June 6, 2019

Mary Erickson, Forest Supervisor
Virginia Kelly, Forest Plan Revision Team Leader
Planning Team
Custer Gallatin National Forest
Supervisor's Office
10 East Babcock
Bozeman, Montana 59715

Re: Comments on the Draft Revised Forest Plan and Draft Environmental Impact Statement, submitted via https://cara.ecosystem-management.org/Public/CommentInput?project=50185

Dear Ms. Erickson, Ms. Kelly, and the Custer Gallatin National Forest Planning Team:

Please accept these comments on behalf of Defenders of Wildlife (Defenders) in response to the Draft Revised Forest Plan and Draft Environmental Impact Statement released on March 8, 2019 (84 Fed. Reg. 8524). Defenders submitted scoping comments on the proposed action on March 5, 2018, and we incorporate by reference those comments to the extent that they do not contradict these additional comments.

Defenders is a national non-profit conservation organization founded in 1947 focused on conserving and restoring native species and the habitat upon which they depend. We submit the following comments on behalf of our more than 1,200,000 members and supporters nationwide, including more than 5,000 in Montana.

Sincerely,

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Comments on the Custer Gallatin National Forest Draft Management Plan and Draft Environmental Impact Statement
Defenders of Wildlife

Contents

I. Introduction

On March 8, 2019, the Custer Gallatin National Forest (Custer Gallatin or Forest) released its Draft Revised Forest Plan (Draft Plan) and associated Draft Environmental Impact Statement (DEIS) for public comment (84 Fed. Reg. 8524). We appreciate the tremendous amount of work and resources this process has required of the Forest and planning team to date. This includes adapting to the 2012 Planning Rule (36 C.F.R. § 219).

These comments focus on the ecological sustainability (36 C.F.R. § 219.8) and the diversity of plant and animal communities (36 C.F.R. § 219.9). A primary goal of the forest plan is to protect and restore terrestrial and aquatic ecosystems and watersheds (36 C.F.R. § 219.8(a)(1)). A revised plan must provide the ecological conditions needed to: contributed to the recovery of species listed as threatened or endangered under the U.S. Endangered Species Act (ESA), conserve species proposed or candidates for listing under the ESA, and maintain population viability for species of conservation concern (SCC) in accordance with 36 C.F.R. § 219.9(b)(1).

The comments below evaluate the likelihood that the draft plan, if implemented, will accomplish these goals and meet rule requirements for ecosystem integrity and at-risk wildlife and plants. Based on our evaluation the Draft Plan, if implemented, would have a low likelihood of achieving stated goals and requirements. For most of the plan components assessed below we attempt to provide a rationale as to why the components are not likely to meet planning goals and requirements.

II. Comments on the legal requirements governing management plan revision

Unfortunately, we are concerned that the Draft Plan and DEIS indicate that Forest's revised plan may not comply with several laws including: the including the National Forest Management Act (NFMA), 16 U.S.C. §§ 1600 et seq.; the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 et seq.; the Endangered Species Act (ESA), 16 U.S.C. §§ 1531 et seq; and other laws. We are urging the Forest Service to make considerable, but necessary, modifications to the Draft Plan that will require a revised DEIS.

A. Compliance with the National Forest Management Act and the 2012 Planning Rule

NFMA was enacted in 1976 in large part to elevate the value of ecosystems, habitat, and wildlife on our national forests to the same level as timber harvest and other uses. Specifically, NFMA requires the Forest Service to develop planning regulations that shall "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives" (16 U.S.C. § 1604(g)(3)(B)). In April 2012, the Forest Service finalized regulations implementing the NFMA (See 16 U.S.C. § 1604, 36 C.F.R. § 219). These regulations, the 2012 Planning Rule, established a process for developing and updating forest plans and set conservation requirements that the plans must meet to

sustain and restore the diversity of ecosystems, plant and animal communities, and at-risk species.

The Draft Plan does not provide meaningful plan components for at-risk species (i.e., providing certainty that necessary ecological conditions for each at-risk species will be achieved under the plan).

1. Best available scientific information

Forest Service planning regulations require the use of best available scientific information (BASI) to inform the planning process. Compliance with the rule requires two tasks: the Responsible Official (1) "shall determine what information is the most accurate, reliable, and relevant to the issues being considered" (the definition of "best available"), and (2) document the "*basis* for that determination" (36 C.F.R. § 219.3 (emphasis added)).

The Draft Plan and DEIS do a poor job of indicating which scientific information was used to inform decisions about plan components and plan component design. It's not always clear the Assessment (where we would expect to find relevant BASI informing management planning decisions) findings are driving decisions, and the DEIS for the revised plan must document when and why this is justified. The information in the DEIS should line up with the information provided in the Assessment. We believe the DEIS should have presented each of the conditions from the Assessment and listing each of the plan components that are designed to provide that condition, as well as an assessment of the effects of the plan on each condition.

As an example of how the Draft Plan seems to have failed to develop plan components consistent with BASI see the Whitebark pine Section III.C.3 below. The Forest Service developed science-based recommendations for managing and restoring whitebark pine in General Technical Reports published in 2012 (Keane et al. 2012) and in 2017 (Keane et al. 2017). However, the Forest Service has not translated key recommendations from these reports, particularly Keane et al. (2017), into plan components.

2. Desired conditions vs. standards and guidelines

The Draft Plan relies heavily on desired conditions, and there are perils of this approach. For example, the requirement for consistency with desired conditions is inherently much more flexible than for mandatory standards (36 C.F.R. § 219.15(d)(1)), and potentially allows no progress whatsoever to be made towards achieving them. Recognizing that such outcome-oriented plan components alone would not provide sufficient certainty, the Planning Rule indicates that mandatory standards and/or guidelines that act as constraints on projects be used where needed "to meet applicable legal requirements." Courts have held that only mandatory terms in forest plans can be considered regulatory mechanisms for the purpose of listing decisions under the Endangered Species Act. The NFMA diversity requirement requires a similar degree of certainty. There should be desired conditions for the ecological conditions

needed by the at-risk species, and these need to be accompanied by related standards and guidelines to ensure that those ecological conditions are achieved.

Many of the desired conditions we have reviewed in the Draft Plan would actually meet the definition of goal statements ("broad statements of intent," 36 C.F.R. § 219.7(e)(2)). Since they are not quantified, they can be subjective, and by themselves they are of mixed value. They can and should guide the development of more specific desired conditions, standards and guidelines. For example, where the plan says the desired condition is "ecosystem health" (as we see in FW-DC-TIM 01) it needs to elaborate in this and/or other plan components on what that means. Otherwise this simply restates the legal requirements. Additionally, the use of generic subjective terms does not support proper implementation. While terms like "sufficient" "adequate" "resilient" "healthy" "sustainable" "natural" and "necessary" might suffice as goals, the failure to include objective measurable conditions means that stakeholders have no idea what the Forest Service is planning, or what the effects will be.

3. The use of objectives

As noted above, measurable desired conditions will point the Forest in the right direction to maintain and restore ecosystem and watershed integrity; it is the objectives that establish the appropriate degree of urgency. The requirements for objectives are relatively straightforward regarding measurability and they are focused on achieving a desired condition or conditions. We appreciate that the Draft Plan includes objectives. However, in cases like FW-OBJ-PRISK-01, the actions meant to occur must be clearer; the objective provides that,

> *Alternatives B and C: Progress towards conservation of an at-risk plant species is made by completing at least two projects per decade with design features that restore habitat or populations of such species.*
>
> *Alternative D: Progress towards conservation of an at-risk plant species is made by completing at least three projects per decade with design features that restore habitat or populations of such species.*
>
> *Alternative E: Progress towards conservation of an at-risk plant species is made by completing at least one project per decade with design features that restore habitat or populations of such species.*

The plan must provide information on in what forest/vegetation types these projects may occur. The reader does not understand what the design features may be.

Objectives must be tiered to specific desired conditions, and this has not been done consistently throughout the Draft Plan. Also, we recommend the Forest Service use objectives to prioritize areas.

4. Flexibility

While the Planning Rule framework "creates a responsive planning process" that "allows the Forest Service to adapt to changing conditions" (36 C.F.R. § 219.6(a)). However, there is nothing in the planning rule that provides authority to establish a flexible forest plan by building uncertainty into the plan components themselves. The decision document will require "An explanation of how the plan components meet the sustainability requirements of § 219.8, the diversity requirements of § 219.9, the multiple use requirements of § 219.10, and the timber requirements of § 219.11" (36 C.F.R. § 219.14(a)(2)). Every plan component developed at this stage of the planning process should be evaluated through the lens of that requirement: Does it allow the forest plan to meet the rule's requirements? A plan that provides discretion, as this draft plan does, for future decision-makers to adopt programmatic decisions on a project-by-project basis would provide the Forest with the ability to essentially change or create plan direction in the future without public involvement. This is counter to the fundamental purpose of NFMA of providing integrated and strategic direction for future projects (NFMA Section 6(f)(1)). It also bypasses the substantive requirements of the planning rule, and its requirement for use of best available scientific information, both of which explicitly do not apply to projects (36 C.F.R. § 219.2(c)). In the case of at-risk species, it would allow the Forest to avoid its statutory obligation for forest plans to provide for diversity of plant and animal communities.

The forest plan cannot simply be a blank check. Plan components must "guide the development of future projects and activities" (FSH 1909.12 Ch. 20, 22.1). It is important that this step of providing a longer-term and landscape-scale context for project decision-making be taken seriously. Where future determinations are necessary, failure to at least provide criteria for making those determinations amounts to including no plan components that would meet species-diversity requirements.

It is clear the Forest Service wants to maximize flexibility in the revised plan. The Draft Plan's treatment of fire and fuels management exemplifies this, which is a clear pattern and not anomalous. Discussed in more depth below in the Fire and fuels Section III.A.1.b, guidelines FW-GDL-FIRE-01 and FW-GDL-FIRE-02 are so vague they provide no meaningful direction. The DEIS (p. 246) reaffirms that flexibility is key goal for plan "direction" related to fire and fuels, given that "flexibility" is listed as a key measure for wildland fire management. Additionally, the effects analysis regarding fire management assess the effects of plan elements and other factors on the extent and level of management flexibility (see DEIS, pp. 254 and 256).

5. Reliance on optional plan content

The plan cannot substitute "management approaches or strategies," referred to as "optional content in the plan" by 36 CFR 219.7(f)(2), for plan components by including substantive plan provisions in optional content. Management approaches must not be written like a plan component (FSH 1909.12, Ch. 20, 22.4). The Planning Rule clearly states that it is plan components that must provide the necessary ecological conditions for at-risk species (36 CFR

219.7(d)(3)). Optional plan content carries no legal weight and is unenforceable (projects need not be consistent with them). Justification for not including plan components should be sought in such cases. Plan components are limited to optional goals, and required desired conditions, objectives, standards, guidelines and suitability of lands. Information may be included in a plan about "management approaches or strategies (36 CFR 219.7(f)(2))," but these are not plan components and cannot be relied on to meet the diversity requirement.

Appendix A (Proposed Management Approaches and Possible Actions) of the Draft Plan describes optional plan content. Much of it reads as if written to be plan components. We provide a more detailed description of this problem in the fire and fuels section III.A.1.a below.

6. Deferring management decisions to the project level

The 2012 Planning Rule requires some degree of certainty regarding its projected effects on viability because plan components necessary for viability "must be included in the plan." The Forest Service cannot circumvent this requirement by including a plan component that defers management planning decisionmaking to the project level. When a plan includes no basis for determining project consistency, it essentially defers a viability determination to the project level. As a result, the plan itself does not do what is required of it by NFMA. This would also result in a forest having to determine viability for each project. The Rule is explicit that it does not apply to projects. The only plausible interpretation is that each project would need to conduct an analysis of forest-wide viability. That not creates maximum uncertainty, but flies in the face of the goal of NFMA for "one integrated plan," and would also create an analytical workload that the Forest Service itself could not support.

There are numerous cases where plan components do not provide sufficient direction but defer management decisionmaking to the project level. For example, guideline FW-GDL-PRISK-01 for at-risk plants states, "When project -specific analysis determines that management activities may potentially impact known at-risk plant populations, mitigation or protection measures should be provided to maintain the populations or sustain habitats of at-risk plant." The Draft Plan should be drawing on the best available science to identify mitigation measures for at-risk plants and incorporate specific recommendations into plan components, where they are available. Instead this guideline kicks the can down the road to project-level decisionmaking.

B. Compliance with the National Environmental Policy Act

The revised forest plan must tell the public how the Forest Service intends to manage the national forest for the next 10-15 years (or more). The EIS for the revised forest plan must evaluate the effects of that a in a way that will meaningfully inform decision makers about likely outcomes. There is a need to avoid arbitrary and capricious decisionmaking. The effects analysis needs to be more than a subjective, qualitative and comparative analysis.

NEPA has two objectives: (1) it requires an agency "to consider every significant aspect of the environmental impact of a proposed action"; and (2) "it ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process." *United States v. Coal. for Buzzards Bay*, 644 F.3d 26, 31 (1st Cir. 2011) (internal citations omitted). Stated another way, NEPA requires federal agencies to take a hard look at the environmental consequences of their actions before they act (See 42 U.S.C. §§ 4321, 4332(2)(C); 40 C.F.R. §§ 1501.2, 1502.25). The key element of this analysis is to evaluate the direct, indirect, and cumulative impacts—also referred to as effects—of several alternatives, including the proposed action, to determine whether an alternative with more conservation potential is available (See C.F.R. §§ 1502.16(a)-(b), 1502.25(c), 1508.16, 1508.27(b)(7)).

1. Need for change

The purpose and need statement in the DEIS should indicate that there is a need to illustrate how the revised plan corrects the deficiencies of the current land and resource management plans from 1986 and 1987. Additionally, the EIS must address why it proposes to change plan direction in the 1986 and 1987 plans that may already meet 2012 Planning Rule requirements and may provide better protections for ecosystems and wildlife.

The DEIS's purpose and need section includes the following statement on p. 4:

> Depending on the resource or land use, either the Gallatin or the Custer Forest Plan may have flexible or prescriptive management direction. Each plan has unique delineations and descriptions of management areas. The number, arrangement, boundaries, and plan direction for the existing management areas in the current plans are challenging to apply to project-level activities. A unified plan replacing tactical, prescriptive language with strategic language is needed to provide more efficient project planning.

The EIS must analyze the effects of transitioning from a "prescriptive" to a "strategic management plan."

2. Range of alternatives

The analyses in the Draft Plan's DEIS does not meet many of the conditions described above and fails to satisfactorily assess the impacts of the draft plan components to ecosystems and species. A key deficiency of the DEIS is its failure to analyze alternative plan components, i.e., a "no action" alternative that compares the effects of plan components from the current land and resource management plans, adopted in 1986 and 1987, and the other alternatives. This relative approach the DEIS employs in analyzing the effects of the alternatives does not capitalize on information available to provide a more thorough quantitative analysis. The purpose of the EIS is to disclose the effects of uses and activities on the values and resources of the Forest, as evaluated in light of the specific plan direction that abates the effects.

The evaluation of the "no action" alternative in the DEIS in inadequate. Every environmental analysis under NEPA must evaluate the "no action" alternative (40 C.F.R. § 1502.14(d)). This provides a baseline from which to measure and evaluate a proposed project's potential environmental impacts. Here, however, the agency has failed to explain the "no action" alternative in enough detail to provide a clear picture of the current Forest Plan. Doing so would make clear to the public that the current plan is better and more protective than the Draft Plan proposed in the preferred alternative.

In several cases, Alternatives B, C, D, and E do not seem significantly different, such as in FW-OBJ-VEGF-01. In *Center for Biological Diversity v. National Highway Traffic Safety Administration*, the entire range of alternatives considered in the National Highway Traffic Safety Administration's EA for setting CAFE (Corporate Average Fuel Economy) standards for automobile emissions ranged only a few percentages in difference of estimated lifetime CO2 emissions reductions. 538 F.3d 1172, 1218 (9th Cir. 2008). There the Ninth Circuit found that the agency considered an unlawfully narrow range of alternatives in its EA where the "alternatives [we]re hardly different from the option that NHTSA ultimately adopted." Id. Similarly, here, the DEIS only considers an overly narrow range of alternatives.

3. High quality information

NEPA requires that information presented to the public in and DEIS about potential environmental impacts of a project be "of high quality" (40 C.F.R § 1500.1(b)). Including all of the relevant information (e.g., objective, relevant forest/vegetation type, applicable design features, etc.) in one place in the document will assist in meeting this mandate.

The DEIS is the primary vehicle for informing the planning process about the effects of plan components, and NEPA has its own requirements for scientific integrity of the discussions and analysis in environmental impact statements, including references to sources relied upon for conclusions in the DEIS (40 C.F.R. 1502.24). Also important, however, is that the Forest Service has incorporated the requirement to use best available scientific information into its NEPA obligations (FSH 1909.12, ch. zero code, § 7.11b).

4. Description of plan components

Plan components are not adequately described. The DEIS does not describe the plan components in a clear way that the public can readily understand. Its descriptions of plan components are unclear and do not adequately present the relevant issues. However, the regulations implementing NEPA require that "[e]nvironmental impact statements shall be written in plain language . . . so that decisionmakers and the public can readily understand them" (40 C.F.R. § 1502.8). The description in the DEIS of the most basic content of the proposed Forest Plan—the plan components—is unclear and does not adequately inform the public of the most basic nature of the agency's action. Without this information, the DEIS fails to fulfill its fundamental purpose of "insur[ing] that environmental information is available to

public officials and citizens before decisions are made and before actions are taken" (40 C.F.R. § 1500.1).

5. Evaluation of plan components

The DEIS does not properly cite specific plan components as the basis for its effects analysis. The DEIS analysis must be limited to the plan components. It is fundamental that the EIS properly characterize what the plan components say and are intended to do. It cannot add words that aren't there. The EIS itself (including appendices) should not make assumptions and interpretations of plan components that it then relies on as if they were the plan components themselves. Such assumptions must be distinguished from the plan components, and their rationale must be provided, including any uncertainty. An EIS may not be used to shore up weaknesses in plan components. The same is true for a biological evaluation or biological assessment produced to support the planning process. The reader needs to know which specific plan components have what asserted effects. NEPA documentation must show how specific plan components affect each ecological condition needed by at-risk species.

Throughout, the DEIS vaguely and generally, and without referencing specific components, refers to plan components rather than critically evaluating their potential environmental impacts. This is inadequate under NEPA. NEPA requires an DEIS to actually evaluate the potential impacts of this plan direction. Merely "[s]tating that a factor was considered, however, is not a substitute for considering it" (*Getty v. Fed. Sav. & Loan Ins. Corp*., 805 F.2d 1050, 1055 (D.C. Cir. 1986)).

The effects analysis does not distinguish between the certainty of standards and guidelines verses the uncertainty of desired conditions and objectives. Standards and guidelines are mandatory regarding what may not occur, while desired conditions and objectives may never be achieved. The DEIS does not include a determination of the likelihood of desired conditions being achieved and fails to analyze the most likely outcomes (instead assuming that likely outcomes are in fact the desired outcomes). As part of this analysis, the EIS should consider whether there are other plan components, especially standards and guidelines, that contribute to achieving the desired conditions.

6. Effects analyses

An DEIS must take a hard look at the direct, indirect, and cumulative effects of the proposed amendment on the human environment as well as means to mitigate adverse environmental impacts, including ecological impacts (40 C.F.R. §§ 1502.16, 1508.25(c)). The DEIS for the management plan must evaluate the effects in a way that will meaningfully inform decisionmakers and the public about likely outcomes. Stated another way, the effects analysis needs to be more than a subjective, qualitative, and comparative analysis—it requires in-depth analyses of significant issues (40 C.F.R. §1501.7(a)(2)), such as species viability requirements.

The analysis must detail how specific proposed plan components affect each ecological condition needed by at-risk species. It is fundamental that the DEIS properly characterize what the plan components direct the Forest to do. The DEIS analysis must properly account for the effects of removing protective standards from the current plan. Some plans seem to have a core assumption that more flexibility is good, and therefore that standards should be limited. Standards provide greater certainty that activities having adverse effects will not occur.

The Forest Service must also address broad-scale effects during management planning. Cumulative effects can include all factors "beyond the authority of the Forest Service" (36 C.F.R. § 219.9(b)(2)) including activities of state and local entities that impact wildlife and biodiversity in the region.

The DEIS must also disclose and address uncertainty and risk. NEPA requires disclosure of incomplete or unavailable information (40 C.F.R. § 1502.22). For at-risk species, it is especially important to characterize the level of uncertainty and the effects in terms of how plan components increase or decrease risk.

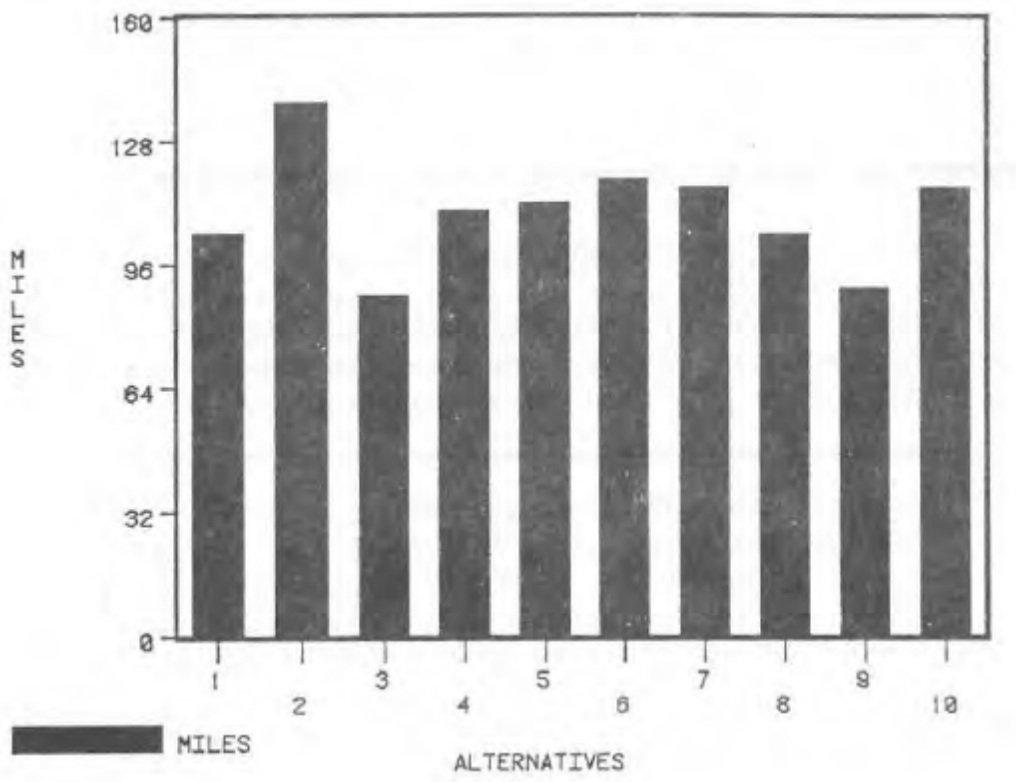
Effects analysis in the Custer Gallatin DEIS is inadequate. The analysis of the effects of the proposed action in the DEIS fails to assess impacts from specific plan components. This failure undermines the conclusions in the DEIS and does not adequately present the potential environmental impacts of the plan revision. Merely stating or listing plan components is inadequate; the DEIS must evaluate the potential impacts of implementing these proposed revised plan components (*See Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin*., 538 F.3d 1172, 1216 (9th Cir. 2008) ("stating the total miles of roads to be constructed is similar to merely stating the sum of the acres to be harvested—it is not a description of the actual environmental effects") (*Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt*., 387 F.3d 989, 994 (9th Cir. 2004)).

We found the effects analysis related to forested ecosystems and associated at-risk species, for example, consistent with problematic patterns found throughout the DEIS. The analysis presents no accounting of effects of specific plan components on the Forest's natural values and resources (including at-risk species). It provides weak and relative comparisons of the effects of the alternatives on the key characteristics selected to assess ecosystem integrity. It is not always clear which scientific and other information was selected as the BASI driving decisions, and given the array of information such as modeling results and peer-reviewed science that sometimes offer a range of findings, providing documentation that explains which information is considered the BASI is essential.

The Final EIS for the 1987 Gallatin National Forest Land and Resource Management Plan provides an example, regarding the impacts of livestock grazing on fish streams, of an effects analysis that is an improvement over most of the analyses in the 2019 Draft Plan. The FEIS states,

Miles of sensitive fishery streams impacted by grazing are shown by alternative in Figure IV-1, based on the Forest's fisheries analysis (Planning Records, 1981). Most of the decreases in fish population due to cattle grazing would be a result of a loss of riparian grasses and forbs adjacent to sensitive fishery streams (Bjornn, 1977; Bossu, 1954; Platts, 1979; Murphy and Hall, 1980). (p. IV-32)

Figure IV-1: Miles of Sensitive Fishery Streams Impacted By Grazing



An increase of 30,000 catchable trout could be gained over- current levels by reducing grazing use in the riparian zone to 40 percent utilization along the 104 miles of sensitive streams presently grazed. In Alternatives 7 and 10 this level of riparian forage utilization would be implemented. (p. IV-33)

Additionally, we would like to clarify the process in these cases where Regional Forester Sensitive Species (RFSS) are not carried forward as SCC. The DEIS notes on p. 126 that "Regional Forester's sensitive plant species would no longer be specifically protected once the new plan is implemented. However, coarse-filter vegetation related plan components would provide for their habitat needs." According to a June 6, 2016 2670/1930 WO memo from the Deputy Chief, National Forest System (Leslie Weldon): "Upon revision of one of these plans under the 2012 Planning Rule, a biological evaluation is required to document the effect of a plan revision on sensitive species because the 2012 Planning Rule SCC framework is not in effect until the Record of Decision is final." The DEIS has not done this. It is not overtly noted in the Custer

Gallatin DEIS that the Forest will conduct the necessary BE to document the effects of the plan on RFSS. This comment applies to all RFSS that have not been carried forward as SCC. For RFSS where there is no longer a concern for persistence in the plan area (and therefore they have not been identified as a SCC), the BE could also serve the purpose of validating that conclusion, in addition to evaluating the effects of plan components on viability. Since this is the last time that viability for these species would be evaluated, the integrity of the scientific analysis included in these documents is important.

7. Need for a revised DEIS

The DEIS is inadequate and a Revised DEIS should be prepared to rectify the inadequacies raised in these comments. As discussed throughout these comments, the DEIS prepared by the agency is inadequate under NEPA, and even if the Service were to rectify its inadequacies in a Final DEIS, those revisions and changes would be so extensive that the agency would be required provide additional opportunity for public comment on the new material (40 C.F.R. §§ 1502.1, 1503.1(a)(4)). Thus, we request that the agency prepare a Revised DEIS for public comment (See, e.g., *Dubois v. U.S. Dep't of Agric*., 102 F.3d 1273, 1278 (1st Cir. 1996) (describing the Forest Service's issuance of a revised draft DEIS for public comment in response to "criticism of the adequacy" of the "draft DEIS and a supplement to the draft")).

C. Compliance with other applicable laws

We discuss how the Forest Service must comply with the ESA and Administrative Procedure Act below. The Forest Service must also comply with wildlife laws, including the Migratory Bird Treaty Act in the development of the amendment (16 U.S.C. §§ 703-712) and the Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668–668c).

1. The Endangered Species Act

The ESA requires federal agencies to, "utilize their authorities in furtherance of the purposes of [the ESA] by carrying out programs for the conservation[1] of endangered species and threatened species" (16 U.S.C. § 1536(a)(1); Section 7(a)(1)). The Forest Service should have been working with the United States Fish and Wildlife Service (USFWS) to develop such programs to be implemented by the revised plan. It is not clear from the plan components that this has occurred (See Canada lynx section III.C.1 below).

Section 7(a)(2) of the ESA requires the Forest Service, in consultation with USFWS, to ensure that any action authorized, funded, or carried out by the agency is not likely to (1) jeopardize the continued existence of any threatened or endangered species, or (2) result in the destruction or adverse modification of the critical habitat of such species (16 U.S.C. §

[1] "Conservation" is defined by the ESA to mean "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary."

1536(a)(2)). For each proposed federal action, the Forest Service must inquire with USFWS as to whether any listed or proposed species may be present in the planning area (16 U.S.C. § 1536(c)(1); 50 C.F.R. § 402.12). If listed or proposed species may be present in the area, the Forest Service must prepare a "biological assessment" to determine whether the listed species may be affected by the proposed action. To date, the Forest Service has not released a biological assessment (or a biological evaluation) as part of the planning process.

Relying on information and analysis in the yet to be produced biological opinion as a substitute for NEPA analysis, without offering an opportunity for review and comment on the biological opinion, violates NEPA's requirements for public comment. Relying on a yet to be developed biological opinion cannot satisfy NEPA's requirement to provide the public with an opportunity for comment on the actual extent of the impacts that will occur under action alternatives (*Cf. San Luis & Delta-Mendota Water Auth. v. Jewell*, 747 F.3d 581, 649-650, 653 (9th Cir. 2014) (concluding that the implementation of a biological opinion was not exempt from NEPA requirements to prepare an EIS or EA and FONSI because "[w]e cannot say that 28 Section 7 of the ESA renders NEPA 'superfluous' when the statutes evaluate different types of environmental impacts through processes that involve varying degrees of public participation.")) (*Portland Audubon Soc'y v. Lujan*, 795 F. Supp. 1489, 1509 (D. Or. 1992) (explaining that ESA consultation cannot substitute for EIS preparation, even where the action agency also prepared an Environmental Assessment, because "The purpose of the Endangered Species Act and the purpose of NEPA are not the same. For example, there is no substitute in the Endangered Species Act for the public comment commanded by NEPA.").

The Forest Service should provide an opportunity for comment on the biological opinion prior to finalizing the EIS. The Final EIS should include the final biological opinion and incorporate public comment on the biological opinion.

2. Administrative Procedure Act

The DEIS also makes assumptions about what management activities will be undertaken during the plan period, but these activities are not laid out in the revised plan itself. These faulty assumptions additionally undermine the conclusions presented in the DEIS as arbitrary and capricious agency decisionmaking in violation of the Administrative Procedure Act, 5 U.S.C. § 706(1)(A). Where an agency relies on an assumption that is not supported by the evidence or facts before it, "the analysis which rests on this assumption is arbitrary and capricious" (*WildEarth Guardians v. United States Bureau of Land Mgmt*., 870 F.3d 1222, 1235 (10th Cir. 2017)). The DEIS must instead consider the effects of the management activities actually laid out in the revised plan itself when evaluating potential environmental impacts. Additional assumptions about management activities can only be included where the agency considers their likelihood of actually occurring, and factors that into its analysis.

III. Comments on ecological sustainability and wildlife

The Planning Rule incorporates an approach to diversity that first protects ecosystems by managing them for ecological integrity and then ensures that individual species are also protected. The rule's two-tiered conservation approach (alternatively called the "ecosystem-species" or "coarse-fine filter" planning method) relies on the use of surrogate measures, or key characteristics, to represent the condition of ecosystems, and also on the identification of at-risk species and evaluation of whether those species will be sustained.

Throughout the Draft Plan, it is not always clear which at-risk species are being provided for via the coarse filter components, and the EIS must document how ecosystem plan components meet the needs of at-risk species. Where they do not, the EIS must demonstrate how species-specific plan components address the necessary ecological conditions that are not provided with sufficient certainty by the ecosystem plan components (36 CFR 219.9(b), FSH 1909.12, Ch. 20, 23.13). For ecosystem plan components, the EIS must project the relevant future ecosystem conditions for each alternative. Where species-specific plan components are needed, it may be sufficient to demonstrate that remaining relevant threats have been managed. An analysis of the effectiveness of the Draft Plan would be better facilitated if the plan simply informed the public which species were being protected by which components.

A. Terrestrial ecosystems

This section provides comments on the Draft Plan direction for terrestrial vegetation, forested and other vegetation, fire and fuels, and timber harvest as well as related content within the DEIS.

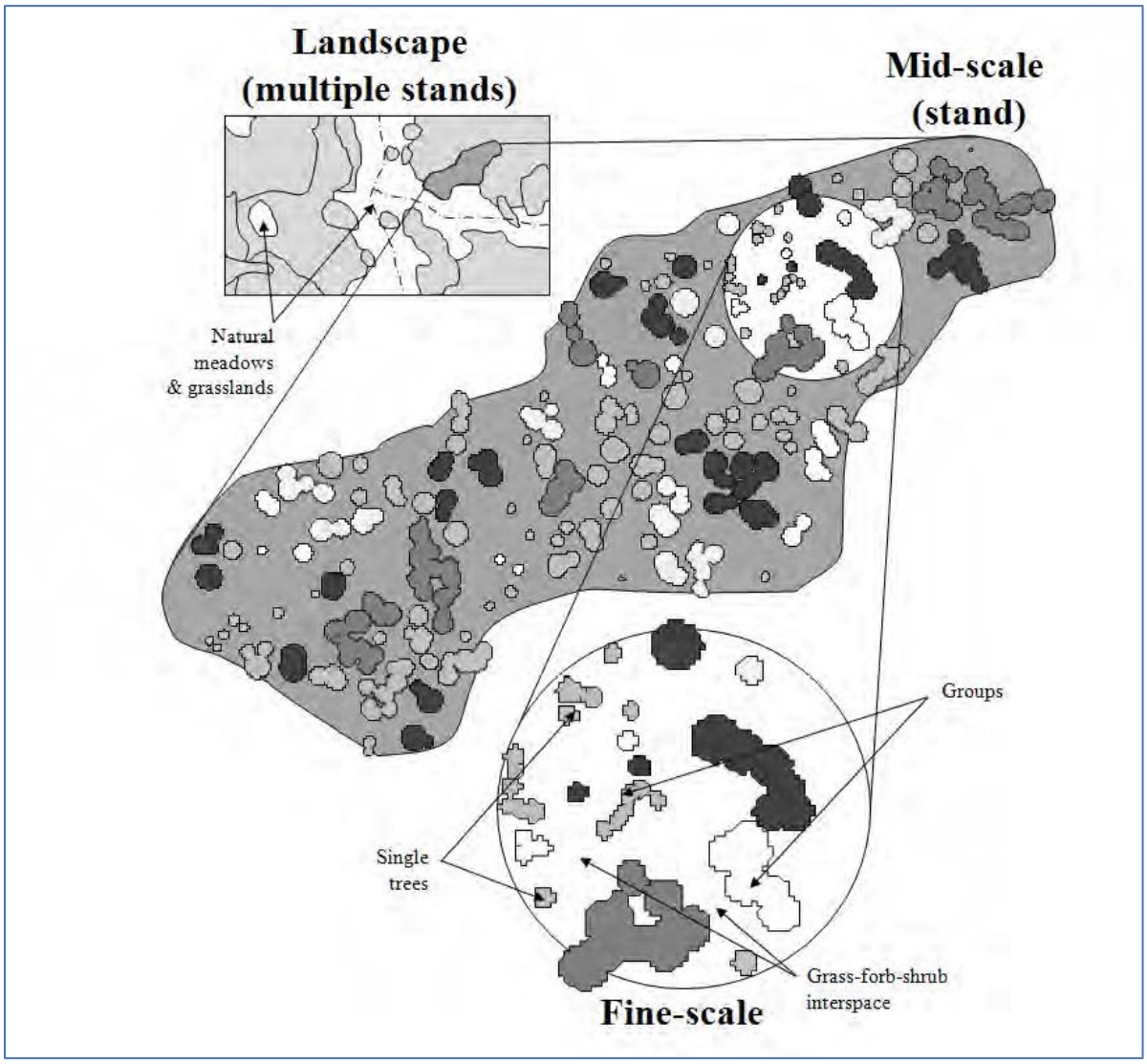
1. Forested vegetation, including fire and fuels and timber management

When planning and managing for the integrity of ecosystems, matters of ecological scale are of paramount importance. Ecosystem level plan direction must be translated where the rubber hits the road, at the landscape/project level. As a general matter, while we appreciate the analysis that supports the forested vegetation section of the plan, we believe the plan can be improved on issues of ecological scale to facilitate effective implementation.

We recommend that the Forest look at scale across large landscape, mid-landscape, and stand level perspectives. We point the Forest to the Carson National Forest Draft Plan vegetation section (attached). The Carson's approach to vegetation is worth replicating for several reasons. For example, desired conditions for terrestrial ecosystems are grouped by vegetation communities, which are the actual ecosystems of interest. Desired conditions for forest and woodland vegetation communities are also described at three spatial scales: landscape (1,000+ acres), mid-scale (10-1,000 acres), and fine-scale (less than 10 acres). The landscape scale describes the "big picture" and includes 10 or more mid-scale units arranged in a mosaic. It makes sense for seral state proportions to apply at this scale. The mid- and fine- scale desired

condition states provide additional detail necessary for guiding future projects and management activities.

It is essential that forest plans assist stakeholders and managers with identifying project priorities within landscapes (e.g. design features at the landscape, patch and stand level). A forest plan should be useful when walking a landscape and looking at potential stands for treatment to support conversations on whether what stakeholders see is desirable or undesirable. As it stands, the Custer Gallatin plan does not paint a granular picture of what we want forest conditions to look like when we are actually standing within them. Below is Figure 4 (Example of the three spatial scales) from p. 25 the Carson Draft Plan that illustrates the nested nature of scaled desired conditions.



a) Forested vegetation

The Custer Gallatin should develop desired conditions for the Potential Vegetation Type (PVT) groups to help support project level prioritization and design. In addition to desired conditions for PVTs, the plan should include current and desired range for tree species within PVTs. We do like how the plan put forward descriptive desired conditions for non-forested vegetation (Table 14). For forested PVTs, see the example below taken from the Flathead revised plan (Table 4, p. 27). *Note the relationship established between desired PVT conditions and wildlife, in this example, big game winter range.*

Table 4 of Flathead National Forest Management Plan

PVT	Current Condition	Desired Range	Desired Conditions
Warm-dry coniferous forest	Ponderosa pine: 4.2 Douglas fir: 76 Western larch: 19 Lodgepole pine: 28	Ponderosa pine: 15-50 Douglas fir: 30-60 Western larch: 10-30 Lodgepole pine: 15-35	Ponderosa pine is very common and all sizes are represented. Douglas-fir is common but usually in mixed stands with ponderosa pine, larch, or lodgepole. Western larch is present on the more moist sites within this type, most often in mixed stands with ponderosa pine and Douglas-fir. Grand fir and subalpine fir may be present on some of the moister sites, usually in understory canopy layers. In areas determined to be big game winter habitat (determined in cooperation with MFWP), species with full crowns in winter (e.g., Douglas-fir and ponderosa pine) are well represented in all size classes, whereas western larch and to a lesser extent lodgepole pine occur as minor or codominant species.

On p. 33 the Draft Plan states that "desired conditions also represent an integration of additional factors such as wildlife habitat needs." It is not clear how this has been done and for what species. We request that the desired conditions note the wildlife that will benefit from the achievement (maintenance or restoration) of the condition. For example, we like how the draft Carson National Forest plan presented wildlife information in the vegetation section.

We discuss some specific plan components below.

> *FW-DC-VEGF-01 – The amount and distribution of forest cover types supports the natural diversity of seral stages, habitats, and species diversity across the landscape and allows for appropriate recruitment and responses following disturbances. The desired condition*

for the distribution of dominance types is shown in table 4. Desired condition ranges apply at the forestwide scale.

Desired condition FW-DC-VEGF-01 is for amounts and distribution of forest cover types, forestwide. As noted earlier, we think this section of the plan would benefit from more information on ecological scale so that the conditions can be translated to landscapes, groups of stands, and stands. Table 4 could include desired conditions for geographic areas and other meaningful units of analysis, such as landscapes (e.g. forested mosaic areas within geographic areas greater than 1,000 acres). The take home from this table is that there is a need to restore ponderosa and whitebark pine. There is a compelling need for specific objectives for ponderosa given the difference between current and desired condition.

FW-DC-VEGF-02 – The plan area supports the natural diversity and distribution of native tree species, generally within the natural range of variation. This diversity and distribution supports the resilience and adaptive capacity of individual tree species. The forestwide desired condition for presence of tree species is described in table 5.

Desired condition FW-DC-VEGF-02 is for distribution of native tree species, but Table 5 doesn't present a desired distribution *per se*, it only presents desired percentages within the Forest. It would be interesting to know how the Forest sees the distribution of these trees within landscapes through more descriptive desired conditions or illustrations. Desired distributions should be presented for more meaningful ecological scales, such as geographic areas and project level planning landscapes. It is not clear how the different desired conditions in 01 and 02 will be applied at the project level, in that some of the information appears contradictory (e.g. Engelmann spruce/subalpine fir values). How will these desired conditions support stakeholder collaboration with the Forest to design restoration projects?

FW-DC-VEGF-03 – The plan area supports a diversity of successional stages that is ecologically resilient and sustainable. Table 6 represents the desired condition of successional stages (estimated by size classes) across the landscape. The location and abundance of size classes fluctuate over time as forests develop, are influenced by disturbances, and may be limited by site productivity and species composition. The range of desired conditions allows for variations in the mix of structural stages to respond to potential changes in climate. Desired condition ranges for each broad potential vegetation type apply at both the forestwide and geographic area scales.

FW-DC-VEGF-03 is for a diversity of successional stages across the plan area/landscape. It would be helpful to define "landscape" for planning, analysis and evaluation purposes. Again, we stress the need for plan direction that can be readily applied to project planning. It is not clear how the information in Table 6 would be applied to landscape/site level design. Also, disturbances will alter the existing condition, sometimes dramatically. How will information be updated to understand changes in successional stages? Wildfires will contribute to early seral stages and we assume that logging will target medium tree "surpluses". This is a situation

where it would be helpful to understand wildlife species dependent on forest type and successional stage so that potential programmatic effects and tradeoffs can be acknowledged before we move to project level design and analysis.

We are very concerned over the very low abundance of large trees across the PVTs. For size classes that are currently "outside" of the desired range, the plan should be providing robust direction on how those ranges will be achieved. The DEIS should look at the effects of not achieving those large tree conditions, and the effects of the management actions that will be taken to achieve them, if relevant.

The Forest should describe current and desired ranges for very large trees (> 20 inches d.b.h.), given their importance for a variety of wildlife species. The Forest should consider desired conditions for very large trees, including the desired species per PVT and riparian areas (See Flathead plan Vegetation FW-DC-TE&V 12).

> *FW-DC-VEGF-04 – The plan area supports a range of forest densities across the landscape that is resilient and sustainable. Table 7 displays the desired condition ranges for the percent of each broad potential vegetation type in each density class. The range of desired conditions allows for variations in the mix of density classes across the landscape to respond to potential changes in climate. Low-density vegetation conditions provide resilience to drought stress, fires, and insect and disease outbreaks. Desired condition ranges for each broad potential vegetation type apply at both the forestwide and geographic area scales.*

This desired condition is for a range of densities "across the landscape." It is not clear how this unit of analysis will be employed during plan implementation. When we think about density, we think about the stand level, but it is difficult to picture this plan direction being applied at that scale. Desired conditions describing desired densities at multiple scales across PVTs would be very helpful. The statement that "low-density vegetation conditions provide resilience to drought stress, fires, and insect and disease outbreaks" should be expanded upon. Is this a supposition for all forest types? Does it apply equally to landscapes, patches, stands, and other ecological units of analysis?

There is an implication that the forest plan will seek to facilitate reductions in canopy cover in cold and warm dry ecosystem types. This makes sense given the reference conditions, but it would be good to understand the implications of this programmatic direction, particularly when the means of achieving desired densities is forest management. It is not clear how managed wildfire, prescribed burning and thinning will each contribute to reductions in stand densities. The DEIS needs to look at the effects of reducing stand densities, particularly in cold and warm dry-montane systems.

The Flathead plan's desired condition for forest density (FW-DC-TE&V 13) provides a clearer description of conditions:

Forest densities range from very low to very high and occur in a diverse pattern across the landscape. Moderate and high tree densities (i.e., greater than or equal to 40 percent canopy cover) occur on 50 to 75 percent of the forested area and most commonly located in the cool-moist and warm-moist potential vegetation types. Forests at lower densities (i.e., less than 40 percent canopy cover) occur on up to 50 percent of the forested area and are most commonly located in the warm-dry potential vegetation type; on the drier and colder sites within the cool-moist and cold potential vegetation types; and in the wildland-urban interface. Forests at lowest densities also occur in seedling/sapling forest size classes.

Forest densities contribute to ecological, social, and economic desired conditions at the stand and landscape scales, including:

Wildlife habitat, e.g., providing cover and foraging conditions for many species including Canada lynx and flammulated owl, and facilitating tree growth for development of very large trees and future old-growth forest.

Forest resilience, e.g., reducing competition, improving tree vigor and growth, and reducing forest fuels in areas of the wildland-urban interface.

Timber productivity on lands suitable for timber production, e.g., maintaining adequate tree growth rates and stocking levels.

The next few plan components we discuss relate to snags.

FW-DC-VEG-05 – Snags (standing dead trees) occur within all forested potential vegetation and cover types to provide adequate habitat for snag-dependent wildlife. Snags vary in amount and distribution across the landscape over time based on site productivity, species composition, and disturbance patterns such as wildfire, wind, insects, and disease. A range of decay classes is present. The average desired quantity of snags (snag density) is described in table 8. The desired condition for the distribution of snags, defined as the percent of the area containing at least one snag of a given size class, is shown in table 9. While achieving these desired average conditions at large scales, snags are unevenly distributed across the forest with densities that are generally higher in riparian areas to provide for snag-dependent species and woody debris in streams and lower along roads and in developed sites or other areas where the concern for human safety is elevated. Individual stands may have no snags, or a higher quantity, depending upon site-specific conditions. Desired condition ranges for each forest type apply at both the forestwide and geographic area scales.

FW-GDL-VEGF-03 – To maintain snags (standing dead trees) over the long term for wildlife habitat and ecosystem processes, all vegetation management projects should retain at least 40 snags per 10 acres. Due to their rarity and high value for wildlife, the

largest snags available should always be prioritized for retention. Guideline applies as an average of treatment units across a project area and allows for variation in snag retention among treatment units with the intent of preserving the most desirable snags. Snags need not necessarily be present on every acre or in every treatment unit; they may be clumped as appropriate for the site, species, and existing snag distribution. If fewer than the minimum desired snags are present, live trees should be retained within treatment units with a preference for the largest and most decadent trees available. Large, live replacement trees may also count FW-GDL-VEGF-05. Trees with evidence of rot or wildlife use are preferred. Live replacement trees do not need to be retained where retention is not possible due to operational limitations associated with harvest or burning implementation. Snags should be retained greater than 300 feet away from roads in areas open for firewood collection. Exceptions to the snag retention guideline may occur in areas where the minimum number of snags or live replacement trees of sufficient sizes are not present prior to management activities and where there is elevated concern with public safety or fire risk (such as, developed sites, near landings, and in areas adjacent to infrastructure).

FW-GDL-VEGF-04 – If snags retained to meet FW-GDL-VEGF-03 are felled (for safety concerns) during vegetation management activities (such as, timber harvest), they should be left on site to provide coarse woody debris. The purpose of this guideline is to maintain snags (standing dead trees) over the long term for wildlife habitat and ecosystem processes. Exceptions may occur where there is elevated concern with public safety or fire risk (such as, developed sites and areas adjacent to infrastructure).

FW-GDL-VEGF-05 – Vegetation management prescriptions should retain, on average, 50 live trees per 10 acres greater than 15 inches in the warm dry broad potential vegetation type, 100 live trees per 10 acres greater than 15 inches in the cool moist broad potential vegetation type, and 80 live trees per 10 acres greater than 15 inches in the cold broad potential vegetation type. Guideline applies as an average across treatment units. Large live trees need not be present on every acre; they may be clumped as appropriate for the site and species. If the minimum amount of large or very large trees are not present, leave all that are available. No replacements or smaller sizes need be left unless desired in the site-specific prescription.

The purpose of this guideline is to maintain large tree structure in order to provide for resilience, future seed sources, structural diversity and wildlife habitat, future snags and downed wood, and to increase future management options. Trees best suited to leave are the longest-lived, windfirm, most fire adapted species available. Exceptions may occur when there are no or fewer desirable large trees available due to factors such as insects, disease, lack of wind-firmness, lack of desirable species, or where retention is not possible due to operational limitations associated with harvest or burning

implementation. Retained trees may also function as replacement snags, or be mixed in clumps with snags to meet FW-GDL-VEGF-03.

Though we appreciate that the Draft Plan includes a desired condition for snag distribution, the stand or project scale is a more appropriate scale for considering snag size and density instead of the forestwide and geographic area scales. We also appreciate the Draft Plan including guidelines that acknowledge the need for live trees to replace fallen snags and otherwise promote snag retention over the long-term. However, the snag-related desired condition and guidelines must be accompanied by or redeveloped as plan standards. Retaining snags at sufficient sizes and densities and appropriate distributions cannot be optional. The existing Custer Gallatin plan has 2 snag standards, and the EIS must assess the impacts of replacing these standards with desired conditions.

The revised plan should also include additional standards that will better ensure the maintenance of snag conditions sufficient to support forest species. Such standards include but are not limited to:

- Closing maintenance roads must be considered as an alternative to hazard tree removal in areas where the snags are below desired levels.

- Limit access for firewood cutting to lessen snag loss in areas where snag desired conditions are not met, and where valuable wildlife habitat should be protected.

- Vegetation management projects must specifically define how the project design will support the disturbance regimes that create habitat conditions for species dependent on snags, logs, burned landscapes, frequent fire, etc. for their persistence.

Please provide more information on the specific habitat needs of "snag-dependent wildlife." Listing those species along with the desired condition is very helpful to readers.

The snag size and density targets proposed in the desired conditions are likely not sufficient to maintain viability for all vulnerable snag-dependent species that occur in the Forest. For instance, Hutto (2006) proposed that Forest Service post-disturbance snag retention guidelines in managed conifer forests were inadequate and recommended targets closer to 80-120 snags per acre (without regard to snag size in dbh). The Forest Service should revise FW-DC-VEG-05 based on the needs of wildlife species that require large snags. Flammulated owls, for example, are secondary cavity nesters and need a high density of large snags. The species tends to prefer ponderosa pine forests. Given a decline of large ponderosa pine trees, available snags may be a limiting factor for flammulated owl persistence and recovery, and thus, there should be particular attention paid to snag retention for the species. They prefer snags >25 in d.b.h., and the low threshold may be 2-8 snags/ac at >13 in d.b.h. (Manley et al. 2004). Nelson et al. (2009) found that a minimum threshold for snag d.b.h. may be 12 in but average at 20 in d.b.h. Management practices must support sufficient snag retention and density for a variety of snag-

dependent species, including flammulated owls (Hutto 2006; Hutto et al. 2016). Boreal owls, also secondary cavity nesters, tend to occur in mature and older, higher elevation and lodgepole forests with trees of large diameter and high basal area (Hayward et al. 1993; Hayward et a. 1994). They need large snags and large trees, including aspen, for nesting: a minimum of nine snags per acre > 13 in in d.b.h. with some snags that must be at least 25 in d.b.h. (Wisdom et al. 2000; Hayward 2008). To enable retention of sufficient snags for boreal owl nesting, projects cannot manage to the minimum.

Designating one or more snag-dependent species as focal species would help test the assumption inherent in the desired condition that listed snag density targets—forest-wide and within forest PVTs—are sufficient for maintaining ecological integrity. Designating one or more woodpecker species, such as the black-backed woodpecker, and other focal species would help the forest achieve the ecological integrity requirement for terrestrial ecosystems. Woodpeckers are indicators for a range of ecosystem conditions, especially snag densities, sizes, decay rates (Hilty and Merenlender 2000; Haggard and Gaines 2001; Bate et al. 2008; Nappi et al. 2015). Additionally, woodpeckers are keystone species in conifer-dominated forests as primary cavity excavators that benefit a range of secondary cavity-using wildlife (Tarbill et al. 2015).

> *FW-DC-VEG-06 – The amount of wildland fire per decade is within the natural range of variation to maintain resilient ecological conditions and adequate habitat for snag-dependent wildlife. Table 10 displays the desired condition ranges for each broad potential vegetation type. Desired condition ranges for each forest type apply at both the forestwide and geographic area scales.*

It is good to see desired fire severity conditions for PVT in FW-DC-VEG-06. This desired condition interacts closely with FW-DC-FIRE, but only includes severity, whereas FW-DC-FIRE also desires certain intensities and frequencies. Where is that information presented? Seeing it all in one place would be helpful. FW-DC-FIRE-02 desires vegetation conditions that support natural fire regimes. We assume these conditions are also the desired conditions in the vegetation section.

The Forest Service should develop two independent desired conditions for mixed and high severity disturbances. The management plan should recognize the importance of complex early seral forest conditions that result from high-severity fire (see Swanson et al. 2011; Donato et al. 2012; DellaSala et al. 2014; Hutto et al. 2016) (but see our comments below on retaining old growth stands). Severely burned forest areas represent critical stages of biodiversity establishment and forest development, and a foundation for supporting ecological integrity. Complex early seral conditions provide high quality habitat and ecological conditions for a wide range of native flora and fauna, including woodpeckers, elk, bears, and others. Naturally disturbed areas, including by high-severity fire, provide opportunities for management that contributes to achieving ecological integrity, habitat diversity, and species persistence

requirements, especially snag dependent and shrub-dependent species, over a long timeframe measured in decades.

> *FW-OBJ-FIRE-01 –*
>
> *Alternatives B and C: Hazardous fuels mitigation occurs on a minimum of 6,000 acres per year. Treatment includes initial entry and maintenance to ensure desired conditions are achieved.*
>
> *Alternative D: Hazardous fuels mitigation occurs on a minimum of 7,000 acres per year. Treatment includes initial entry and maintenance to ensure desired conditions are achieved.*
>
> *Alternative E: Hazardous fuels mitigation occurs on a minimum of 4,000 acres per year. Treatment includes initial entry and maintenance to ensure desired conditions are achieved.*
>
> *FW-OBJ-FIRE-01 – Natural unplanned wildfire occurs on a minimum of 375,000 acres per decade, as conditions allow, in all vegetation types.*

The FW-OBJ-FIRE objectives need to be integrated with the forest vegetation section. Hazardous fuels mitigation is being proposed on between 4,000 and 7,000 acres per year. Will this be largely in the WUI and thus not contributing to desired conditions across ecosystem/forest types? FW-DC-FIRE 02 implies that it will. Can the Forest provide more information in the plan on where these activities may be prioritized? FW-OBJ-FIRE 02 seeks natural unplanned wildfire on a minimum of 375,000 per decade. This desired condition will be the primary means of achieving the vegetation desired conditions, but it seems important to acknowledge that not all fires will contribute to vegetation desired conditions (some may be undesirable).

As discussed, it seems like more can be done using scaled descriptions of desired conditions to prioritize landscapes and stands for restoration actions, including prescribed burning. It seems that a key piece of the puzzle is missing as we move from plans to projects; the Draft Plan gives little sense of where conditions are in a desirable state and where undesirable structural, compositional, functional conditions exist. The Planning Rule encourages plans to present "opportunities to restore fire adapted ecosystems" (36 C.F.R. § 219.9(a)(1)(v)). As the Forest knows, stakeholders seek information at the programmatic scale on areas that are a high priority for wildfire restoration actions. The directives also encourage "Opportunities for landscape scale restoration" (1909.12_20), stating that plans should look at the arrangement of conditions and characteristics at multiple spatial scales. We encourage the Forest to present more explicit information in the plan to help guide landscape design and project prioritization.

There are clearly fire deficits for mixed and high severity fire within the cold and cool moist systems. How will the plan's wildfire management strategy facilitate achievement of these desired conditions? The table (10) supports the idea for ecological restoration within warm dry-pine savanna types to return low severity fire to those areas. Does the plan reflect this priority?

> *FW-DC-VEG-07 – Landscape-scale patch configuration and composition is conducive to ecological processes operating within their natural range of variation including the extent, intensity and frequency of disturbance events, to provide for habitat connectivity, wildlife movement and gene flow. In montane ecosystems, the density of patches per square mile is doubled relative to 2017. In particular, large, contiguous patches of medium-sized, closed canopy forest conditions are reduced (smaller percentage of landscape) as well as disaggregated to reduce contagion and increase landscape-level ecosystem diversity and heterogeneity. In turn, the extent and density of early and late seral patches is increased. Early seral conditions are also less aggregated and more evenly distributed across the landscape resulting in greater diversity and contrast among patches. Table 11 shows the desired patch size distribution at the geographic area and forestwide scale.*

Defining the ecologically appropriate unit of analysis for landscape structure is important for FW-DC-VEG-07. This is a case where a figure illustrating the desired mosaic at the landscape scale for PVTs may be useful for the reader to visualize the desired mosaic. Fire will be the primary means of achieving these conditions, so this condition should be integrated with the fire objectives.

We also strongly suggest a standalone desired condition similar to Flathead FW-DC-TE&V 19 which desires patterns for forestwide and PVT types that contribute to connectivity of wildlife and presents desired conditions for patterns within PVTs.

> *FW-DC-VEG-08 – The extent, concentration and distribution of large live tree structure is sufficient to provide structural diversity, wildlife habitat, future snags, and potential future late-seral forest conditions. The desired range of large tree structure is shown in table 12. Desired condition ranges for each broad potential vegetation type apply at both the forestwide and geographic area scales.*

> *FW-DC-VEG-10 – The amount of old growth is maintained or increased relative to existing condition in table 13. The location and condition of old growth is dynamic over time. Development and maintenance of old growth stands is influenced by succession, natural disturbance regimes, silvicultural treatments, and climate. Landscape-level resiliency is provided by promoting a mosaic of younger forests to replace old growth when it is killed by stand-replacing events. The desired condition of old growth is described in table 13.*

Regarding FW-DC-VEG-08 and 10, and old growth conservation, we repeat our significant concern with the dearth of large live trees across PVTs. Table 12 shows deficits for large live tree structure and therefore the current condition is largely insufficient to provide structural diversity, wildlife habitat, future stands and potential future later-seral forest conditions. It is important that the DEIS evaluate the effects of possibly not achieving the desired condition for these factors, while continuing to log older forests.

Readers may be confused by the fact that that there are deficits in large trees (Table 6), large live tree structure (Table 12), but that there is a desire to *maintain* old growth within the existing condition (FW-DC-VEG-10 and Table 13). More explanation would be helpful to help support effective implementation. We encourage the Forest to look at the Flathead desired condition for old-growth (FW-DC-TE&V 14, below), which is explicit about maintaining *and* increasing trends in the amount, patch size, and connectivity of old growth forest, whereas the Custer Gallatin desires to maintain *or* increase old growth conditions.

> (From the Flathead plan.) Forest conditions *support the maintenance of existing amounts of old-growth forest and foster an increasing trend in the amount, patch size, and connectivity of old-growth forest into the future*, especially in the warm-dry and warm-moist potential vegetation types. Old-growth forest provides conditions that create habitat for old-growth-associated wildlife species. Old-growth forest is distributed widely across the Forest. Forestwide and within individual watersheds, the distribution, patch size, and amount of old-growth forest varies over time, depending upon forest development stage and the influence of climate and natural disturbances.

It is also discouraging to see the Custer Gallatin desire to *promote* younger forests to <u>replace</u> old growth killed by stand replacing events, which sounds like a desire for salvage logging. *Replacing* rare old growth structural conditions, even when it is killed, must be demonstrated to improve "landscape-level resiliency."

> *FW-GDL-VEGF-01 – To contribute to biodiversity and landscape heterogeneity, as well as provide habitat for old-growth-associated plant and animal species, vegetation management (including timber harvest, fuels treatment, or prescribed fire) in old growth other than lodgepole pine, should be used only to achieve one or more of the following purposes:*
>
> *1. To maintain or restore old growth habitat characteristics and ecosystem processes.*
>
> *2. To increase resilience to disturbances or stressors (such as drought, high severity fire, bark beetles) that may have negative impacts on old-growth characteristics or abundance at stand or landscape scales.*

FW-GDL-VEGF seeks to "contribute to biodiversity and landscape heterogeneity" and "provide habitat for old-growth associated plant and animal species." It would be good to know what

these terms mean exactly, although they sound good. As noted elsewhere in these comments, issues of scale are paramount when presenting information on "landscapes." It would also be good to know what the old growth associated plant and animal species are that will benefit from this guideline.

Logging within old growth stands to "maintain or restore old growth habitat characteristics and ecosystem processes" is tricky business. As written, this guideline could be applied simply by declaring through a purpose and need for an action to accomplish these goals. We don't think this guideline offers sufficient protection for old growth forests. This **standard** from the Flathead is better:

> In old-growth forest, vegetation management activities must not modify the characteristics of the stand to the extent that stand density (basal area) and trees per acre above a specific size and age class are reduced to below the minimum criteria in Green et al. Vegetation management within old-growth forest (see glossary) shall be limited to actions that maintain or promote old-growth forest characteristics and ecosystem processes increase resistance and resilience of old-growth forest to disturbances or stressors that may have negative impacts on old-growth characteristics (such as severe drought, high-severity fire, epidemic bark beetle infestations);reduce fuel hazards in the wildland-urban interface; or address human safety.

We also encourage the Forest to adopt plan direction similar to this guideline from the Flathead (FW-GDL-TE&V 06):

> To increase the patch size of old-growth forest in the future, if managing vegetation within 300 feet of existing old-growth forest, treatment prescriptions that would promote the development of old-growth forest in the future should be considered. At a minimum, the following structural and composition components associated with old-growth forest should be retained if present within at least 300 feet of the old-growth forest patch:
>
> - larger live trees (e.g., greater than 17 inches d.b.h.) of species and condition that will persist over time (such as western larch, ponderosa pine, Douglas-fir) and not cause unacceptable impacts to future stand conditions (e.g., dwarf mistletoe infection or potential dysgenic seed source);
> - large downed wood (greater than 9 inches diameter); and/or
> - snags and decayed, decadent trees greater than 15 inches d.b.h.
>
> Exceptions to this guideline may occur to protect human health and safety and within portions of the wildland-urban interface where decreased fuels are determined necessary to protect values at risk.

We appreciate the guideline to avoid road construction in old growth, but it would be wrong to allow access for the open-ended purposes of FW-GDL-VEGF 01. The guideline would be improved by adding that "unless access is needed…*and there are no feasible alternative road locations*."

FW-OBJ-VEGF-01 –

Alternatives B and C: Implement five to eight forested vegetation management projects per decade with explicit primary or secondary purposes of benefitting wildlife, whitebark pine and other at-risk species habitat, pollinator habitat, non-commercial vegetation, and general terrestrial ecosystem conditions.

Alternative D: Implement eight to ten forested vegetation management projects per decade with explicit primary or secondary purposes of benefitting wildlife, whitebark pine and other at-risk species habitat, pollinator habitat, non-commercial vegetation, and general terrestrial ecosystem conditions.

Alternative E: Implement two forested vegetation management projects per decade with explicit primary or secondary purposes of benefitting wildlife, whitebark pine and other at-risk species habitat, pollinator habitat, non-commercial vegetation, and general terrestrial ecosystem conditions.

We appreciate the presented objectives, but it is not necessarily clear how they relate to the desired conditions for vegetation because they focus on wildlife, whitebark pine, at-risk species, pollinators, and "non-commercial" vegetation, which were not the subject of this section. For example, FW-OBJ-VEGF-01 ALT D seeks to "Implement eight to ten forested vegetation management projects per decade … ." It is not clear the desired wildlife ecological conditions that are being targeted here. More specific incorporation of specific desired conditions for PVTs, including descriptions of desired wildlife habitat/connectivity, at a variety of spatial scales, would better support these types of objectives.

Would it not be the objective of *all* vegetation management treatments (e.g. prescribed fire, managed wildfire, thinning, harvest) to move towards desired conditions?

Also, is the Forest implying that there will be other forested vegetation management projects that do not include the purposes of these objectives? These vegetation objectives (and the desired conditions) need to be reconciled with the objective to treat 4-6,000 acres of hazardous fuels per year under FW-OBJ-FIRE-01 and the objective to great 5-8,000 acres on a decadal basis under FW-OBJ-TIM-03. There is also the objective that natural unplanned wildfire will occur on a minimum of 375,000 acres per decade (FW-OBJ-FIRE-2) which will likely be the primary driver of achieving desired vegetation conditions. The objectives should focus work on forest types that are in fire deficit and have structural conditions that do not support desired fire behavior.

To support collaborative landscape restoration actions the plan should identify priority landscapes to restore departed stands to desired structural conditions.

b) Fire and Fuels

Given the wealth of scientific analyses and materials about fire and fuels developed specifically to support the Custer Gallatin planning process, it is befuddling how minimally this information seems to have been used to inform the Draft Plan. Relevant topics including wildfire and fire suppression were addressed throughout the Assessment and in more detail in the specialist reports on fire (Shea 2017), forested terrestrial vegetation (Sandbak 2017), nonforested terrestrial ecosystems (Reid 2017), aquatic and riparian ecosystems (Barndt et al. 2017), invasive plants (Lamont and Reid 2017), and possibly others. The Custer Gallatin hosted The Science of National Forest Planning Symposium on September 14, 2018 that generated a set of helpful BASI and BASI syntheses on fire-related topics (Calkin and Haas 2018; Finney 2018; Hansen 2018; Haufler and Mehl 2018; Higuera 2018). The Forest Service's Rocky Mountain Research Station developed the report, *Climate Change Vulnerability and Adaptation in the Northern Rocky Mountains* (RMSR-GTR-374), with the intent to inform forest planning processes in the Rocky Mountain Region of the Forest Service (Halofsky 2018a,b). Though RMSR-GTR-374 provides detailed information about fire and fire risk in relation to climate change and is cited frequently in the DEIS, how the report informed fire and fuels management plan components is not clear.

In Appendix A of the Draft Plan, states,

> A wildfire risk assessment for the forest will be utilized and follows the methods outlined in the publication "A Wildfire Risk Assessment Framework for Land and Resource Management" (Scott, Thompson and Calkin 2013). This identified areas of risk and the spatial data used in the assessment analyzes where resource objectives and protection objectives can be met. (Appendix A, p. 23)

This statement is confusing. It is not clear if a wildfire risk assessment has been conducted for the Forest or if the assessment is to occur in the future. Scott et al. (2013) does not seem to be used or cited in any other planning document, including the Assessment, specialist reports, or DEIS. This framework was intended to be a tool for planning, among other purposes and was available in 2013. If the risk assessment framework was used to conduct such an assessment for planning, the Forest Service should have made a more explicit connection between the results the revised plan components. If a wildfire risk assessment is conducted after the management plan is implemented, the results may be significant enough that a plan amendment may be warranted to modify and better specify plan components that would account for this assessment.

Appendix A cites the Hansen et al. (2018) report, *Vegetation Climate Adaptation Planning in Support of The Custer Gallatin National Forest Plan Revision*:

> For specific information on climate change vulnerabilities and recommended management strategies related to potential climate change that are relevant to landscape and stand level prescriptions, refer to documents produced by the Northern Rockies Adaptation Partnership, the Reforestation-Revegetation Climate Change Primer for the Northern Region, (Hansen et al. 2018) and other publications as they are available. (Appendix A, p. 12)

Yet, has the report been used to inform Draft Plan content?

To meet the Planning Rule requirements laid out in 36 C.F.R. § 219.3, the Responsible Official must document how the BASI was used to make determinations about fires and fuels plan direction. And with an information-rich topic area as this, the Responsible Official should provide a rationale for why some science was chosen to inform the plan revision among other available scientific materials. Based on our review of the Draft Plan, DEIS, Draft Plan and DEIS appendices (including the vegetation model in DEIS Appendix B), Assessment, and specialist reports, we cannot discern how the Responsible Official used the BASI to develop plan components and other plan content regarding fires and fuels management. We believe the fires and fuels direction in the Draft Plan fails to meet the requirements of 36 C.F.R. § 219.3.

The Forest Service provided a helpful table showing existing and desired NRV for wildfire severity associated with desired condition FW-DC-VEGF-06 and another table, associated with FW-DC-FIRE-01, describing the Forest's "natural fire regimes," based on vegetation modeling described in Appendix B of the DEIS (in the case of FW-DC-VEGF-06). However, the lack of site- and scale-specific plan direction—when scientific information is available to support providing such direction—is a deficiency of the Draft Plan, which we address in our "Forested Vegetation" section above and explain in more detail below.

We address some of our concerns over the Draft Plan's treatment of fires and fuels above, with a particular focus on FW-DC-VEGF-06, FW-DC-FIRE-01, and FW-OBJ-FIRE-01. Below are some additional comments on the Draft Plan's fires and fuels plan components.

> *FW-DC-FIRE-01 – Wildland fires burn with a range of intensity, severity and frequency that allows ecosystems to function in a resilient and sustainable manner. Please refer to the glossary for the definition of fire regimes.*

FW-DC-FIRE-01 is confusing. The information in Table 71, which describes the Forest's natural fire regimes, must be incorporated into this desired condition. As written, the component does not make it clear that Table 71 lays out the desired targets. Is this how FW-DC-FIRE-01 is to be interpreted? The forested vegetation section in the Draft Plan contains numerous helpful tables that make it obvious that information in the tables are part of the associated desired conditions, so it appears this should be an easy correction.

FW-DC-FIRE-02 – Vegetation conditions (composition, structure and function) support natural fire regimes except in the wildland-urban interface and adjacent to infrastructure where vegetation conditions support low-intensity fire where necessary in order to reduce negative impacts to values at risk.

What is the areal extent of the wildland-urban interface (WUI) throughout the Forest? FW-DC-FIRE-02 highlights that the size of the WUI is essential for readers to understand how much of the Forest could be impacted by management that artificially alters fire regimes and may be managing away from integrity. Again, the Forest Service should include in its objectives how much restoration is targeted for WUI areas. The Gila National Forest's Preliminary Draft Plan differentiates the intended management program in the WUI by designating the WUI a management area and also including a standard that states that while ecosystem function will not be the primary focus in the WUI, this will still be a consideration. While we would have preferred additional standards and guidelines to provide more comprehensive direction for projects and activities in the WUI, we found delineating the WUI as a management area a helpful approach. The Carson National Forest included several plan components specific to the WUI that help differentiate management activities in the WUI from other forest areas.

FW-STD-FIRE-01 – All wildfires shall have a management response that considers risk to life and safety, taking into account the costs and effects to resources and values at risk.

The meaning and implications of FW-STD-FIRE-01 are not apparent. What does the standard mean by "costs"—monetary costs or costs in terms of harms to natural resources? What are the potential "effects" to which managers are supposed to "take into account" in their responses to wildfire? Moreover, the standard is too broad and vague to provide project direction.

FW-GDL-FIRE-01 – To meet multiple resource desired conditions, the Custer Gallatin should use wildland fires forestwide where and when conditions permit.

FW-GDL-FIRE-01 is so amorphous it provides no meaningful project constraints. What are the desired conditions the guideline is meant to meet?

FW-GDL-FIRE-02 – To reduce the negative impacts of wildfires to values at risk, improve fire control opportunities, or decrease risk to fire personnel and the public, fuels treatments should be designed to remove or rearrange the live and dead vegetation as necessary to reduce fire intensity.

A guideline is intended provide specific constraints on projects and activities (see 36 C.F.R. § 219.7(e)(1)(iv)), but FW-GDL-FIRE-02 only raises questions. To what "values at risk" is the guideline referring—infrastructure, natural resource values, both? What are the potential negative impacts or examples of negative impacts to be reduced? What does "improve fire

control opportunities mean"—before or during a wildfire? What does "… rearrange the live and dead vegetation as necessary to reduce fire intensity" entail?

Overall, the plan components do not provide a coherent fire program that maximizes human safety and the protection of communities and Forest infrastructure while restoring and maintaining ecological integrity by managing (or not managing) wildfire or employing prescribed fire and other fuels treatment tools. Plan components are not sufficiently protective of natural resources and habitats. Under each alternative, thousands of acres are slated to be "restored," but there is very little plan direction to provide guidance as to how this will occur at the project level. For example, how will the Forest Service identify and protect areas with species habitat that is sensitive to high-severity fire or fuels reduction treatments (even in the WUI)?

The Draft Plan also must be clear regarding how fire and fuels plan components reflect climate change adaptation strategies.

As with the Draft Plan components, the proposed management approaches and possible actions proposed in Appendix A, are generally vague and broad. Overall, they don't seem to enhance plan component direction. However, there are a few proposals of concern within Appendix A. The statement, "… if a naturally ignited, unplanned wildland fire does not meet identified resource objectives, the fire may be suppressed," appears to be plan direction that is significant enough to be developed into a standard or guideline for the conditions under which unplanned fires should be suppressed. All of the "Planned Ignitions and Mechanical Fuels Treatments" content in Appendix A must be redeveloped as plan components for research natural areas and special areas and wilderness and wilderness study areas. The statements within this section indicate plan direction with effects that must be analyzed in the DEIS. The statement, "A suite of mechanical fuels reduction treatments may also be used, including commercial timber sales and noncommercial treatments such as thinning, mowing, mastication, and herbicide application" also seems to be direction with effects.

c) Timber

The term "ecosystem health" is unique to this section and is not meaningful with regard to plan direction for ecosystems.

> *FW-DC-TIM-01 – Lands identified as suitable for timber production support a regularly scheduled timber harvest program that provides for jobs and income while also sustaining ecosystem health.*
>
> *FW-DC-TIM-03 – Timber production and harvest contribute to ecological sustainability and ecosystem health while contributing to economic sustainability, providing jobs, and income to local economies.*

Timber harvest must meet requirements for sustainability (36 C.F.R. § 219.8) and diversity of plant and animal communities (36 C.F.R. § 219.9). Plan alternatives proposed designating between 553,000-604,000 acres as suitable or timber production "because timber production is compatible with the desired conditions and objectives…" Desired conditions for timber must therefore reflect this compatibility. This desired condition should be rephrased as:

> Production of timber and timber harvest contributes to ecological sustainability and contributes to the achievement of vegetation desired conditions (such as species composition, size class, forest density, vegetation diversity, landscape pattern, and forest resilience to disturbances).

The reference to "ecosystem health" in FW-DC-TIM-01 and FW-DC-TIM-03 are problematic for the same reasons.

> *FW-DC-TIM 02 – Lands suitable for timber production are resistant to natural disturbances, thereby minimizing the economic loss of the timber resource compared to lands designated as unsuitable for timber production.*

For FW-DC-TIM 02 it is not consistent with the Draft Plan to call for suitable timber acres to be "resistant to natural disturbances" given the plan's emphasis on resiliency. There are no desired conditions for vegetation resistance that this is compatible with. The suggested language above concerning forest resilience is more appropriate.

> *FW-OBJ-TIM-03 –*
>
> *Alternatives B and C: Annually complete vegetation management treatments (such as, timber harvest, planned ignitions, thinning, planting) on an average of 6,000 to 7,500 acres of the Custer Gallatin, measured on a decadal basis, to maintain or move towards achieving desired conditions for forest, deciduous woodland, shrubland and grassland ecosystems (this objective includes the acres outlined in FW-OBJ-FIRE-01).*
>
> *Alternative D: Annually complete vegetation management treatments (such as, timber harvest, planned ignitions, thinning, planting) on an average of 8,000 acres of the Custer Gallatin, measured on a decadal basis, to maintain or move towards achieving desired conditions for forest, deciduous woodland, shrubland and grassland ecosystems (this objective includes the acres outlined in FW-OBJ-FIRE-01).*
>
> *Alternative E: Annually complete vegetation management treatments (such as, timber harvest, planned ignitions, thinning, planting) on an average of 5,000 acres of the Custer Gallatin, measured on a decadal basis, to maintain or move towards achieving desired conditions for forest, deciduous woodland, shrubland and grassland ecosystems (this objective includes the acres outlined in FW-OBJ-FIRE-01).*

FW-OBJ-TIM-03 puts forward acres treated annually to "maintain or move towards achieving desired conditions for forest, deciduous woodland, shrubland and grassland ecosystems." Doesn't all timber harvest maintain or move towards desired ecosystem conditions? Please clarify. The objective also states that "this objective includes the acres outlined in FW-OBJ-FIRE-01", which is acres treated for hazardous fuels mitigation. This is confusing; it looks like the plan is double counting.

> *FW-STD-TIM-04 – Clearcutting shall be used as a harvest method only where it has been determined to be the method most appropriate to meet the purpose and need of the project outcome. Other types of even-aged harvest shall be used only where determined to be appropriate. Determinations shall be based on an interdisciplinary review of site-specific conditions and the desired conditions for vegetation, wildlife habitat, scenery, and other resources.*

FW-STD-TIM-04 says that clearcutting shall be used "only where it has been determined to be the method most appropriate to meet the purpose and need of the project outcome." The plan direction should be related to the plan, not the purpose and need of a project. Clearcutting, if necessary, should be based on desired conditions. The standard should be revised to state that clearcutting shall be used as a harvest method only where it has been determined to be the "optimum method for achieving desired conditions for vegetation, wildlife habitat, scenery, and other resources."

> *FW-STD-TIM-08 – Openings created by clearcutting, seedtree cutting, shelterwood seed cutting, or other cuts designed to regenerate an even-aged stand of timber in one harvest operation shall not exceed 40 acres. This standard applies to new, individual harvest proposals on national forest lands only and need not consider existing openings on national forest land, adjacent private or other agency lands. Exceptions to the 40-acre maximum opening size may occur when determined necessary to achieve desired ecological conditions for the plan area, such as those associated with forest patterns, patch sizes, and forest resilience in the short and long term. Maximum opening size under this exception is show in table 17.*

For the exceptions to the maximum opening size, it would be helpful for the standard (FW-STD-TIM-08) to list the actual plan direction that makes it "necessary to achieve desired ecological conditions for the plan area."

> *FW-GDL-TIM-01 – Salvage harvest in areas burned by wildfire should retain some unburned patches and patches burned at low severity (less than 20 percent tree mortality) to contribute to ecosystem and wildlife habitat diversity.*
>
> *FW-GDL-TIM-02 – Salvage harvest in areas burned by wildfire should retain clusters of burned trees of a variety of sizes, including large and very large sizes (greater than 15 inches DBH) to provide habitat for wildlife species associated with burned habitats.*

FW-GDL-TIM-01 highlights that there should be desired conditions for recently burned forests. Please look at the Flathead plan FW-DC-TE&V 25 and Table 13. The same comment applies to FW-GDL-TIM-02; there must be desired conditions for recently burned forests.

d) Comments on the DEIS for forested vegetation, including fire and fuels and timber management

There are numerous problems with the DEIS regarding forested vegetation, fire and fuels, and timber management. We discuss some of these below.

(1) Assumptions about desired conditions

We appreciate the list of terrestrial vegetation key ecosystem characteristics in Table 30. It would be helpful to see these cross-walked with the plan components that provide for their integrity. On p. 145 the DEIS notes that "desired conditions for vegetation were developed to provide for the ecological integrity of the Custer Gallatin National Forest ecosystems." The DEIS needs to project the future conditions of the key ecosystem characteristics and compare those to the desired conditions. The DEIS must provide an actual "result" in terms of the key characteristic and cannot substitute qualitative or subjective judgments of sufficiency for actual analysis of effects on key characteristics. The DEIS cannot assume that desired conditions will occur because they are desired. Their likelihood of occurring and timeframe required, and associated uncertainty, should be disclosed. Where relevant, the DEIS must also distinguish between the certainty of standards and guidelines and the uncertainty of desired conditions and objectives. Standards and guidelines are mandatory regarding what may not occur, while desired conditions and objectives may never be achieved. The analysis should include a determination of the likelihood of desired conditions being achieved and analyze the most likely outcomes even if they are not desired.

The DEIS must consider both the effects of the desired condition and the effects of the management actions needed to restore or maintain them. In particular, the effects on at-risk species must consider plan components likely to cause adverse effects as well as those in tended to benefit the species. There may be highly adverse effects on a species in the short-term to purportedly obtain long-term benefits for the same species or for ecosystem integrity.

We note that the range of alternatives do not include a range of desired conditions for vegetation (i.e. desired conditions do not vary across alternatives). Within the requirement to provide conditions within NRV within an ecosystem, the Forest has the discretion to choose conditions within some range, and to differentiate by location within the ecosystem. To support decisionmaking, we believe that there should be a range of desired conditions across alternatives. As it stands the Forest is putting forward an unreasonably narrow range of alternatives as described in more detail above in section II.B.2.

(2) The relationship between the DEIS and Draft Plan

Throughout the DEIS, including the vegetation-related sections, the DEIS ascribes more direction or more detailed direction to the Draft Plan than the Draft Plan actually provides. For example, the DEIS states on p. 253, "All alternatives contain objectives for treating vegetation, through wildland fire and mechanical treatments, to improve structure and composition. This includes reducing surface fuels, ladder fuels, and canopy density in order to reduce fire intensity." The Draft Plan contains no specific direction for reducing these types of fuels.

Table 35 provides some interesting information that is not in the plan. For example, the desire to increase subalpine fir/Engelman spruce "particularly in Canada lynx habitat" offers a desired condition at a level of granularity that may support better implementation of the plan. We are unclear on why there is a desire to trend lodgepole pine downward in dominance type when it is firmly within NRV.

Given concerns over ponderosa pine, the plan should include specific objectives for restoration. There is also a sense of urgency in restoring Douglas-fir systems, but the plan lacks sufficient direction to address the concern. Given that there is variation in fire severity in lodgepole including low-severity nonlethal fire, there should be desired conditions to support this desired structural and functional condition for integrity. The discussion on p. 177 reinforces the notion that lodgepole pine systems have high integrity ("as long as fire remains on the landscape…"). Silviculture operations in lodgepole are generally not considered restorative given the absence of departure from reference conditions in these systems. The DEIS should reflect this knowledge.

The DEIS states that "all revised plan alternatives include specific plan components related to ecological processes and disturbance including insects and fire" (p. 214). It is necessary to cite the components here; we have viewed many components in the Draft Plan that are not specific. The important question for the DEIS is *why* the direction is expected to "meaningfully contribute" to the ecological integrity of specific ecosystems. It may not be relevant to compare the action alternatives to the current forest plan when evaluating effects to integrity. What is needed is a projection of the characteristics over time compared to the desired condition.

(3) The use of vegetation models

On p. 153, the DEIS explains that the analysis relies on models to assess the potential effects of plan direction. Appendix B in the DEIS describes the modeling effort. We are concerned that there may be disconnect between the models and the actual content of the plan, resulting in an analysis of the "effects" of the model, rather than the actual effects of the plan direction. For example, Table 15 in Appendix B (similar to Table 96 on p. 630 of the DEIS) illustrates various activities modeled under PRISM, yet for instance there is no explicit plan direction for prescribed burning or mechanical treatment across alternatives (it is simply lumped into a broader vegetation management objective). Though the DEIS generally does a poor job of

identifying and analyzing effects, the DEIS indicates in some places that prescribed burning and mechanical treatment have potential adverse effects and that these effects are different. It is important for the revised plan to identify in the objectives how much prescribed fire versus mechanical treatment will be used for fuels reduction, so the public understands the potential magnitude of these effects.

Only plan components have effects. It is fundamental that the DEIS properly characterize what the plan components say. The DEIS itself (including appendices) should not make assumptions and interpretations of plan components that it then relies on as if they were the plan components themselves. Such assumptions must be distinguished from the plan components, and their rationale must be provided, including any uncertainty.

While the models may be best suited to compare "relative effects among alternatives" (p. 154), a relative comparison of alternatives by itself is likely inadequate to comply with NEPA. Moreover, if any indices used cannot be translated into absolute values, they cannot be used to determine substantive compliance with NFMA.

(4) Effects of suppression

We are concerned that the DEIS may not properly account for the effects of suppression. In several areas the DEIS cites suppression as justification to pursue management actions to achieve desired conditions (which may carry ancillary costs to the environment), where it is also necessary to assess the effects to integrity of ceasing suppression. On p. 161 the DEIS states that "Fire suppression will likely continue to alter successional processes…although vegetation treatments and wildfires may mitigate this somewhat." The DEIS must look at how the plan is affecting decisions to suppress fire and the effects of those decisions. The implication is that continued fire suppression will be a barrier to achieving integrity. Similarly, on p. 162 the DEIS notes that "fire suppression has resulted in an increase in conifer colonization into grassland, shrublands, and broadleaf woodlands…" and that without "periodic disturbance, these cover types may be replaced by conifers." This would be a threat to integrity caused by suppression. The DEIS must look at the role of the plan in restoring disturbance regimes to achieve the necessary periodic disturbance (i.e. must look at the effects of continued suppression). Also, on p. 164 the DEIS, in discussing insects and disease, notes that fire suppression has been an influence on the population or intensity of insect and diseases. The DEIS needs to look at the role of continued suppression on the key characteristics, including stand densities that may influence insect behavior.

> Circumstances where wildfires are suppressed take into account certain fuel and weather conditions, proximity to values at risk, time of year, or fire effects that are predicted to move the landscape away or not maintain desired conditions. However, when natural fires are suppressed in fire-adapted ecosystems, there could be detrimental effects to vegetation composition and structure, ecosystem processes, soil dynamics, wildlife habitat and biodiversity (Keane et al. 2002). In combination with

> climate change, land-use change, and 20th century fire exclusion, suppression of wildfires also increases the existing fire deficit (Marlon et al. 2012). (DEIS, p. 243)

The DEIS states on p. 131, "There are also impacts to plants associated with wildfire suppression activities, such as fire line construction and other mechanical activities, reforestation following fire, and the increased potential for the spread of noxious weeds." Besides the spread of noxious weeds, the DEIS must disclose the specific impacts to plants. Also, here is an opportunity for the DEIS to analyze specific plan components in relation to these effects. How much will FW-STD-PRISK-01 mitigate effects to at-risk plants, for example? How will FW-STD-INV-01 and FW-STD-INV-04 reduce the spread of noxious weeds, if at all? These are the kinds of details the DEIS must provide.

(5) Effects of prescribed fire and restoration

For prescribed fire, the DEIS again misses the mark. The issue is not the difference between Alternative D and E with regard to prescribed fire acres. The issue is the effect that prescribed burning has on the integrity of the Forest's ecosystems. Acknowledging that "higher levels of treatment could have an important effect at more local scales" is not appropriate (p. 216). It is those "scales" that make up the integrity of an ecosystem. "Ecosystems have integrity when their composition, structure, function, and connectivity are operating normally over *multiple spatial and temporal scales*" (Directives 23.11b, emphasis added). The notion that the plan has no effect on integrity but suddenly does have effects when implemented is not only illogical but defeats the purpose of planning.

Furthermore, it is problematic that the alternatives are not demonstrated to meet the purpose and need of the action. One of the primary purposes of all of the alternatives is to comply with the Planning Rule. One of the "themes" of Alternative D is ecological restoration (e.g. management for ecosystem integrity). It is discouraging to see the DEIS essentially put forward the finding that Alternative D will have no measurable effect on the integrity of ecosystems within the plan area, as measured by the plan and DEIS. If implementation of Alternative D will have "important effects at more local scales" the DEIS should essentially yard up those effects to put forward information on how the alternative will meet the purpose and need to meet Planning Rule requirements for integrity.

The DEIS states on pp. 253-254,

> Prescribed fire is essential to reducing fuels; (Reinhardt et al. 2008) found that it is possible to craft treatments to achieve both ecological restoration and fire hazard reduction. However, ecological restoration will also include reintroducing fire and other active management; the most effective ecosystem treatments should include prescribed fire. Prescribed fire on the landscape in all alternatives would be expected to partially offset predicted effects from climate change (Wiedinmyer and Hurteau 2010).

Yet, the way the vegetation objective alternatives are written, the Draft Plan does not direct that prescribed fire will occur under all alternatives, or even any alternative. On p. 243, the DEIS states,

> The Forest Service manages wildfires to meet resource objectives; using unplanned natural ignitions to achieve these objectives and ecological purposes to foster resilient ecosystems. The benefits of managing wildfires to meet resource objectives may include: reducing fuels so that future fires burn in that area with lower severity ecosystems, (Parks et al. 2014), increasing biodiversity (Martin and Sapsis 1992), cycling nutrients back into the soil (Hungerford et al. 1991)), or reducing forest density to favor fire resistant species (Agee 1993).

The excerpt from the DEIS puts an imperative on the revised plan to include desired conditions for fire increasing biodiversity and cycling nutrients.

Figure 8 (p. 215) shows acres of prescribed fire, but as noted, we are not aware of specific plan direction for prescribed fire in the Draft Plan. It would be helpful if the DEIS illustrated how the acres treated through vegetation management actions numbers were derived across alternatives (50-80,000 acres). This is found in Table 15 of Appendix B, but as noted, the numbers are lumped within the Draft Plan. The DEIS should reflect the actions that are promoted under the plan.

We are intrigued by the statement that "Under all alternatives, fire will continue to support the diversity of vegetation across grasslands, retard conifer encroachment into meadows and parks, regenerate aspen and green ash stands and maintain the mixture of vegetation on shrublands that help support wildlife habitat diversity" (p. 216). This sounds like the desired condition, but elsewhere it is discussed that uncharacteristic fire will have non-desirable effects. *Some* fire may do this. The DEIS then says that the effects of fire will be the same across all alternatives. But don't alternatives vary in levels of prescribed fire and fuels reduction that are intended to alter fire behavior? To conclude that the differences in effects are minimal raises the question of whether the forest plan is effectively contributing to the restoration of fire adapted ecosystems, a principle goal under the Planning Rule.

Also, regarding prescribed fire, the DEIS (p. 254) states,

> The use of prescribed fire within the wildland urban interface (wildland urban interface) is a high-risk action and is often more expensive than prescribed fire in the non-wildland urban interface. This is due to the extra steps taken to ensure public safety and mitigate hazards to private property. Additionally, impacts from smoke emissions adjacent to homes for extended periods limit the number of acres that can be treated. Within the wildland urban interface, there is an increased need to rely on mechanical and hand treatments rather than fire.

Without knowing how much fuel treatment, allocated among alternatives in the Fires and Fuels and Timber objectives, is intended to be targeted within the WUI and without knowing the total area of the WUI, the reader has no basis for understanding the magnitude of these impacts. The DEIS must also disclose the direct and indirect ecological effects of restricting prescribed and wildfire in the WUI.

(6) Effects of timber harvest

P. 166 notes that "More recently this tool (timber harvest) is used to assist in restoration of ecosystem processes, improve resilience, promote certain wildlife habitats, and/or to reduce or alter fuels to modify or change fire behavior." While we don't categorically disagree, it is important that the DEIS not assume strictly positive effects associated with timber harvest, particularly when it is designed for production purposes (i.e. within lands suitable for production). The PRISM model assumes different levels of different types of harvest and the effects of these proposed actions need to be disclosed within this DEIS. We note that many stakeholders are interested in using thinning as a restoration tool and need specific information in the forest plan on where opportunities to achieve desired conditions at the stand level may exist.

The information on p. 215 that "Based on landscape dynamic simulation models, a minimum of 30-50 percent of the landscape must be treated to significantly change landscape dynamics" results in a statement that thus "at the forestwide scale, the extent, frequency and severity of ecosystem processes are not predicted to vary significantly across alternatives as a function of management actions." It seems that the DEIS is saying that treatment using vegetation management actions will have no effect on ecological processes at the scale of the forest. But how does Keane define landscapes? The DEIS acknowledges that at an undefined "project scale" treatment would be expected to have effects. We have a scale issue that needs to be addressed. The outcome of implementing and applying the plan **should** have effects, and the DEIS must clearly and, to the extent possible, quantitatively identify and evaluate all adverse as we all beneficial impacts. To say that the plan, which directs treatment projects through plan components, has no effect on desired conditions for ecosystem functionality (if that is what the DEIS is trying to say) is problematic. This essentially kicks the can of those effects analysis to the "project" level, when now is the time to evaluate the plan's program of work on forest systems.

We note that Table 45 (p. 217) reflects actions under the PRISM model but that the plan doesn't actually set objectives for these types of harvest.

The statement on p. 217 that "desired conditions, standards and guidelines" limit timber harvest suggests that desired conditions act as a constraint on actions. We do not agree with this characterization. For standards and guidelines, the DEIS needs to demonstrate how the constraint within a standard or guideline is acting as a limitation.

P. 217 sets up the timber harvest analysis as looking at how the variations in logging effects are consistent with the "theme and design" of the alternatives (e.g. restoration vs. production). The implication is that there are no differences across alternatives, thus raising questions about the sufficiency of this NEPA process. This analysis needs to look at the effects in light of the purpose of the plan, namely meeting the requirements for ecological integrity. The DEIS falls short here by simply stating that (emphasis added):

> The effect of timber harvest on forest vegetation is expected to be *small relative natural disturbance agents*. Nevertheless, for all the revised plan alternatives, plan components *assure timber harvests are designed to help meet desired vegetation conditions*. As such, for the revised plan alternatives, *timber harvest is expected to contribute to achieving more resilient conditions across the Forest*.

There are several notable problems with this conclusory statement. The fact that effects are "small relative to natural disturbance" does not discount the effects. Statements of relativity are not useful and of questionable value within a NEPA context. The DEIS can't simply declare that plan components assure anything – the purpose of the DEIS is to demonstrate this cause and effect relationship in terms of compliance with Planning Rule requirements. A finding that something is "expected to contribute" is subjective and judgmental. The DEIS must evaluate the effects of the plan in a way that will meaningfully inform decision makers about likely outcomes and must be more than a subjective, qualitative and comparative analysis. This analysis must be specific, and the documentation must show the effect of each relevant plan component, rather than lumping all plan direction. For example, the mantra that "All the revised plan alternatives include specific plan components related to vegetation composition that will contribute to biodiversity and ecological integrity" of X is repeated throughout the DEIS. Those specific components and their effects must be drawn out in the DEIS.

This pattern occurs throughout the DEIS. For invasive species (p. 218), "Threats to native vegetation from weeds would be greatest in alternative E and less so in the current plans and alternatives B, C, and D based on treatment objectives by alternative." We are not clear on the reference to "treatment objectives" here, but there appears to be an effect on ecological integrity associated with the plan. Similarly, for pollinators (p. 219) the DEIS notes that "Timber harvest increases some short-term threats to pollinators due to a higher potential for harvest related ground disturbance…" yet the DEIS makes no findings about variations across alternatives, despite the "themes" of the alternatives. Again, apparently the effects will be an issue for another planning process.

The DEIS also glosses over impacts of clearcutting, where levels vary by alternatives. There is no doubt that regeneration harvest will affect ecosystem structure, function, composition and connectivity. The DEIS only touts the benefits: desired conditions for composition (for what PVTs?) and desired patch size distribution. No potential harmful effects are disclosed. This is a

case where the DEIS must demonstrate the causal relationship between clearcutting and ecosystem benefits, using best available science.

The DEIS states on p. 129, "Mechanical activities include vegetation management treatments, whether for restoration or to meet timber production objectives. Activities, such as logging, can have impacts to plants and plant habitat through canopy removal, soil disturbance and erosion, and stream sedimentation." The DEIS must determine whether these are significant effects and if plan components (standards or guidelines) are adequately mitigating. For example, how does FW-GDL-SOIL-01—intended to "minimize the likelihood of downslope rill and gully erosion"—mitigate impacts to plants, if at all? A NEPA-compliant effects analysis would help demonstrate whether standards and guidelines alleviate adverse impacts or whether additional standards and guidelines may be necessary.

(7) Effects on riparian forests

For vegetation composition in riparian management zones the DEIS notes that "recent research has documented that in some cases active riparian zone management can advance riparian condition while preserving the functional attributes for riparian, aquatic, and water resources" (p. 226). The DEIS should present this information. It should be noted that the DEIS states that "clearcutting" creates "long-term degradation" within riparian areas (p. 226). This thread needs to be continued given plan direction (guidelines) for clearcutting in riparian areas. The statement that "Treatments would be designed to reflect the composition, structure and pattern of vegetation that would be consistent with the natural range of variability, as described in the desired conditions" needs to be scrutinized. As we noted in our comments on the desired conditions for watersheds/aquatics there are significant problems with the construction of many of the DCs. Here the DEIS needs to name the specific desired condition that generates this specific effect and point the reader to how it would be implemented in the manner presented. In that same section the DEIS says that management in the outer zone "as long as treatments did not create long-term degradation to riparian and aquatic condition." We are not aware of plan component within the riparian management zone section that includes this standard. If there is a benefit to riparian forests from active management allowed by standards and guidelines, the DEIS should reflect that beneficial effect (and cite the BASI to justify it).

In the discussion of effects to riparian forests, the DEIS (p. 226) notes that,

> The entire riparian management zone is classified as not suitable for timber production, based on the determination that a scheduled flow of commercial timber products using a rotation age could not be expected to occur on these lands due to management requirements and desired conditions for other resources.

This determination is documented in the suitability analysis within the appendix. But in looking at that document we don't see the analysis of how the riparian management requirements and

desired conditions led to this determination. Seeing that, and also seeing how it was determined that producing a scheduled flow of commercial timber products was determined compatible with other "areas", is essential to understanding how these important decisions were made. As noted elsewhere the DEIS needs to demonstrate how specific desired conditions ensure that timber harvest and vegetation management will lead to the positive effect (see our comments on the riparian plan direction). The DEIS states that "Vegetation management in the outer riparian zone" would be allowed "so long as conditions in the inner riparian management zone were not adversely affected and wildlife needs were met to achieve desired conditions." This may be a reference to Guideline 07, which doesn't say anything about adverse effects. Restating, or paraphrasing, plan components does not satisfy NEPA, which requires an attempt to determine the actual results of the plan components.

We are not sure what the DEIS is conveying when it says that "Forestwide plan components would protect riparian resources by *minimizing the effects* of grazing on these areas in all revised plan alternatives" (p. 227). We are not convinced that minimization of harm to riparian integrity meets rule requirements; this needs to be demonstrated. The DEIS must disclose the effectiveness of mitigation measures (if this is what is being said). Generally, the grazing effects discussion within this section simply paraphrase plan components.

(8) Effects on forest structure

The DEIS provides a justification for logging old growth lodgepole pine (pp. 233-234). The fact that mature lodgepole stands "are slowly transitioning to younger stands dominated by more shade-tolerant species" simply illustrates stand and landscape dynamics in that system. The fact that "old growth lodgepole is naturally structurally homogenous, compositionally pure, relatively short-lived, and smaller in diameter than other species" compared to other species, is not a compelling rationale to log it. Clearcutting old growth lodgepole is not clearly the most useful tool managers have to generate new stands; natural disturbances, including existing transitions to younger stands as noted, are performing this ecological function. Clearcutting old growth to "promote the long-term recruitment of old growth" is a rationale that is going to need some more work in the DEIS. The definitive statement that it will not have negative environmental consequences nor detract from ecological integrity must be supported with valid analysis.

The Planning Rule's best available science requirement also requires that the DEIS include references to the scientific basis for conclusions about effects (36 C.F.R. § 219.3 directs the Forest Service to document the basis of decisionmaking and how information was applied to the issues considered). The DEIS is the primary vehicle for informing the planning process about the effects of plan components, and NEPA has its own requirements for scientific integrity of the discussions and analysis in environmental impact statements, including references to sources relied upon for conclusions in the DEIS (40 C.F.R. 1508.24). It is critical that the information used as a basis for conclusions in the DEIS be disclosed. In particular, the Forest

Service has a burden of proving assertions important to selection of alternatives like logging or active restoration is better than passive, or long-term benefits outweigh short-term damage, or protective standards have adverse effects.

The Consequences to Terrestrial Vegetation from Forest Plan Components Associated with other Resource Programs or Management simply summarizes plan components and juxtaposes alternatives in a less than meaningful manner.

2. Grassland, shrubland, woodland, riparian, and alpine vegetation

We appreciate the intent that this plan direction will support project level design; as noted, that is an important role for desired conditions for vegetation.

We appreciate the direction for pollinators. As noted, there are vegetation objectives that seek to benefit pollinator habitat. The plan may be improved by including standalone direction that applies to pollinators for all vegetation (not just these ecosystem types). We like this plan direction from the Flathead regarding vegetation management and pollinators (as well as noted benefits to other wildlife):

> FW-DC-TE&V 15 (emphasis added): Snags suitable for nesting and denning, particularly in very large sizes (i.e., greater than 20 inches d.b.h.), are present not only in old-growth forests but across the matrix of forest lands, contributing to the diversity of forest structure *and to the sustainability of wildlife and pollinator species associated with snags* (*such as flammulated owls and fisher)*.
>
> FW-DC-TE&V 17 (emphasis added): Downed wood, especially the larger material (9 inches or larger in diameter), is present across the matrix of forested lands, contributing to forest structural diversity, soil ecological function, *and habitat for wildlife species associated with downed wood for feeding, denning, resting, and cover such as pollinators, Canada lynx, grizzly bears, pileated woodpeckers, marten, and fisher.*

As noted earlier, we appreciate the specificity of the desired conditions in Table 14.

B. Watersheds and aquatic and riparian habitats

1. Watersheds and aquatics

(Note to reader: Many of the comments below apply to the use of desired conditions throughout the Draft Plan.)

> *DC-WTR-01 – Watershed features, including natural disturbance regimes and aquatic or riparian habitats, are well distributed, diverse, and complex. Watersheds and associated aquatic ecosystems retain their inherent resilience to respond and adjust to*

> *disturbances, including climate change, without long-term, adverse changes to their physical or biological integrity.*

Please provide more information on the meaning of the term "well distributed." Following from the above discussion, we quote the Preamble to the 2012 Planning Rule at Fed Reg 21217 (emphasis added):

> Importantly, the term 'well-distributed' on its own is *not clearly biological*. Many people have interpreted the term in a geographical context as opposed to a biological context. This geographic interpretation has proven problematic at times, because the plan area is not an ecological boundary; it is an administrative boundary…

Is the Forest using the term in a geographical or biological context?

DC-WTR-01 also states that "Watershed and associated aquatic ecosystems retain their inherent resilience to respond to and adjust to disturbances, including climate change, without *long-term, adverse changes to their physical or biological integrity*." Please explain how physical and biological integrity will be measured.

> *DC-WTR-02 – Spatial connectivity is prevalent within or between watersheds. Lateral, longitudinal, vertical, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact habitat refugia. These network connections provide unobstructed physical and chemical routes to areas critical for fulfilling life history requirements of aquatic, riparian-associated, and many upland species of flora and fauna.*

DC-WTR-02 notes areas in the Forest that are "intact habitat refugia." When will these areas be identified and by what criteria? A requirement of the Planning Rule is that plan components must state where they apply (36 C.F.R. § 219.7(e)). Many plan components that we have reviewed in the Draft Plan do not provide any basis for determining the location, either for the purpose of analyzing the effects of the forest plan or for implementing the plan. Maps should be provided where possible (if locations are sensitive, a specific existing map could be cited without including it in the plan itself). DC-WTR-10's reference to "movement corridors" …

> *DC-WTR-10 – Riparian vegetation provides breeding, feeding and sheltering opportunities, as well as habitat connectivity and movement corridors for a wide range of terrestrial, semi-aquatic and avian wildlife species.*

… fits this comment as well.

The plan should also include maps of lands "of specific character" (FSH 1909.12, Section 22.2) where plan components would apply, but it could also provide objective criteria for that "character" that could be used to determine where the component would apply. That would allow analysis of effects of the plan based on what is currently known about where the criteria

would be met and would govern how consistency with the plan is determined when projects are planned. If locations are unknown, there should also be a procedural standard to survey for locations using the criteria from the plan. In lieu of maps, criteria could be provided that allow an objective determination of the applicability of a plan component.

> *DC-WTR-03 – Habitat and ecological conditions support self-sustaining populations of native aquatic and riparian associated plant and animal species.*
>
> *DC-WTR-04 – Aquatic systems and riparian habitats express physical integrity, including physical integrity of shorelines, banks, and bottom configurations, within their aquatic natural range of variation.*
>
> *DC-WTR-07 – Groundwater-dependent ecosystems, including wetlands, seeps, springs, fens, riparian areas, groundwater-fed streams and lakes, and groundwater aquifers, persist in size and exhibit water table elevations and function within their natural range of variation. The function of surface and subsurface aquatic ecosystems persists.*

To implement the plan, it will be necessary to actually describe the "habitat and ecological conditions" that support plant and animal species in DC-WTR-03. Similarly, when a project manager embarks on implementing DC-WTR-04, how will s/he determine whether a stream or riparian habitat area "express(es) physical integrity…within their aquatic natural range of variation"? DC-WTR-07 repeats the mistake of desiring a condition "within their natural range of variation." This essentially amounts to restating the requirements of the rule, which as we know from the directives, is discouraged: Plan components "should not merely repeat existing direction from laws, regulations, or directives" (FSH 1909.12, Section 22.1). This ambiguity is problematic for a number of reasons including the fact that a project's consistency cannot be determined without, in effect, creating a new plan component applicable to future projects (which therefore must be amended into the forest plan).

Desired condition values must be based on the best available scientific information, but desired conditions do not necessarily require very good information. Their accuracy only becomes important as they are being reached, which in many cases would be beyond the plan period. There could be plenty of time to recalibrate and adjust desired conditions. In the shorter term it is really only important that they point you in the right direction (and be measurable). (Objectives then establish the appropriate degree of urgency).

The Planning Rule introduced a requirement for ecological integrity at the plan level so that the actual values would be ascertained at the plan level, not to put them off to individual projects. Specific desired conditions must be determined at the plan level because they apply to all future projects in a particular ecosystem or landscape. Failure to do so now will create a need to amend the plan whenever specific desired conditions are established for such an area. Lack of meaningful desired conditions also makes it difficult to properly consider the effects of the plan, and of alternative plan components, during the NEPA process.

DC-WTR-06 – In-stream flows are sufficient to create and maintain riparian, aquatic, and wetland habitats; to retain patterns of sediment, nutrient, and wood routing and transport while maintaining reference dimensions (such as, bankfull width, depth, entrenchment ratio, slope, and sinuosity); to ensure floodplain inundation occurs within the natural range of variation allowing floodplain development; and to ensure the timing, magnitude, duration, and spatial distribution of peak, high, and low flows are retained, within the range of conditions of the reference watersheds, as defined by agency monitoring.

The use of the term "sufficient" in DC-WTR-06 is problematic (and this problem goes beyond this component.) Everyone agrees with the directives statement that plan components must be "written clearly and with clarity of purpose and without ambiguity so that a project's consistency with applicable plan components can be easily determined" (FSH 1909.12, Section 22.1). The use of generic subjective terms does not support good implementation. As noted above in Section II.A.2, subjective terms do not enable the measurability of conditions, which means that stakeholders have no idea what the Forest Service is planning, or what the effects will be.

As noted above, in Section II.A.3, objectives establish the appropriate degree of urgency and are focused on achieving a desired condition or conditions. The Forest proposes three objectives for watersheds and aquatics, but it is unclear how they are tied to achieving the desired conditions.

WTR-OBJ-01 –

Alternatives B and C: Per decade, complete 600 miles of stream and headwater spring restoration; and 50 acres of lake, pond, and wetland restoration projects across the spectrum of montane and pine savanna habitats.

Alternative D: Per decade, complete 800 miles of stream and headwater spring restoration; and 100 acres of lake, pond and wetland restoration projects across the spectrum of montane and pine savanna habitats.

Alternatives E: Per decade, complete 200 miles of stream and headwater spring restoration; and 10 acres of lake, pond and wetland restoration projects across the spectrum of montane and pine savanna habitats.

Objective 1 focuses on stream/headwater spring/lake/pond/wetland restoration but as noted above the ambiguity of the desired conditions makes it difficult to determine how these projects will be designed to restore degraded ecological conditions. Nor does the objective "help set the basis for priority areas or activities", which is a key function of objectives (FSH 1909.12, Section 22.12).

WTR-OBJ-03 –

Alternatives B and C: Per decade, progress towards conservation of an at-risk aquatic species is made by completing 5 to 7 projects with design features that restore habitat or populations of such species.

Alternatives D: Per decade, progress towards conservation of an at-risk aquatic species is made by completing 8 to 10 projects with design features that restore habitat or populations of such species.

Alternatives E: Per decade, progress towards conservation of an at-risk aquatic species is made by completing 1 to 3 projects with design features that restore habitat or populations of such species.

Objective 3 seeks to complete projects "with design features that restore habitat or populations of (at-risk aquatic) species." To what desired condition is this tiered? Clearly the design features are the key ecological conditions/characteristics needed by the species. Naming the species and referencing their desired habitat conditions is essential in this case.

WTR-STD-04 – Project-specific best management practices (including the more protective of both Federal and the states' of Montana and South Dakota best management practices) shall be incorporated in land use and project plans as a principle mechanism for controlling non-point pollution sources, to meet soil and watershed desired conditions, and to protect beneficial uses.

Standard 04 states that "Project-specific best management practices…shall be incorporated in land use and project plans…" Is this not the land use plan? This reads as if there is another land use plan where the BMPs will be incorporated.

WTR-GDL-02 – To maintain or protect spawning adult fish, juvenile fish, and fish eggs and embryos new or reconstruction management activities that have the potential to directly deliver sediment outside of natural levels to spawning and rearing habitat, should be limited to times outside of spawning, rearing, and incubation seasons unless the short term effects would be offset by a long term benefit.

Guideline 02 is problematic. The intent is "to maintain or protect spawning adult fish, juvenile fish, and fish eggs and embryos" and the requirement is to limit activities "that have the potential to directly deliver sediment *outside of natural levels*" during certain times (emphasis added). The problem is that the plan provides no guidance on the criteria used to determine natural levels. This approach simply leaves it up to future projects to decide how to interpret this. It is always good to remember that standards and guidelines must be clear and unambiguous so that project planners do not have to figure out, project by project, what is required and how it is to be applied (and then defend their interpretation).

Generally, it is not clear how the standards and guidelines relate to the desired conditions; how they act as restraints to help achieve or maintain the conditions. There are a dozen desired conditions in this issue area, and we would expect standards and guidelines that protect/restore: watershed features, spatial connectivity, unobstructed physical and chemical routes for species, habitat and ecological conditions for native aquatic and riparian species, aquatic system and riparian physical integrity, sediment regimes, in stream flows, groundwater dependent ecosystems, municipal watersheds, beavers, habitat connectivity and movement corridors for wildlife, instream and riparian conditions in "managed watersheds", and water quality. Naming the desired condition that a standard/guideline is intended to support would be helpful.

2. Riparian Management Zones

We assess RMZ plan components in this section.

> *Riparian Management Zone-DC-01 – Riparian management zones have native assemblages of flora and fauna; well distributed physical, chemical, and biological conditions resilient to disturbance regimes; species composition and structural diversity of native plant communities provide adequate summer and winter thermal regulation, provide bank stability moderating the rate of surface erosion, bank erosion, and channel avulsion; maintain and contribute to water quality and nutrient cycling processes, organic matter processing, and ecosystem metabolism.*

DC-01 reiterates the "well distributed" desire that we commented on above. The desire is to be "resilient", which as noted, is a generic subjective term that is ubiquitously used to describe desired conditions. Species composition and structural diversity of native plant communities provide "adequate summer and winter thermal regulation." A future project planner will determine what is adequate. Under DC-02 a future project planner will also decide whether riparian management zones are "properly functioning."

> *Riparian Management Zone-STD-01 – Vegetation management, using mechanical treatments, shall only occur in the inner riparian management zone if the purpose is to restore or enhance aquatic and riparian-associated resources. However, in the inner riparian management zone, non-mechanical vegetation treatments such as hand fuel treatments, prescribed fire, and sapling thinning may be authorized, as long as aquatic and riparian-associated resources are maintained or enhanced. Hazard trees may be removed for purposes such as protecting human safety.*

A standard (01) assures us that vegetation management "shall only occur in the inner riparian management zone *if the purpose is to restore or enhance aquatic and riparian-associated resources*" (emphasis added). The purpose of a project is not the effect of a project. Those aquatic and riparian-associated resources are not defined, at least not in this plan component. As noted earlier, it is always good to remember that standards and guidelines must be clear and

unambiguous so that project planners do not have to figure out, project by project, what is required and how it is to be applied (and then defend their interpretation). The standard also enables other actions in the inner zone, "as long as aquatic and riparian-associated resources are maintained or enhanced." This is an empirical matter where those effects must be observed.

> *Riparian Management Zone-STD-02 – Pesticides, other toxicants and chemicals, or bio-controls shall only be applied within riparian management zones if needed to maintain, protect, or enhance aquatic and riparian resources or to restore native plant communities.*

Standard 02 similarly allows for pesticides, other toxicants and chemicals and bio-controls to be applied within Riparian Management Zones (RMZs) "if needed to maintain, protect, or enhance aquatic and riparian resources or to restore native plant communities." Future project planners will need to figure this out and then defend their interpretation.

> *Riparian Management Zone-GDL-01 – To reduce the likelihood of sediment input to streams and to reduce adverse effects to stream channels and riparian areas, placer activities (prospecting, exploration, and mining) should be conducted in a manner that precludes sediment input to streams. Processing facilities should be located outside of the inner riparian management zone and have containment provisions that minimize sediment and other by-products inputs to stream courses.*

Similarly, placer mining "should be conducted in a manner that precludes sediment output to streams" (Guideline 01), without noting the manner.

> *Riparian Management Zone-GDL-02 – To reduce the likelihood of sediment input to streams and to reduce adverse effects to stream channels and riparian areas, new permanent livestock handling or loading facilities (for example, corrals), livestock handling activities, and livestock trailing should be located outside of the riparian management zone unless it can be demonstrated these facilities or handling activities will not affect the riparian area functionality or that such placement improves an existing situation. Livestock trailing is allowed when herding livestock away from riparian areas to uplands or to another pasture to meet riparian resource desired conditions.*

Guideline 02 is less problematic, it notes that various livestock activities *should* be located outside of the RMZ "unless it can be demonstrated these…activities will not affect riparian area functionality…" Demonstration of no effect is good, but how will that demonstration be verified? Future project planners may need to figure out how to interpret *riparian area functionality*, and then defend their interpretation. Trailing is allowed to "meet riparian resource desired conditions" (see comments above).

> *Riparian Management Zone-GDL-03 – To reduce the likelihood of sediment input to*

streams and reduce adverse effects to stream channels and riparian areas, temporary fire facilities (such as, incident bases, camps, staging areas, heli-spots, retardant batch plants, and other centers for incident activities) should be located outside of riparian management zones. When no practical alternative exists, all appropriate measures to maintain, restore, or enhance aquatic and riparian associated resources should be used.

Under Guideline 03, temporary fire facilities are allowed within RMZs "when no practical alternative exists" and if "all appropriate measures" are used to maintain, restore, or enhance aquatic and riparian resources. This will be interpreted in the future. Under Guideline 04, new permanent roads, temp roads, and the construction of machine fireline should be avoided in RMZs, unless "those activities would contribute to attainment of aquatic and riparian desired conditions." An example for future project planners may be useful for this case. When do roads contribute to attainment of the desired conditions? Naming the condition may be helpful here.

Riparian Management Zone-GDL-05 – To reduce the likelihood of sediment input to streams and reduce adverse effects to stream channels and riparian areas, new landings, skid trails, staging or decking should be located outside riparian management zones. If these activities are needed inside of riparian management zones, minimize the disturbance area footprint and locate activities outside the active floodplain.

Guideline 05 puts more pressure on future project planners to defend their interpretations by stating that new landings, skid trails, staging or decking may be allowed when "needed inside of RMZs." In those cases, the project planner is directed to "minimize the disturbance area footprint." "Minimize" is a word that should be avoided in standards and guidelines.

Riparian Management Zone-GDL-06 – To meet the role of downed or large woody debris in aquatic and riparian ecosystems, vegetation treatments inside riparian management zone should retain enough wood onsite to meet riparian ecosystem demands, except where they would be a threat to public health and safety.

Riparian Management Zone-GDL-07 – To protect ecosystem functions of the inner riparian management zone, vegetation management in the outer riparian management zone should be specifically designed to ensure the ecosystem functions of the inner riparian management zone are protected.

Guideline 06 tells a future project planner to retain "enough wood" to meet riparian ecosystem "demands" while 07 advises that outer zone vegetation management "be *designed* to *ensure*" the protection of inner zone ecosystem functions. It is not clear how these guidelines will be evaluated for effectiveness.

Riparian Management Zone-GDL-08 – To maintain thermal cover for aquatic systems and riparian biota, and to minimize the risk for potential wind-throw, clear-cut harvest should not occur in the riparian management zone, unless necessary for riparian

restoration.

Guideline 08 allows clearcutting in RMZs if "necessary for riparian restoration." A future planner will determine what is necessary and that determination will likely be controversial. Salvage logging should be prohibited in the inner and outer zones, and this should be a standard.

3. Comments on the DEIS for watersheds and aquatic and riparian habitats

With regard to watersheds, aquatic species and habitat, and riparian ecosystems, the DEIS concludes that the plan components "provide more detail and clarity" than the current plans (p. 88). We are not seeing this clarity.

The DEIS concludes that "New aquatic and riparian desired conditions, objectives, standards and guidelines would be applied in a consistent manner across the entire forest across all revised plan alternatives" (p. 89). We don't see how many of those plan components will be applied in a consistent manner.

The fact that the DEIS simply assumes that allowed vegetation management will in all cases benefit resources is problematic, given the wording of those plan components (see above). We disagree with the DEIS statement that actions that degrade conditions will be limited in RMZs (see above). We also don't agree that "Guidelines are designed to protect riparian and aquatic resources by taking a multi-scale and multi-resource hard look at stream habitat and riparian conditions prior to entry" (p. 89). We do not agree that future project level NEPA will alleviate concerns over impacts to ecological integrity and species viability, given the wording of the plan components. The DEIS must provide evidence of the effectiveness of standards and guidelines.

Conclusory and relative statements such as RMZs "would maintain and enhance habitat for aquatic species, including species of conservation concern, more rapidly than current plans" (p. 89) does not constitute an effects analysis. A conclusory statement is one made without supporting evidence, underlying logic, or reasoning. All statements related to compliance with legal requirements should be substantiated with documented facts or analytical results. This is especially important with respect to conclusions about ecological integrity and species persistence.

With regard to logging effects, the DEIS states that "trees would not be cut, especially in the inner riparian management zone, unless it could be demonstrated that this would improve riparian management zones" (p. 93). RMZ Standard 01, if this is what the DEIS is referencing, says nothing about demonstrating improvement for RMZs, and nothing about the outer zone. It says that veg management is allowed in the inner zone "if the purpose is to restore or enhance…resources." Details matter, and "purpose" is not a "demonstration." The DEIS needs to cite the plan direction referenced here, including for the outer zone. By no means does the plan direction "ensure" that the inner RMZ stays intact.

We appreciate the DEIS citing evidence of the effectiveness of BMPs in reducing sediment to streams.

C. Wildlife

1. Canada lynx (*Lynx canadensis*)

The Canada lynx is listed under the ESA as a threatened species, and the Forest Service is required by the ESA and NFMA to contribute to the species' recovery. Though there is uncertainty regarding whether Canada lynx currently occupy the Custer Gallatin, lynx have been observed on the Forest within the last 15 years (USFWS 2017). The Forest contains critical habitat and is within the Greater Yellowstone Area (GYA) geographic unit. The USFWS believes lynx habitat in the GYA is patchy, but has stated, "… relatively small impacts could shift potential habitats in this unit from just barely able to support a persistent resident population to incapable of doing so" (USFWS 2017, p. 158). It is possible that habitat conditions can improve for lynx in the unit (Lynx SSA Team 2016, p. 46), and the DEIS (citing Bell et al. 2016) noted that the GYA may serve as climate refugia for lynx in the future.

Under the ESA, the Forest Service must utilize its "authorities in furtherance of the purposes of [the ESA] by carrying out programs for the conservation[2] of endangered species and threatened species" (16 U.S.C. § 1536(a)(1)). NFMA, the Planning Rule, the planning process, and resulting management plans all shape the contours of the Forest Service's authorities that must be marshalled in the service of recovering listed species. Specifically, the 2012 Planning Rule establishes an affirmative regulatory obligation that forest plans "provide the ecological conditions necessary to: contribute to the recovery of federally listed threatened or endangered species" (36 C.F.R. § 219.9(b)(1)).

We believe the Draft Plan fails to meet its requirement to contribute to the recovery of lynx. While planning for a contribution to recovery may be difficult in the absence of the recovery plan for the lynx, it does not absolve the Forest Service from meeting its lawful obligation to do so. The lack of a recovery plan puts a greater responsibility on the Forest to ensure that plan components, suitability determinations, and management and geographic area designations result in a plan that advances recovery for lynx and habitat protections and mechanisms to maintain and restore habitat. The Forest Service should work with the USFWS informally and through the ESA Section 7 consultation process to assure that the aggregate revised plan components constitute a conservation program that promotes recovery not merely a mechanism that reduces adverse effects and prevents jeopardy decisions.

[2] "Conservation" is defined by the ESA to mean "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary."

The Forest's planning Assessment reported that 4,282 square miles of suitable lynx habitat, with critical habitat making up about 2,240 square miles of this (Dixon et al. 2017). The extent of suitable habitat for the species on the Forest is not insignificant.

The Assessment discussed research by Kosterman (2014), which found that mature forest is more important to lynx, especially breeding females, than previously thought. The DEIS discussed Holbrook et al. (2017) and Kosterman et al. (2018), both of which found that mature forest is important for lynx in winter and improving reproduction.

When the NRLMD was implemented in 2007, experts were less aware of the extent of climate change effects. But given what we now know and are learning about how climate change is negatively impacting lynx habitat in some areas, it is essential to protect with stringent management measures all remaining habitat from other manageable impacts. Climate change may be the most significant current and future stressor to lynx habitat (ILBT 2013; Lynx SSA Team 2016; USFWS 2016 & 2017). Experts are concerned about the impacts of changing snow conditions on snowshoe hares (USFWS 2016, p. 68):

> … the shorter duration and diminished snow cover in the DPS is causing an increasingly pronounced mismatch in the phenology of hare pelage change that may reduce hare survival (Mills et al. 2013, entire; Zimova et al. 2013, entire). Diminished snow duration by as much as 8 weeks by the end of the century could have population-level effects on hares at the southern edge of their range. Hares exhibit plasticity in the rate at which they can molt from white to brown in the spring, but not in the initiation date of color change or the fall transition from brown to white (Mills et al. 2013, pp. 7362-7363). Hares do not seem to compensate for mismatched pelage by changing their behavior related to concealment, thus predisposing them to predation. There is wide variability in the timing of pelage change by individual hares within populations, and "mismatched" hares experience increased mortality rates (Zimova et al. 2016, p. 302). Under high emission scenarios, this could lead to an 11 percent decline in hare survival by mid-century and a 23 percent decline by late century. Diminished survival would lead to steep (high emissions) to moderate (medium-low emissions) declines in hare populations (Zimova et al. 2016, p. 304). It is also possible that this phenological mismatch may dampen hare cycles (Zimova et al. 2016, p. 305). Snow patterns have been proposed to potentially play a role in dampening cycles (Cornulier et al. 2013, pp. 64-65, Sultaire et al. 2016a, entire).

A more recent study supports these findings (Peers 2017). A recent Michigan study found that hare occupancy is changing in relation to snow; areas once occupied have been abandoned due to unfavorable snow conditions (Burt et al. 2017). Experts are currently researching the adaptive potential of hares to shorter durations of snow cover.

The Draft Plan relies almost exclusively on the current direction of the Northern Rockies Lynx Management Direction (NRLMD), a 2007 amendment to the 1987 land and resource

management plan. The NRLMD contains a set of goals, objectives, standards, and guidelines intended to address and limit threats to lynx habitat.

> *FW-DC-WLLX-01 – Boreal forest habitats provide denning, foraging, resting, and travel habitat for Canada lynx at a scale that approximates the size of a reproductive female's home range; for example, within a lynx analysis unit. Matrix habitats that occur between patches of boreal forest provide adequate cover to facilitate lynx movement between denning and foraging habitats within lynx analysis units, as well as dispersal between lynx analysis units.*

The Draft Plan adds a desired condition (FW-DC-WLLX-01), and we believe this is a helpful addition to the revised plan. However, it does not go far enough. Standards and guidelines in addition to those in the NRLMD are necessary to assure the Forest is working toward achieving FW-DC-WLLX-01.

In aggregate, the NRLMD components (including the modified standard and guideline) may limit take compared with an alternative that would replace NRLMD components with nothing. However, abiding by the NRLMD direction exclusive to additional regulatory plan components can enable net habitat losses, temporarily and possibly permanently.

To our knowledge, there have been no ecological assessments of how the NRLMD has been applied to contribute to lynx population recovery and whether lynx are responding to the management changes, a point made in USFWS (2016, p. 193). It is not clear how the direction is impacting snowshoe hare abundance and density, because these variables are not being monitored—nor will they be if the Draft Plan is implemented as is. Experts believe the lynx population throughout the Northern Rockies has not changed significantly since ESA listing in 2000 (Lynx SSA Team 2016). And, again, we acknowledge that lynx may not currently occupy the Custer Gallatin and the habitat may be marginal. Yet, there are no existing or Draft Plan components aimed at improving habitat or restoring potentially suitable habitat.

We believe one or more additional plan standards are necessary to better protect mature forest habitat. Both the Assessment and DEIS reject using the Holbrook et al. (2017) and the Kosterman et al. (2018) studies, discussed above, to inform planning because the structural classes the studies used are different than those used by the Northern Rockies Lynx Management Direction (NRLMD). The DEIS did not evaluate the impacts of not including plan components to better protect mature forest that is suitable lynx habitat, despite the new BASI.

The Forest Service must select an alternative that protects habitat from winter motorized recreation. The DEIS acknowledges that winter recreation can be harmful to lynx. As it stands the DEIS does not contain sufficient analysis of OSV effects across alternatives to support a proper determination on which alternative and plan direction meets regulatory requirements for recovery. We believe there is reason to be cautious about allowing OSV use in lynx habitat.

Indeed, bobcats can displace lynx from snowshoe hare hunting grounds, a concern especially given changing snow conditions (USFWS 2016, citing Peers et al 2016).

Incidental trapping of lynx is a threat. As the DEIS states, " … as with most wild cats, lynx are vulnerable to trapping and can be inadvertently caught in traps legally set for other furbearer species" (DEIS, p. 336, citing Interagency Lynx Biology Team 2013) and "some federally protected lynx have been incidentally caught in traps or illegally shot by hunters in Montana" (DEIS, p. 350). The Forest Service should develop a standard that prohibits furbearer trapping in lynx designated critical habitat, except for live-trapping for permitted research.

Lynx critical habitat should be designated as a management area.

Monitoring lynx habitat conditions, guided by MON-WL-8, requires no more than reporting required for the USFWS under the NRLMD. We acknowledge that a proxy for actual lynx distribution, abundance, and population trends is necessary. However, stand initiation is an insufficient proxy when snowshoe hare density can be measured (c.f. Mills et al. 2005). It is also important to know the percentage of mature forest in each LAU (based on Kosterman (2014), Holbrook et al. (2017), and Kosterman (2018)). A periodic sampling of hare density would not only provide information that gets closer to measuring recovery trends but would also help answer key questions and address important assumptions in the plan, such as whether precommercial thinning can improve whitebark pine conditions without diminishing the prospects for lynx recovery. The response of hares to vegetation management, fire, and other stressors will not only help assess ecosystem conditions the affect lynx recovery but help answer highly relevant scientific questions.

2. Wolverine (*Gulo gulo*)

The Distinct Population Segment (DPS) of the North American Wolverine Occurring in the Contiguous United States is proposed for listing as a threatened under the ESA. The Custer Gallatin is included in the DPS boundary. As such, the revised plan is required to conserve the species under 36 C.F.R. § 219.9(b)(1). The proposed plan components will likely fail to meet this requirement. For example, the Forest Service must restrict access to recreation, particularly winter motorized recreation, in wolverine habitat. The Forest Service should include a standard in the revised plan that bans trapping in wolverine core and connectivity habitat.

We have not been able to identify any plan components aimed at improving or restoring ecological conditions necessary for wolverine conservation. The DEIS did not analyze the plan effects in a way that would demonstrate how the plan would result in restored or improved conditions.

The BASI demonstrates that recreational activities, especially dispersed winter motorized recreation, disturb wolverines, causing behavioral changes including increased movement and energy expenditure, especially in denning females (Heinemeyer et al. 2017). The Heinemeyer et

al. (2017) findings provide certainty around the effects of recreation on wolverines and indicate that winter recreation's negative impacts. For example, Heinemeyer et al. (2017) states,

> Wolverines responded negatively to increasing intensity of winter recreation, with off-road or dispersed recreation eliciting a stronger response than recreation concentrated on access routes. Indirect habitat loss from winter recreation reduced the quality of 2 – 28% of available habitat within home ranges. Female wolverines exhibited strong avoidance of off-road motorized recreation and were more vulnerable to higher levels of indirect habitat loss than males who appeared to be less sensitive to disturbance. While non-motorized recreation covered a relatively small proportion of home ranges, these areas were also avoided by male and female wolverines. (Heinemeyer et al. 2017, p. v)

> Our results suggest that winter recreation should be considered when assessing wolverine habitat suitability, cumulative effects and conservation. Our research provides land managers with a more detailed understanding of important habitat characteristics used by wolverines within home ranges and should inform management of wolverine habitats across the large landscapes they require. Further, it shows that female wolverines are sensitive to dispersed winter recreation which results in indirect habitat loss during the critical denning season. The functional responses to dispersed winter recreation provide insight into these negative effects, and suggest that lower levels of dispersed recreation will have less effect on wolverines than more widespread and intense recreation. (Heinemeyer et al. 2017, p. 43)

Winter recreation, including dispersed over the snow vehicle (OSV) use, is almost definitely going to increase over the life of the plan. There is no reason to believe the trends in use and trends in technological advance will not enable users to continue pushing higher into the Forest, especially as snowfall continues to lessen and seasonal snow becomes less deep due to climate change.

The DEIS did not assess the combined effects of climate change and OSV use on wolverine habitat. As snow levels diminish with climate change, dispersed OSV use will become more concentrated in remaining areas with deep snow – the last refugia of wolverine. Winter recreation will thus continually become a more serious threat to the persistence of the population over time. The trend of decreasing depth and seasonal persistence of snow combined with the trends of overall increasing OSV use and increasing OSV use in higher altitude areas point to the habitat protection in Alternative D as preferred for conserving wolverines.

3. Whitebark Pine (*Pinus albicaulis*)

Whitebark pine is a candidate for listing under the ESA (76 Fed. Reg. 42631). The Forest Service is required to develop plan components that will conserve this species (36 C.F.R. § 219.9(b)(1),

and the planning directives provide further guidance on how to accomplish this (FSM 1909.12, ch. 20, 23.13b).

Despite providing a fairly robust species evaluation in the Assessment, with an update in the DEIS based on new science, the Forest Service has provided no indication it engaged with the USFWS to evaluate conditions for the species or develop plan components as directed by FSM 1909.12, ch. 20, 23.13b(3). Instead of considering "conservation measures identified in existing conservation strategies and agreements" to incorporate into the Draft Plan, in accordance with FSM 1909.12, ch. 20, 23.13b(1), the Draft Plan seems to be planning to rely on collaboration with the Greater Yellowstone Coordinating Committee-Whitebark Pine Subcommittee for plan direction instead of providing necessary plan direction in the Forest's management plan.

The Draft Plan offers weak plan components, no standards, and optional management approaches that seem to contain plan direction more appropriate to be included as plan components. The Draft Plan inappropriately defers decisionmaking about whitebark pine management to the project level. At a moment when the species requires an all-out conservation effort to save it, the Draft Plan falls short of providing a coherent conservation and restoration program with an integrated set of plan components to which management approaches and other guidance are tiered. The components and optional plan direction may fail to conserve the Forest's whitebark pine population. The Draft Plan does not comply with Planning Rule requirement 36 C.F.R. § 219.9(b)(1).

The plan Assessment noted whitebark pine's foundational and keystone role in the cold, high-elevation regions of the Forest, acknowledging the need to not only conserve the species to fulfil the species diversity requirement but also to consider the condition of the species' population in relation to ecosystem function. According to the Assessment, the decline of whitebark pine is altering the structure and composition, detrimentally impacting integrity of the high-elevation forest ecosystems and ecosystem services, such as hydrological processes. Protein-rich seeds provide food for a diversity of species, including the grizzly bear. Seed dispersal is almost completely dependent on the Clark's nutcracker. Given the bird's population decline, particularly in Montana, we are very surprised that the Clark's nutcracker was not identified as a SCC by the Regional Forester.

The Assessment identified interrelated threats to whitebark pine and whitebark pine ecosystems: fire suppression, climate change, white pine blister rust (an exotic fungal disease), and mountain pine beetle. It determined the threats are likely to continue, and the species' population is likely to continue to decline.

Overall, the planning Assessment provided a helpful survey of much of the BASI relevant to whitebark pine. We realize a significant number of scientific papers and other information were published after the completion of the Assessment and appreciate that the Forest Service has incorporate some of this information into the DEIS. Despite the satisfactory assessment of whitebark pine conditions and threats, the Draft Plan's weak components are not

commensurate with the magnitude of the threats presented in the Assessment findings and the DEIS.

As stated above, the Assessment and DEIS identify the following threats to whitebark pine: fire suppression, climate change, white pine blister rust, and mountain pine beetle. Yet, plan components only vaguely address one of these threats: white pine blister rust.

Despite the importance of whitebark pine to the Forest's cold, high-elevation ecosystems; the importance of seeds as a food plant for wildlife, including at-risk species like the grizzly bear; the magnitude of the threats facing the species; and the species' status as an ESA candidate, plan components related to the species are inadequate to conserve the species. That the plan components do not aggregate into a robust program to promote whitebark pine conservation is baffling given that the Forest Service issued a suite of recommendations in General Technical Reports published in 2012 (Keane et al. 2012) and in 2017 (Keane et al. 2017) for managing, restoring, and monitoring whitebark pine in the face of the species' considerable threats, including climate change.

Desired conditions relating to whitebark pine merely describe the desired distribution of the species in relation to other conifers (FW-DC-VEGF-01) and desired NRV in terms of conifer diversity across the Forest (FW-DC-VEGF-02). There is no desired condition that the species be conserved, which is an oversight in the Draft Plan.

We appreciate the Draft Plan contains objectives for restoring ecosystem conditions, habitat, and whitebark pine. Objective FW-OBJ-VEGF-01 call for the completion of five to eight projects under Alternatives B and C, eight to 10 projects under in Alternative D, and two projects under in Alternative E for each decade. Similarly, Objective FW-OBJ-VEGF-02 calls for a low of 500 acres of restoration under Alternative E and a high of 800 acres under Alternative D to occur over the course of each coming decade. There is not much of a difference between alternatives and it is not clear how the targets were derived based on the regulatory requirement to conserve this species in the plan area. Moreover, the objectives do not make a distinction between which of these targets will be restored among the alternatives. The plan provides no guarantee that whitebark pine will be among the chosen projects during the 10-year period range. And the number of proposed projects and acreage aims seem meager given the restoration needs on the Forest. How much whitebark pine needs to be restored to conserve the species on the Forest? That's how much the objective should be aiming to achieve.

As stated above, the Draft Plan contains no plan standards for whitebark pine. Plan standards are essential for placing constraints around restoration activities, for example.

> *FW-GDL-PRISK-01 – When project -specific analysis determines that management activities may potentially impact known at-risk plant populations, mitigation or protection measures should be provided to maintain the populations or sustain habitats of at-risk plant.*

FW-GDL-PRISK-03 – When conducting management activities in or near whitebark pine trees or stands identified for collection of scion, pollen, or seed; areas identified as important for cone production or blister rust resistance; and whitebark pine plantations, project-level design criteria or wildland fire management strategies should protect them from potential loss to support the recovery or long-term persistence of this species.

It would be more appropriate to modify the above two guidelines into standards and develop additional standards and guidelines to provide the mitigation direction and project-level design criteria referenced in the guidelines. As we discuss above in Section II.A.6 on deferring management decisions to the project level, these guidelines provide examples where the Forest Service should have provided enhanced direction to help guide project-level mitigation and design criteria.

The DEIS (pp. 299-300) states,

> The current Forest Plans do not contain specific standards or guidelines related to white pine blister rust and its relationship to five-needle pines such as whitebark pine. The revised plan alternative components include specific targets for treatments of at-risk species, including whitebark pine which includes white pine blister rust considerations.
>
> Goals and management approaches for the revised plan alternatives include cooperation with the Greater Yellowstone Coordinating Committee-Whitebark Pine Subcommittee on whitebark pine conservation strategies and adaptive management of habitat which incorporates principles of restoration documented in Whitebark Pine Strategy for the Greater Yellowstone Area and Adaptive Action Plan prepared by the Greater Yellowstone Coordinating Committee Whitebark Pine Subcommittee (2011, 2015) and any new best available science for possible whitebark pine restoration strategies and activities (Keane et al. 2012).
>
> • Promoting rust resistance, by a) supporting selective breeding programs to develop and deploy blister-rust resistant whitebark; b) facilitating and accelerating natural selection for rust resistant trees by reducing competition, providing openings for natural seed dispersal and seedling survival; and c) planting seedlings from trees known to have some level of resistance.
>
> • Saving seed sources, by protecting mature seed-producing resistant whitebark pine trees so that apparent rust-resistant seeds can be harvested in the future; and
>
> • Employing restoration treatments, including limiting the spread of blister rust, using fire to encourage regeneration, implementing silvicultural cuttings to reduce competition and increase vigor and reduce likelihood of mountain pine beetle attacks, planting blister rust-resistant seedlings to accelerate the effects

> of selection, and promoting natural regeneration and diverse age class structures to maintain ecosystem function and reduce landscape level beetle hazard, and to provide large populations for selection for rust resistance.
>
> The revised plan alternatives propose a guideline that when conducting management activities in or near whitebark pine trees or stands identified for collection of scion, pollen, or seed; areas identified as important for cone production or blister rust resistance; and whitebark pine plantations, project-level design criteria or wildland fire management strategies should protect them from potential loss to support the recovery or long-term persistence of this species.

Instead of developing crucial standards in the plan, the Forest Service has chosen to defer decisionmaking regarding whitebark pine to the project-level. In the excerpt above, the DEIS implies that the Greater Yellowstone Coordinating Committee-Whitebark Pine Subcommittee will be providing direction for Forest actions; this is inappropriate. Though we do not reject the Draft Plan goal (FW-GO-PRISK-01) of collaborating with the Subcommittee, we do reject the Forest implementing direction derived from the Subcommittee process that should be bounded by plan components in the Forest's management plan. Again, under NEPA, the DEIS must evaluate only the potential environmental impacts of the proposed action, here the plan revision, and its analysis must be limited to the plan components. Additionally, the inclusion of these examples in the DEIS raises two immediate questions. Why was this direction not developed in the Draft Plan as plan components? Why are they included at all, given the DEIS made no attempt to analyze their effects?

The Draft Plan's Appendix A (p. 21) states the Forest will be guided by the following management approach for whitebark pine in wilderness areas:

> Use the most recent guidance or documents to provide additional information and support for restoration activities within recommended and designed wilderness areas. Currently, these include the publication "A Range-Wide Restoration Strategy for Whitebark Pine" (Keane et al. 2012b).

Again, management activities must be bounded by direction in the management plan.

The monitoring question developed to monitor (MON-VEGF-04) whitebark pine restoration and conservation: "To what extent have vegetation management projects occurred?"—is the wrong question to assess whether or not and to what extent the Forest's whitebark pine population is being conserved. As with the objectives, the Draft Plan does not guarantee that whitebark pine restoration will occur at all.

The effects analysis is inadequate to meet NEPA standards. The analysis does not assess effects of the two guidelines. The following DEIS (p. 300) excerpt illustrates this lack of impacts analysis:

> The revised plan alternatives propose a guideline that when conducting management activities in or near whitebark pine trees or stands identified for collection of scion, pollen, or seed; areas identified as important for cone production or blister rust resistance; and whitebark pine plantations, project-level design criteria or wildland fire management strategies should protect them from potential loss to support the recovery or long-term persistence of this species.

The statement merely restates the guideline, with which the reader is familiar. This is also true with the DEIS's assessment of management, which states,

> Management approaches include targeted restoration treatments that may be desirable in whitebark pine stands where disturbance is determined to benefit the species. For example, removing shade-tolerant conifers may aid in the persistence of mature whitebark pine, increase the potential for nutcracker caching, and to open up areas for planting of rust-resistant trees. All projects would be evaluated to assess their potential impacts to the species, especially in cases where there are healthy cone-producing trees present. Conservation and restoration treatments would typically be designed to create openings in sites that are advantageous for reestablishing whitebark pine. For whitebark physiology, ecology, genetics, distribution, mortality, and regeneration on the Custer Gallatin, the Whitebark Pine Strategy for the Greater Yellowstone Area, Adaptive Action Plan prepared by the Greater Yellowstone Coordinating Committee (2011 and 2015, respectively), and any new best available science for possible whitebark pine restoration strategies and activities would be used. (DEIS, p. 126-127)

The DEIS is inventing a level of detail that doesn't exist in the management approaches. There are no Draft Plan components or management approaches that offer guidance for "removing shade-tolerant conifers," assessing project "impacts to the species, especially in cases where there are healthy cone-producing trees present," or "create openings in sites that are advantageous for reestablishing whitebark pine."

The alternative comparison presented in Table 29 (DEIS, p. 139), focuses on the risk of ground disturbing activities. There should be a standard in the management plan that protects whitebark pine trees from ground disturbing activities. Guideline FW-GDL-PRISK-02 is not sufficient to address this issue. The DEIS provides a few examples of whitebark pine restoration strategies and activities from Keane et al. (2012) (which Keane et al. (2017) said was out of date with respect to climate change), indicating that these strategies may be activities that occur on the Forest, though this is not clear.

We recommend the Forest Service incorporate whitebark pine management, restoration, and monitoring recommendations from Keane et al. (2012) (found at: https://www.fs.fed.us/rm/pubs/rmrs_gtr279.pdf) and Keane et al. (2017) (found at: https://www.fs.fed.us/rm/pubs_series/rmrs/gtr/rmrs_gtr361.pdf) in the Forest's revised management plan. Provide a BASI rationale for why or why not the Forest is selecting specific

recommendations for development into plan components. Analyze the effects of these plan components in the DEIS.

4. Grizzly bear (*Ursus arctos horribilis*)

Over the last two decades, Defenders has played an important role in the recovery of grizzly bears in the Northern Rockies. Recognizing that the largest threat facing long term grizzly bear recovery is human related mortalities, Defenders has focused heavily on reducing conflict through our coexistence program. Since 1997, we have invested over $700,000 on more than 350 projects designed to minimize or eliminate conflicts between people and grizzly bears. These efforts assist communities living in grizzly country with the tools necessary to prevent conflicts with grizzly bears and promote tolerance. We operate these projects in partnership with local communities and residents as well as county, state, tribal and federal agencies.

Currently, grizzly bears in the Greater Yellowstone Ecosystem (GYE) remain listed as a threatened species and protected under the ESA. This planning process must put in place adequate protections to support a stable to increasing GYE grizzly bear population while also ensuring Forest Service lands will contribute to a robust, connected and resilient meta-population of grizzly bears in the future (36 C.F.R. § 219.9(b)(1)). For long term recovery, grizzly bears must be able to expand and establish well-connected populations throughout suitable habitat within historic range. Expansion will always be slow because grizzly bears are one of the slowest reproducing land mammals: female grizzly bears do not typically breed until after age 5, they have an average litter size of approximately 2 cubs, and they do not breed again for close to 3 years (Schwartz et. al. 2003). In addition, females set up home ranges adjacent to or overlapping their mothers' home range, making for slow range expansion (McLellan and Hovey 2011). Long-term habitat protections are critical to supporting future grizzly bear expansion.

Known grizzly bear mortality continues to be high in the Greater Yellowstone Ecosystem (GYE) with 51 known/probable mortalities inside the Demographic Monitoring Area (DMA) and 18 known/probably mortalities outside the DMA in 2018 (IGBST 2018 Mortality Database online). Most of these are human-related mortalities. As grizzly bears expand their range, mortalities and conflicts have been increasing outside the DMA. This is not unexpected as bears utilize private land outside the DMA where anthropogenic attractants can be numerous. Nevertheless, that does not minimize the need for habitat security on public lands outside the Primary Conservation Area (PCA) but rather accentuates the need for public lands to act as habitat stepping stones for grizzly bears as they move outside the PCA and even outside the DMA.

The key to ensuring that grizzly bears can continue to successfully reproduce and reoccupy historic habitat is to ensure habitat protections are in place within the PCA, DMA and connectivity areas in order to minimize human-caused mortality. Defenders fully supports the goal of the USFWS of "achieving connectivity and managing grizzly bear populations in the northern Rockies as subpopulations of a grizzly bear metapopulation" (USFWS 2011 Five-Year Review, p. 14). The Forest must incorporate plan components that provide for occupancy and

movement of grizzly bears, including females, inside and outside the Primary Conservation area and DMA.

The National Forest Management Act and Recovery

The Forest Service is assuming that it may base plan components on the Greater Yellowstone ecosystem Conservation Strategy (GYE CS). However, that strategy was developed to delist a single distinct population segment (DPS) from among the five grizzly bear recovery zones. As such, it was primarily designed to adequately provide for the continued existence of bears in the GYE. However, the GYE population remains isolated and its continued viability and growth is contingent on maintaining and restoring long-term connectivity with other populations. In order to contribute to the recovery of the metapopulation, this planning process should also be premised on the purpose of the GYE population serving as a source population for natural recovery of grizzly bears in the Bitterroot ecosystem. Adopting only the measures in the GYE CS specific to the PCA, is likely insufficient to promote recovery of the species as a whole. There is an independent requirement under both ESA and NFMA (36 C.F.R. § 219.9(b)(1)) to contribute to recovery of the grizzly bear species, and a narrow focus on the GYE population has shortchanged planning for recovery of the species as a whole on national forest lands.

The best available science continues to show that maintaining larger core populations and allowing movement between populations would be beneficial to the species (Proctor et al., 2012). The GYE population remains isolated with low genetic diversity, highlighting the need to continue to support expansion of both the NCDE and the GYE grizzly bear populations (Miller and Waits 2003). For connectivity to occur bears must be able to successfully disperse but the likelihood of this occurring may remain low (Peck et al., 2017). Strengthening protections on public lands and working to reduce mortality on private lands in-between ecosystems would improve their chances. In order for the Custer Gallatin plan to meet regulatory requirements to contribute to recovery of the grizzly bear species, the plan must meaningfully consider enhancing connectivity throughout the planning area. At a minimum, the cumulative effects analysis area for grizzly bears must include the Bitterroot and Northern Continental Divide recovery zones, and the DEIS must consider the effects on the population as a whole and incorporate additional plan direction to support occupancy of grizzly bear habitat outside the PCA and connectivity between populations.

Habitat security within the PCA needs to remain strong into the foreseeable future so that grizzly bears in the GYE can continue to expand into historic habitat as well as contribute to natural re-colonization of the Bitterroot Ecosystem. Defenders believes the approach provided by Alternative D which identifies key linkage areas (Bridger, Gallatin) and provides additional plan components that would be beneficial for grizzly bears is essential for meeting Planning Rule requirements for recovery. At minimum, the plan must include plan components that secure grizzly bear habitat both inside and outside the PCA and DMA. Below we outline plan

components we believe must be carried outside the PCA and into linkage/connectivity areas in any preferred alternative in order to meet rule requirements.

Species of Conservation Concern

The planning process also needs to recognize that if the grizzly bear is delisted, it will then have to meet the requirements of NFMA for non-listed species. For the Custer Gallatin revised plan, that will require that grizzly bears be identified as a SCC, for which the forest plan must include plan components that provide ecological conditions needed to maintain a viable population on the national forest. For viability, grizzly bears must be distributed within the planning area so that they are resilient and adaptable to present and future stressors (36 C.F.R. § 219.19) based upon best available science and considering historical distributions, recolonization, among other factors. We were alarmed when the proposed action did not include grizzly bears as a species of conservation concern. Since that time, listing status has been restored and the court decision is in appeal. Grizzly bears should be designated as a species of conservation concern on this forest and managed in accordance with requirements associated with that designation if/when grizzly bears in the GYE are once again delisted. The DEIS must demonstrate that grizzly bears in the planning area will meet viability requirements.

Stronger measures are needed to safeguard habitat for a viable population in the GYE, to ensure that recovery is maintained rather than just preventing jeopardy, and to consider the needs of and effects on the species as a whole when adopting plan components for the GYE.

Vegetation

FW-GDL-WL-02 and 04 Alternative B, C, and D

FW-GDL-WL-02 Alternative B, C, and D

"Vegetation management activities in a key linkage area should include design features to restore, maintain or enhance habitat connectivity for long distance range shifts of wide-ranging wildlife species."

More clarity on the specific "design features" in FW-GDL-WL-02 would improve this plan component and make it more effective as a contribution to grizzly bear conservation and recovery. There should be an accompanying desired condition for vegetation with linkage and DMA areas to guide implementation of this guideline.

FW-GDL-WL-04 Alternative B, C, and D

"To maintain habitat quality and limit disturbance effects on wildlife movement patterns, a key linkage area should be free of sustained substantial disturbance for at least four years out of every 10-year period, including at least two consecutive years of no sustained substantial disturbance. Sustained substantial disturbance is the use of heavy equipment or low-level

helicopter flights for vegetation management actions for a total of more than 30 days throughout an entire key linkage area in a calendar year."

Based on our review we do not see a scientific analysis that supports the proposed periodicity of disturbance (4 years out of every 10-year period) as applied in FW-GDL-WL-04, Alternative B, C, D. Only two consecutive years of no-sustained level of disturbance may be inadequate for grizzly bear security. Please provide the BASI analysis used that shows how this Guideline would benefit the integrity of the linkage area and that a two consecutive year limit is sufficient. Vegetation management could benefit grizzly bears. However, if a treatment improves the habitat for grizzly bears but does not limit human access to areas than that area could become a population sink (Nielsen, et al. 2004).

Site Development

The Conservation Strategy proposes a multi-agency review of 1998 baseline for developed sites to identify solutions to growing recreational pressure (DEIS, p. 364). This process is ongoing, but it is still unclear to the public if the edits the agencies are proposing are significant, how those edits will affect grizzly bear habitat and if the revised draft will undergo public review. Increasing the allowed number of developed sites could endanger grizzly bears and any significant changes to the Conservation Strategy should undergo a public comment process.

Agency grizzly bear removals are a leading cause of known grizzly bear mortality. The DEIS recognizes that "Developed sites provide places for people to concentrate use, which can contribute to disturbance factors that may displace wary bears, while at the same time often provide facilities for storing, preparing, and eating food, or disposing of garbage, which may act as attractants for less wary bears (DEIS, p. 365)" In addition, "Management decisions focused on maintaining secure habitat and not increasing developed sites or livestock grazing allotments have worked collectively to allow for grizzly bear expansion into suitable habitats and reduced potential for human-caused grizzly bear mortality (DEIS, p. 369)." If developed sites are a recognized source of conflicts and the restriction of such sites has likely been successful at allowing expansion of the grizzly bear population then now is not the time to ease restrictions, particularly when projections show an increase in recreation pressure.

On Forest Service lands food storage orders assist with minimizing such conflicts but adequate enforcement is often underfunded, thereby difficult, and compliance is not assured. Therefore, relying on food storage order to fully minimize the potential for conflict is inadequate. Consequently, limiting the number of developed sites on public lands offers another way to continue to prevent bear-human conflict and associated mortalities. Defenders appreciates that plan components would allow for fewer new developed sites in riparian management zones (DEIS, p. 373). In addition, we believe that a plan component prohibiting the development of new sites in the DMA and identified linkage areas would best meet regulatory requirements for conservation of grizzly bears.

Alternative D: FW-GDL-WL-03

Defenders supports this guideline, which limits construction of permanent facilities or structures within key linkage areas. This guideline should be included in any preferred alternative.

FW-STD-WLGB-04

Defenders believes that this standard, which limits developed sites at or below 1998 baseline levels, should be carried into the DMA and be included in identified linkage areas/connectivity areas in order to best meet regulatory requirements for grizzly bear conservation.

Mountain Biking/ Non-Motorized Use

Human activity, even non-motorized activity can influence bear activity (Coltrane and Sinnott, 2015). Concerns are growing over the rapidly increasing interest in mountain biking and trail running in prime grizzly bear habitat. Bicyclists moving along a well-maintained bike path can travel quickly and quietly. This can and has resulted in sudden encounters between bicyclists and grizzly bears (Croteau, 2016; Shedlock 2013). While encounters resulting in injury or death are rare, a survey conducted in Alberta, Canada found that 35 out of 41 (84%) of mountain bikers had come within 50 meters of a bear (Schmor, 1999). The sudden encounter is the most common situation associated with grizzly bear-inflicted injury (Herrero, 1989).

In the report following the 2016 fatality of Mr. Brad Treat, the review board made a series of recommendations related to mountain bike safety. The Forest should take these recommendations and incorporate them into the revised plan as mitigation measures where appropriate.

Recommendations included:

> Before new trails are opened to mountain biking in bear habitat, particularly grizzly habitat, there should be careful evaluation of the safety and reasonableness of enhancing mountain bike access in these areas where bear density is high.
>
> These evaluations should include:
>
> 1. Evaluation of the sight distance along trails due to vegetation density (i.e. does the trail traverse riparian zones with limited sight distance and high ambient noise levels from running water in streams), or dense vegetation due to early successional stage vegetation, or extremely curved trail segments (tortuosity) where surprise encounters are likely.
>
> 2. Evaluation of the productivity of bear foods along trail routes (i.e. does the trail traverse productive huckleberry fields or avalanche chutes?).

3. Evaluation of the application of seasonal closures of trails for mountain bikes during key seasons and the management capacity of agencies to maintain and manage such seasonal closures should the trail be opened for mountain bike use. (Servheen, et al., March3, 2017).

The Bridger, Bangtail, and Crazy Mountain geographic area has the lowest percentage of secure habitat of the Bear Analysis Units yet the DEIS states that it has good potential to provide habitat connectivity (DEIS, Table 60, p. 362)." In addition, the Draft Plan notes that recreation use is heavy in the Bridger and Bangtail mountains (Draft Plan, p.166). The DEIS also notes that the Bridger Bangtail range is identified in the NCDE Conservation Strategy under Zone 2 (DEIS, p. 364). Unfortunately, outside of beneficial food storage orders, Zone 2 receives very little additional plan protections to ensure its ability to contribute to connectivity. Given the trail density and identified high visitor use it is unclear how the Bridger, Bangtail and Crazy geographic area will function as a linkage are for grizzly bears and how, or if mechanize/non-motorized trail use was taken into consideration in the connectivity analysis. Please clarify how trail use and projected future use of trails was taken into consideration in the identification of linkage areas.

It is important that the Forest Service closely monitor visitor and bear use of motorized, mechanized and non-motorized trails in the DMA and linkage areas, so measures can be taken when necessary to mitigate bear-human conflicts. Monitoring key linkage areas before grizzly bears occupy the habitat would inform potential steps that could be taken proactively to prevent conflict. This could include trail closures or the reassessment of potential new trail construction. We request inclusion of a Monitoring Question for monitoring high use non-motorized trails in occupied grizzly bear habitat and connectivity areas that outlines potential mitigation steps the Forests could take to resolve grizzly bear conflicts. Defenders also requests the Forest implement a bear awareness outreach campaign targeting mountain bikers and trail runners, including signage for popular trail systems.

Defenders supports FW-GDL-RECEVENT-02 that will not allow non-motorized recreation events within the PCA at night during the non-denning season. We ask this be carried into the DMA and linkage areas.

Access and Recreation

FW-STD-WLGB-01, 02, 04

Roads have been shown to increase mortality of grizzly bears, cause area avoidance and fragment grizzly bear habitat (Kasworm & Manley, 1990; Mace, et al. 1996; Proctor, et al. 2012). As noted in the DEIS, "Areas outside the recovery zone are important to bears in that they allow for population expansion, and provide additional habitat ecological resilience, which presents options for grizzly bear responses to changing environmental conditions (DEIS, p. 361)." How the lands are managed outside the PCA is integral to successful connectivity

between the GYE and NCDE. To best meet requirements for grizzly bear conservation, Defenders requests FW-STD-WLGB-01, 02 and 03 be carried into the DMA and identified linkage areas.

We ask for the inclusion of a Standard that any new or authorized recreation permits include a clause for modification or cancellation of activities if needed to resolve a grizzly-bear human conflict situation.

Ski Resorts and Over Snow Use

The Custer Gallatin National Forest is home to four ski resorts. Ski resorts can create significant footprints including hundreds of visitors and associated bear attractants. The forest should include plan components that prevent bear-human conflicts and mitigate the potential for future expansion or modification of these areas to disturb grizzly bear habitat. We request a Standard that any new or reauthorized ski permits include measures to limit the risk of bear-human conflicts.

Grizzly bears can be susceptible to disturbance at their den sites particularly in the spring when females and cubs of the year are still present (Mace and Waller 1997). Allowing extensive winter access in areas where grizzly bears are denning can be detrimental to grizzly bear security. The DEIS points to Podruzny et al. 2002, stating that large amounts of wilderness or other land use designations that restrict snowmobile use mean a small portion of denning habitat is vulnerable on the Custer Gallatin. However, that study also notes that additional research is needed to identify spring habitats of post emergent bears (Podruzny, 2002). The Forest should look at spring emergence habitat in snowmobile use areas to better understand potential impacts to grizzly bears in the PCA, DMA and linkage areas. Defenders requests a standard that states no net increase in motorized over-snow use in the PCA, DMA and identified linkage areas in modeled denning habitat during spring emergence. In addition, we request a Desired Condition that over-snow motorized use does not have negative effects on denning of female grizzly bears with cubs during den emergence. The Flathead National Forest includes just such a Desired Condition FW-DC-REC-22, associated Standard, FW-STD-REC-05 and Monitoring Question MON-NCDE-08. The indicator being "Percentage of modeled grizzly bear denning habitat where public motorized over-snow vehicle use is allowed during the den emergence time period (MFWP model for the NCDE or subsequent updates)" (Flathead National Forest Plan, 2018).

Connectivity

Connectivity and linkage between grizzly bear populations has been stated as a goal of the

USFWS and the Interagency Grizzly Bear Committee. "Loss and fragmentation of natural habitat is particularly relevant to the management and survival of grizzly bears…Ideally, preserving linkage between populations is a more legitimate long-term conservation strategy than are

attempts to manage separate island populations. (USFWS Grizzly Bear Recovery Plan 1993, P. 24)." In the Interagency Grizzly Bear Committee's Five-Year Plan (2018-2022), management goal #1 is to "Maintain or enhance connectivity between ecosystems and with Canadian populations to provide effective two-way genetic exchange." In addition, The Southwest Montana Grizzly Bear Management Plan states "The best way to mitigate potential negative impacts from climate change is through well-connected populations of grizzly bears. Connectivity among grizzly bear populations also mitigates genetic erosion and increases resilience to demographic and environmental variation (Montana Fish, Wildlife and Parks, Grizzly Bear Management Plan for SW Montana, p. 41)."

We are encouraged by the Forest's intent to facilitate linkage through the forest plan but feel there is a need for improvement to truly achieve the long-term goal of a connected, sustainable and resistant grizzly bear population in Montana and best meet regulatory requirements for bears. For example, the DEIS states "Like the current plans, the revised plan alternatives contain no plan components specific to grizzly bears that would restrict land management actions outside the recovery zone (DEIS, p. 373). This is problematic.

FW-GO-WLGB

Defenders supports goal FW-GO-WLGB to work with partners to address the issue of habitat connectivity. For connectivity to be successful it will take collaboration and funding from a multitude of partners.

FW-GO-WLGB-01 and FW-DC-WLGB-02

Male grizzly bears tend to disperse farther than females (McLellan and Hovey, 2001; Proctor et al. 2004). This makes the potential for male-mediated connectivity or genetic connectivity more likely to occur before females or demographic connectivity (Peck et al., 2017). Facilitating such movement is a step in the right direction but limiting long term goals and desired conditions to male mediated movement is not enough to secure a future for a connected metapopulation of grizzly bears.

FW-GO-WLGB-01 (suggested edit in italics)

The Forest Service works with State, Federal, Tribal, and other willing partners to address the issue of habitat connectivity between grizzly bear ecosystems, with the long-term goal of achieving successful *occupancy* and dispersal of grizzly bears between ecosystems, and ultimately increasing the genetic diversity and long-term health of grizzly bears inhabiting the Custer Gallatin National Forest.

Defenders asks that Desired Condition FW-DC-WLGB-02 not only contributes to facilitating movement but also occupancy by females. In addition, we ask for the removal of "socially

acceptable". The term "socially acceptable" is subjective and undefined. The plan should include a goal of building social acceptance for grizzly bears across the Forest.

FW-DC-WLGB-02 (suggested edit in italics)

Outside the primary conservation area and recovery zone, grizzly bears, *including reproductive females* occur where habitat is biologically suitable. ~~*and grizzly bear occurrence is socially acceptable*~~. Availability of secure habitat contributes to habitat connectivity, which facilitates grizzly bear movement between the Greater Yellowstone Area and other grizzly bear ecosystems.

Grazing

Defenders has worked in Montana since the early 1990s to minimize conflict between grizzly bears and livestock including assisting with the cost and implementation of removing dead livestock, securing livestock feed, securing garbage, electric fencing, livestock guard dogs and range rider projects. Defenders appreciates the decline in livestock allotments within the recovery zone since 1998. These actions have likely reduced potential grizzly bear mortality related to livestock conflicts on the forest. Defenders is also supportive of plan components that recognize the risk of bear-livestock conflict and limit grazing activities in the PCA and recovery zone. However, keeping protections only within the PCA is not enough to support connectivity. To address this concern, we request expanding some of those protections into occupied grizzly bear habitat and identified linkage areas.

FW-SUIT-WLGB-01

Defenders supports this plan component within the PCA and recovery zone and requests that this be carried outside the PCA and recovery zone, into identified linkage areas and occupied grizzly bear habitat. These areas should not be suitable for increases in number or acreage of active commercial livestock grazing allotments above 1998 baseline and would not be suitable for permitted grazing of sheep.

FW-STD-WLGB-05

Defenders requests this standard, limiting the number and acreage of livestock grazing allotments above that which occurred in 1998, be expanded outside the PCA into occupied grizzly bear habitat on the Custer-Gallatin and key linkage areas.

FW-STD-WLGB-06

Defenders supports Alternative D but requests that this standard be carried into occupied grizzly bear habitat and linkage areas. If the Forest chooses **– Alternative B, C and E**

Defenders requests this standard be expanded outside the PCA into occupied grizzly bear habitat on the Custer-Gallatin and key linkage areas.

FW-GO-GRAZ-02-Alternative D

Defenders supports emphasis on allotment closure as identified in this goal. We request that one consideration for this action be areas with consistent conflicts between native predators such as wolves and grizzly bears and livestock. In addition, clarification of "under-represented reference" and "native species restoration" areas would be useful and the Forest should consider desired conditions for these important places.

FW-STD-GRZ-02-Alternative D

It is well known that livestock grazing, in particular sheep grazing, is detrimental to grizzly bears due to the likelihood of grizzly bears preying on sheep and dying because of either agency management action or direct action taken by the livestock producer (Knight and Judd, 1983; Anderson et. al., 1997; Sagor et. al. 1997). Defenders supports FW-STD-GRZ-02-Alternative D.

FW-STD-GRAZ-03-Alternative B, C, E

Defenders supports Alternative D however, if this standard is chosen requiring a risk assessment to determine if mitigation is effective at preventing disease transmission between livestock and bighorn sheep Defenders requests that any risk assessment must also address the efficacy of the plan at preventing conflicts between livestock and native predators like grizzly bears and wolves.

Monitoring questions MON-WL-01 asks "What are the number of wildlife conflicts" but indicators are focused on citations, food attractants and outreach (CGNF Draft Plan, p. 198). Defenders requests broadening this to include monitoring the number and locations conflicts between livestock and native predators including grizzly bears and wolves. This information should inform future livestock allotment plans.

Grizzly bear relocation sites

FW-OBJ-WLGB-Alternative D

Alternative D identifies seven relocation sites. As was seen in 2018 with the capture of a grizzly bear in Stevensville, Montana, the U.S. Forest Service needs to develop plans that allow for the relocation of grizzly bears in areas in-between ecosystems. Providing habitat that contributes to connectivity but capturing and relocating grizzly bears that show up back into the Primary Conservation Areas will severely retard the already slow process of connecting populations. We appreciate that the Forest is taking the initiative to identify relocation sites within the plan and request that some of these sites allow relocation outside the PCA. We support Alternative D's identification of seven location sites because it provides additional flexibility within the Forest.

Food Storage

FW-STD-WL-01

We applaud the Forest Service for applying food storage orders in the Absaroka Beartooth Mountains; Bridger, Bangtail, and Crazy Mountains; Madison, Henrys Lake, and Gallatin Mountains and the Pryor Mountains Geographic Area. As opportunistic omnivores, grizzly bears are frequently enticed by anthropogenic attractants like unattended coolers, garbage and livestock. This situation rarely ends well for the bear and can lead to habituation to human activity which often becomes a human safety issue. By enacting and enforcing the food storage orders the Forests will be able to minimize such conflicts, improving safety for both people and bears. Funding for enforcement personnel will be important to program success. Ideally enforcement is coupled with a strong public outreach campaign about food storage orders.

Defenders has been heavily invested in the effort to minimize conflicts between people and grizzly bears by securing human related attractants such as garbage and livestock. This has included cost-sharing with state, federal and tribal agencies on food storage on public lands, including bear-resistant garbage containment and food storage lockers. Defenders will continue to invest in such efforts to secure attractants on public lands.

The DEIS should analyze the sufficiency of "baseline" conditions, given effects of recreational use

Motorized and mechanized technology is rapidly developing allowing people to get places that were much more difficult in the past. In addition, use of grizzly bear habitat continues to grow each year as people explore the Greater Yellowstone area. Grizzly bear habitat security is often tied to "baseline". However, "baseline" conditions of recreational use (measured as the recreation spatial footprint) may not be sufficient to provide necessary grizzly bear habitat security during the life of the plan given increased human presence within that spatial footprint.

Alternative D provides more habitat security than other alternatives, but the merits of these protections for necessary grizzly bear conservation are not adequately presented in the DEIS. Defenders requests the FDEIS analyze the specific effects of Alternatives C and D in providing for the habitat and security needs of grizzly bears over the life of the plan, given projected growth in recreation pressure and forest use. Creation of a unique alternative that protects "baseline" conditions plus other secure areas may be necessary given expected effects of human use. Based on this analysis, the forest plan may need to draw certain protective elements from Alternative D to meet the purpose and need for long-term grizzly bear recovery. The plan must maintain and/or improve protections within the PCA, providing for secure core habitat that contributes to a stable to increasing grizzly bear population. In addition, we request that the DMA and identified linkage areas include new protections as well as carry over protections proposed for only the PCA. Steps must be taken to encourage continued range expansion, support connectivity between the NCDE and GYE and allow for the GYE to be a

source population for the Bitterroot ecosystem. The FDEIS must take into consideration the population as a whole, rather than the narrow focus of sustaining a population in the GYE.

5. Greater sage-grouse (*Centrocercus urophasianus*)

Please see our scoping comments from March 5, 2018 on greater sage-grouse and the plan components required for the species to persist. We appreciate that the Draft Plan includes 7 guidelines aimed at protected sage-grouse, these are all necessary to maintain species viability and should be reworked into standards. Here is another place where seeing the ecosystem plan components relevant to greater sage-grouse would be tremendously helpful.

6. White-tailed prairie dog (*Cynomys leurcurus*) and black-tailed prairie dog (*Cynomys ludovicianus*)

We appreciate that the Forest Service has acknowledged that maintaining white-tailed prairie dog viability requires species-specific plan components, given the species has been identified as a SCC. However, the black-tailed prairie dog has lost over 98% of the area it once occupied, and the revised management plan should not have weaker plan direction; the black-tailed prairie dog should also be identified as a SCC.

Given that in the 1970s there were 15 white-tailed prairie dog colonies in and around the Forest and now there is one 40-acre colony, the Forest Service must do more to keep the white-tailed prairie dog viable. Our scoping comments included a range of additional plan components to protect prairie dogs, and the following recommendations should be added to ensure the Forest can maintain viability for both species.

- Prohibit recreational shooting of prairie dogs.
- Prohibit lethal control of prairie dogs.
- Close and obliterate roads and motorized activity in and around prairie dog colonies and re-introduction sites to minimize disturbance and discourage shooting.
- Prevent plague by implementing a plague management and reduction programs that includes the use of insecticide dusting and vaccination. (see Seglund and Schnurr 2010).
- Minimize impacts of energy and/or mineral development on prairie dogs. (adapted from Seglund and Schnurr 2010).

Additionally, the Forest Service should explain how specific ecosystem plan components contribute to maintaining viability. The plan should include a specific desired condition that viability is maintained for these species. It would be helpful to know how much occupied area exists on the Forest and how much unoccupied suitable habitat exists that could serve as recovery habitat.

Below are some comments about the proposed plan components in the Draft Plan.

> *FW-GO-WLPD-01 – The Forest Service engages with state (Montana and South Dakota) wildlife agencies to coordinate management of prairie dog towns and habitat in a manner consistent with statewide management plans.*

Management direction related to prairie dogs on the Forest must be included in the Custer Gallatin revised plan. If the Forest Service is going to adopt direction from state plans, a plan amendment will be required. The Forest Service is under no obligation to align any part of its management plan with any state government wildlife management direction (36 C.F.R. § 219.4(b)(3)). the courts have consistently upheld that the federal government has supremacy over its lands under the Property Clause of the United States Constitution (United States Constitution, Article IV, Section 3), which grants Congress the "Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States." In *Kleppe v. New Mexico*, 426 U.S. 529, 541 (1976), the Court stated, "the 'complete power' that Congress has over public lands necessarily includes the power to regulate and protect the wildlife living there." Kleppe further described the limit of a state's ability to dictate policy on federal lands: "those powers exist only in so far as [their] exercise may be not incompatible with, or restrained by, the rights conveyed to the Federal government by the Constitution." *Id*. at 545 (internal quotes omitted). The Forest Service clearly has the authority to manage wildlife habitat and species populations, and this includes managing the public's use of wildlife on national forests and grasslands.

> *FW-STD-WLPD-01 – Use of toxicants (such as, rodenticides) shall not be permitted to control the spread of white-tailed prairie dog colonies.*
>
> *FW-GDL-WLPD-01 – To maintain important ecological contributions of prairie dogs, non-lethal means should be implemented before lethal means to control the spread of black-tailed prairie dogs.*

We support FW-STD-WLPD-01 but, it should apply to black-tailed prairie dogs as well. At a minimum, FW-GDL-WLPD-01 should be a standard and revised as a standard.

> *FW-STD-WLPD-01 – New roads, trails and other permanent facilities or structures, shall not be constructed within 100 feet of white-tailed prairie dog colonies.*
>
> *FW-GDL-WLPD-01 – To limit disturbance to prairie dogs and other species associated with prairie dog colonies, new roads, trails and other permanent facilities or structures, should not be constructed within 100 feet of black-tailed prairie dog colonies, unless for the specific purpose of managing undesired colony expansion.*

We appreciate a standard that provides a restriction on road-building near white-tailed prairie dog colonies, however the standard is not sufficient and should apply to black-tailed prairie

dogs as well. However, 100 feet is not nearly a large enough buffer to provide protection from roads (and the associated threats of vehicle collisions, increased shooting, compacting soil, and others) and new structures (that can provide unnatural perches for predators, crush prairie dogs during construction, permanently remove habitat, and lead to increased human disturbance). Buffers around colonies should be at least 0.5 miles, a standard adopted in other federal land management plans (Seglund et al. 2004). The Forest Service should have plan components aimed at preventing construction of and removing roads near prairie dog colonies.

The effects analysis for the white-tailed prairie dog suffers from some problems that we described above: failure to describe effects from specific plan components, unfounded assumptions about effects, and a lack of assessment of the effects of ecosystem-focused plan components on the species. For example, the DEIS (p. 427) states,

> White-tailed prairie dogs are susceptible to unrestricted recreational shooting, but the effects have not been well studied for this species. Lower population density and less social structure of white-tailed prairie dog colonies may discourage recreational shooting (U.S. Department of the Interior 2010). Further, the small size and isolated location of the white-tailed prairie dog colony is unlikely to attract recreational shooting on the Custer Gallatin.

That shooters won't be attracted to the last remaining white-tailed prairie dog colony on the Forest is an assumption made with no support. Moreover, the Forest must have a standard that prohibits prairie dog shooting. The DEIS (p. 428) states,

> The 2012 Planning Rule requires that plan components must provide the ecological conditions necessary to maintain long-term persistence of each species of conservation concern within the plan area. The white-tailed prairie dog population on the Custer Gallatin is small, but has remained persistent over time. Due to the small size of the population and limited habitat on the Custer Gallatin for expansion, white-tailed prairie dog is vulnerable to stressors beyond the authority of the Forest Service to manage; most notably the risk of plague spread by fleas. In this case, the plan must provide direction that will contribute to maintaining long-term persistence of the species within its range. Under all revised plan alternatives, plan components provide proactive measures to manage conditions within the authority of the Forest Service to maintain the existing population of white-tailed prairie dogs, and allow for colony expansion. Under all alternatives, habitat would be maintained for the species such that, if the existing population were devastated by disease, the habitat could be recolonized from nearby source populations in Wyoming.

And, thus, the revised plan should have plan components that direct the Forest to conduct plague mitigation, which is within the agency's authority. The assumption that white-tailed prairie dogs from Wyoming could recolonize the Custer Gallatin in the event of plague is unsupported. The DEIS notes on p. 428 that, "The Bureau of Land Management plan prohibits

surface occupancy and use for oils and gas exploration and development within ¼ mile of prairie dog colonies active within the past ten years." The EIS should analyze the effects of oil and gas development on white-tailed prairie dogs and develop plan components to protect prairie dogs from oil and gas disturbance. The EIS must analyze the effects of prairie dogs no longer being protected by the Regional Forester Sensitive Species designation.

7. Western pearlshell mussel (*Margaritifera falcata*)

The western pearlshell mussel was designated by the Regional Forester as an SCC on the Custer Gallatin. As noted in the DEIS, "widespread decline in westslope cutthroat trout has a negative impact on the western pearlshell, since the historical distribution of the pearlshell closely matched the historical distribution of the westslope cutthroat" (DEIS at 81). Putting aside the asymmetry of the decisionmaking process, the plan now must provide ecological conditions to support a viable population of western pearlshell mussels (with a distribution sufficient to be resilient and adaptable to stressors and likely future environments). Here is what the DEIS says about the western pearlshells and the plan's provision of the ecological conditions that are necessary for their persistence:

> The riparian management zones in the revised plan alternatives would help decrease sediment inputs to streams that would benefit habitat conditions of this mussel. (DEIS at 90)

This is problematic. First, according to the SCC rationale for western pearlshells, the threats go beyond sedimentation and include habitat degradation, water withdrawals and barriers to fish movement (concluding that the plan will benefit the westslope cutthroat trout, which in turn benefits the western pearlshell, is a subjective judgement). The DEIS needs to cite the actual plan components that provide the necessary conditions for pearshell persistence in the plan area.

The DEIS "analysis" generally consists of simply restating plan components, making subjective judgements of their sufficiency, and then comparing objectives across alternatives. While NEPA requires a comparison of alternatives, it also requires a comparison of the effects of alternatives. There must be some attempt to determine the results of the plan components and then compare them. But for aquatic species (there is no specific mention of western pearlshells) the DEIS simply states that all of the plan alternative objectives would benefit aquatic species, but that Alternative D has the most benefit and E the least. This is not a sufficient effects analysis.

The DEIS concluded that the RMZs would help decrease sediment inputs to streams that would benefit conditions for the western pearlshells (not necessarily provide ecological conditions for viability). But timber harvest. The DEIS discloses that there will be impacts from delivery of sediment from temporary roads and those "rare situations" where landings are placed in the RMZ. Yet, the DEIS assures us that sediment effects will be lower ("more beneficial to water

quality") under Alternative E (because it logs larger trees to derive volume) while Alternative D (the "conservation alternative") would be "least beneficial". The issue at hand here is sediment impacts to aquatic systems; how did we get to "beneficial" effects in this discussion?

The DEIS also discloses that "Water quality effects attributed to timber harvest could include increased sediment, nutrient loading, and changes to water temperature" but that is acceptable because risk of impaired water quality would not increase over current conditions. (DEIS at 93). For western pearlshell mussels, current conditions are the cause for concern.

The DEIS states that "*If* climate change continues to increase air and water temperature, western pearlshell would be negatively affected because increased temperatures could limit the extent of the temperature sensitive westslope cutthroat trout" (DEIS at 91, emphasis added). Putting aside that this further supports the argument to designate westslope as an SCC, it is important to reference the scientific basis for the assumption that climate change may not continue to increase air and water temperatures.

The requirement is for the plan to provide the necessary ecological conditions for western pearlshell viability and persistence in the plan area, not to "benefit habitat conditions" for the species. In order to provide the necessary ecological conditions for viability, the DEIS needs to project the future condition of the conditions that support western pearlshells. The DEIS must provide an actual "result" in terms of ecological conditions relevant to the species. The DEIS cannot substitute qualitative or subjective judgments of sufficiency for actual analysis of effects. It is also not sufficient to simply assume that desired conditions will occur because they are desired conditions. Their likelihood of occurring and timeframe required, and associated uncertainty, should be disclosed.

The DEIS is confusing in that it declares that the revised plan components would provide protections for aquatic species categorized as Northern Region sensitive. Yet on p. 80 the DEIS notes that "Upon final Regional Forester's determination of the Custer Gallatin's Aquatic Species of Conservation Concern list, the Regional Forester's sensitive aquatic species list will be replaced with the species of conservation concern list. Analysis of sensitive aquatic species pertain to the current forest plans."

Regarding the western glacier stonefly. The DEIS informs us that "The potential effects of climate change…would decrease glaciers and permanent snowfields – a key habitat component for this species – could therefore degrade habitat for the western glacier stonefly." The DEIS also adds that climate change effects are "outside the management purview of this forest plan" (DEIS at 90). Climate change is not outside the management purview of this plan. Plans are to address and adapt to the effects of climate change. In fact, the rule directly addresses what to do in cases where circumstances not within the inherent capability of the plan area preclude providing ecological conditions needed to maintain or restore a viable population of SCC (36 C.F.R. § 219.9(b)(2)). According to the directives one of those circumstances could be climate change. Here is the example from the directives:

> Current and projected changes in climate that may affect a National Forest or grassland's ability to maintain or even contribute to the ecological conditions necessary to maintain viable populations of some species. An example is the warming trends at higher elevations in the West, which are altering the capability of some National Forests in California and other areas of the West to provide ecological conditions needed to maintain viable populations of American pika.

So, climate change is not irrelevant to the discussion of the viability of western glacier stonefly. The DEIS states that "more data is needed on western glacier stonefly to determine its specific habitat distribution and niche on the Custer Gallatin" (DEIS, p. 90). There is no monitoring of stonefly in the Draft Plan.

8. At-risk plant species

There are 26 plant species of conservation concern on the Forest. The Draft Plan notes that in addition to the single desired condition (FW-DC-PRISK 01), "meeting or moving towards the desired conditions for each of the broad potential vegetation types found in the terrestrial vegetation and invasive species sections are intended to also provide for the long-term persistence of at-risk plant species." In order to better accomplish this, we request that those species be listed in the plan with their coarse-filter affiliations (e.g. potential vegetation types). Noting at-risk plant community habitats may be an effective way of linking at-risk plants with the coarse filter conditions that will support them. For example, here is a desired condition from the draft Carson National Forest plan applied at the fine scale (10 acres or less) for at-risk plant communities that could be replicated on Custer Gallatin:

Carson National Forest Draft FW-DC-VEG-19: At-risk plant community habitats (e.g., gypseous or limy sandstones; Mancos Shale soils; margins of springs; basalt lava flows and cinders; calcareous soil and alkaline clay; canyons, cliffs, and ledges; granitic soils and igneous rocks; and sandstone rocks and soils) are present, to maintain self-sustaining populations of associated at-risk plant species.

As it stands, the single desired condition may not support optimal project level planning and plan implementation. The objective (FW-OBJ-PRISK-01) is presented absent information on in what forest/vegetation types these projects may occur. The reader does not understand what the design features may be. Also, see Section II.B.3 above regarding the NEPA requirement that DEIS's use high quality information.

We appreciate the general guidance for at-risk plant species provided in Appendix A and believe that these management approaches, particularly the evaluation of areas proposed for ground disturbing activities for presence of occupied or suitable habitat for at-risk plant species, should be translated into plan components. As a general matter of plan organization, it would be helpful to put the management approaches in the plan within the relevant section; this

allows the reader to see how the management approaches complement the plan direction. We have seen other forests structure their plans this way.

For Standard 01 (FW-STD-PRISK), it is not clear how the Forest will provide certainty that mitigation will be effective. If there is uncertainty over the effectiveness of mitigation it must be disclosed within the DEIS. The same comment applies to FW-GDL-PRISK 01. For FW-GDL-PRISK 02, the reader does not understand how or when it will be determined that wildfire control lines and retardant are advantageous to at-risk plant species.

As stated above, the EIS must assess the effects of plan components on Regional Forester Sensitive Species. The EIS must also assess the effects of the revised plan on a Sensitive Species that is not identified as a SCC.

The DEIS on p. 126 notes that "The *plan components* that are likely to have an effect on at-risk plants species habitat guilds are summarized in the following sections" (emphasis added) For the cold forest habitat guild, the DEIS then lists management approaches, which are not plan components. When touting effects, the DEIS cannot rely on plan content that is not plan components. To do so is arbitrary and capricious. This error is repeated on p. 129 where the DEIS says that current (no action) site-specific protections "would continue to occur with the plan components for at-risk species under the revised plan alternatives *and the management strategies in appendix A of the draft revised plan*" (emphasis added). Generally, the DEIS predicts that timber harvest will increase threats to at-risk species, and that the impact of harvest is consistent between the alternatives. These noted effects are conclusory however: "As a result of these revised plan alternatives' plan components, at-risk species and their respective habitats would be considered during vegetation projects and grasslands, shrublands, wetland and riparian, sparsely vegetated habitat guilds are expected to be maintained and continue to provide persistence of at-risk plant species despite the potential for impacts in areas used for timber production." We would expect to see more causal analysis of the effects of specific plan components on viability.

For grazing, the DEIS notes that "All habitat guilds except alpine have the potential to be impacted by livestock or wild horse grazing" but that they will be "protected by revised plan alternatives plan components during project level allotment planning to prevent negative impacts associated with livestock." This raises concerns over what protections are in place at the plan level and those that may be applied at some uncertain time in the future. What is the effect on at-risk plants if project level allotment planning does not, or is slow to, occur? Generally, the effects analysis of grazing on at-risk plants simply summarizes the plan direction, with which the reader is already familiar. See Section II.B.5 above regarding the evaluation of plan components. The DEIS should reflect the fact that Alternative D has grazing direction that would have more beneficial environmental impacts than other alternatives for conservation of at-risk plants.

9. Bison (*Bison bison*)

Defenders of Wildlife supports Alternative D for bison in the Draft Plan as part of the overarching vision to achieve a year-round, sustainable bison population on the Custer.

The framework for managing Yellowstone bison is under the Interagency Bison Management Plan (IBMP), the cooperative, multi-agency effort guiding management of bison and brucellosis in and around Yellowstone National Park. The IBMP includes objectives related to the partner role of the Forest and particularly in respect to the delineation of management zones where bison presence is tolerated and management is emphasized. As a result, the majority of our Draft Plan comments pertain to the U.S. Forest Service's future actions toward contributing to bison management, as a partner of the IBMP.

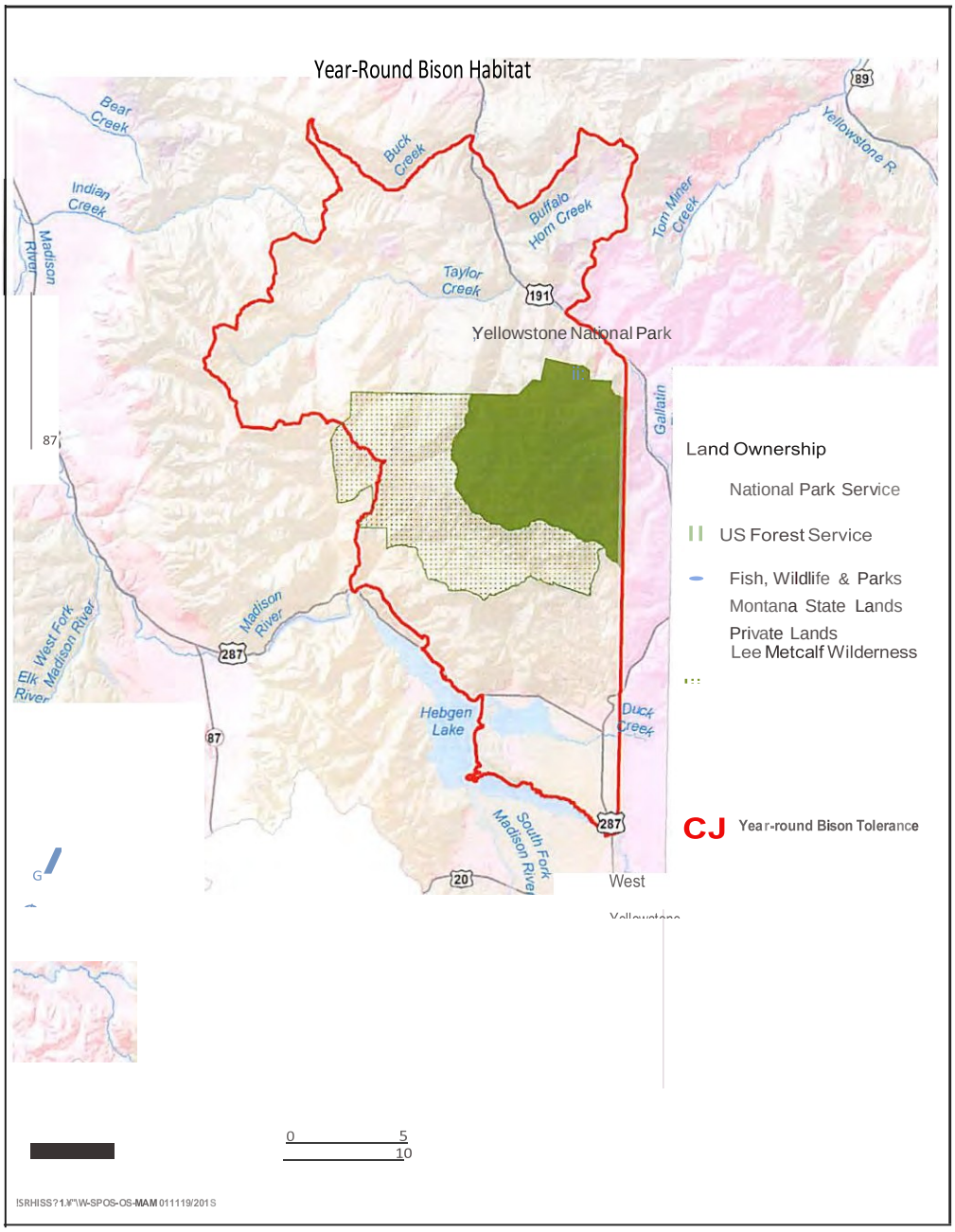
In addition to the management objectives outlined in the IBMP, when bison are on national forest lands, the Forest Service has responsibilities under federal laws to provide habitat for bison, as a native species. NFMA states that national forests must maintain viable populations of native species. The Forest also has an obligation to maintain or restore ecological conditions on the forest that contribute to maintaining a viable population of bison within their range (36 CFR 219.9 (b)(2)(ii)). As the federal land manager, the Forest is the lead agency for facilitating bison dispersal throughout the tolerance area (on the west and north side of Yellowstone), and as a necessary ecological condition that the forest should provide to contribute to bison viability. There is also agreement among the partner agencies that bison numbers will not be reduced to a point where viability ever becomes at risk, as provided by the Joint Management Plan (2000) under the IBMP.

Below is a description of the geographic area in consideration, along with key management guidelines for bison under the IBMP as well as our comments on the Draft Plan's plan components regarding bison. In addition to our comments, we would like to express that we are pleased to see captured in the Draft Plan some of the management actions we suggested in our March 21, 2018 comment letter that Defenders collaborated on with the Greater Yellowstone Coalition and the National Parks Conservation Association. It seems evident that many of those proposed actions would actually support a SCC determination for bison within the Custer Gallatin planning area. While we understand this determination rests with the Regional Forester, we feel it is appropriate to identify the SCC Rationale for the bison objectives and guidelines outlined in the Draft Plan.

Geographic Area and Management

The Forest surrounds much of Yellowstone National Park and is critical habitat for and used by migratory and resident bison. Approximately 88% of lands in the newly designated tolerance zone (~380,000 acres in total, including Zone 2 under the IBMP) outside the park are on the Custer Gallatin lands (Montana, 2013). Monitoring efforts conducted under the IBMP have shown bison conduct their historic migration—across the border of Yellowstone National

Park—to access winter habitat and calving grounds on the Forest (north and west sides of Yellowstone). Currently, bison are only located in the Madison, Henrys Lake, and Gallatin Mountains Geographic Area and the Absaroka Beartooth Geographic Area.



Under the IBMP, Zone 2 of the Hedgen and Gardiner basins provides for year-round occupancy of bison. As part of this forest plan revision, affording bison with suitable habitat to ensure their ability to inhabit Hedgen and Gardiner basins, for year-round occupancy, is an important management measure by the Forest Service for long term sustainability of Yellowstone bison.

Noted in the Joint Management Plan, Zone 2 of the Forest is dedicated "winter habitat with some private property where bison will be managed for: i) spatial and temporal separation; ii) lethal removal for private property concerns; iii) bison tolerance limits (up to 100); and, iv) bison park population size (3,000)."

A 2015 Environmental Assessment (EA) decision by Montana Governor Bullock provided an additional 256,000 acres (400 square miles) of a tolerance area for bison to access suitable habitat on the Forest outside the park. The EA also delineated state agency roles of the Montana Department of Livestock and Montana Fish, Wildlife and Parks (FWP) for bison and brucellosis management discretion on the ground.

Specifically, the IBMP seeks to:

- Maintain a wild, free-ranging bison population;
- Reduce the risk of brucellosis transmission from bison to cattle;
- Manage bison that leave Yellowstone National Park and enter the State of Montana;
- Maintain Montana's brucellosis-free status for domestic livestock.

Comments on the Draft Plan

Desired Conditions (FW-DC-WLBI)

Native bison have access to forage, security and movement corridors to facilitate distribution of the species to suitable habitats within the plan area.

Montana Governor Bullock's 2015 EA decision, approved by the IBMP in April 2016, provided for an additional 256,000 acres (400 square miles) of a tolerance area for bison to access for suitable habitat outside the park. In theory, this measure is intended to support the presence of bison year-round; however, of consequence is the animals have a difficult time accessing this tolerance zone in order to utilize the suitable habitat due to a number of contributing factors. These include bison tendency to avoid hunting/hazing areas (away from Zone 3) and the issues with the proximity of the migration corridor that follows Montana Highway 191, posing vehicular dangers. While this desired condition (1) is important to the viability of bison on the Forest, we believe a suite of management measures (detailed below) will be necessary to achieve this vision.

Suitable habitat accommodates bison migrating out of Yellowstone National Park in winter, as well as supporting year-round bison presence on the Custer Gallatin National Forest. Adequate connecting corridors exist between suitable habitats to facilitate bison on the landscape with sufficient distribution to be resilient to stressors, adaptable to changing conditions, and contributing to stable or increasing genetic diversity.

"Adequate connecting corridors" are a key factor for access to suitable habitats and for bison to inhabit the larger landscape; however, the Forest Service may consider habitat improvement projects to increase the quality of the habitat within these corridors and thus better attract bison to use these routes to access the West Side tolerance area. At the recent IBMP meeting in Gardiner, MT (IBMP, 2019), Forest Supervisor Mary Erickson noted that there have been past discussions about the potential to manipulate habitat as a way to aid migration into the new tolerance area, including up through the Taylor Fork drainage. Specifically, one idea is to increase the width of a migration corridor along Hwy 191. Erickson acknowledged that the Forest has yet to work on this issue, and she suggested the development of a working group to consider this strategy (IBMP, 2019). For the Draft Plan, captured in the objectives are actions to improve the habitat within these corridors, which will be important for realizing this desired condition.

We also appreciate the inclusion in desired condition 2, that the Forest will be "contributing to stable or increasing genetic diversity." The Draft Plan states the importance of bison to encourage park visitation. Yellowstone bison are also highly valued for their genetics and for the strong potential for these animals to be a source population for restoration of bison outside of the Greater Yellowstone Ecosystem, to tribal and public lands across the Great Plains. The bison are the descendants of the last remaining animals after the mass slaughter of the 1800s. In North America, the American bison is considered ecologically extinct throughout most of its historic range and with many experts fearing the species was heading toward genetic extinction (Bailey 2013). Freese et al. (2007) documented that the North American bison is considered "ecologically extinct" across its former range and, along with Sanderson et al. (2008), called for urgent measures to conserve the remaining wild and free-ranging bison—the plains bison that inhabit Yellowstone—and to restore the species as wildlife in focal areas across its historic range.

Educational materials, including signage at trailheads and campgrounds where bison may occur, are available to help forest users understand wild bison behavior and act accordingly in order to avoid conflicts.

Bison are known to prefer using established trails and roads when moving within heavily wooded areas or winter snow within YNP (Bullock, 2015). Cooperation between FWP and the Forest for outreach to guest ranches and high-use trails were identified in the EA as tools to help reduce the potential of bison-human conflicts. It is our opinion that increasing and applying additional communications through in-person contacts and community meetings, facilitated by FWP could help better enhance these outreach efforts and the coexistence efforts. In addition, educational materials should not be limited to bison behavior. These products, signage, brochures, etc., should also portray the important history of Yellowstone bison and how because they are native, free-ranging animals of high genetic value, this bison population is important to supplementing conservation herds on tribal lands and on other public lands in the future.

Alternative D: Bison are present year-round with sufficient numbers and adequate distribution to provide a self-sustaining population on the Custer Gallatin National Forest.

For Alternative D (4), in consideration of the Forest Service's "fine filter" for species specific components (36 C.F.R. § 219.9), Defenders offers the following comments for this more overarching vision. Desired conditions (1-3) provide for the more short-term vision of native bison having access to suitable forage, adequate distribution through connective corridors, and ultimately toward (4) for bison to be present year-round with sufficient numbers adequate distribution on the forest; all important factors. However, the management actions for achieving these conditions are largely dependent on the ability of the animals to move beyond hunting/hazing areas of the forest to access the year-round (West Side) new tolerance area, west of Yellowstone National Park, pursuant of Montana Governor Bullock's November 2015 decision. There were many considerations leading up to this EA but considerations for how to successful realize this decision have yet to be implemented, with the Forest Service playing a significant role as the land manager.

The principal role of the Forest Service in implementing the Joint Management Plan, under the IBMP is to provide habitat for bison. Changes in the IBMP were proposed in 2012 that would expand the habitat where bison would be allowed on the national forest and would permit year-round use. The IBMP members verbally agreed to Governor Bullock's decision in April 2016. The new agreement would allow bison that roam outside the park in search of food to remain on an estimated 256,000 acres (400 square miles, just north and west of the park). Toward this goal, in 2017 the partner agencies of the IBMP identified a need to clarify details about how bison could enter and use available habitat on the West Side, as well as how they would be managed when/if they do arrive. Despite the Forest Service's management responsibility to provide habitat for bison, the challenge remains: how to get the animals to the expanded tolerance area where they can access suitable habitat for year-round occupancy.

As noted above, bison can be reluctant to move across hunting units, and the animals also have the additional challenge of migrating a corridor in close proximity to Hwy 191 (Rick Wallen, personal communication, May 3, 2019) the issue has repeatedly been the topic of debate at IBMP meetings. To address these issues the IBMP formed a technical committee. The committee's March 2018 meeting focused on the need to clarify how bison could enter and use available habitat on the West Side (IBMP, 2018). The committee discussed three management options: 1) herding bison up Hwy 191 (via horse or ATV); 2) changing the structure of bison hunts in the same area that the animals need to move through, from the park's boundary to the West Side tolerance area; and 3) through the identification and enhancement of migratory routes (IBMP, 2018).

Park officials noted during a 2018 presentation to the IBMP that the Taylor Fork and Upper Gallatin provide the largest contiguous area of habitat in the year-round tolerance area, and that suitable habitat is constrained to the Taylor Fork and Hwy 191 corridors, particularly during

winter. They also noted four potential migration routes, each one with different constraints. The park experts considered movements affected by high abundance, high snow and human disturbance (Geremia 2018).

In our opinion, Alternative D (4), the desired condition for a year-round bison population on the Forest serves as the overarching condition to those desired conditions of 1, 2 and 3. Without cooperative objectives, standards and guidelines for moving bison into the new tolerance area, achieving a year-round population on the Forest and with high enough numbers for long-term sustainability may be difficult to achieve without a cooperative strategy for bison to better access those West Side habitats.

Alternative D, along with 1-3 for achieving this vision is also consistent with the objectives and management actions of the IBMP of which the Custer Gallatin National Forest is a major partner.

Objective 1.1 of the IBMP: "Within geographical and timing considerations, allow a level of year-round bison tolerance within Zone 2 of the Hedgen and Gardiner basins, consistent with (a) managing risk of brucellosis transmission from bison to livestock and (b) enhancing wild bison conservation and hunting" (IBMP, 2000, page 3).

In cooperation with other agency partners (i.e., Forest Service), Objective 1.1 includes monitoring "existing vegetation and rangelands conditions" (IBMP, 2000, page 4).

Management action 1.1.b – "Consistent with the management responses outlined below, allow bison on habitat on U.S. Forest Service and other lands north of the park boundary and south of Yankee Jim Canyon" (IBMP, 2000 page 4).

Objectives (FW-OBJ-WLBI)

01 Alternatives B and C: Complete one habitat improvement project within, or for the purpose of creating or connecting, suitable bison habitat every three years.

Alternative D: Complete three habitat improvement projects within, or for the purpose of creating or connecting, suitable bison habitat per year.

Alternative E: No objective for bison habitat improvement.

Defenders supports Alternative D as the primary Draft Plan objective for the Forest and toward the efforts to achieve a year-round bison population on the forest. We are concerned; however, that three (potentially large-scale) projects per year may not be an achievable goal for the Forest Service to undertake. In this case, it might be helpful to include the language, . . . "small to large scale" projects within, or for the purpose of creating or connecting, suitable bison habitat per year. These could range from noxious weed abatement projects to enhancing habitat or expanding the bison corridor following Hwy 191.

In addition to the objectives listed above, the Forest Service may also consider an objective for increased tolerance of bison for Desired Condition Alternative D. This additional objective/alternative could use the similar language to the below objective in the IBMP, such as the following:

Objective 1.3: "Reduce conflict between landowners, livestock operators, and bison outside YNP via permit management, improved relations, education and incentives" (IBMP 2000: p. 6).

Management Action 1.3a – "Work with private landowners and livestock producers and operators to provide conflict-free habitat in the Hedgen and Gardiner basins" (IBMP 2000: 6).

Furthermore, based on the Joint Management Plan, this action seems reasonable for the Forest Service to consider in its objectives, and as a partner in bison management and brucellosis, under the IBMP.

> The Joint Management Plan uses many tools to address the risk of transmission of brucellosis, but primarily relies on the spatial and temporal separation of bison from an affected herd and cattle. The agencies will not allow bison to intermingle with cattle. Additionally, in the spring, the agencies will haze bison back into the park, at or near the time when bison historically can return to the park based on snow and weather conditions, or capture or shoot them if hazing is unsuccessful. The Joint Management Plan includes capture, test, and slaughter of seropositive bison at both the Reese Creek and West Yellowstone areas in steps one and two, and the use of hazing, capture, test and slaughter operations, or quarantine, if available, of all bison that might remain outside the park in these areas after specified haze-back dates.
>
> The agencies also will defer cattle grazing on the Gallatin National Forest for the summer until after bison are hazed back into the park in the spring. Additionally, the agencies will use vaccination of bison and cattle to reduce risk even further and to work toward the eventual elimination of brucellosis in bison.

Guidelines (FW-GDL-WLBI)

> *Alternatives B, C and D: To promote bison expansion within management zones, vegetation treatment projects and management actions taken to resolve bison-livestock conflicts should favor bison within these zones.*
>
> *Alternative E: To minimize impacts to livestock operations, vegetation treatment projects and management actions taken to resolve bison-livestock conflicts should favor livestock. To facilitate progressive expansion of bison management zones over time, bison habitat improvement projects should be strategically placed within and in close proximity to existing management zone boundaries.*

Alternatives B, C and E: To facilitate bison expansion into unoccupied, suitable habitat, management actions should not impede bison movement unless needed to achieve interagency bison population and distribution.

Alternative D: To facilitate bison expansion into unoccupied, suitable habitat, management actions should not impede bison movement.

Guideline (1) Alternatives B, C and D support the desired condition of Alternative D. However, Alternative E, while important to minimize conflict; it seems the intent of this guideline is to place the Forest livestock management over and above bison. This guideline should be removed as it is counter to the Forest differing management approaches for bison, managed as wildlife on the forest to that of cattle grazing as a different use of the forest.

While Guideline 2 may be applicable to the desired conditions, in our opinion it has not been adequately captured in the desired conditions nor in the objectives. In this case, we offer the following rewrite of this guideline: "To facilitate bison occupancy in management zones over time, bison habitat improvement projects should be strategically placed within suitable habitat areas and within migration corridors."

Alternative B, C and E seems reasonable for IBMP cooperation and toward the Draft Plan desired condition of Alternative D for bison year-round occupancy on the CGNP. Defenders finds Alternative D as the strongest guideline for establishing, helping to achieve and/or maintaining the desired condition of Alternative D for a year-round bison population on the Forest.

Species of Concern Consideration

For the Draft Plan, we would live to address the importance of the Forest Service's role in applied management of plains bison for their ecological importance to the Yellowstone ecosystem and to overall restoration of the species. For achieving this goal, we believe an SCC determination should be supported by the Regional Forester, as expressed and based on the scientific evidence we presented in our March 21, 2018 comment letter.

SCC Rational for Bison:

- Known to occur – Native bison migrate and inhabit the plan area.
- Distribution and abundance in plan area – During winters, Yellowstone bison migrate into the Gardiner and Hebgen basins, which include portions of the Forest. Numbers range from year to year, largely based on snow conditions.
- Population trend in the plan area – the IBMP bison population objective of 3,000 animals that was set in the 2000 IBMP has been exceeded in many years, despite active culling and hunting. The timing and numbers of bison migrating seasonally into the plan

area is a function of several variables, including (as noted) snow conditions inside the park as well as total herd size (IBMP, 2019).

- Habitat description – Bison select for mesic grassland habitats and graze on grasses, forbs and sedges (Freese, 2018).

- Habitat trend in the plan area – Results from ongoing habitat studies in Gardiner Basin show most sites having higher bare ground and lower species richness than expected (see USDA Forest Service, 2017). However, that trend may be improving due to the dramatic decline in the Northern Range elk herd and corresponding decrease in grazing pressure. The tolerance zones for bison outside of Yellowstone (within and beyond the plan area) were expanded in 2016 (per Bullock, 2015; IBMP, 2016), resulting in an additional 256,000 acres where bison are allowed.

- Relevant life history/other information – Bison in the Greater Yellowstone Area are adaptively managed by the IBMP, of which the Forest is a major partner.

- Relevant threats to populations in plan area – While social tolerance of bison by humans may ultimately limit the distribution and abundance of bison within and beyond the plan area, the IBMP provides high assurance that bison will continue to persist in the long term.

- Rationale for SCC determination – the restricted distribution of Yellowstone bison is a known threat to the viability of bison in the plan area. Current management of bison limits their distribution, thus perpetuating one of the threats noted by the best available science.

There is sufficient information available to conclude there is substantial concern for long-term persistence in the plan area.

10. Native trout

We are disappointed that the Forest and Regional Forester continue to ignore the fact that native trout are insecure within the plan area. The Draft Plan's admission that "a decline in westslope and Yellowstone cutthroat trout number in the montane portion of the planning area has occurred during the past several decades" is a clear statement of concern. The fact that native trout remain "strong in some isolated stream reaches" brings little comfort as to their security within the planning area. The good news is that the species of conservation concern determination can be revisited.

For the record, we reiterate our claim made in scoping that it is to rely on 77 FR 21217, April 9, 2012 (the Preamble) to write off native trout in the planning area. Here is the rationale for westslope trout: (emphasis added)

> This fish has been *seriously reduced in its range* outside the plan area by two primary factors: hybridization with Rainbow Trout, and habitat loss and degradation. Even though habitat trends are improving within the plan area, *some local populations could be susceptible to further hybridization, isolation, and declining numbers from stressors such as localized habitat degradation and climate change*. Remaining local populations are *being secured* through habitat improvement projects and isolation from downstream non-native trout populations. Therefore, this species is not identified as an SCC. Expectations included in the Preamble to the 2012 Planning Rule and language in the Directives (77 FR 21217, April 9, 2012; FSH 1909.12, Section 23.13c) support this finding. In those documents, all members of a species in a planning area are considered members of one population.

The argument is that despite serious reduction in range, declines in numbers within the plan area, and the fact that planning area populations continue to be at at-risk, somehow the Preamble language absolves the Regional Forester of making the correct determination. This is incorrect. 77 FR 21217 includes a discussion of commenters concerns over the definition of a viable population in the Planning Rule. (People expressed concern that the rule dropped the "well-distributed" language from the 1982 regulation definition of viability.) In their response the Forest Service argues that the definition of a viable population has changed and applies **to the management of species of conservation concern**: "This final rule includes requirements to restore or maintain ecological conditions to support *viable populations of species of conservation concern*" (emphasis added). There is absolutely no ambiguity that the definition of a viable population applies to the management of SCC. This is absolutely clear in the rule itself in that the term "viable" is only used in connection with the management of SCC; once an SCC has been designated, "the responsible official shall determine whether or not the plan components…provide the ecological conditions necessary to…maintain a viable population of each species of conservation concern within the plan area" (36 C.F.R. § 219.9(b)(1)). The clear purpose of the clause is to ensure that forests affirmatively manage for "viable" populations of SCC because they are of concern in the plan area and that the management objective is for them to continue to persist in the plan area. Specifically, forests are to manage conditions for SCC such that they have "sufficient distribution to be resilient and adaptable to stressors and likely future environments (36 C.F.R. § 219.19).

The discussion on FR 21217 then turns to the issue of *how* to determine what is a sufficient distribution for an SCC. "Whether distribution (of an SCC) is 'sufficient' will be evaluated in the context of what a population needs for resilience and adaptability such that it can continue to persist over the long term, considering the species' natural history, the ability of individuals to interact, historical distribution and potential future distribution, and recognizing that habitat and species distribution will be dynamic over time." Finally the Forest Service notes that when making decisions over how an SCC needs to be distributed so that it will be viable, "that for the purposes of this subpart, *the individuals of a species of conservation concern that exist in the plan area* will be considered to be members of one population of that species" (emphasis

added). In no ambiguous terms, the Forest Service states **this direction only applies to SCC, not to species being considered for SCC status.**

The rationales for native trout on the Custer Gallatin also cite the directives at FSH 1909.12, Section 23.13c. This section is entitled Species of Conservation Concern and addresses "requirements for species-specific plan components for species of conservation concern." The direction states "See section 21.22a of this Handbook *for guidance on selecting species of conservation concern*" (emphasis added). Yes, the directives note that "The meaning of the word 'population' for planning purposes is explained in the preamble to the proposed rule" **but that does not apply to selecting SCC**.

Thus, the Regional Forester's rationale is fatally flawed.

Westslope and Yellowstone cutthroat trout were identified by Custer Gallatin staff as "potential species of conservation concern" and we support that initial determination. The Regional Forester's determination should be reversed, and native trout should be listed as SCC for the Custer Gallatin. At that time the Forest can evaluate plan area distribution and could find that the current distribution is sufficiently distributed for viability.

IV. Conclusion

Consistent with the substantive requirements of the 2012 Planning Rule, final revised plans should provide a suite of plan components aimed at achieving an ecological sustainability and plant and animal diversity over the life of the plans. Based on our assessment of the Draft Plan, detailed above, we do not believe the Custer Gallatin revised plan—as is—will meet these requirements. The Forest Service has not provided adequate NEPA analysis of the effects of the Draft Plan and effects of transitioning from the existing plan to a revised plan. To comply with NFMA, NEPA, and other applicable laws, achieve ecological integrity and at-risk species requirements in the Planning Rule, and enable the revised plan to gain public support, we regret to conclude the Forest Service must undertake an effort that significantly improves plan components and revises the DEIS based on the revised draft plan's content. The Forest Service must enable the public to comment on a revised draft plan and DEIS.

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USDA
United States Department of Agriculture

Carson National Forest
Draft Land Management Plan

Rio Arriba, Taos, Mora, and Colfax Counties, New Mexico

Forest Service Southwestern Region MB-R3-02-09 May 2019

Carson National Forest
Draft Land Management Plan
Rio Arriba, Taos, Mora, and Colfax Counties, New Mexico

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Chapter 2. Forestwide Plan Components

Ecological Sustainability and Diversity of Plant and Animal Communities

The Carson National Forest's vision is for ecosystems in the plan area to have ecological integrity and adaptive capacity. Ecosystems have integrity when their composition, structure, function, and connectivity are operating normally over multiple spatial and temporal scales. However, not every desired condition or acre has to meet the definition of ecological integrity, because some specific areas may not have the capability or because another concern, such as public safety is more important in a specific area.

Ecological restoration is an outcome of managing for desired conditions and may be necessary in degraded ecosystems. It is an intentional activity that initiates or accelerates ecosystem recovery with respect to its health (functional processes and productivity), integrity (species composition and community structure), and sustainability (resistance and resilience to disturbance) under current and future conditions. Restoration may not necessarily return an ecosystem to its former state, because contemporary constraints and conditions can cause it to develop along an altered trajectory.

In light of possible changes in species composition under the effects of changing climate patterns and with a focus on restoration, the plan components for the Carson's land management plan are designed to provide ecological conditions to sustain functional ecosystems based on a future viewpoint. Functional ecosystems are those that sustain critical ecological functions over time to provide ecosystem services including, clean air, fresh water, food, and fuel (provisioning ecosystem services); pollination, soil formation, and nutrient cycling (supporting ecosystem services); carbon storage, climate regulation, water filtration, and flood control (regulating ecosystem services); and educational, aesthetic, spiritual, cultural, and recreational experiences (cultural ecosystem services).

Vegetation (VEG)

Desired conditions and other plan components (objectives, standards, and guidelines) related to the major vegetation communities are presented first in this plan, because they provide the setting or habitat that reflects not only healthy ecological systems, but also the social and economic considerations needed for long-term sustainability. Vegetation provides ecosystem services, including, climate regulation and soil stabilization (regulating), food and wood products (provisioning), nutrient cycling (supporting), and aesthetic and cultural values (cultural). Desired conditions and other plan components have been incorporated within each vegetation community for the needs and requirements of at-risk species, and, in some cases, general wildlife dependent on these major vegetation types.

Ecological desired conditions for terrestrial ecosystems are grouped by vegetation communities and described at multiple, nested scales when possible. Not all of these conditions will be achievable over the life of this plan, some may only be realized over long timeframes (up to several hundred years). Most vegetation communities correspond to a mapped ecological response unit,[5] though it is appropriate to base management for a particular vegetation community on local conditions, including soils and other site-specific indicators. Small inclusions of other ecological response units or ecological response unit subtypes may be managed under a single prescription or evaluated separately at the project or activity level.

Where scientific information is available, desired conditions are based on the historical ecology of a vegetation community that can be inferred based on historic ranges of natural variability. They also reflect current conditions and stressors that may not have existed historically and also reflect social and economic desires in terms of the services that humans expect from ecosystems. Therefore, desired conditions do not necessarily represent reference conditions, since it may not be possible or desirable to return to a historic condition in all situations. Ranges of values presented as part of desired conditions reflect spatial variability in soils, elevation, or aspect, and provide managerial flexibility to meet local project objectives. Most acres should be managed towards the median of the range, but representation across the range is equally desired. For those vegetation communities with seral state proportion tables, the quantitative information they contain reflects the desired condition narrative. Seral state percentages (proportions) represent the approximate mid-point of the range of desired conditions described under the landscape scale, and are used primarily to compute overall system departure,[6] not intended as a prescription. In other words, the seral state percentages do not need to be achieved by every project, instead a reasonable range is expected, while managing toward those percentages on average across the landscape.

Scale

Desired conditions for forest and woodland vegetation communities are described at three spatial scales where appropriate: landscape scale (1,000+ acres), mid-scale (10 - 1,000 acres), and fine-scale (less than 10 acres). Not enough science is available to provide descriptions at all scales for alpine tundra, bristlecone pine, montane subalpine grassland, and sagebrush communities. The landscape scale describes the big picture of desired conditions (Figure 4). A landscape area comprises ten or more mid-scale units of

[5] An exception is aspen which is not its own ecological response unit, but occurs as a seral stage in several other ecological response units. Forest and shrub riparian includes several riparian ecological response units and may include additional areas based on site specific delineations. Wetland riparian includes areas in addition to the herbaceous riparian ecological response unit.

[6] Seral state departure is calculated at the landscape scale relying on remotely sensed information such as the Southwestern Region's midscale mapping project. The minimum mid-scale vegetation mapping unit is five acres.

variable elevations, slopes, aspects, soils, plant associations, and disturbance processes. It includes multiple stands and natural openings and meadows. Contributions from all seral stages and low departure at the landscape scale are positive indicators of ecosystem condition. Seral state proportions apply only at this scale.

Descriptions at the mid- and fine-scales provide additional detail necessary for guiding future projects and management activities. The mid-scale comprises assemblages of fine-scale units which have similar biophysical conditions. The mid- and fine-scales in forests and woodlands include open grass-forb-shrub interspaces and uneven-aged stand conditions consisting of single and grouped trees of different vegetation structural stages, young to old. Species composition, age, structure, and distribution of individual trees (single, grouped, or aggregates of groups) are described at the fine-scale. Fine-scale desired conditions typically contain greater variability, which is desirable for providing heterogeneity at smaller spatial scales.

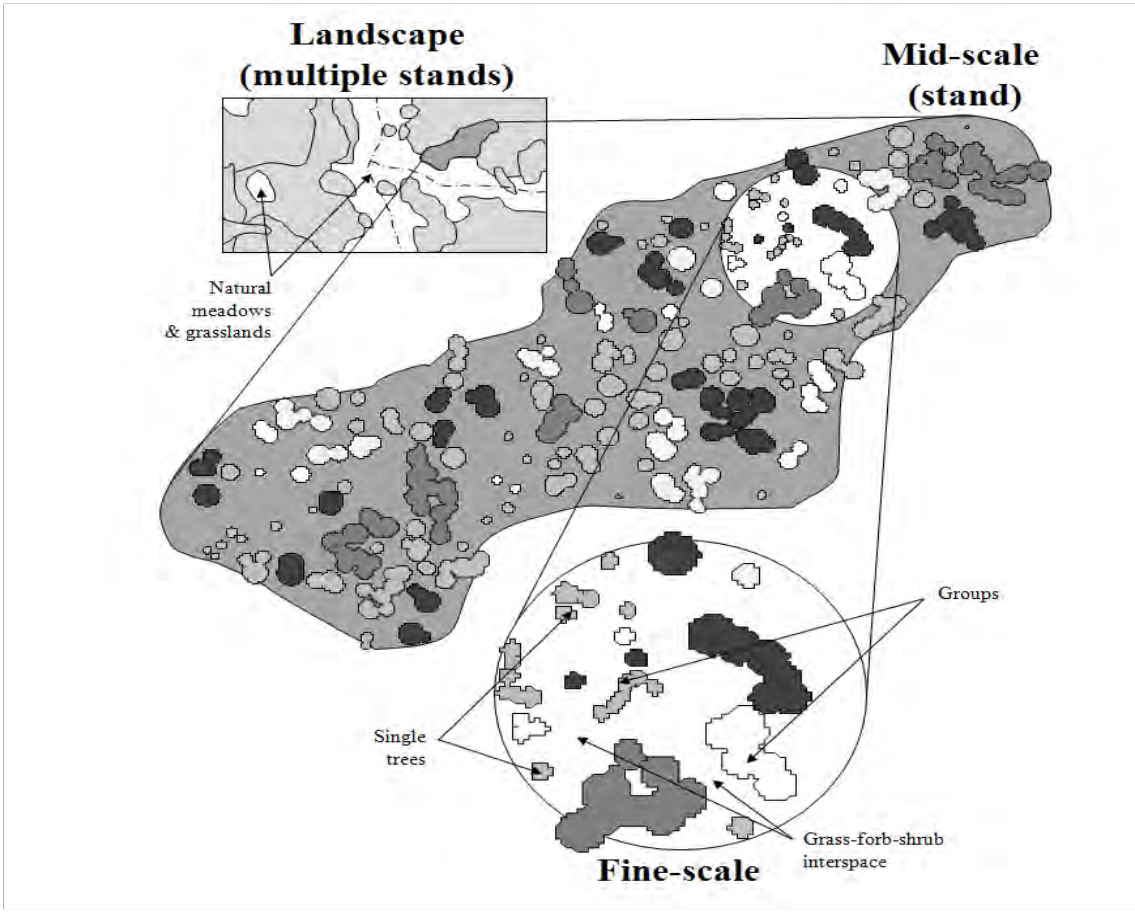

Figure 4. Example of the three spatial scales

When using this plan to develop project specifications, it is important to keep in mind that ecological desired conditions for all scales are applicable, regardless of the size of the project. Smaller projects need to consider the larger scales in terms of how the project contributes to the ecological desired conditions within the context of the larger-scale unit, and larger projects need to consider the design features required to ensure that the fine scale ecological progress is made toward desired conditions and maintained across the project area.

Consideration of scale is also important when evaluating progress toward ecological desired conditions, because the range of variability and distribution of conditions is affected by the scale at which they are viewed. For example, when ecological desired conditions are articulated at larger scales, they represent an average of fine-scale conditions across broader areas. This may make conditions appear less variable when they are evaluated at large scales, even though variability does exist at smaller scales.

All Vegetation Community Desired Conditions (FW-VEG-DC)

Landscape Scale (1,000 acres or greater)

1 Ecosystems contain a mosaic of vegetation conditions, densities, and structures. This mosaic occurs at a variety of scales across landscapes and watersheds, reflecting the disturbance regimes that naturally affect the area. Natural ecological cycles (i.e., hydrologic, energy, nutrient) facilitate the shifting of plant communities, structure, and ages across the landscape over time.

2 Ecosystems are resilient or adaptive to the frequency, extent, and severity of disturbances (e.g., human impacts, fire in fire-adapted systems, flooding in riparian systems, insects, pathogens, and climate variability). Natural disturbance regimes, including fire, are restored where practical and allowed to function in their natural ecological role. Wildfire maintains and enhances resources, including wildlife habitat for species associated with fire-adapted systems. Uncharacteristic wildland fire behavior is minimal or absent on the landscape.

3 Ecosystems maintain all of their essential components (i.e., plant density, species composition, structure, coarse woody debris, and snags), processes (i.e., disturbance and regeneration), and functions (i.e., nutrient cycling, water infiltration, and carbon sequestration) despite changing and uncertain future environmental conditions.

4 Old growth is well distributed, dynamic in nature, and shifts on the landscape over time, as a result of succession and disturbance. Old growth attributes (e.g., multistory structure, large old trees, large trees with sloughing, exfoliating bark, snags, large downed logs, and other indicators of decadence) are present in all forest and woodland vegetation communities and provide habitat for associated species.

5 Ecological conditions affecting habitat quality, distribution, and abundance contribute to self-sustaining populations of native and desirable non-native plants and animals that are healthy, well distributed, genetically diverse, and connected (on NFS lands and to adjacent public and privately conserved lands), enabling species to adapt to changing environmental and climatic conditions. Conditions provide for the life history, distribution, and natural population fluctuations of the species within the capability of the ecosystem.

6 Vegetation conditions allow for gradual transitions between vegetation communities. Transition zones shift in time and space, due to ecological processes affecting site conditions (i.e., fire and climate).

7 Vegetation characteristics (e.g., tree density, litter depth) support favorable water flow and quality.

8 All age classes of deciduous trees (e.g. aspen, cottonwood, and Gambel oak) are well represented on appropriate ecological settings, and provide habitat for wildlife and rare plants.

9 Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and to ecosystem function.

10 Vegetation connectivity and abundance provide for genetic exchange, daily and seasonal movements of animals, and predator-prey interactions across multiple spatial scales, consistent with existing landforms and topography. Habitat configuration and availability and species genetic diversity allow long distance range shifts of plant and wildlife populations, in response to changing environmental and climatic conditions.

11 Native plant communities dominate the landscape, while invasive species are nonexistent or low in abundance and do not disrupt ecological function.

12 Native insect and disease populations are generally at endemic levels with occasional outbreaks. The scale of insect and disease outbreaks is usually restricted by variation of vegetation structure and composition.

13 The transition from NFS lands to adjacent lands where similar desired conditions are being met is seamless and does not exhibit abrupt changes in visual or ecological integrity.

14 Habitats and refugia for rare, endemic, and culturally important species are intact, functioning, and sufficient for species persistence and recovery.

15 Overall plant composition similarity to site potential (FSH 2090.11) averages greater than 66 percent, but can vary considerably at fine- and mid- scales owing to a diversity of seral conditions.

Mid-Scale (10-1,000 acres)

16 Diverse cool and warm season grasses, forb species, and litter are abundant and contiguous enough to support natural fire regimes, consistent with site potential. Herbaceous vegetation amount and structure (e.g., plant density, height, litter, and seed heads) provide habitat to support wildlife and prey species.

17 The composition, density, structure, and mosaic of vegetation conditions reduce the threat of uncharacteristic wildfires to ecosystems and local communities.

18 Native plants provide nectar, floral diversity, and pollen throughout the seasons when pollinator species are active.

Fine-Scale (10 acres or less)

19 At-risk plant community habitats (e.g., gypseous or limy sandstones; Mancos Shale soils; margins of springs; basalt lava flows and cinders; calcareous soil and alkaline clay; canyons, cliffs, and ledges; granitic soils and igneous rocks; and sandstone rocks and soils) are present, to maintain self-sustaining populations of associated at-risk plant species.

20 The structure and function of the vegetation and associated microclimate and special features (e.g., snags, logs, large trees, interlocking canopy, cliffs, cavities, talus slopes, bogs, fens, rock piles, specific soil types, and wet areas) exist in adequate quantities within the capability of the Forest, to provide habitat and refugia for at-risk species with restricted distributions.

21 Ecological conditions, as described in these desired conditions, provide habitat to support, sustain, and recover rare, endemic, or at-risk species.

All Vegetation Community Vegetation Standards (FW-VEG-S)

1	Collection of plant at-risk species shall be for research or scientific purposes only.

All Vegetation Community Guidelines (FW-VEG-G)

1	Management activities and special uses occurring within federally listed species' habitat should integrate habitat management objectives and species protection measures from the most recent approved USFWS recovery plan, to maintain the persistence or contribute to the recovery of that species.
2	Where the Forest Service has entered into a signed conservation agreement that provides guidance on activities or actions to be carried out by the Carson, those activities or actions should be undertaken consistent with the guidance found within the Conservation Agreement, to maintain the persistence or contribute to the recovery of federally listed species.
3	Vegetation should provide for at-risk species' habitats, by minimizing disturbance, providing recovery strategies, and managing for desired levels of key structural elements for at-risk species (e.g., large old trees and snags, downed woody debris, denser vegetation structure, and soil structure) important for nesting, rearing, breeding, foraging, and dispersal, to maintain the persistence or contribute to the recovery of at-risk species.
4	For cavity nesting birds, snags should be retained at levels indicated in vegetation desired condition statements or in the largest diameter classes available, if available, and replaced at natural recruitment rates, to maintain the persistence of cavity nesting birds.
5	Naturally ignited fires (i.e., lightning-caused fires) that occur in fire adapted vegetation types should be managed for resource benefit when burning conditions facilitate progress toward desired conditions and risks to firefighters, infrastructure, and the public can be mitigated.

Management Approaches for All Vegetation Communities

1. To meet old growth desired conditions, consider designing management activities to restore and maintain characteristic levels of:
    a. Large, old ponderosa pine trees with reddish-yellow, wide platy bark, flattened tops, moderate to full crowns, and large drooping or gnarled limbs (e.g., Thomson's age class 4, Dunning's tree class 5, or Keen's Tree Class 4, A & B).
    b. Mature trees with large dwarf mistletoe induced witches' brooms suitable for wildlife nesting, caching, and denning, except where retaining such trees would prevent the desired development of uneven-aged conditions over time.
    c. Large snags, partial snags, and trees greater than 18 inch diameter (DBH) with broken tops, cavities, sloughing bark, lightning scars greater than 4 inches wide, and large stick nests.
    d. Gambel oak greater than 8 inches diameter at root collar.
2. In areas of high vulnerability to changing climate patterns, consider alternative management approaches to facilitate natural adaptation to changing conditions. Consider managing tree basal area at the low end of the range of desired conditions to mitigate water stress.

3. Consider using mechanical, chemical, and prescribed fire treatments to maintain existing grassland and meadow openings, expand openings by removing woody species from the perimeter, and create new openings.
4. When thinning, consider leaving characteristic levels of snags, downed logs, and other woody components that collect drifting seeds, provide shade, reduce surface temperatures, retain moisture, and increase forage for ungulate grazing.
5. Consider using methods, such as fencing, aerating soil (decompacting soils), improving livestock grazing strategies, or strategically locating constructed waters or roads to protect and enhance grassland composition, structure, and productivity and soil function.
6. Consider working closely with the U.S. Fish and Wildlife Service (USFWS) to provide for federally listed species' habitats, through minimizing disturbance, providing recovery strategies, and managing for desired levels of key structural elements (e.g., large old trees and snags, downed woody debris, denser vegetation structure, and soil structure) important for nesting, rearing, breeding, foraging, and dispersal.
7. Consider working collaboratively with federally recognized tribes, NMDGF, local governments, and other partners to plan and accomplish projects that will make progress toward desired conditions.
8. Consider fostering partnerships with universities and other science organizations to develop concepts and tools applicable to vegetation management, as well as to identify research opportunities related to management activities aimed at ecosystem restoration.
9. Consider planning in cooperation with landowners, when proposed vegetation treatments are adjacent to private land.
10. Consider working with volunteer groups on projects that improve vegetation condition and ecosystem function.
11. Consider using computer models or other tools as they are developed to understand management impacts on carbon stocks and fluxes (changes over time).

Related Plan Content for All Vegetation Communities

Below are those resources which have been identified as the most important related resources to this section. We recommend you look at these sections, as well as other resources not identified below that you deem to be important to your specific project.

Watersheds and Water, Wildlife, Fish, and Plants, Nonnative Invasive Species

Alpine and Tundra (VEG-ALP)

The alpine and tundra vegetation community is present on only 9,996 acres on the Carson in the Questa and Camino Real Ranger Districts. It occurs on sites above 10,600 feet and supports sparse, low-growing vegetation as a result of unstable substrates, exposure to high winds, and a short growing season. On gradual to moderate slopes, flat ridges, valleys, and basins, where soils are fairly stable, the vegetation community may support tundra systems with diverse alpine flora, characterized by perennial, rhizomatous, sod-forming sedges, and prostrate and mat-forming forbs with thick rootstocks or taproots. Fire is not a significant disturbance in these communities, though plants and soils are very sensitive to impacts from grazing and recreation.

Occupying the highest and coldest peaks and ridges, the alpine and tundra vegetation community is an important source of snow accumulation and water production (regulating and provisioning ecosystem

services). Designated wildernesses make up 86 percent of the alpine and tundra vegetation community, but some areas, such as Kachina Peak in Taos Ski Valley and Wheeler Peak, are subject to heavy recreation from hikers, backpackers, and skiers (cultural ecosystem service). Cold temperatures are a defining feature that makes the alpine and tundra vegetation community especially vulnerable to changes in climate. The Carson plays a significant role in the sustainability of the alpine and tundra vegetation community in the broader landscape and may provide an important refuge for dependent organisms, because this vegetation community within the Carson is relatively intact.

Alpine and Tundra Desired Conditions (FW-VEG-ALP-DC)

1 Desired seral stage proportions for the alpine and tundra vegetation community at landscape scale:

Class	Description	Proportion (%)
Early	Early development	5
Herbaceous	All herb types	95
Treed	Uncharacteristic tree cover; contemporary landscapes only	0

2 The ecological attributes and processes that provide habitat for native biota or historic and cultural values are maintained.

3 The patch distribution of rock and herbaceous cover is finely patterned with about 60 percent total vegetation cover.

4 Tree cover is typically less than 10 percent. Completely barren or rocky areas make up only a small percentage of the vegetation community.

5 Endemic levels of disturbances (e.g., insects, diseases, fire, snow, and wind) maintain a functioning ecosystem that contains all its components, processes, and conditions. Mixed severity fires occur very infrequently, every 100 to 200 years (fire regime IIIc). Plants, animals, and geologic features that contribute to ecological diversity and uniqueness are maintained.

6 Alpine ecosystems occupy harsh high elevation sites, resulting in short stature and relatively slow growth for both shrubs and herbaceous species. Wetland communities are present in snowloaded depressions and are dominated by plane leaf willow, snow willow, and artic willow. Alpine fellfields are free of snow in the winter and dominated by alpine clover, tufted hairgrass, and Bellardi bog sedge, to allow for the persistence of at-risk species.

7 Key features (e.g., boulder fields and talus slopes) that are necessary for alpine dependent plant and animal species (e.g., alpine larkspur, marmots, pika, and bighorn sheep) are well distributed and not uncharacteristically disturbed, within the capacity of the vegetation community.

8 The alpine and tundra vegetation community continues to be resilient to natural and human-caused impacts.

Alpine and Tundra Guidelines (FW-VEG-ALP-G)

1 Trail construction and maintenance in the alpine and tundra vegetation community should minimize disturbance to at-risk plants and to important key habitat features (e.g., rock outcrops,

willows, and talus slopes) for at-risk species and other alpine dependent species (e.g., yellow-bellied marmot and American pika), to maintain the persistence of native species.

2 To assist breeding and nesting success of at-risk species, adaptive seasonal use or percent utilizations for livestock grazing should be considered and based on the best available information, as well as on site-specific factors (e.g., topography and available habitat).

At-risk Species for Alpine and Tundra

- American peregrine falcon
- White-tailed ptarmigan (Questa and Camino Real Ranger Districts)
- Alpine larkspur (Questa and Camino Real Ranger Districts)

Related Plan Content for Alpine and Tundra

Watersheds and Water, Wildlife, Fish, and Plants, Nonnative Invasive Species

Montane and Subalpine Grasslands (VEG-MSG)

Montane and subalpine grasslands vegetation community cover 125,351 acres across every ranger district, except the Jicarilla. They are naturally fragmented, occurring as meadows and openings in spruce fir, mixed conifer, and ponderosa pine forests, between 8,000 and 10,000 feet elevation. They are often intermingled with the wetland riparian vegetation community. A diverse mix of grass and forb species may be present, varying according to soil type, soil moisture, and temperature. Dominant species may include Arizona fescue, mountain muhly, various sedges, Parry's oatgrass, pine dropseed, Thurber's fescue, and blue grama. Grassland openings are created and maintained by a combination of tree-limiting site conditions (e.g., soils and climate) and disturbance (mainly fire). Trees may occur along the periphery of meadows and some shrubs may be present, though canopy cover was historically no more than 10 percent for either. Hydrology is closely tied to snowmelt, and these meadows are seasonally wet, but do not typically experience flooding. Grassland communities are susceptible to channel and gully erosion and their size and number have been reduced, as a result of encroaching trees and shrubs and livestock grazing. Invasive species infestation is a concern, and introduced Kentucky bluegrass dominates native species in some areas.

Expansive grasslands like Valle Vidal and Lucero Lakes provide important habitat, forage, and hydrologic benefits (provisioning and regulating ecosystem services). Smaller meadows and herbaceous riparian areas create unique habitats within other communities and contribute to biodiversity and livestock production (provisioning ecosystem services). Montane and subalpine grassland vegetation community has been altered from historic condition by natural and anthropogenic impacts. Bunchgrasses are less common, trees and shrubs have displaced herbaceous cover, and reduced vegetation cover and ground disturbing activities have altered hydrologic function and increased erosion.

Montane and Subalpine Grasslands Desired Conditions (FW-VEG-MSG-DC)

1 Desired seral stage proportions for montane and subalpine grassland vegetation community at the landscape scale:

Class	Description	Proportion (%)
Early	Recently burned; sparsely vegetated; early development grassland	20
Herbaceous	All grass and forb types; mid to late development. Perennial-mixed grasses, <10% shrub/tree cover, >10% grass cover	80
Treed	Tree or shrub invaded; *contemporary landscapes only*	0

Landscape Scale (1,000 acres or greater)

2 The montane and subalpine grassland community is open and grassy with tree and shrub canopy cover of less than 10 percent each. Vegetation is dominated by native herbaceous plants. Regeneration, seed head production, and a balance of grass and forb species, including warm and cool season species, occur in most years and within the capability of soils. The structure, composition, and distribution of vegetation are within the range of natural variability and occur in natural patterns of abundance and diversity, varying with soil type and microclimate.

3 Herbaceous vegetation cover (herbaceous cover, decaying debris, and leaf litter) is maintained at levels that contribute to suitable hydrologic function, soil stability, and nutrient cycling, while providing food and cover for at-risk species and other wildlife species. A diversity of native grass and forb species and adequate plant litter reduce compaction and erosion.

4 Soil function is sustained. Soils are permeable and capable of infiltrating water to reduce overland flows during precipitation events and allow for burrowing by small mammals (e.g., Gunnison's prairie dog, ground squirrels, and masked shrew). Adequate water infiltration discourages arroyos, gullies, and head cuts from forming in drainages. Existing arroyos and gullies are stabilizing and recovering.

5 Natural surface drainages and subsurface flow patterns are not altered by human or animal trampling, to assure water flow into connected waterbodies or streams.

6 Fire plays its natural role on the landscape. Vegetation height and density carry fire and support the historic fire return interval. Fires are low-intensity but with high aboveground consumption. Fire return intervals are influenced by the fire regime in adjoining vegetation types and range from 1 to 35 years (fire regime II). Introduced annuals do not cause changes to the natural fire regime.

7 Biological soil crusts are present and improve nutrient cycling and stabilize soils, especially on sandier soils.

Mid-Scale (10-1,000 acres)

8 The composition, structure, and distribution of native vegetation reflect a mix of early, middle, and late seral stages. Early seral stages will typically contain more forbs, older stages are dominated by more grasses and fewer forbs. Native plant species are present in all age classes and are healthy, reproducing, and persisting.

9 Depending on soil type, bare soil is no more than 30 percent by area and is most often less than 10 percent. Basal vegetation varies between 30-75 percent groundcover. Organic litter varies between 15 and 50 percent cover. Vegetation composition averages 40-60 percent grass, and 10-30 percent forbs.

10 Vegetation conditions provide hiding, nesting, and thermal cover in contiguous blocks for wildlife, including small mammals and songbird nesting. Soil condition, as defined by basic soil functions (e.g., stability, soil hydrology, and nutrient cycling), has the capacity to support the diversity of associated species (e.g., western burrowing owl, prairie dog, and masked shrew).

Fine Scale (10 acres or less)

11 Biological diversity is high in the montane and subalpine grassland vegetation community. Within site capability, a mosaic of vegetation density exists across the landscape, ranging from densely vegetated areas, to provide cover for the small mammals, ground-nesting birds, and neonate ungulates, to bare areas that result from natural processes, such as freeze–thaw action or burrowing by small mammals.

12 Fine scale features of rock piles and wet areas that are necessary to support at-risk species are well distributed, within the capacity of the vegetation community.

13 Cool season grasses and forbs provide nutritional forage; while shrubs and standing grass growth from the previous year provide adequate hiding cover (over 6”) to protect wildlife from predation.

14 Grasslands are connected (consistent with the distribution of Mollisol soils) and are not fragmented.

Montane and Subalpine Grasslands Standards (FW-VEG-MSG-S)

1 Heavy equipment and log decks shall not be staged in montane meadows.

Montane and Subalpine Grasslands Guidelines (FW-VEG-MSG-G)

1 New stock tanks and wildlife waters should be placed in locations that reduce concentrations of grazing animals and subsequent vegetation and soil effects in open grasslands and meadows.

At-risk Species for Montane and Subalpine Grasslands

- Black-footed ferret
- Northern leopard frog
- American peregrine falcon
- Western burrowing owl
- Gunnison’s prairie dog
- Masked shrew

Related Plan Content for Montane and Subalpine Grasslands

Watersheds and Water, Wildlife, Fish, and Plants, Nonnative Invasive Species

Bristlecone Pine (VEG-BP)

The bristlecone pine vegetation community is rare on the Carson, found on less than 5,000 acres scattered across the Questa and Camino Real Ranger Districts. The bristlecone pine vegetation community occurs above 10,500 feet and favors south-facing, dry, rocky ridges and slopes. Bristlecone pine is the dominant species, though Douglas-fir, Engelmann spruce, and ponderosa pine may also be present. The canopy is open and patchy and the understory is typically sparse.

Bristlecone pine trees have unique structural and physiological qualities that make them stress tolerant and allow them to occupy sites that other species cannot. They provide unique ecological functions on these sites, including slope stability, snow retention, and post-fire recovery (regulating ecosystem services). Their presence on harsh sites influences watershed hydrology, facilitates succession, provides habitat, and maintains forested cover on sites that may otherwise become treeless (regulating and provisioning ecosystem services). As some of the oldest trees on the Carson they are valued for their charismatic gnarled forms and their longevity (cultural ecosystem service).

Bristlecone Pine Desired Conditions (FW-VEG-BP-DC)

1 Desired seral stage proportions for the bristlecone pine vegetation community at the landscape scale:

Class	Description	Proportion (%)
Early	Recently burned; grass, forb, shrub, and seedling/sapling size trees	20
Mid-Closed	Small trees, closed canopy; *contemporary landscapes only*	0
Mid-Open	Small trees, open canopy	20
Late-Open	Medium and large trees, open canopy	60
Late-Closed	Medium and large trees, closed canopy; *contemporary landscapes only*	0

Landscape Scale (1,000 acres or greater)

2 Bristlecone pine is resistant to white pine blister rust or resilient when it occurs.

3 Trees persist despite changing and uncertain future environmental conditions and continue to provide slope stability, snow retention, and watershed hydrology.

4 Native grasses and forbs are present in the understory, but cover is generally sparse and discontinuous. However, plant litter (e.g., leaves and needles) and coarse woody debris are present in sufficient quantity to resist accelerated soil erosion and promote nutrient cycling and water retention.

5 Fire is rare in the bristlecone pine vegetation community (especially at higher elevations) and not stand replacing. Stands with continuous understory may carry low-severity surface fire (mainly at lower elevations). Bristlecone pine establishment is rare, but may be stimulated following fire that removes competition from other species.

Mid-Scale (10-1,000 acres)

6 At the mid-scale, tree distribution is patchy in the bristlecone pine vegetation community, with an open canopy, influenced by disturbance, exposure, soil type, aspect, and site productivity. The

majority of trees are large, late seral and widely spaced, but all age classes are represented and provide a reliable source of replacement.

7 Bristlecone pine is the dominant and most common tree species, though other occasional species may occur.

Fine Scale (10 acres or less)

8 Moist soil conditions (e.g., thick litter layers, wet areas, coarse woody debris, and decaying debris) are maintained and well distributed, within the capacity of the vegetation community for at-risk species.

Bristlecone Pine Guidelines (FW-VEG-BP-G)

1 Planting should use white pine blister rust resistant trees from an appropriate seed transfer zone, to reduce spread of disease.

At-risk Species for Bristlecone Pine

- Masked shrew

Management Approaches for Bristlecone Pine

1. Consider creating a mosaic of mixed age classes and regeneration opportunities across the landscape to retain a range of bristlecone attributes in the area while white pine blister resistant selection occurs rapidly in younger stands and slowly in older stands.

Related Plan Content for Bristlecone Pine

Watersheds and Water, Wildlife, Fish, and Plants, Nonnative Invasive Species

Spruce Fir Forest (VEG-SFF)

The spruce-fir forest vegetation community occupies the coldest and wettest forested slopes, ridges, and valleys on the Carson. It covers nearly 290,000 acres, at elevations between 9,000 and 11,500 feet, bounded at upper elevations by the alpine and tundra vegetation community and transitioning to mixed conifer at lower elevations. It occurs in all districts, except the Jicarilla. Engelmann spruce, western subalpine fir, and corkbark fir are the dominant species. Near timberline, firs are less abundant, while at lower elevations mixed conifer species may be present. Below 10,500 feet, quaking aspen occurs following disturbances and may be dominant or codominant. On the Carson, common understory species include whortleberry, huckleberry, common juniper, Oregon boxleaf, spruce-fir fleabane, Jacob's-ladder, Parry's goldenrod, and strawberry. As a result of past logging, fewer large trees exist now than what occurred historically.

The disturbance frequency in the spruce-fir forest vegetation community is both historically and currently low, but the natural disturbance regime includes infrequent, but high-intensity events like wind throw, fire, and spruce beetle epidemics. The current disturbance regime in the spruce-fir forest vegetation community is probably not outside the historic norm.

The spruce-fir forest vegetation community covers the highest forested peaks and slopes on the Carson. The cold, dark forests accumulate and retain deep snowpack late into the spring, regulating snowmelt,

streamflow, and water infiltration throughout the year (regulating ecosystem services). Due to the low product value and the difficulty of building roads, some areas of spruce-fir forests were not logged prior to 1950. Because these forests were neither roaded nor cut, 27 percent of the spruce-fir forest vegetation community has been designated as wilderness (cultural ecosystem service). Other areas of the spruce-fir forest vegetation community were heavily logged in the past and still lack trees in the oldest age classes. At lower elevations the spruce-fir forest vegetation community may include some Douglas-fir, which is preferred as fuelwood by local communities (provisioning ecosystem service). Medicinal osha is collected from aspen stands and other wet areas in the spruce-fir forest vegetation community (provisioning ecosystem service).

Spruce Fir Forest Desired Conditions (FW-VEG-SFF-DC)

1 Desired seral stage proportions for the spruce-fir forest vegetation community at the landscape scale:

Class	Description	Proportion (%)
Non-Tree	Non-tree: Recently burned; grass, forb, and shrub types	9
Aspen	All aspen, deciduous tree mix, and evergreen-deciduous mix tree types	11
Early	Seedling/sapling and small trees, all cover classes	21
Mid	Medium trees, all cover classes	14
Late	Large trees, closed canopy	45

Landscape Scale (1,000 acres or greater)

2 Spruce-fir forest vegetation community comprises multiple species of varying ages in a mosaic of seral stages and structures. Its arrangement on the landscape is similar to historic patterns, with groups and patches of variably-sized and aged trees and other vegetation. Tree canopies are generally more closed than in mixed conifer forests.

3 Old growth structure generally occurs over large areas as stands or patches.

4 Vigorous trees dominate, but older declining, top-killed, lightning-scarred, and fire-scarred trees are a component that provide for snags and coarse woody debris and are well-distributed throughout the landscape. Generally, there are 13 to 30 snags greater than 8 inches in diameter per acre and 1 to 3 of those snags are 18 inches or greater in diameter. Lower snag densities within those ranges are associated with early seral states and higher densities are associated with late seral states. Coarse woody debris ranges from 5 to 30 tons per acre for early-seral stages; 30 to 40 tons per acre for mid-seral stages; and 40 tons per acre or greater for late-seral stages

5 Natural openings and subalpine meadows are well distributed throughout SFF and are maintained by natural processes. They provide sufficient quality habitat for at-risk species to persist.

6 The understory consists of native grasses, forbs, sedges, mosses, liverworts, and shrubs.

7 In the lower spruce-fir type, mixed severity fires (fire regime III) occur infrequently. In the upper spruce-fir type, high severity fires (fire regime IV and V) occur very infrequently.

Mid-Scale (10-1,000 acres)

8 At the mid-scale, the distribution of groups and patches varies, depending on disturbance, elevation, soil type, aspect, and site productivity. Patches are primarily even-aged with variation in species composition and size, but are mostly in the hundreds of acres. Disturbances of thousands of acres are rare. There may be frequent small disturbances resulting in groups and patches of tens of acres or less. Disturbance-created grass, forb, and shrub openings may compose up to 100 percent of the mid-scale area, depending on the local disturbance history.

9 Tree density ranges from 20 to 250 square feet of basal area per acre, depending on disturbance history, structural stage, and site productivity.

10 Aspen is occasionally present in large patches, providing habitat for organisms that depend on it (e.g., northern goshawk, cavity nesters including woodpeckers and owls, and a variety of fungi and microorganisms). Where they naturally occur, all age classes of aspen are present in even-aged groups or patches and are regenerating and vigorous. A diverse understory of native herbaceous and shrub species has a variety of seral and age classes and is vigorous and regenerating.

11 Localized, accelerated soil erosion may occur following high-severity fires, but not to the extent that it results in long-term impairment to connected waters downstream or causes loss of soil productivity over major portions of the 5^{th} or 6^{th} code watershed.

12 Uneven-aged groups and patches compose about 20 percent of the spruce-fir forest vegetation community and provide for wildlife species that need multi-storied canopies with dense low- to mid-canopy layers.

13 Forest conditions in goshawk post-fledging family areas are generally consistent with surrounding forest conditions, except these forests contain 10-20 percent greater tree density (basal area) than goshawk foraging areas and the general forest. Goshawk nest areas have forest conditions that are multi-aged, but are dominated by large trees with relatively denser canopies than other areas in the spruce-fir forest vegetation community.

14 The wildland-urban interface has strategically located areas in a more open condition than occur in the surrounding general forest. Grass/forb/shrub vegetation and aspen may make up a much larger percentage of the wildland-urban interface than they do in the general forest. Structures in the wildland-urban interface are surrounded by grassy openings with very few to no trees such that available fuels support surface fires.

Fine Scale (10 acres or less)

15 Mid- to old-aged trees grow tightly spaced with interlocking crowns. Trees are generally of the same height and age in early group/patch development, but may be multi-layered in late development. Small openings (gaps) are present as a result of localized disturbances (e.g. wind and disease).

16 Moist soil conditions (e.g., thick litter layers, wet areas, coarse woody debris, and decaying debris) are maintained and well distributed, within the capacity of the vegetation community for at-risk species.

Spruce Fir Forest Guidelines (FW-VEG-SFF-G)

1 Soil and vegetation disturbance from management activities should occur in confined, localized areas, where impacts to long-term soil and vegetation condition are avoided.

2 A minimum of 6 nest areas (known and replacement) should be located per goshawk territory, to maintain the persistence or contribute to the recovery of at-risk species. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas should generally be 25 to 30 acres in size.

3 Goshawk post-fledging family areas of approximately 420 acres in size should be designated surrounding the nest sites, to maintain the persistence or contribute to the recovery of at-risk species.

4 In goshawk foraging areas and post-fledging family areas, groups of 6 reserve trees should be retained within management created openings greater than 0.5 acre, to maintain the persistence or contribute to the recovery of at-risk species.

5 Human presence should be minimized in occupied goshawk nest areas during nesting season of March 1 through September 30, to maintain the persistence or contribute to the recovery of at-risk species.

At-risk Species for Spruce Fir Forest

- Canada lynx
- Northern goshawk
- Masked shrew
- Pale Townsend's big-eared bat
- Robust larkspur

Related Plan Content for Spruce Fir Forest

Watersheds and Water, Wildlife, Fish, and Plants, Nonnative Invasive Species

Aspen (VEG-ASP)

On the Carson, aspen occurs as an early seral component of other vegetation communities. It does not persist indefinitely, but is dependent on disturbance for its regeneration and therefore its distribution is expected to shift spatially across the landscape over time. However, when a conifer seed source is unavailable, aspen may persist as a seral state for decades to centuries. Aspen is adapted to a wider range of environmental conditions than most of the plant species it is associated with and spans elevations from ponderosa to spruce and fir forests. Where they occur, aspen stands provide important moist and cool habitat, water storage and water recharge, nutrient cycling, reduced fire intensity, and slowed fire spread. They provide a disproportionately large ecological benefit and tend to have higher biodiversity and a greater abundance of plants, fungi, invertebrates, mammals, and cavity-nesting bird species than the surrounding forest (supporting and provisioning ecosystem services). Even small aspen stands provide refugia. The soft wood of decaying stems and snags provides valuable habitat, particularly for cavity-dependent species.

Aspen stands may be single- or multi-storied depending on disturbance history and local stand dynamics. The canopy is usually closed. Understory structure may be complex with multiple shrub and herbaceous layers, or simple with just an herbaceous layer. The herbaceous layer may be dense or sparse, dominated by graminoids or forbs. Some of the species typically found associated with the aspen vegetation community include western yarrow, violet, and several grasses and sedges. The understory may also contain shrubs, including creeping barberry, Oregon boxleaf, and mountain snowberry. Aspen stands provide important habitat for wildlife and plants.

They also have high scenic value and provide opportunities for recreation and cultural or spiritual experiences (cultural ecosystem services). The green leaves and white trunks provide a natural contrast to the surrounding forest. The aspen vegetation community attracts both residents and visitors to the Carson to enjoy abundant wildlife, shade, and scenery (cultural ecosystem services). During fall months, the landscape is transformed into a patchwork of green and gold, drawing fall color lovers from around the region (cultural ecosystem services). Aspen provide unique seasonal opportunities for hiking, biking, bird watching, nature exploration, picnicking and other recreation activities (cultural ecosystem services). On the Carson, aspen is also an important source of building material (i.e., latillas and coyote fences), as well as fuelwood for local forest-dependent communities (provisioning and cultural ecosystem services). Aspen bark is used as a medicinal tea (provisioning ecosystem service).

At lower elevations on the Carson where fire regimes have been disrupted (the mixed conifer with aspen and mixed confer with frequent fire vegetation communities), aspen is slightly to very underrepresented relative to reference conditions. It is well represented in the higher elevation spruce-fir forest vegetation community, but many of the stands that exist are aging and being overtaken by conifers.

Aspen Desired Conditions (FW-VEG-ASP-DC)

Landscape Scale (1,000 acres or greater)

1 The aspen vegetation community occurs as a slowly shifting mosaic and in natural patterns of abundance and distribution across its range, with new aspen clones establishing over time. New openings provide adequate regeneration and old, declining stands transition to conifer dominance.

2 Fire intervals in vegetation communities where aspen is a component are similar to reference conditions and the size, age, and spatial extent of the aspen vegetation community stands reflect large-scale disturbance patterns and processes.

3 Stands with the potential for aspen are affected by disturbances that may include fire, mechanical treatments, insects, pathogens, and abiotic factors. Collectively, these agents of change promote healthy tree regeneration, decadence, and nutrient cycling and in turn contribute to high quality wildlife habitat and biodiversity.

4 Snags, downed aspen, and woody debris are scattered across the landscape and provide habitat for a variety of wildlife species (e.g., small mammals, reptiles, amphibians, and birds), while contributing to efficient nutrient cycling.

Mid-Scale (10-1,000 acres)

5 Aspen in multistoried patches may compose 10 to 100 percent of the mid-scale area, depending on local disturbance history.

6 Aspen is successfully regenerating and recruiting into older and larger size classes.

7 Understory vegetation consists of shrubby or herbaceous species, providing forage and cover for wildlife and livestock.

Fine Scale (10 acres or less)

8 Size classes have a natural distribution, with the greatest number of stems in the smallest classes.

9 Moist soil conditions (e.g., thick litter layers, wet areas, coarse woody debris, and decaying debris) are maintained and well distributed, within the capacity of the vegetation community for at-risk species.

Aspen Guidelines (FW-VEG-ASP-G)

1 To provide necessary habitat characteristics for wildlife species, aspen trees 10 inch or greater diameter (DBH), both live and dead, should be protected during management activities, except where they may pose a risk to worker or public safety or to infrastructure.

2 A minimum of 6 nest areas (known and replacement) should be located per goshawk territory, to maintain the persistence or contribute to the recovery of at-risk species. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas should generally be 25 to 30 acres in size.

3 Goshawk post-fledging family areas of approximately 420 acres in size should be designated surrounding the nest sites, to maintain the persistence or contribute to the recovery of at-risk species.

4 Human presence should be minimized in occupied goshawk nest areas during the nesting season of March 1 through September 30, to maintain the persistence or contribute to the recovery of at-risk species.

At-risk Species for Aspen

- Canada lynx
- American peregrine falcon
- Northern goshawk
- Masked shrew
- Robust larkspur

Management Approaches for Aspen

1. Consider stimulating aspen growth and managing for pure aspen stands in high elevation forested wildland-urban interface forests to help mitigate fire hazard.
2. Consider using small patch clearcuts (< 5 acres), conifer removal, and wildland fire to stimulate aspen sprouting in areas that currently have or previously supported aspen.

3. Consider strategies to promote aspen regeneration, such as jackstrawing, planting, public education, temporary exclosure fencing, and improving the forage and browse in the surrounding area to diffuse browse pressure.
4. Consider selective removal of fire-sensitive species (i.e., white fir) and small diameter conifers. Retain large ponderosa pine and Douglas-fir.
5. Consider monitoring to quantify the size and distribution of aspen patches required to overcome existing levels of browse pressure.

Related Plan Content for Aspen

Watersheds and Water, Wildlife, Fish, and Plants, Nonnative Invasive Species

Mixed Conifer with Aspen (VEG-MCW)

The mixed conifer with aspen vegetation community is found in the cooler wetter sites within the mixed conifer life zone, where fires are less frequent and are characterized by more mixed to high severities. The distinguishing feature of the mixed conifer with aspen vegetation community is the presence of quaking aspen in a post-disturbance seral state. On the Carson, the mixed conifer with aspen vegetation community is found on about 131,000 acres at elevations between 7,000 and 10,000 feet. It is most common in the eastside ranger districts, and does not occur in the Jicarilla Ranger District.

Dominant and codominant vegetation in the mixed conifer with aspen vegetation community varies by elevation and moisture availability. Ponderosa pine occurs incidentally or is absent, while Douglas-fir, southwestern white pine, white fir, and Colorado blue spruce are dominant or codominant. Oregon boxleaf is characteristic in the understory, but a wide variety of other shrubs, graminoids, and forbs may be present, depending on soil type, aspect, elevation, disturbance history, and other factors. In the aspen component, conifer species may or may not be present in significant proportions, depending on successional status.

The mixed conifer with aspen vegetation community occurs on productive sites that grow large Douglas-fir trees that are valued as timber and fuelwood (provisioning ecosystem services). Selective harvesting during the last century has shifted stand structure and composition, favoring dense, moderate-sized, true firs. Fire exclusion has had an impact by reducing opportunities for aspen establishment. Aspen in this vegetation community is slightly underrepresented and young aspen stands are particularly rare. When combined with predicted warming and drying, the current stand conditions are likely to become increasingly susceptible to insects, disease, and large, uncharacteristic wildland fires in the future.

The mixed conifer with aspen vegetation community covers many areas that provide important recreational opportunities including Sipapu and Red River ski resorts, the South Boundary mountain bike trail, and Elephant Rock, Cabresto Lake, and Trout Lakes areas (cultural ecosystem services). Designated wildernesses make up 14.5 percent of the mixed conifer with aspen vegetation community (cultural ecosystem service). There are good hunting and osha collecting opportunities in the mixed conifer with aspen vegetation community forests (cultural and provisioning ecosystem services).

Mixed Conifer with Aspen Desired Conditions (FW-VEG-MCW-DC)

1	Desired seral stage proportions for the mixed conifer with aspen vegetation community at the landscape scale:

Class	Description	Proportion (%)
Non-Tree	Non-tree: Recently burned; grass, forb, and shrub types	1
Aspen	All aspen, deciduous tree mix, and evergreen-deciduous mix tree types	21
Early-Mid	Seedling/sapling, small trees and medium trees, all cover classes	29
Late-Closed	Large trees, closed canopy	49
Late-Open	Large trees, open canopy; contemporary landscapes only	0

Landscape Scale (1,000 acres or greater)

2 The mixed conifer with aspen vegetation community comprises variable species of varying ages in a mosaic of seral stages and structures. Its arrangement on the landscape is similar to historic patterns, with groups and patches of variably-sized and aged trees and other vegetation. A range of seral states, each characterized by distinct dominant species composition and biophysical conditions, are distributed across the landscape, such that each state adequately supplies the subsequent states progressively through time. Canopies in older seral stages are generally more closed than in dry mixed conifer.

3 Mixed severity fire (fire regime III) is characteristic at the lower elevations of this type (every 50 to 100 years). High-severity fires (fire regimes IV & V) occur less frequently and are more likely to occur at higher elevations.

4 Old growth structure generally occurs over large areas as stands or patches.

5 Vigorous trees dominate, but older declining, top-killed, lightning-scarred, and fire-scarred trees are a component. Declining trees are well distributed throughout the landscape and provide for snags, and coarse woody debris. Generally, there are an average of 20 snags greater than 8 inches in diameter per acre and 1 to 5 of those snags are 18” or greater in diameter. Lower snag densities are associated with early seral stages and higher densities are associated with late seral stages. Coarse woody debris, including downed logs, ranges from 5 to 20 tons per acre for early-seral stages; 20 to 40 tons per acre for mid-seral stages; and 35 tons per acre or greater for late-seral stages.

6 Dwarf mistletoe infestations may be present in stands with a Douglas-fir or spruce component, but rarely in other tree species. Infestation size, severity, and amount of mortality varies among infested stands. Witches’ brooms may be scattered throughout the infestations, providing structural diversity in the stand and improved foraging and nesting habitat for wildlife species, such as small mammals (e.g., tree squirrels) and raptors (e.g., goshawks and red-tailed hawks).

7 An understory consisting of native grass, forbs, and shrubs is present. Mosses and lichens are prevalent and function to recycle soil nutrients.

Mid-Scale (10-1,000 acres)

8 At the mid-scale, the distribution of groups and patches varies in the mixed conifer with aspen vegetation community, depending on disturbance, elevation, soil type, aspect, and site productivity. Patch sizes vary, but are frequently in the hundreds of acres, with rare disturbances in the thousands of acres. Groups and patches of tens of acres or less are relatively common. A mosaic of groups and patches of trees, primarily even-aged, and variable in size, species composition, and age is present.

Disturbance-created grass, forb, shrub openings may compose 10-100 percent of the mid-scale area, depending on the local disturbance history.

9 Tree density ranges from 20 to 180 square feet of basal area per acre, depending on disturbance history and site productivity.

10 Basal area is 10-20 percent higher in some areas than in the general forest. Examples include goshawk post- fledging family areas and north-facing slopes. Goshawk nest areas have forest conditions that are multi-aged, but are dominated by large trees with relatively denser canopies than other areas in the wet mixed conifer type.

11 The prevalence of aspen is dependent on seral stage, but is occasionally present in large patches, providing habitat for organisms (e.g., cavity-nesting birds, fungi, and microorganisms) that depend on it. Where they naturally occur, all age classes of aspen are present in even-aged groups or patches and are regenerating and vigorous. A diverse understory of native herbaceous and shrub species has a variety of seral and age classes and is vigorous and regenerating.

12 Fire behavior is often smoldering low-intensity surface fire, with single tree and isolated group torching. Due to the presence of ladder fuels, when environmental conditions align fires transition rapidly into the canopy as passive or active crown fire behavior with conifer tree mortality up to 100 percent across mid-scale patches (10-1,000 acres). High-severity fires generally do not result in areas of mortality exceeding 1,000 acres. Other more frequent disturbances affect smaller areas.

13 Uneven-aged groups and patches, comprising about 20 percent of the mixed conifer with aspen vegetation community, provide habitat for species (e.g., black bear and bobcat) that need multistoried canopies with dense low- to mid-canopy layers.

14 The wildland-urban interface is dominated by early-seral fire-adapted species growing in a more open condition than in the surrounding general forest. These conditions result in fires that burn primarily on the forest floor and rarely spread as crown fire.

Fine Scale (10 acres or less)

15 In mid-aged and older forests, trees are typically variably-spaced with crowns interlocking (grouped and clumped trees) or nearly interlocking. Trees within groups can be of similar or variable species and ages.

16 Small openings (gaps) are present as a result of disturbances and provide wildlife and plant species habitat.

17 Moist soil conditions (e.g., thick litter layers, wet areas, coarse woody debris, and decaying debris) are maintained and well distributed, within the capacity of the vegetation community for at-risk species.

Mixed Conifer with Aspen Guidelines (FW-VEG-MCW-G)

1 Slash piles should be retained across the landscape for several years, to increase small mammal occupancy in areas where coarse woody debris is deficient and provide nesting habitat and cover for associated wildlife species (e.g., turkeys, birds, small mammals, reptiles, and invertebrates).

2	If slash is scattered, it should be at a height that still allows big game movement.
3	A minimum of 6 nest areas (known and replacement) should be located per goshawk territory, to maintain the persistence or contribute to the recovery of at-risk species. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas should generally be 25 to 30 acres in size.
4	Goshawk post-fledging family areas of approximately 420 acres in size should be designated surrounding the nest sites, to maintain the persistence or contribute to the recovery of at-risk species, to maintain the persistence or contribute to the recovery of at-risk species.
5	In goshawk foraging areas and post-fledging family areas groups of 6 reserve trees should be retained within management created openings greater than 0.5 acre, to maintain the persistence or contribute to the recovery of at-risk species.
6	Human presence should be minimized in occupied goshawk nest areas during nesting season of March 1 through September 30, to maintain the persistence or contribute to the recovery of at-risk species.

At-risk Species for Mixed Conifer with Aspen

- Mexican spotted owl
- American peregrine falcon
- Northern goshawk
- Masked shrew
- Pale Townsend’s big-eared bat
- Robust larkspur

Related Plan Content for Mixed Conifer with Aspen

Watersheds and Water, Wildlife, Fish, and Plants, Nonnative Invasive Species

Mixed Conifer with Frequent Fire (VEG-MCD)

The mixed conifer with frequent fire vegetation community occupies the warmer, drier sites within the mixed conifer life zone. It covers nearly 183,000 acres on the Carson at elevations of 6,000 to 10,000 feet. It is present on every district except the Jicarilla Ranger District. The mixed conifer with frequent fire vegetation community is distinguished from mixed conifer with aspen vegetation community by having a more frequent, lower severity fire regime and aspen as a minor component found within dissimilar inclusions, rather than as a seral stage. The mixed conifer with frequent fire vegetation community is dominated by ponderosa pine, with some Douglas-fir and white fir. When fire is episodic and low- to mixed-severity, both mature and juvenile white fir are killed and an open forest structure is maintained with fire adapted ponderosa pine and Douglas-fir in the overstory, and Gambel oak, creeping barberry, and mountain snowberry are common in the understory. The natural fire regime in mixed conifer with frequent fire is highly departed and has resulted in dense, homogeneous stands with a shift toward more shade tolerant tree species that are not adapted to fire.

Dense stands outcompete aspen which would have historically been a minor and dispersed component in the mixed conifer with frequent fire vegetation community, but is now very underrepresented. Dense stands are susceptible to insects and disease and much more at risk from large, high severity fire. There are many fewer openings that support grass, forb, and oak cover than there would have been historically, which results in less forage for wildlife and livestock grazing. Many forest dependent communities are near mixed conifer with frequent fire forests and rely on them for fuelwood and other products, like osha (cultural and provisioning ecosystem services).

Mixed Conifer with Frequent Fire Desired Conditions (FW-VEG-MCD-DC)

1 Desired seral stage proportions for the mixed conifer with frequent fire vegetation community at the landscape scale:

Class	Description	Proportion (%)
Non-Tree-Early	Recently burned; grass, forb, and shrub types; seedling/sapling size trees	9
Mid-Closed	Small trees, closed canopy	3
Mid-Open	Small trees, open canopy	3
Late-Closed	Medium to large trees, closed canopy	25
Late-Open	Multi-storied with open canopy, largest trees are medium to large	60

Landscape Scale (1,000 acres or greater)

2 The mixed conifer with frequent fire vegetation community comprises multiple species of varying ages in a mosaic of seral stages and structures. Its arrangement on the landscape is similar to historic patterns, with groups and patches of variably-sized and aged trees and other vegetation. Portions of the forest may be in various stages of development (including temporary openings or groups of very young trees) providing a source of future old growth structure on the landscape. Even-aged structure may be present on up to 10 percent of the landscape to provide structural diversity.

3 Frequent, low-severity fires (fire regime I) occur across the entire landscape, including throughout goshawk home ranges, with a return interval of 14 to 24 years. Fires burn primarily on the forest floor and typically do not spread between tree groups as crown fire.

4 Old growth structure occurs throughout the landscape, generally in small areas as individual old growth components or as clumps of old growth. Old growth may be intermixed with groups of younger trees or distinct groups of mostly old trees.

5 Vigorous trees dominate, but older declining, top-killed, lightning-scarred, and fire-scarred trees are a component that provide for snags and coarse woody debris and are well distributed throughout the landscape.

6 Dwarf mistletoe infestations may be present on ponderosa pine and Douglas-fir, but rarely in other tree species. It occurs in less than 15 percent of host trees in uneven-aged forest structures and less than 25 percent in even-aged forest structures. Infestation size, severity, and amount of mortality varies among infected trees. Witches' brooms may be scattered throughout the infestations providing structural diversity in the stand and improved foraging and nesting habitat for wildlife species, such as small mammals (e.g. tree squirrels) and raptors (e.g., goshawks).

7 The majority of soil cover comprises native grasses and forbs, as opposed to needles and leaves, but all contribute to the fine fuels that maintain a natural fire regime.

Mid-Scale (10-1,000 acres)

8 At the mid-scale, appearance is variable, but generally uneven-aged and open. Openness typically ranges from 50 percent in more productive sites to 90 percent in less productive sites. Occasionally small patches (generally less than 60 acres) of even-aged forest structure are present, based upon disturbance events and regeneration establishment. A small percentage of the landscape may be predisposed to larger even-aged patches, based on physical site conditions that favor mixed-severity and stand replacement fire and other disturbances. Disturbances sustain the overall variation in age and structural distribution.

9 Tree density ranges from 30 to 125 square feet of basal area per acre, with the majority coming from larger trees.

10 Trees are arranged in small clumps and groups interspersed within variably-sized openings of grass/forb/shrub vegetation associations similar to historic patterns. Size, shape, number of trees per group, and number of groups per area are variable across the landscape depending on elevation, soil type, aspect, and site productivity. More biologically productive forested sites contain more trees per group and more groups per area.

11 Snags are typically 18 inch diameter (DBH) or larger, and average 3 per acre. Downed logs (>12 inch diameter at mid-point, >8 feet long) average 3 per acre in forested areas. Coarse woody debris, including downed logs, ranges from 5 to 15 tons per acre.

12 Basal area is 10 to 20 percent higher in some areas than in the general forest. Examples include goshawk post- fledging family areas, north-facing slopes, and canyon bottoms. Goshawk nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively denser canopies than other areas in the dry mixed conifer type.

13 Groups of aspen are present in the mixed conifer with frequent fire vegetation community where they naturally occur.

14 Where the potential exists, Gambel oak thickets with various diameter stems and low growing, shrubby oak are present. These thickets provide forage, cover, and nesting habitat for species (e.g., small mammals, birds, deer, and elk). Gambel oak mast (acorns) provides food for wildlife species, such as black bear. The distribution and abundance of oak balances wildfire hazard fuels reduction and tree regeneration with wildlife habitat, grazing conditions, age class diversity, and soil condition.

15 The wildland-urban interface comprises smaller and more widely spaced groups of trees and lower numbers of snags and coarse woody debris than surrounding general forest. Crown base heights may be higher than in areas outside the wildland-urban interface. Within the wildland-urban interface, fires burn primarily on the forest floor and rarely spread as crown fire.

Fine Scale (10 acres or less)

16 Tree groups are typically less than 1 acre and consist of 2 to 50 trees per group, but are sometimes larger, such as on north facing slopes. Regeneration openings occur as a mosaic and are similar in size to nearby groups.

17 Interspaces between groups are variably shaped, comprised of a native grass-forb-shrub mix, and may contain individual trees or snags.

18 Trees typically occur in irregularly-shaped groups and are variably spaced with some tight clumps. Trees within groups are of similar or variable ages, often containing more than one species. Crowns of trees within mid-aged and old groups are interlocking or nearly interlocking.

19 Density is variable, with canopy cover ranging from very open to closed.

20 Groundcover consists primarily of perennial grasses and forbs capable of carrying surface fire. Fires generally burn as surface fires, but single-tree torching and isolated group torching is not uncommon.

21 Moist soil conditions (e.g., thick litter layers, wet areas, coarse woody debris, and decaying debris) are maintained and well distributed, within the capacity of the vegetation community for at-risk species.

Mixed Conifer with Frequent Fire Objectives (FW-VEG-MCD-O)

1 Mechanically treat at least 5,500 - 10,000 acres, during each 10-year period following plan approval.

2 During each 10 year period following plan approval, treat at least 20,000 - 40,000 acres using a combination of prescribed fire and naturally ignited wildfire to make progress toward or to maintain desired conditions.

Mixed Conifer with Frequent Fire Guidelines (FW-VEG-MCD-G)

1 Slash piles should be retained across the landscape for several years, to increase small mammal occupancy in areas where coarse woody debris is deficient and provide nesting habitat and cover for wildlife-associated species (e.g., turkeys, birds, small mammals, reptiles, and invertebrates).

2 If slash is scattered, it should be at a height that still allows big game movement.

3 A minimum of 6 nest areas (known and replacement) should be located per goshawk territory, to maintain the persistence or contribute to the recovery of at-risk species. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas should generally be 25 to 30 acres in size.

4 Goshawk post-fledging family areas of approximately 420 acres in size should be designated surrounding the nest sites, to maintain the persistence or contribute to the recovery of at-risk species.

5	In goshawk foraging areas and post-fledging family areas groups of 3 to 5 reserve trees should be retained within management created openings greater than 1 acre, to maintain the persistence or contribute to the recovery of at-risk species.
6	Human presence should be minimized in occupied goshawk nest areas during the nesting season of March 1 through September 30, to maintain the persistence or contribute to the recovery of at-risk species.

At-risk Species for Mixed Conifer with Frequent Fire

- Mexican spotted owl
- American peregrine falcon
- Northern goshawk
- Pale Townsend's big-eared bat
- Robust larkspur

Related Plan Content for Mixed Conifer with Frequent Fire

Watersheds and Water, Wildlife, Fish, and Plants, Nonnative Invasive Species

Ponderosa Pine Forest (VEG-PPF)

Ponderosa pine forest is the most common vegetation community on the Carson, covering nearly 313,000 acres and occurring on every ranger district. It spans moisture gradients from 6,000 to 7,500 feet. Ponderosa pine is the dominant species, but other trees, such as Gambel oak, piñon pine, and juniper, may be present. There is typically a productive grass-forb-shrub understory. Gambel oak and kinnikinnick are common. In other savannah areas, grasses and forbs dominate the understory and extensive interspaces are between widely spaced individuals or clumps of trees. Common grass species are blue gramma, mountain muhly, muttongrass, and Arizona fescue. The ponderosa pine has evolved mechanisms to tolerate frequent, low intensity surface fires and adapts to drought during the growing season. The fire regime in the ponderosa pine forest vegetation community is highly departed from reference condition and has resulted in dense, homogeneous stands with a shift toward more shade tolerant tree species that are not adapted to fire. The ponderosa pine forest vegetation community on the Carson is an important source of commercial timber, and fuelwood (provisioning ecosystem services).

Past activities have created a departed condition in most of the ponderosa pine forest vegetation community on the Carson. The result is a lack of open canopy, few large tree dominated stands, and less snags. Beginning around the turn of the 19th century and continuing into the 1950s, high-grade logging on the Carson removed much of the most valuable merchantable timber from accessible ponderosa pine forest stands. What remains are even-aged, relatively young dense stands of small diameter ponderosa pine trees. Dense ponderosa pine forest supports less grass in the understory now than it did in the past, providing less forage for wildlife and livestock. In addition, a legacy of unmanaged livestock grazing in the early 1900s and fire suppression have significantly reduced the ability of fire to play a natural role in the ponderosa pine forest vegetation community and has allowed fire-sensitive species, such as white fir, to establish. The current ponderosa pine forest vegetation community condition is extremely susceptible to large, uncharacteristic wildfire and disturbance agents (especially dwarf mistletoe) that will be exacerbated under a warming and drying climate. In many cases mechanical treatment is required prior to

reintroducing fire. Treatments that create canopy openings can induce an oak response that suppresses tree regeneration and can increase fire hazard.

Beginning in the 1940s through the 1980s, over 50,000 acres of ponderosa pine, piñon pine and juniper trees and sagebrush were converted to grasslands. These conversions were accomplished by plowing, chaining, dozer piling, tree crushing, and hand clearing with chainsaws, then seeding to grass (mostly crested wheat). The primary purpose of these conversion areas was to increase available forage for wildlife and livestock grazing. Some lands that have the potential to support ponderosa pine forest continue to be managed instead for forage production. Those areas are identified as Grassland Maintenance Management Areas, and are managed toward the desired conditions defined for that management area.

Ponderosa Pine Forest Desired Conditions (FW-VEG-PPF-DC)

1 Desired seral stage proportions for the ponderosa pine forest vegetation community at the landscape scale:

Class	Description	Proportion (%)
Non-Tree	Recently burned; grass, forb, and shrub types;	0
Early	Seedling/sapling and small trees, closed canopy	1
Mid	Single-storied with open canopy, largest trees are medium to large	3
Late	Multi-storied with open canopy, largest trees are medium to large	96
Single Story	Small to large trees, single storied, closed canopy; *contemporary landscapes only*	0

Landscape Scale (1,000 acres or greater)

2 The ponderosa pine forest vegetation community comprises trees of varying ages in a mosaic of seral stages and structures. Its arrangement on the landscape is similar to historic patterns, with groups and patches of variably-sized and aged trees. Forest appearance is generally uneven-aged and open; occasional areas of even-aged structure may be present. Denser stand conditions exist in some locations, such as north facing slopes and canyon bottoms.

3 The majority of soil cover is native grasses and forbs, as opposed to needles and leaves, but all contribute to the fine fuels that maintain a natural fire regime.

4 Frequent, low-severity fires (fire regime I) occur across the entire landscape including throughout the range of northern goshawks, with a return interval of 4 to 18 years. Fires burn primarily on the forest floor and typically do not spread between tree groups as crown fire.

5 Old growth structure (large, old ponderosa pine trees with reddish-yellow, wide platy bark, flattened tops, moderate to full crowns, and large drooping or gnarled limbs) occurs throughout the landscape, generally in small areas as individual old growth components or as clumps of old growth. Old growth is generally intermixed with groups of uneven-aged trees but may occasionally occur in larger even-aged patches.

6 Vigorous trees dominate, but older declining, top-killed, lightning-scarred, and fire-scarred trees are a component that provide for snags and coarse woody debris that are irregularly distributed across the landscape and may not exist in some patches.

7 Isolated dwarf mistletoe infestations may be present. It occurs in less than 15 percent of host trees in uneven-aged forest structures and less than 25 percent in even-aged forest structures. Infestation size, severity, and amount of mortality varies among infected trees. Witches' brooms may be scattered throughout the infestations providing structural diversity in the stand and improved foraging and nesting habitat for wildlife species, such as small mammals (e.g., tree squirrels), raptors (e.g., goshawks and owls), and invertebrate species.

Mid-Scale (10-1,000 acres)

8 At the mid-scale forest appearance is variable but generally uneven-aged and open. Generally all age classes are represented and evenly distributed, ranging from young to old. Seedlings and saplings are maintained at sufficient levels to provide a reliable source of replacement. Occasionally patches of even-aged forest structure are present, based upon disturbance events and regeneration establishment. A small percentage of the landscape may be predisposed to larger even-aged patches, based on physical site conditions that favor mixed-severity and stand replacement fire and other disturbances. Disturbances sustain the overall variation in age and structural distribution.

9 Tree species composition is relatively homogeneous. Trees may be isolated individuals or arranged in small clumps and groups interspersed within variably-sized openings of grass/forb/shrub vegetation associations similar to historic patterns. Size, shape, number of trees per group, and number of groups per area are variable across the landscape depending on elevation, soil type, aspect, and site productivity. More biologically productive forested sites contain more trees per group and more groups per area.

10 Snags are typically 18 inch diameter (DBH) or larger, and average 1 to 2 per acre. Downed logs (>12 inch diameter at mid-point, >8 feet long) average 3 per acre. Coarse woody debris, including downed logs, ranges from 3 to 10 tons per acre.

11 Where the potential exists, Gambel oak thickets with various diameter stems and low growing, shrubby oak are present. These thickets provide forage, cover, and nesting habitat for species (e.g., small mammals, birds, deer, and elk). Gambel oak mast (acorns) provides food for wildlife species, such as black bear. The distribution and abundance of oak balances wildfire hazard fuels reduction and tree regeneration with wildlife habitat, grazing conditions, age class diversity, and soil condition.

12 Interspaces typically range from 52 percent in more productive sites to 90 percent in less productive sites. In areas with high fine-scale aggregation of trees into groups, mid-scale openness ranges from 78-90 percent. Tree density within forested areas generally ranges from 22 to 89 square-foot basal area per acre.

13 In some areas, basal area is 10-20 percent higher in mid-aged to old tree groups compared to the rest of the forest (i.e., goshawk post-fledging family areas). Goshawk nest areas have forest conditions that are multi-aged, but dominated by large trees with interlocking crowns and a canopy that is denser relative to other ponderosa pine areas.

14 In the wildland-urban interface, the density of snags, downed logs, coarse woody debris, live trees, and Gambel oak may be at the low range of desired conditions, to reduce fire intensity and assist the control of fire. Groups of trees may be smaller, more widely spaced, or may have fewer trees per group (but still within desired condition) compared to areas outside the wildland-urban interface. Crown base heights may be higher than in areas outside the wildland-urban interface to reduce the potential for fire spreading to the tree canopy.

Fine Scale (10 acres or less)

15 Trees typically occur in irregularly shaped small groups of less than one acre, though they may be larger, such as on north-facing slopes. Some groups form tight clumps, or trees may occur as isolated individuals depending on soils, plant associations, climate, and disturbance.

16 Groups range in size from 2 to approximately 40 trees and may contain species other than ponderosa pine. Trees within groups may be of similar or variable ages. Crowns of trees are interlocking or nearly interlocking in groups that are mid-aged to old.

17 The interspaces between groups are variably shaped, a native grass/forb/shrub mix, and may contain individual trees or snags. Regeneration openings occur as a mosaic and are similar in size to nearby groups.

18 Groundcover consists primarily of perennial grasses, forbs, shrubs, and needle cast capable of carrying surface fire. Generally, fires burn as surface fires, but single-tree torching and isolated group torching are not uncommon and contribute to a mosaic across the landscape.

19 Rocky features, outcrops of gypseous or limy sandstones, volcanic substrate soils, and Mancos Shale soils provide habitat within the capacity of the vegetation community for at-risk species.

Ponderosa Pine Forest Objectives (FW-VEG-PPF-O)

1 Mechanically treat at least 22,000 - 50,000 acres, during each 10-year period following plan approval.

2 During the 10 years following plan approval, treat at least 80,000 - 125,000 acres using a combination of prescribed fire and naturally ignited wildfire to make progress toward or maintain desired conditions.

Ponderosa Pine Forest Guidelines (FW-VEG-PPF-G)

1 Vegetation treatments should be designed such that structural stages and age classes are proportionally represented to assure continuous recruitment of old growth characteristics at the appropriate scale over time.

2 To provide necessary habitat components, the largest and tallest snags (representative of the stand) and downed logs should be retained along edges of openings and within groups/clumps of trees, to provide habitat and roost sites for wildlife species (e.g., small mammals, cavity-nesting birds, and tree-dwelling bats).

3	Slash piles should be retained across the landscape for several years, to increase small mammal occupancy in areas where coarse woody debris is deficient and provide nesting habitat and cover for turkeys, birds, small mammals, reptiles, and invertebrates.
4	If slash is scattered, it should be at a height that still allows big game movement.
5	A minimum of 6 nest areas (known and replacement) should be located per goshawk territory, to maintain the persistence or contribute to the recovery of at-risk species. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas should generally be 25 to 30 acres in size.
6	Goshawk post-fledging family areas of approximately 420 acres surrounding nest sites should be designated, to maintain the persistence or contribute to the recovery of at-risk species.
7	In goshawk foraging areas and post-fledging family areas groups of 3 to 5 reserve trees should be retained within management created openings greater than 1 acre, to maintain the persistence or contribute to the recovery of at-risk species.
8	Human presence should be minimized in occupied goshawk nest areas during the nesting season of March 1 through September 30, to maintain the persistence or contribute to the recovery of at-risk species.

At-risk Species for Ponderosa Pine Forest

- American peregrine falcon
- Northern goshawk
- Pale Townsend's big-eared bat
- Spotted bat
- Pagosa milkvetch (Jicarilla Ranger District)
- Ripley's milkvetch (Tres Piedras, Questa, and Camino Real Ranger Districts)
- Small-headed goldenweed (Tres Piedras and El Rito Ranger Districts)

Related Plan Content for Ponderosa Pine Forest

Watersheds and Water, Wildlife, Fish, and Plants, Nonnative Invasive Species

Piñon-Juniper Woodland (VEG-PJO)

The piñon-juniper woodland vegetation community covers 178,000 acres and occurs on every ranger district of the Carson. It occupies drier sites from 6,200 to above 7,500 feet, where it begins to be outcompeted by ponderosa pine and Douglas-fir. The moderate- to high-density overstory is dominated by two-needle piñon pine, Rocky Mountain juniper, and one-seed juniper. Soils are generally shallow, coarse, and often rocky, and support sparse shrubs and grasses, mainly blue and sideoats gramas. Typical disturbances (e.g., fire, insects, and disease) are high severity and occur infrequently, creating and maintaining even-aged patches. Woodland development occurs in distinctive phases, ranging from open grass-forbs, to mid-aged open canopy, to mature closed canopy forest.

American Indians have occupied the piñon-juniper woodland vegetation community in northern New Mexico for centuries and have utilized plants from these areas for many purposes, including food and building materials (cultural and provisioning ecosystem services). Piñon pine and juniper are highly valued by local forest-dependent communities for fuelwood and pine nuts, and openings provide forage for livestock and wildlife (provisioning ecosystem services). Between 2002 and 2005, bark beetles killed a significant portion of the piñon pine component on approximately 284,500 acres in the piñon-juniper woodland, piñon-juniper sagebrush, and other vegetation communities on the Carson. Soil function has been degraded due to a lack of effective groundcover, less overall organic matter, and changes in species composition, resulting in altered soil stability and reduced nutrient cycling. The pinyon jay is dependent on piñon pine trees and nuts, and the piñon-juniper woodland vegetation community provides important habitat for game species, including elk, deer, and bear.

Beginning in the 1940s through the 1980s, over 50,000 acres of ponderosa pine, piñon pine, and juniper trees and sagebrush were converted to grasslands. These conversions were accomplished by plowing, chaining, dozer piling, tree crushing, and hand clearing with chainsaws, then seeding to grass (mostly crested wheat). The primary purpose of these conversion areas was to increase available forage for wildlife and livestock grazing. Some lands that have the potential to support the piñon-juniper woodland vegetation community are still being managed instead for forage production. Those areas are identified as Grassland Maintenance Management Areas, and are managed toward the desired conditions defined for that management area.

Piñon-Juniper Woodland Desired Conditions (FW-VEG-PJO-DC)

1 Desired seral stage proportions for the piñon-juniper woodland vegetation community at the landscape scale:

Class	Description	Proportion (%)
Non-Tree	Non-tree: Recently burned; grass, forb, & shrub types	10
Early-Open	Seedling/sapling and open canopy small trees	5
Early-Closed	Small trees, closed canopy	15
Late-Open	Medium to large trees, open canopy	10
Late-Closed	Medium to large trees, closed canopy	60

Landscape Scale (1,000 acres or greater)

2 The piñon-juniper woodland vegetation community is characterized by even-aged patches of piñon pines and junipers that, at the landscape scale, form multi-aged woodlands. In treed seral states, piñon pine trees are occasionally absent, but one or more juniper species is always present.

3 Tree density is high, and where interlocking crowns shade the ground over extensive areas shrubs are sparse to moderate and herbaceous cover is low and discontinuous. However, plant litter (e.g., leaves and needles) and coarse woody debris are present in sufficient quantity to resist accelerated soil erosion and promote nutrient cycling, water retention, and the microclimatic conditions necessary for piñon pine seed germination (improved nutrient and soil properties, higher soil moisture, lower temperatures, and reduced solar insolation).

4 Biological soil crusts are present and improve nutrient cycling and stabilize soils, especially on sandier soils.

5 Based on site capability, native grass and forb cover is maximized to protect and enrich soils, as well as provide forage for ungulate grazing.

6 Widespread fire occurs infrequently, on the order of centuries, and its effects are variable due to variation in groundcover. The fires that do occur are mixed to high severity (fire regimes III, IV, & V).

7 Old growth structure occurs throughout the landscape, often concentrated in mid- and fine-scale units as patches of old growth. Very old trees (>300 years old) are present.

8 Older, declining, infested, or diseased trees are a component that provide a source of snags and coarse woody debris and are well-distributed throughout the landscape. There are an average of 2 snags per acre, and coarse woody debris averages 2 to 5 tons per acre.

Mid-Scale (10-1,000 acres)

9 The distribution of patches varies depending on disturbance, elevation, soil type, aspect, and site productivity. Patches are primarily even-aged and vary in size but are mostly in the 10s to 100s of acres.

10 Tree densities vary among seral stages, but average 150-200 trees per acre.

11 Where the potential exists, Gambel oak thickets with various diameter stems and low growing, shrubby oak are present. These thickets provide forage, cover, and habitat for species that depend on them (e.g., small mammals, nesting or feeding birds, deer, and elk). Gambel oak mast (acorns) provides food for wildlife species, such as black bear and small mammals. The distribution and abundance of oak balances wildfire hazard fuels reduction and tree regeneration with wildlife habitat, grazing conditions, age class diversity, and soil condition.

12 In the wildland-urban interface the density of snags, coarse woody debris, live trees and Gambel oak may be lower than in the rest of the vegetation community, to reduce fire intensity and assist in the control of fire. Trees may be younger and more widely spaced, and disturbances (e.g., prescribed fire and vegetation treatments) may occur more frequently than in areas outside of the wildland-urban interface. Crown base heights may be higher than in areas outside of the wildland-urban interface to reduce the potential for fire spreading to the tree canopy.

Fine Scale (10 acres or less)

13 Small fires may occur more frequently at the fine scale, burning single trees or small patches (fire regime III, return interval 35-200 years).

14 Rocky features, outcrops of gypseous or limy sandstones, volcanic substrate soils, and Mancos Shale soils provide habitat within the capacity of the vegetation community for at-risk species.

Piñon-Juniper Woodland Standards (FW-VEG-PJO-S)

1 On non-grassland soils in the piñon-juniper woodland vegetation community, seral grasslands created by previous vegetation treatments shall be managed toward restoration of piñon-juniper woodland vegetation community desired conditions, unless they are in a Grassland Maintenance Management Area.

Piñon-Juniper Woodland Guidelines (FW-VEG-PJO-G)

1 Treatments in the piñon-juniper woodland vegetation community should leave key habitat features (i.e., roosting trees, snags, partially dead or dying trees, large trees, or downed logs) and single or small groups of medium to large native trees that are widely spaced, with expanses of herbaceous vegetation and coarse woody debris, to provide for soil productivity, traditional uses (e.g., piñon nut gathering), and wildlife needs, such as foraging habitat for at-risk species, migratory birds, and other piñon-juniper obligate species.

2 Treatments in the piñon-juniper woodland vegetation community should avoid creating a sharp, well-defined edge between dense woodlands and recovered shrublands, to provide foraging habitat of at-risk species.

3 Grassland soil inclusions (Mollisols) should be managed towards montane and subalpine grasslands vegetation community desired conditions, to protect soil function and provide forage.

4 If slash is scattered, it should be at a height that still allows big game movement.

At-risk Species for Piñon-Juniper Woodland

- American peregrine falcon
- Pinyon jay
- Pale Townsend’s big-eared bat
- Spotted bat
- Chaco milkvetch
- Chama blazing star
- Pagosa milkvetch
- Ripley’s milkvetch
- Tufted sand verbena (Canjilon Ranger District)

Related Plan Content for Piñon-Juniper Woodland

Watersheds and Water, Wildlife, Fish, and Plants, Nonnative Invasive Species, Grassland Maintenance Management Area

Piñon-Juniper Sagebrush (VEG-PJS)

Piñon-juniper sagebrush is a transitional vegetation community, spanning conditions between wetter, higher elevation (piñon-juniper woodland vegetation community) and the lower elevation sagebrush

shrubland vegetation community. The piñon-juniper sagebrush vegetation community occurs on over 217,000 acres of the Carson, between 5,900 and 7,500 feet. It is found on every ranger district. The two-needle piñon pine and Rocky Mountain juniper overstory is open, with trees occurring as individuals or in small, often even-aged clumps. Some Utah juniper is found in the southern Tres Piedras and El Rito Ranger Districts. Cover in the understory is between 6 and 25 percent big sagebrush, with a limited herbaceous layer concentrated in canopy openings. Blue grama and sideoats grama are common grass species.

Piñon pine and juniper are highly valued by local forest-dependent communities for fuelwood, building materials, and pine nuts (cultural and provisioning ecosystem services). Openings provide forage for livestock and wildlife (cultural and provisioning ecosystem services). Recent bark beetle induced piñon pine mortality was greatest at lower elevations and on drier sites, the same areas that favor the piñon-juniper sagebrush over the piñon-juniper woodland vegetation community. Soil function has been degraded due to a lack of effective groundcover, less overall organic matter, and changes in species composition, resulting in altered soil stability and reduced nutrient cycling. The pinyon jay is dependent on piñon pine trees and nuts, and the piñon-juniper sagebrush community provides important habitat for game species including elk, deer, and bear.

Beginning in the 1940s through the 1980s, over 50,000 acres of ponderosa pine, piñon pine, and juniper trees and sagebrush were converted to grasslands. These conversions were accomplished by plowing, chaining, dozer piling, tree crushing, and hand clearing with chainsaws, then seeding to grass (mostly crested wheat). The primary purpose of these conversion areas was to increase available forage for wild and livestock grazing. Some lands that have the potential to support the piñon-juniper sagebrush vegetation community are still being managed instead for forage production. Those areas are identified as Grassland Maintenance Management Areas, and are managed toward the desired conditions defined for that management area.

Piñon-Juniper Sagebrush Desired Conditions (FW-VEG-PJS-DC)

1 Desired seral stage proportions for the piñon-juniper sagebrush vegetation community at the landscape scale:

Class	Description	Proportion (%)
Early	Non-tree: Recently burned, grass, forb, & shrub types	10
Mid-Open	Seedling/sapling and open canopy small trees	25
Mid-Closed	Medium to large trees, open canopy	35
Late-Open	Small trees, closed canopy	20
Late-Closed	Medium to large trees, closed canopy	10

Landscape Scale (1,000 acres or greater)

2 The piñon-juniper sagebrush vegetation community is a mix of trees and shrubs that occurs as a series of vegetation states that move from herbaceous-dominated to shrub-dominated to tree-dominated over time. Trees occur as individuals or in smaller groups ranging from young to old across the landscape. Typically groups are even-aged. Piñon pine trees are occasionally absent but one or more juniper species is always present.

3 The understory is dominated by moderate to high density shrubs depending on successional stage. The shrub component consists of sagebrush or a mix of sagebrush and other shrub species, which are well-distributed. Shrub canopy is typically closed during the later successional stages. Litter and rock compose the greatest proportion of groundcover. Native grasses and forbs are sparse due to shrub dominance.

4 Biological soil crusts are present and improve nutrient cycling and stabilize soils, especially on sandier soils.

5 Native grass and forb cover are adequate, based on site capability, to protect and enrich soils, as well as provide for ungulate grazing.

6 Fires are typically infrequent (fire return intervals of 80-100+ years) and mixed severity (fire regime III). Stand replacing fire may occur at longer intervals.

7 Old growth structure occurs throughout the landscape, generally in small areas as individual old growth components or as clumps of old growth. Snags and old trees with dead limbs or tops are scattered across the landscape. Large deadwood is present.

8 Older, declining, infested, or diseased trees are a component that provide a source of snags and coarse woody debris and are well-distributed throughout the landscape. There are an average of 6 snags per acre, and coarse woody debris averages 4 tons per acre.

Mid-Scale (10-1,000 acres)

9 Snags and old trees with dead limbs/tops are scattered, with snags 8 inches and above (diameter at root collar) averaging 6 snags per acre, while snags 18 inches and above average 1 snag per acre. Coarse woody debris averages about 4 tons per acre.

10 The understory is dominated by moderate to high density shrubs with a closed shrub canopy in later successional stages.

11 Where historically occurring, Gambel oak thickets with various diameter stems and low growing, shrubby oak are present. These thickets provide forage, cover, and habitat for species that depend on them, such as small mammals, feeding or nesting birds, deer, and elk. Gambel oak mast (acorns) provides food for wildlife species (e.g. black bear and small mammals). The distribution and abundance of oak balances wildfire hazard fuels reduction and tree regeneration with wildlife habitat, grazing conditions, age class diversity, and soil condition.

12 In the wildland-urban interface the density of snags, coarse woody debris, live trees, and Gambel oak may be lower than in the rest of the vegetation community to reduce fire intensity and assist in the control of fire. Trees may be younger and more widely spaced, and disturbances (e.g., prescribed fire and vegetation treatments) may occur more frequently than in areas outside of the wildland-urban interface. Crown base heights may be higher than in non-wildland-urban interface areas to reduce the potential for fire spreading to the tree canopy.

Fine Scale (10 acres or less)

13 Trees occur as individuals or in smaller groups ranging from young to old. Typically groups are even-aged. The patch size of woodlands ranges from 1 to 10s of acres, and occasionally includes patches of even-aged woodland structure, based upon disturbance events and regeneration establishment.

14 Piñon pine trees are occasionally absent, but one or more juniper species is always present.

15 Small fires may occur more frequently at the fine-scale, burning single trees or small patches, but usually not spreading through shrubs, perennial grasses, and forb groundcover (fire regime III, return interval 35-200 years).

16 Rocky features, outcrops of gypseous or limy sandstones, volcanic substrate soils, and Mancos Shale soils provide habitat within the capacity of the vegetation community for at-risk species.

Piñon-Juniper Sagebrush Standards (FW-VEG-PJS-S)

1 On non-grassland soils in the piñon-juniper sagebrush community, seral grasslands created by previous vegetation treatments shall be managed toward restoration of piñon-juniper sagebrush desired conditions unless they are in a Grassland Maintenance Management Area.

Piñon-Juniper Sagebrush Guidelines (FW-VEG-PJS-G)

1 Vegetation community inclusions with Mollisol soils should be managed toward montane and subalpine grassland desired conditions, to protect soil function and provide forage.

2 If slash is scattered, it should be at a height that still allows big game movement.

3 Treatments in the piñon-juniper sagebrush vegetation community should avoid creating a sharp, well-defined edge between dense woodlands and recovered shrublands, to provide foraging habitat of at-risk species.

4 Treatments in the piñon-juniper sagebrush vegetation community should leave key habitat features (i.e., roosting trees, snags, partially dead or dying trees, large trees, or downed logs) and single or small groups of medium to large native trees that are widely spaced, with expanses of shrubs and coarse woody debris, to provide for soil productivity, traditional uses (e.g., piñon nut gathering), and wildlife needs, such as foraging habitat for at-risk species, migratory birds, and other piñon-juniper obligate species.

At-risk Species for Piñon-Juniper Sagebrush

- American peregrine falcon
- Pinyon jay
- Spotted bat
- Chama blazing star (Canjilon and El Rito Ranger Districts)
- Ripley’s milkvetch (Tres Piedras, Questa, and Camino Real Ranger Districts)

- Tufted sand verbena (Canjilon Ranger District)

Related Plan Content for Piñon-Juniper Sagebrush

Watersheds and Water, Wildlife, Fish, and Plants, Nonnative Invasive Species, Grassland Maintenance Management Area

Sagebrush (VEG-SAGE)

The sagebrush vegetation community only occurs in significant amounts on the Jicarilla Ranger District and the southern portion of the Tres Piedras Ranger District. It covers 59,144 acres on the Carson, but is common on the lower elevation land adjacent to the Carson. Many communities that were historically grasslands have been invaded by sagebrush shrubs, both on and outside the Carson. Sagebrush in northern New Mexico is at the southern edge of its range, and temperature and available moisture limit the amount of grass cover in the understory. Big sagebrush is the dominant species in this vegetation community, with less than 10 percent tree cover and few other shrub species present. Grama grass species occur sparsely. Historically, fires burned as frequently as every 35 years and maintained both treeless shrub states and large grass dominated interspaces.

Although sagebrush is a common species on the landscape surrounding the Carson, its range has shifted as trees encroach on shrublands and shrubs encroach on grasslands. The sagebrush vegetation community is defined by climate and soils that historically favored sagebrush over either trees or grasslands. SAGE on the Carson, particularly on the Tres Piedras Ranger District, has uniquely low departure in the context landscape. The Carson plays a significant role in the sustainability of the sagebrush vegetation community in the broader landscape and may provide an important refuge for dependent organisms. A majority of soils in the sagebrush vegetation community are in unsatisfactory condition, altering soil stability and reducing nutrient cycling. A lack of effective vegetation groundcover contributes to this soil condition, and also provides less forage for livestock and lower quality habitat for wildlife. The sagebrush vegetation community is important for the western burrowing owl, the black-footed ferret, and Gunnison's prairie dog. Sagebrush is collected for medicinal and ceremonial purposes (a cultural ecosystem service).

Sagebrush Desired Conditions (FW-VEG-SAGE-DC)

1 Desired seral stage proportions for the sagebrush vegetation community at the landscape scale:

Class	Description	Proportion (%)
Early	Recently burned, all herb types	15
Late-Closed	Shrub, closed canopy	30
Late-Open	Shrub, open canopy	55
Tree	All tree types; *contemporary landscapes only*	0

2 The composition, structure, and function of biotic and abiotic components of the sagebrush vegetation community are within or moving toward reference conditions. The majority of sagebrush is in mid-seral or mature states.

3 Shrub cover and the distribution of large contiguous shrub patches meet the needs of a variety of sagebrush obligate wildlife species, as described in these desired conditions.

4 A vigorous, though not necessarily dense, understory community of native grasses and forbs is present.

5 Biological soil crusts are present and improve nutrient cycling and stabilize soils, especially on sandier soils.

6 Single trees or groups of trees cover less than 10 percent of any sagebrush vegetation community terrestrial ecosystem unit polygon and less than 5 percent of the vegetation community as a whole.

7 Shrub cover is 20 to 50 percent of any sagebrush vegetation community terrestrial ecosystem unit polygon.

8 Stand replacing fires burn every 35-200 years (fire regime III).

9 Soil condition, as defined by basic soil functions (e.g., stability, soil hydrology, and nutrient cycling), has the capacity to support the diversity of associated species and at-risk species.

At-risk Species for Sagebrush

- Black-footed ferret
- American peregrine falcon
- Western burrowing owl
- Gunnison's prairie dog
- Spotted bat
- Ripley's milkvetch (Tres Piedras, Questa, and Camino Real Ranger Districts)
- Tufted sand verbena (Canjilon Ranger District)

Management Approaches for Sagebrush

1. Consider vegetation management activities in the sagebrush vegetation community (e.g., chemical application, mowing, disking, and burning), to enhance shrubland diversity, distribution, and productivity to support wildlife.

Related Plan Content for Sagebrush

Watersheds and Water, Wildlife, Fish, and Plants, Nonnative Invasive Species