's areas. All bats known from Wyoming carry limited legal protection as 'sensitive species' and as 'protected nongame animals.'

Although singularly difficult to study because of their crepuscular and nocturnal activity phases, American bats are insectivorous or, most uncommonly, blood-feeders. Also, they have low reproductive rates, usually involving single offspring, uncommonly with twins. Living and brooding chambers are diverse, variously in tree cavities, caves, fissures in rock outcrops or soil, or in artificial places of human habitation. One species of particular interest to the present context is the Silver-haired bat (*Lasionycteris noctivagans*) as described in the following peer-reviewed study:

Campbell, L. A., Hallett, J. G., and O'Connell, M. A., 1996, Conservation of bats in managed forests: Use of roosts by *Lasionycteris noctivagans*: Journal of Mammalogy, v. 77(4), p. 976–984.

Their roosts are in dead or dying trees having exfoliating bark with extensive vertical cracks or cavities—i.e., roosting under peeling bark of *standing* snags. As stated by Campbell et al. (1996, p. 976: "Recruitment and retention of snags and the maintenance of structural complexity in forest patches in upland as well as riparian areas are important for the conservation of species of bats in managed forests." Thinking more generally, bats are important ecological components across intact Wyoming forests, especially in terms of natural control of flying insects. The USFS, however, has little grasp on the potential total diversity or ecological status of chiropterans across Wyoming. Essentially no concern is expressed over that weakness within documents of the LaVA project.

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Comment 824: Best Available Science
824.01: Reference Citations — Best Available Science
Comment 1 and USFS Response (p. 130 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 824.01:

"**COMMENT 1:** In general, the reference section is incomplete or some references are not cited in the text where they are pertinent to the discussion."

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

12. The 'References' section of the DEIS (p. 255–278), as generously labeled, is a study in incompleteness and uselessness. Chosen by me at random, the combined first two pages of the 'References' section hold 26 papers, only seven of which are actually cited within text of the DEIS. That is a 27 percent positive performance as judged on 'completeness.' Similarly, following my semi-random choice of pages 94–98 from text of the DEIS, of the ten citations to published papers, only two actually appear in the list of 'References.' Also, it is commonly the case in this DEIS that multiply authored papers lack 'et al.' completions, thereby incorrectly suggesting to users only existence of solo authorships. If citations to governmental reports and/or peer-reviewed research papers are to be presented at all, they should stand as reliable exhibits of accuracy and usefulness to verifiability of perspectives presented within the document at hand.

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

The harsh evaluation (item 12, directly above) that I made in the review of August 15, 2018 in large part resulted from an absence of explanation in the DRAFT EIS that many of the references resulted from inclusion of citations that originated amongst the array of Specialist Reports.

The reference listing within the FINAL EIS lacks the stylistic consistency and bibliographic thoroughness (including all volume numbers, pagination, etc.) that characterizes a genuinely professional work. Nevertheless, a significant effort toward improvement was made within this final version, which I appreciate. But still, the explanation of what constitutes this array of citations is available only in the Response to Comment 1 for 824.01 of Appendix B in the FEIS. Why was that important bit of information not placed as a useful instructional comment right at the top of the 'References' section?

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824.02: Best Available Science — Best Available Science Comment 1 and USFS Response (p. 131 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 824.02:

"**COMMENT 1:** What's more, the Forest Service relies on faulty assumptions to ignore many direct, indirect, and cumulative impacts. Instead, the Forest Service assumes that the proposed logging will provide resilience to future epidemics, high mortality stands will accelerate in growth and production, and logging will result in more favorable conditions for regeneration of stands to conform to forest plan desired conditions. See, e.g., DEIS at iv. By ignoring best available science that refutes these assumptions, the Forest Service fails to take the required "hard look" at the direct, indirect, and cumulative impacts of its proposal."

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

Because of the vagueness of Comment 1 itself, I'm not sure just why my Letter #120 was added to the specific list of commenters.

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

I think all I can say here is that, as a typical scientist, I share much hesitation in endorsing many of the promises for good progress within a massively conceived project in which modes to adequate financing are all but ignored.

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Comment 825: Document Suggestions
825.06: General — Document Suggestions
Comment 2 and USFS Response (p. 133 of FEIS Appendix B)

USFS-SELECTED CITIZEN'S COMMENT 1 FOR 825.06:
None; but see: FEIS Appendix B, p. 133 — Comment 2 of Changes to Final Environmental Impact Statement: Numerous locations in the final environmental impact statement.

LILLEGRAVEN'S RELEVANT COMMENTS FROM LETTER #120:

11. As shown clearly in the captions to Tables 26 and 27 in the DEIS, almost the entire document applies redundant and/or inaccurate nomenclature to the pair of Wyoming mountain ranges occupied by the MBNF. The term 'Sierra Madre Mountain Range' is redundant (the correct name is simply 'Sierra Madre'), and the name 'Snowy Range Mountain Range' is redundant *and* erroneous (the correct name is 'Medicine Bow Mountains'). Those corrections certainly do matter in a practical sense. For example, in attempting to locate literature relevant to those ranges using searches within disparate databases, one must employ correct search terms. Almost always, in peer-reviewed, scientific writing, the correct geographic names are utilized. Searches under the term 'Snowy Range' (when 'Medicine Bow Mountains' is actually intended), however, will take the investigator *only* to the unusually scenic, small, and relatively high-elevation component of the northern Medicine Bow Mountains.

COMMENTS ON FINAL EIS FROM LILLEGRAVEN:

I shudder even to think about the magnitude of monetary costs and employee time that was expended in composing, duplicating, and distributing documentation associated with the LaVA project. The entirety of the text and its graphics represents an official document of the United States of America as ramrodded by one of its largest domestic agencies. To most Americans living outside of Wyoming, the LaVA documents are seen as specific to a remote, seemingly well-hidden, minor mountainous area that exists somewhere far off to the southeast from Yellowstone National Park.

With that in mind, is it wise for the Department of Agriculture's U.S. Forest Service to intentionally spend our tax dollars in applying terminology that is geographically incorrect and will lead to unnecessary confusion among its users? The northern Medicine Bow Mountains begin just south of the Pass Creek Basin and continue southward across the Wyoming/Colorado state boundary, penetrating deeply into north-central Colorado. A tourist following that southward transect would have crossed the Snowy Range shortly after his/her hike began; the Snowy Range does *not* extend southward to any sense of proximity to the Colorado line. The Snowy Range is a well-defined, distinct place, and it exists *only* within the northern and northeastern, largely quartzitic, high-elevation extremes of the Medicine Bow Mountains.

Also, use of the term 'Sierra Madre Mountain Range' could become goofier only by adding to the existing redundancy (i.e., beyond the correct term 'Sierra Madre') such as 'Sierra Madre Mountain Range Uplift Chain Plateau'—or beyond.

Finally, and more seriously, I reiterate the importance of applying correct terminology when posing geographic questions to a computerized database.

———————————————————

In Closing —

In my attached review (dated August 15, 2018) of the DRAFT EIS for the LaVA project I presented fifteen examples, selected across a broad array of topics, of what I considered to be serious informational omissions. Personnel of the U.S. Forest Service responded to each of those examples, some responses more thoroughly justified than others, within Appendix B of the project's FINAL EIS.

Both the DRAFT and FINAL versions of the EIS are much longer on promises than on verifiable workability. Nevertheless, the present document does reflect my acceptance of several of the USFS responses. But I do object (based upon verifiable criticisms) to most of the others. The issue of project funding, as based upon the USFS's own data and analysis, I consider as fatal to furtherance of the project. In short, the paucity of essential, economically based information has shown that even the USFS itself does not know how—or if—the many promises of project success could come to pass. That situation, in my opinion as a citizen taxpayer, is procedurally unacceptable and fiscally irresponsible.

As I drafted this formal document, I have done my best to clarify in detail the reasons behind my decision to recommend choice of the inaccurately named 'No Action' alternative.

Sincerely yours,

Citizen of Wyoming

Attachment:
Review Comments on LaVA DRAFT Environmental Impact Statement

Review Comments on LaVA DRAFT Environmental Impact Statement

Jason A. Lillegraven, PhD
[Representing only myself]
[redacted]

August 15, 2018

To whom it may concern:

The Bottom Line —

My statement deals with the 'Medicine Bow *Landscape Vegetation Analysis* Project' (LaVA). Following close reading of the project's DRAFT Environmental Impact Statement (DEIS) and most of its supporting documentation, it is my opinion that the contents are inadequate to justify recommendation of the option of 'modified proposed action' as would be authorized by section 104(1) of the Healthy Forests Restoration Act. My decision to favor the 'no action' alternative is justified below through a series of examples of serious informational omissions within the DEIS.

Fifteen Examples of Informational Omissions —

1. This DEIS proposes profound reshaping of the Medicine Bow National Forest (MBNF), spread across an effective duration of 15 to 20 years. As written, the document depends upon an assumption that the present levels of personnel and facilities will be adequate to make the proposed forest modifications possible. Such assertions are highly unrealistic. The DEIS is fatally devoid of analysis of finances required to accomplish the specified tasks.

2. This DEIS does not adequately take into account the combined, negative influences across the MBNF of historic timber harvests, mining, over-grazing, excessive hunting, and introductions of exotic species. Those activities have profoundly stressed the original forest system to the extent that today it should be characterized as almost completely within '*recovery* mode.' As considered below, even special, functionally recognized forest areas are to be subjected forthwith to renewed stress through application of the full suite of forest-reduction tools.

3. The MBNF today is *functionally* subdivided into 23 categories of specifically numbered 'Forest Plan Management Areas' (FPMAs). As specified in the DEIS, all but six of the designated FPMAs are to be authorized to apply the full suite of tools intended for forest reduction (from handwork upward through application of heavily mechanized equipment). Applications of those tools are scheduled to involve even the following, unusually sensitive, numbered categories: seasonal and year-around 'Backcountry Recreation' areas (categories 1.31, 1.33, 3.31, and 3.33); 'Scenic Rivers' (of the National River System; 3.4); 'Forest Flora and Fauna Habitats' (3.5); 'Special Wildlife Areas' (3.54); 'Crucial Deer & Elk Winter Range' (3.58); 'Scenery' (4.2); 'General Forest and Rangeland Vegetation Emphasis' (5.12); 'Forest Products, Ecological Restoration' (5.15); and 'Deer and Elk Winter Range' (5.41).

4. Use of the full suite of forest-reduction tools is even to be permitted on the popular recreation area in western Albany County known as Sheep Mountain. That is the home of the 'Sheep Mountain Game *Refuge*' (*not* the 'Sheep Mountain Game *Reserve*' as cited in the DEIS). This nationally designated game refuge, the only one in Wyoming, was created in 1924. It is relatively intact ecologically, and it is unique within the United States in existing upon an enormous, eastwardly thrusted fault block that developed during the ancient 'Laramide' interval of mountain building. From the perspective of residents of southern Wyoming, despoiling the Sheep Mountain Game Refuge through deforestation would be comparable to doing something similar within the forested highlands of Yellowstone National Park.

5. The LaVA project's planned duration is vague (i.e., '15–20 years'), and the DEIS lacks any semblance of a clearly presented temporal-planning schedule. Treatments are to be authorized for 15 years (starting in 2019), but they ". . . would be completed within approximately 20 years of the project decision" (document E4 in the Analysis Folder).

6. The DEIS, including its multiplicity of maps, is devoid of information about the location of segments of the 600 miles of recommended 'temporary roads.' Apparently, this represents a failure of relevant planning, even though 'temporary road construction' is planned to commence in 2019.

7. The costs of securely closing 'temporary roads' (against use by unauthorized vehicles) and then followed by the decommissioning of roads to natural contours would be prohibitively high. Such costs would exist both in dollars and as linked to mustering added personnel. The costs are not considered in the DEIS.

8. Although not overtly stated in the DEIS, it seems that the extensive 'temporary road' system would function principally in expansion of commercial logging within ever-more-limited areas presently lacking access for heavy vehicles. Whatever the functions, the newly graded roads could involve fully a quarter of the total area of the Medicine Bow National Forest and two-thirds of its 360,000 acres planned for 'treatment' by reductions during the conduct of LaVA. Logging, even when dominated by harvesting weakened or parasite-killed trees, clearly is to take precedence over diverse-species' habitat protection, general forest-ecological recovery, human recreation, or scenic resources.

9. It appears that *all* local species of conifers are becoming eligible for harvesting within LaVA during commercial logging. That includes species such as Engelmann spruce and subalpine fir that tend to be lightly infected by parasitic insects. This new vulnerability of Engelmann spruce to harvesting represents a change from the 2008 U.S. Forest Service's forest-wide decision to preserve that species for beneficial wildlife habitat.

10. All maps provided within the DEIS lack standard geographic coordinates (i.e., latitude/longitude *or* township/range). Thus it is unnecessarily difficult to reliably determine specific locations of the wealth of unique features or defining patterns seen on the maps.

11. As shown clearly in the captions to Tables 26 and 27 in the DEIS, almost the entire document applies redundant and/or inaccurate nomenclature to the pair of Wyoming mountain ranges occupied by the MBNF. The term 'Sierra Madre Mountain Range' is redundant (the correct name is simply 'Sierra Madre'), and the name 'Snowy

Range Mountain Range' is redundant *and* erroneous (the correct name is 'Medicine Bow Mountains'). Those corrections certainly do matter in a practical sense. For example, in attempting to locate literature relevant to those ranges using searches within disparate databases, one must employ correct search terms. Almost always, in peer-reviewed, scientific writing, the correct geographic names are utilized. Searches under the term 'Snowy Range' (when 'Medicine Bow Mountains' is actually intended), however, will take the investigator *only* to the unusually scenic, small, and relatively high-elevation component of the northern Medicine Bow Mountains.

12. The 'References' section of the DEIS (p. 255–278), as generously labeled, is a study in incompleteness and uselessness. Chosen by me at random, the combined first two pages of the 'References' section hold 26 papers, only seven of which are actually cited within text of the DEIS. That is a 27 percent positive performance as judged on 'completeness.' Similarly, following my semi-random choice of pages 94–98 from text of the DEIS, of the ten citations to published papers, only two actually appear in the list of 'References.' Also, it is commonly the case in this DEIS that multiply authored papers lack 'et al.' completions, thereby incorrectly suggesting to users only existence of solo authorships. If citations to governmental reports and/or peer-reviewed research papers are to be presented at all, they should stand as reliable exhibits of accuracy and usefulness to verifiability of perspectives presented within the document at hand.

13. This DEIS is devoid of anything useful or relevant to tests of the concept of trends in weather or climate change. The following statement (Table 17, p. 54) skirts the entire question, lifelessly pleading immeasurability of temperature-related data as based upon the study's expected duration of 15 years: "The amount of climate change that would occur over that period is within the natural weather disturbance that occur [sic] over a 15-year period, so there would be no measureable change to disclose in the draft environmental impact statement due to climate change." The key to understanding future weather-related history, however, must be linked to knowledge from the past, for which much relevant information now exists within the scientific library. For example, note NASA's graph attached at the end of this letter (publ. Aug. 10, 2018 in *New York Times*). Temperature trends are readily recognizable within 15-year durations, especially beginning at about the year 1910. The vapid path chosen within this project's DEIS is most unfortunate because of the simplicity of intentional avoidance of whatever information might come to the surface within its own data.

14. Probably the most important factors leading to restoration of a healthy forest include availability of liquid water and the existence of appropriate soil microbes (symbiotic bacteria and fungi). This DEIS holds almost nothing of value in terms of considering the roles of soil microbes in evaluating presence or absence of health of the MBNF. The terms 'bacteria' or 'bacterium' do not exist in the DEIS, 'fungi' or 'fungus' each appear only once (p. 193 and 195, respectively), 'microbe' appears once (p. 164), and nothing of informational substance is contained within any of those occurrences. What grand opportunities are thereby being passed up!

15. Similarly, scientific knowledge about life histories of bats (Mammalia, Order Chiroptera), as related to their roles in forest ecology, is burgeoning. Nevertheless, only the Hoary bat is mentioned in the DEIS, thus ignoring the 15 other species that definitely have been recorded in Wyoming forests. And even for the Hoary bat, only its *existence* across the MBNF is mentioned. The document provides no consequential information

about how that species might synergistically add to or subtract from welfare of the forest itself — or how the forest may be essential to welfare of the bat and insect faunas. Again, grand opportunities for the gathering of first-class ecological information from this project will be bypassed.

A Few Comments in Closing —

Each of the 15 examples I summarized above is intended to highlight impacts of inadequacies distributed throughout the LaVA-project's DEIS. The topical diversity of those sampled items is substantial. Relevant topics range from inadequate project-wide funding in support of planned actions to the absence of information about forest health as based upon synergistic interactions provided by bat–insect diversity. Repeating from the first paragraph of this letter, it is my opinion that contents of the LaVA-project's DEIS are inadequate to justify the option of continuation by way of a 'modified proposed action.' Please recognize that most of the examples I've presented represent serious informational omissions, and it is upon those failings that I recommend the 'no action' alternative.

Beyond my own list of examples, however, there exist even broader arrays of salient, science-based items. For example, I refer specifically to comments provided by Dr. Daniel B. Tinker, Associate Professor in the University of Wyoming's Department of Botany. Dr. Tinker is a seasoned researcher who has focused on the MBNF's overall ecological setting. His concerns reinforce a conclusion that this DEIS fails to meet the NEPA-required, full disclosure of the project's environmental impacts. I have, with his permission, attached his contribution to the final pages of the present letter. I will close with the following summary points as paraphrased from Dr. Tinker's review:

- The removal of trees potentially hazardous to human health and safety has long been a routine focus by the USFS within the MBNF;

- Forests characteristic of the MBNF are inherently resistant to beetle attacks, and the co-evolution has happened across scales of thousands of years;

- Even in the absence of well-intentioned human 'treatments,' the MBNF already is exhibiting "age class, structural, and vegetative diversity." Natural co-adaptive processes are creating new and diverse forest stands of differing tree ages, sizes, including occasional realignment of dominant tree species;

- Understory vegetation was relatively untouched by the recent bark-beetle epidemic, and in some cases herbaceous, grass-like species have been increasing, thus already improving habitats for wildlife in the absence of human 'treatments';

- Removals of living canopy and understory trees by cutting or controlled burning actually *delays* (rather than accelerates) forest recovery or regeneration. Growth rates of understory trees in the absence of human 'treatment' have increased three-fold in the MBNF;

- Potential commercial recovery of useful wood products from infected timber stands is limited, and fallen dead trees already are well into decay. Removal of such woody resources requires destruction of living, healthy trees; and

- Forest types characteristic of the MBNF have dealt naturally with frequent intervals of burning across thousands of years, and even young, rejuvenating parts of the forest may burn again only a few years after the preceding fire. Thus human-based thinning of woody fuels in uninhabited parts of the forest is impractical.

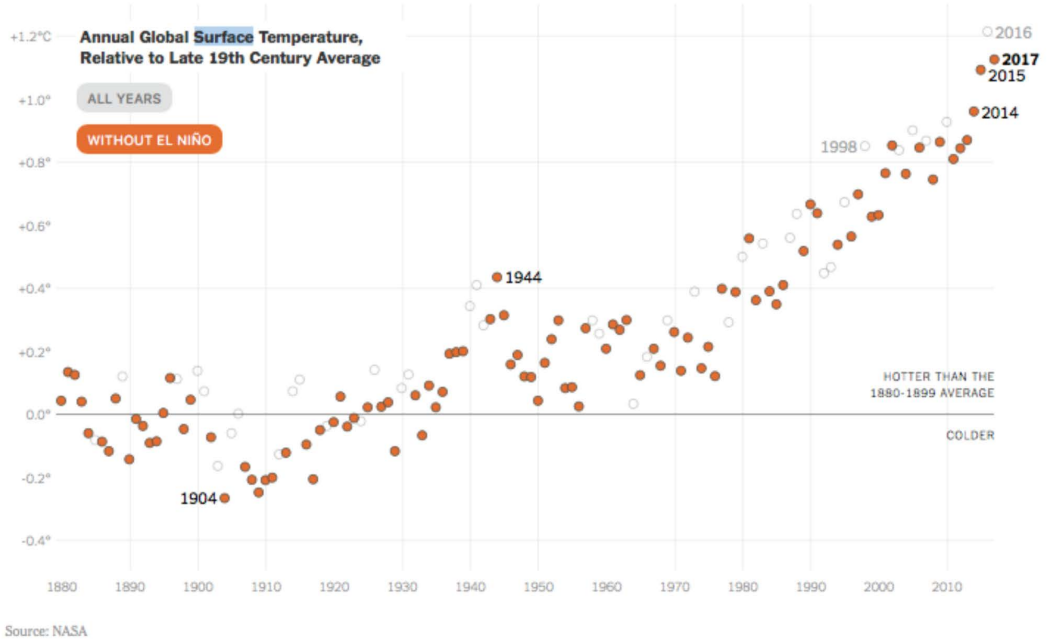
- As a general statement, one should recognize the absence of scientific support for much of the activity proposed within the DEIS for the LaVA project.

Thus it would seem that recovery of fundamental forest structure and function of the MBNF is already occurring, and most of that healing is in the absence of any active forest-management 'treatments.' My reading of this situation envisions Mother Nature as being in full control of the long-term health of her own forest. Indeed, most of the biggest jobs proposed in the LaVA-project's DEIS are verifiably already well underway in the absence of human 'treatments.'

Sincerely yours,

Jason A. Lillegraven

Citizen of Wyoming



Source: NASA

THOUGHTS RELATED TO THE LANDSCAPE VEGETATION ANALYSIS ON THE MEDICINE BOW NATIONAL FOREST, WYOMING

My name is Dr. Dan Tinker and I am a forest and fire ecologist, employed as an Associate Professor at the University of Wyoming. I was a member of the Governor's Forest Task Force two years ago and have worked and conducted research in the MBNF for over two decades. I would like to provide my perspective on the proposed LaVA project, as outlined in the scoping document. My opinions and thoughts are my own, and do not reflect any official position of the University of Wyoming.

While the bark beetle epidemic that has occurred over the past decade or so is unprecedented in geographic extent, at least in recent recorded history, the impacts to forests at the stand and watershed level have been documented numerous times throughout the Intermountain West's montane forests. Overstory mortality has been considerably less than predicted across the landscape, although some stands have experienced high levels of tree death. Studies of forest recovery from Wyoming and other states in the region have suggested that recovery of forest structure and function – largely through surviving overstory trees and "advance regeneration" of smaller understory trees – is already occurring, much of it in the absence of any active forest management treatments. Below, I will address a few specific areas that I think are important to consider more fully.

1. Health and human safety are the most important issues in all of this. Removal of hazard trees and dangerous areas of forest around human settlements, trails, roads, campgrounds, etc. is absolutely appropriate and necessary. I believe this has been the focus of tree removal to date, and I applaud those involved with this process.
2. The goal of "restoring resilience" to the forests is commendable, but concepts of resilience are complex, at best. Resilience, by definition, refers to a forest returning to the pre-disturbance condition after some period of recovery, whether natural or assisted by humans. Recent evidence shows that these forests are inherently resilient to these types of disturbances, which, along with high-intensity fires, they have evolved with for thousands of years.
3. The promotion of "age class, structural, and vegetative diversity" across the landscape, as outlined in the Purpose portion of the LaVA document, is already occurring in the absence of any treatments. The advance regeneration mentioned above, along with the survival of all understory vegetation and many mature canopy trees, is creating a new forest stand that will be composed of a broad range of tree ages and sizes, and in some cases, the dominant tree species in some stands may change from primarily lodgepole pine, to other species such as subalpine fir or even aspen.
4. Understory vegetation is relatively untouched by the bark beetle epidemic, and in some cases, graminoid species may increase in abundance, providing improved wildlife habitat, again in the absence of any treatments.
5. Using harvest and burning to "accelerate recovery and regeneration" is not accurate. In fact, removing living canopy and understory trees by either method will actually delay these processes, which are already occurring. Understory tree growth has increased three-fold (based on recent data from MBNF forests) in the absence of treatment.
6. Recovery of usable forest products from the stands is limited, at best. Many of the woody resources that were killed by the bark beetles have since fallen to the ground and begun to decompose, crack, and fragment. Removal of these woody resources requires removal of living, healthy trees.

7. Removing woody fuels in an attempt to reduce the likelihood of large, high-intensity fires is appropriate only in areas around human settlement or adjacent to other non-federal lands. These types of fires have occurred for thousands of years, and even young, regenerating stands may reburn after only a few years if weather conditions are suitable.
8. A more general comment relates to the interpretation or absence of scientific support for much of the proposed activity. In particular, there is clearly no consensus regarding the effectiveness of widespread fuel reductions in an effort to reduce either the occurrence or severity of future fires. Similarly, as mentioned above, many studies have already documented the diversity in forest age and structure that is occurring across the landscape, indicating that intensive treatments may actually decrease, rather than increase species diversity.

I provide these comments respectfully, and would be interested in joining in future discussions related to this, and other similar projects.

Daniel B. Tinker, PhD
University of Wyoming