Defenders of Wildlife
The Wilderness Society
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Rio Grande National Forest
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Via e-mail: rgnf_forest_plan@fs.fed.us

December 29, 2017

Dear Rio Grande National Forest Planning Team,

Please accept the following comments on the Rio Grande National Forest Draft Plan and Environmental Impact Statement (DEIS) as a supplement to a comment letter our organizations (along with several other organizations) submitted on December 22, 2017. This letter covers additional topics including ecological integrity, species at risk, and the transportation system.

Thank you for your work on this forest plan and commitment to this remarkable national forest. We look forward to the next steps in the plan revision process.

With regards,

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Providing for Sustainability in the Revised Land Management Plan

I. Ecological Sustainability and Diversity of Animal and Plant Communities

A primary goal of the forest plan is to protect and restore terrestrial and aquatic ecosystems and watersheds (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 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.

A. Legal and Regulatory Framework

1. Meeting the Diversity Requirement under the National Forest Management Act

The National Forest Management Act (NFMA) requires that forest plans "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)). Court interpretations of the statutory requirement include a ruling that the NFMA diversity mandate not only imposes a substantive standard on the Forest Service, it "confirms the Forest Service's duty to protect [all] wildlife" (Seattle Audubon Society v. Moseley, 1489). Courts have also recognized that the Forest Service's "statutory duty clearly requires protection of the entire biological community" (Sierra Club v. Espy, 364).

The Forest Service has interpreted the diversity requirement of NFMA through the development of the 2012 Planning Rule. It 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.

The RGNF draft plan's approach to providing for the maintenance of ecosystem integrity and recovery, conservation, and viability of individual species associated with those systems relies heavily on coarse filter desired conditions. Very few at-risk species-specific plan components are presented,

which indicates that the Forest is highly confident that coarse filter components will provide for at-risk species recovery, conservation, and viability. Such as approach sets a very high bar for the coarse filter components in that they must meet the conservation needs of all at-risk species affiliated with the systems of interest.

Throughout the draft plan, it is not always clear which at-risk species are being provided for via the coarse filter components. 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.

It is important to appropriately frame the purpose of a forest plan under the planning rule. The draft plan states, "The adaptive management domain created a process to increase the responsiveness of forest managers to changing conditions on the landscape, changes in higher level direction, and developing technologies" (Draft Plan at 6). It is true that the planning pule framework "creates a responsive planning process" that "allows the Forest Service to adapt to changing conditions" (36 CFR 219.6(a)) (emphasis added). 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 CFR 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 BASI, both of which explicitly do not apply to projects (36 CFR 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.

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). Monitoring programs are required, but are not plan components and cannot be used in lieu of plan components to meet diversity requirements.

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). This content is needed for "plan components" to provide necessary ecological conditions for at-risk species, because 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.

The following comments are based on our interpretation of the plan and its structural flaws.

2. Meeting National Environmental Policy Act Requirements

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. The effects analysis needs to be more than a subjective, qualitative and comparative analysis. The National Environmental Policy Act (NEPA) process and EIS must meet several conditions, including but not limited to the following:

- NEPA requires that significant issues be analyzed in depth in an EIS (40 CFR § 1501.7(a)(2)). This means effects on threatened, endangered, proposed or candidate species and species of conservation concern must be evaluated and disclosed in the EIS.

- The 2012 Planning Rule requires the responsible official to use and document the best available scientific information (BASI) to inform the planning process (36 CFR 219.3). The responsible official "shall document how the best available scientific information was used to inform the assessment, the plan decision, and the monitoring program as required in §§ 219.6(a)(3) and 219.14(a)(4)," by explaining how "the information was applied to the issues considered." 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 EIS (40 CFR 1508.24).

- The EIS must properly cite the plan components as the basis for its effects analysis. Only plan components have effects. It is fundamental that the EIS properly characterize what the plan components say. 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 what the actual plan components are that have the asserted effects. NEPA documentation must show how *specific* plan components affect *each* ecological condition needed by at-risk species.

- The effects analysis must 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. Does the analysis include a determination of the likelihood of desired conditions being achieved, and analyze the most likely outcomes even if those are not 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.

- The EIS must properly account for the effects of wildfire, fire suppression, salvage logging, and other ecosystem drivers and stressors.

- The EIS cannot use a relative comparison of alternatives without showing the actual effects on ecological conditions. NEPA requires effects of alternatives to be presented in a "comparative form." A narrative description does not facilitate comparison, and a relative comparison of alternatives by itself is usually 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.

- The EIS must consider the adverse effects of plan components that are included in the plan to promote non-wildlife uses, as well as those that are intended to benefit wildlife. Forest plans must integrate management for all multiple uses; NFMA requires "one integrated plan." That means that plan components must not be mutually exclusive. However, they can sometimes work at cross-purposes, and it is important that the effects analysis take into account plan components that are not favorable to at-risk species as well as those that are.

The analyses in the RGNF'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 plan, adopted in 1996, and the proposed action. 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. For example, the RGNF's wildlife overviews[1] referenced in the DEIS and provided on the Forest's website, include several maps with modeled habitat for many at-risk species. The DEIS did not make use of these data to quantify the contrasting areal extent of at-risk wildlife habitat occurring in the different areas under the different alternatives. 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 Purpose and Need statement in the DEIS (at iii) should also indicate that there is a need to illustrate how the revised plan corrects the deficiencies of the current land and resource management plan from 1996. There is a need to incorporate plan direction to contribute to the recovery of threatened and endangered species.

There are numerous problems we see in the DEIS that we demonstrate below. We believe these problems are significant enough to warrant a supplemental EIS.

B. Comments on Ecosystems and Associated At-risk Species

The DEIS states, "Most species are expected to be maintained by plan components (desired conditions, objectives, standards, guidelines, and suitability of lands) that provide for broad ecosystem integrity and ecosystem diversity" (DEIS at 191). The plan relies heavily on desired conditions to meet rule requirements. One basic premise of programmatic effects analysis is that if the plan components do not prevent an effect from occurring, the EIS must disclose the possibility of that effect occurring, and may also discuss the likelihood of it occurring. Thus, the absence of mandatory plan components to limit effects should result in a greater likelihood of effects.

In addition, the establishment of desired conditions does not by itself lead to a conclusion that they must occur. The effects analysis must disclose the uncertainty associated with these aspects of plan components. (For example, the Flathead National Forest DEIS included modeled projections of vegetative conditions that revealed desired conditions that were not likely to be accomplished.) The uncertainty created by vague and indeterminate desired conditions must be recognized in the effects analysis.

The effects analysis does not 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 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). The EIS should consider whether there are other plan components, especially standards and guidelines, that contribute to achieving the desired conditions.

[1] https://www.fs.usda.gov/detail/riogrande/landmanagement/projects/?cid=fseprd479410.

The DEIS presents a somewhat confusing Analysis and Methods discussion starting on page 192 pertaining to how the DEIS addresses wildlife and plants. In its description of methods for analysis, the DEIS (at 192) states,

> This analysis evaluates the effectiveness of the alternatives to provide direction to create the ecological conditions necessary to contribute to the recovery of federally listed threatened and endangered species, the conservation of proposed and candidate species, the maintenance of viable populations for species of conservation concern …

The DEIS provides no analysis of the effectiveness of plan components. Moreover, it is not sufficient to use a relative approach to evaluating alternatives. For example, the assertion that "The potential watershed impacts of alternative B represent a relative midpoint among alternatives" does not comply with NEPA (DEIS at 178). The DEIS needs to assess the likelihood of impacts given a specific plan directive. NEPA requires effects of alternatives to be presented in a "comparative form." A narrative description does not facilitate comparison, and a relative comparison of alternatives by itself is usually inadequate to satisfy NEPA requirements.

The Analysis and Methods section states (DEIS at 192),

> This analysis compares the current abundance and condition of various habitats with ecological reference conditions (natural range of variation) based on the dynamic nature of ecosystems, recognizing they are not static (Landres et al. 1999).

This statement requires some clarification. Is "habitats" synonymous with "ecosystems"? We are not finding abundance figures associated with these various habitats.

The DEIS (at 194) states that the analysis includes:

- reviewing plan components that have potential to influence habitat conditions, thereby influencing the ecological conditions that would support species persistence,
- evaluating the proposed magnitude of change in the management approach by alternative and potential consequences from the management approach, …

The analysis does neither of these things.

To determine that the plan will provide the necessary conditions for the target species, the EIS must document the ecological conditions needed by each target species. The information in the EIS should line up with the information provided in the Assessment. We believe the EIS could do a more systematic job of presenting 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. Appendix D of the draft plan claims that the wildlife

overviews, provided on the RGNF website,[2] overview, "ecological conditions necessary for the recovery of federally listed threatened and endangered species, conservation of proposed and candidate species, and maintenance of a viable populations of species of conservation concern" (Draft Plan at 168). The overviews do not provide this information.

The Ninth Circuit established the basic analytical requirements for evaluating species viability at the project level in The Lands Council v. McNair, 537 F.3d 981 (9th Cir. 2008) based on the 1982 regulatory requirement for viability:

> … the Forest Service must support its conclusions that a project meets the requirements of the NFMA and relevant Forest Plan with studies that the agency, in its expertise, deems reliable. The Forest Service must explain the conclusions it has drawn from its chosen methodology, and the reasons it considers the underlying evidence to be reliable.
>
> … when the Forest Service decides, in its expertise, that habitat is a reliable proxy for species' viability in a particular case, the Forest Service nevertheless must both describe the quantity and quality of habitat that is necessary to sustain the viability of the species in question and explain its methodology for measuring this habitat.

There is no language in 2012 Planning Rule that should lead to a different outcome, and there is no reason to expect that the principles inherent in this holding would not apply at the plan level as well. The EIS must provide a thorough discussion of what ecological conditions are necessary for each at-risk species, and an objective determination of effects of plan alternatives in terms of how well they provide these conditions.

Although the analytical methods are unclear regarding how the Forest will make viability determinations, the Forest appears to be attempting to use a "proxy on proxy on proxy" approach to addressing viability in this case, where an ecological condition is analyzed to determine the effects on habitat for a group of species, which is used to determine effects on habitat for an individual species, which is then ostensibly used to determine viability of the species population. This involves establishing major assumptions about the relationships of individual species populations to their habitat, and of those habitat requirements to the groupings used in the analysis. The best available scientific information used as a basis for these assumptions must be documented.

It is very difficult to follow the SCC analysis in the DEIS and there appears to be no assessment that supports a conclusion that necessary ecological conditions will be provided (either via coarse filter components or species specific). The current condition of the various ecological conditions is summarized (DEIS at 246-249). And then, beginning on p. 250 effects are presented by management activity, but there is no evaluation of effects to the necessary ecological conditions by activity. It appears that these effects are generalized to all SCCs. The results of this analysis are very

[2] https://www.fs.usda.gov/detail/riogrande/landmanagement/projects/?cid=fseprd534370.

lacking and cannot support conclusions about viability. No specific plan components are evaluated. And then, in the cumulative effects section (DEIS at 253) we see some discussion of effects to actual ecological conditions, but this analysis is clearly not intended to support viability determinations (for example for Willow Thickets and Cottonwood Galleries the DEIS simply states that "the cumulative effects on species of conservation concern are not expected to increase beyond current trends" (DEIS at 254). We find this analysis to be totally insufficient.

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.

Please provide clear information for each at-risk species that explains 1) what ecological conditions the species needs to persist in the planning area; 2) whether (and if possible how much of) those conditions would occur in the plan area and a rationale that is based on plan components and their effects.

1. Forested Ecosystems and Associated At-risk Species

We have several concerns about some overarching themes in the draft plan regarding the management of forest ecosystems that occur on the RGNF and how these themes are translated into plan components and are addressed in the DEIS. Some of these concerns include:

- Mixed messages and conflicted plan direction regarding wildfire suppression and desired conditions for wildfire. The Purpose and Need statement in the DEIS (DEIS at iii) states there is a, "need to shift fire management direction focused on suppression to use fire for resource benefit." Yet, Revision Topic 2 includes the statement, "The need to reduce the risk of a stand-replacing wildfire in beetle-killed forest is at the forefront for both Forest managers and the surrounding communities" (DEIS at 18). The draft plan, by characterizing wildfire as simultaneously desirable and undesirable for example, has some inconsistency regarding fire proposed direction.

- Several plan components that pertain to forest ecosystems are not consistent with best available science and other information presented in the *Rio Grande National Forest – Assessment 1 and 3: Ecosystem Integrity, Systems Drivers and Stressors for Terrestrial Ecosystems* (Terrestrial Assessment) and DEIS.

- The forest ecosystems identified in plan documents vary in reference conditions for structure, composition, and function and how habitat connectivity can be restored or maintained based on these variations. However, several plan components do not sufficiently differentiate management direction for the ecosystems in a way that recognizes this variation. The planning rule requires that integrity be pursued for each ecosystem within the plan area; lumping ecosystems for planning purposes so that integrity is not achieved would violate the planning rule.

- There are no specific plan components aimed at restoring or maintaining habitat connectivity across forest ecosystems.

- Salvage logging in areas affected by the spruce beetle outbreak enabled by the plan seems to be uninformed by the BASI.

- There is no direction related to maintaining or restoring ecosystem conditions to maintain the viability of plants that are potential SCC.

- The analysis of direct, indirect, and cumulative effects of draft plan direction on at-risk species is inadequate to enable effects determinations.

Based on the *Rio Grande National Forest Assessment 5: Identifying and Assessing At-risk Species* (Assessment Report 5) (at 53-67, Table 4), the following at-risk species are associated with forested ecosystems on the RGNF.

Threatened and Endangered Species
Canada lynx (threatened): spruce-fir, lodgepole pine
Mexican spotted owl (threatened): mixed conifer

Proposed and Candidate Species
Wolverine (proposed): spruce-fir

Potential Species of Conservation Concern
Western Bumblebee: habitat generalist
Boreal Owl: spruce-fir, mixed-conifer, aspen
Flammulated Owl: mixed-conifer, aspen, ponderosa pine
Olive-sided Flycatcher: spruce-fir
Peregrine Falcon: multiple forest types
American Marten: spruce-fir, lodgepole
Fringed Myotis: multiple forest types
Black Canyon Gilia: spruce-fir
Ripley's Milkvetch: ponderosa pine

Northern Moonwort: spruce-fir
Slender Rock-brake: conifer forest
Mountain Bladder Fern: spruce-fir
Smith's Draba: spruce-fir, aspen
Colorado Tansy-aster: conifer
Arizona Willow: spruce-fir
King's campion: spruce-fir
Sphagnum Bog-moss: spruce-fir
Rothrock's Townsend Daisy: ponderosa pine

It is not clear from the draft plan which species are associated with these various forest ecosystems, and in some cases, the ecosystems listed as being associated with species don't match up to the ecosystem types identified in between Assessment 5 and the Terrestrial Assessment. For example, lodgepole pine was lumped in with spruce-fir for the purpose of the vegetation modeling conducted for the Terrestrial Assessment, and ponderosa pine has been mixed in with mixed-conifer.

The RGNF selected the following characteristics for assessing conditions of all terrestrial ecosystem types on the forest (Terrestrial Assessment at 3):

- Diversity of vegetation – amount and distribution of vegetation structural stages
- Landscape Disturbances and Patterns
- Connectivity and Human-caused Fragmentation
- Late successional habitats
- Snags and down woody material

Assessment Report 5, the RGNF wildlife overviews,[3] and additional BASI provided information on some key characteristics necessary for species persistence, ecosystem stressors, and other threats.

A Sampling of Key Characteristics for Forest Associated At-risk Species

Key Ecosystem Characteristics	**Wolverine** (spruce-fir, alpine)	**American Marten** (spruce-fir, lodgepole)	**Canada Lynx** (spruce-fir, lodgepole)	**Boreal Owl** (Spruce-fir, spruce-fir-aspen)	**Olive-sided Flycatcher** (spruce-fir, mixed conifer, ponderosa)
Snags and/or live trees		9 snags/ac at >16 in dbh		Large trees, snags (9 snags/ac, min: 13 in, ave: 25 in dbh); large aspen	Use both live trees and snags
Down wood		47 logs/ac at >16 in diameter	Dense understory (lynx denning & SSH* forage)		

[3] https://www.fs.usda.gov/detail/riogrande/landmanagement/projects/?cid=fseprd534370.

			SSH: 143 stems/ac at <3 in, 60 stems/ac at > 4 in		
Succession stage		Late-succession, old growth	Mature for lynx, with mature for SSH in spruce-fir (but early-seral lodgepole)	Late-succession, old growth (>23% old forest at 5,000 ac scale)	Early, post-disturbance (e.g., mod-, high-severity fire)
Tree density		135 trees/ac at >8 in dbh	High densities of live Engelmann spruce and subalpine fir	Ave: 23 trees/ac at >15 in dbh	
Openings		<25-30% of home range (males: 15 mi^2, females: 6 mi^2 approx.)	<300 ft		Avoid closed canopy, prefer openings
Nest/den sites		6.3 squirrel middens/ac	Steep, north-facing slopes; close to foraging habitat	Woodpecker- or flicker- excavated cavities (Engelmann spruce)	Live, coniferous tree branches
Prey	Small mammals	Squirrels and other small mammals	Snowshoe hare, red squirrel	Voles and other small mammals and birds	insects
Composition	snow	Spruce-fir, riparian-willow	Spruce-fir, aspen, riparian-willow	Spruce-fir near meadows	Conifer, riparian
Connectivity	Large, connected snow patches	Large, contiguous forested areas (<330 ft between patches)	Large, contiguous forested areas (<300 ft between patches)		

*SSH (snowshoe hare)

American marten references: RGNF undated, *Martes Americana*; Hargis et al. 1999; Powell et al. 2003; Buskirk and Powell 1994; Buskirk and Ruggiero 1994; Buskirk and Zielinski 1997; Ruggiero et al. 1998.

Boreal owl references: RGNF undated, *Aegolius funereus*; Ryder et al. 1987; Hayward et al. 1987, 1993; Hayward 1994; Herren et al. 1996.

Canada lynx: Kohler 1990; Koehler and Brittell 1990; Ruggiero et al. 1994; Aubrey et al. 2000; Ruediger et. al. 2000; Shenk 2009; Ivan 2011; Squires et al. 2016.

Olive-sided flycatcher: Hutto and Young 1999. Kotliar et al. 2007.

North American wolverine: RGNF undated, *Gulo gulo luscus*.

A Sampling of Key Characteristics for Forest Associated At-risk Species (Continued)

Key Ecosystem Characteristics	**Flammulated Owl** (mixed conifer, ponderosa)	**Mexican Spotted Owl** (mixed conifer, ponderosa)	**Northern Goshawk** (spruce-fir, aspen, lodgepole, mixed conifer, ponderosa)	**Fringed Myotis** (ponderosa, non-forest)	**Northern Pocket Gopher** (ponderosa, non-forest)

Snags and/or live trees	Large snags, large aspen		large aspen	Abundant snags for roosting	
Down wood					
Succession stage	mature	Successional diversity	Mature, >40% closure	mature	
Tree density					
Openings	open	Open habitat for foraging			
Nest/den sites			Cavities (secondary)	Caves, mines, abandoned bldgs..	
Prey	insects	Small mammals, herps		Beetles, moths, varied	Forbs, other plants
Composition		Douglas-fir, southwestern white pine, limber pine, canyons			
Connectivity					
Nearby water				High quality	

Flammulated owl: (RGNF undated, (*Psiloscops (=Otus) flammeolus*)
Mexican spotted owl: RGNF undated, *Strix occidentalis lucida*)
Northern goshawk: (RGNF undated, *Accipiter gentilis*)
Fringed myotis: (RGNF undated, *Myotis thysanodes*)
Northern pocket gopher: (RGNF undated, *Thomomys talpoides agrestis*)

Ecosystem Stressors and Threats to Forest Associated At-risk Species

Stressors and Threats	**WOLV**	**AMMA**	**CALY**	**BOOW**	**OSFL**	**FLOW**	**MESO**	**NOGO**	**FRMY**	**NOPG**
Timber harvest		X		X		X	X	X	X	
Vegetation management				X	X	X	X	X		X
Wildlife fire				X		X	X		X	
Fire suppression					X	X	X	X	X	
Beetle disturbance		X	X						X	
Recreation	X		X	X		X	X		X	X
Nest/roost disturbance				X		X	X	X	X	
Climate change	X								X	
Roads	X									X
Energy										
Chemicals									X	X
Livestock grazing							X	X		

Wolverine (WOLV), American Marten (AMMA), Canada Lynx (CALY), Boreal Owl (BOOW), Olive-sided Flycatcher (OSFL), Flammulated Owl (FLOW), Mexican Spotted Owl (MESO), Northern Goshawk (NOGO), Fringed Myotis (FRMY), Northern Pocket Gopher (NOPG)

a) Comments on Plan Components for Forested Ecosystems and Associated At-risk Species

We examined the following plan components relevant to at-risk species associated with the RGNF's forested ecosystems. See Appendix 1: Canada Lynx Comments.

Vegetation Management

> ***DC-VEG-1:*** *Timber harvest prescriptions should identify distribution of coarse woody debris and snags, as well as live green replacement trees for future snags. The minimum requirements for adequate wildlife habitat and ecosystem function are shown in Table 5. …*

In Table 5 (Draft Plan at 37), we note the bracketed detail under the title of the table, "Quantities are based on an average per acre basis across the planning unit," (emphasis added). What "planning unit" means must be specified. Does this mean across the plan area, the entire Forest or project area or different unit or scale? Desired distributions must be in the plan and should be applicable to project implementation. We disagree with some of the snag targets in Table 5. See the table above for snag requirements of at-risk species associated with the Forest. See Appendix 2: Snags and Downed Wood Targets.

> ***DC-VEG-2:*** *Vegetation management strategies are consistent with historical succession and disturbance regimes where possible and consistent with other land management objectives. (General Forest Geographic Area, Specially Designated Geographic Area)*

There must be a desired condition for historical succession and disturbance regimes. The following questions must be answered to develop a desired condition (DC) or multiple DCs that meet rule requirements. What *are* the DCs for the disturbance factors, which are described in Terrestrial Assessment, that occur on the forest regardless of vegetation management strategies? What is the NRV for each disturbance process for the identified ecosystems? The plan must develop DCs for disturbances that address the variation in the identified ecosystems. Succession and disturbance regimes are different for spruce-fir and dry mixed conifer forest types, for example. What are the "vegetation management strategies" referred to in this DC? Does "vegetation management" necessarily mean active management? What are the "other land management objectives" referenced by this DC; are these specific objectives in the draft plan or other objectives?

This provision is not described in terms specific enough to allow progress toward its achievement. The statement reads more like a guideline. We recommend "consistent with" be replaced by

"maintain or restore" to reflect planning rule language and to establish that natural succession and disturbance based on NRV is desirable.

> ***DC-VEG-3:*** *Vegetation management occurs on lands identified as not suitable for timber production, for other multiple-use purposes, and these areas have an irregular, unscheduled timber harvest program. These harvests meet management direction and desired conditions for these areas and may provide services and benefits to people. (General Forest Geographic Area, Roadless Geographic Area, Specially Designated Geographic Area)*

The purpose of this DC is not clear. The text, "irregular, unscheduled timber harvest program" deviates from the rule (see 219.11(c)). Harvest activities must meet plan direction.

> ***DC-VEG-4:*** *In spruce-fir forests where the mature forest canopy has reached 60 percent or more mortality from bark beetles, remaining mature and late-successional forest patches that are expected to remain green or mostly green during the life of the plan are retained where they are considered integral to ecosystem or species habitat-related goals. (General Forest Geographic Area, Specially Designated Geographic Area)*

We agree that plan components to retain green trees must be included in the plan. This DC requires some revision. It is written like a standard, and standards and/or guidelines should be included in the plan to support implementing this direction at the project-level. We recommend that this be a forestwide DC. What are the "species habitat-related goals"? List them or reference where these exist in the plan. We are guessing that this DC is pertinent to Canada lynx, maybe marten, and possibly others, and this should be clarified in plan documents and referenced in the DC. What is the BASI rationale for the 60 percent threshold? What are the conditions where green or mostly green patches would be "considered integral"? The statement leaves too much uncertainty.

> ***DC-VEG-5:*** *Late-successional/old-forest conditions (see Appendix A) are maintained or enhanced to provide ecological conditions necessary to maintain viable populations of at-risk species. (General Forest Geographic Area, Specially Designated Geographic Area)*

This DC must describe the necessary conditions to sustain the at-risk species, and those species must be articulated. The conditions must be measurable, and based on the BASI. Appendix A is over 25 years old, and contains an important note on the first page of the report on the Forest Service's webpage to which the report is linked (https://www.fs.fed.us/rm/pubs_series/rm/gtr/rm_gtr213.pdf), which states,

> This is a legacy archive publication from the former Intermountain Research Station (INT) or Rocky Mountain Forest and Range Experimental Station (RM). The content may not reflect current scientific knowledge, policies, or practices.

The statement indicates that the old growth criteria listed in the report may not reflect BASI. The RGNF must justify and document why this report is considered the BASI and not newer

information, given the added caveat to the report. This report includes 22 chapters; from which chapter(s) did Appendix A's recommendations come from?

Additionally, the set of information the Forest is using related to late-successional/old forest conditions is confusing and contradictory. Appendix A does not seem to be informing the Table 6 in the draft plan (Draft Plan at 39), which provides desired condition ranges for "old forest" for different forest ecosystem types. The Terrestrial Assessment (at 35) found that for dry mixed conifer forest current late successional habitat (proportionately at 30 percent) is 25 percent less than historic conditions (proportionally at 41 percent). However, the draft plan indicates the desired condition for warm-dry mixed conifer "old forest" is 15-20 percent (Draft Plan at 39, Table 6). According to the Terrestrial Assessment (at 35), the current proportion of spruce-fir is 13 percent and historic proportion was 46 percent, yet the desired condition in Table 6 of the draft plan is set at 25-35 percent. The draft plan does not indicate the data source for Table 6. What accounts for this significant discrepancy? What *is* the condition of this characteristic on the Forest? If our interpretation of this information is incorrect, the plan must include clarification regarding what this information means. Based on this situation, it's impossible to see how the RGNF would develop a desired condition or a set of desired conditions that comply with the BASI requirements of the planning rule.

Including a DC for old forest conditions is necessary for species such as the northern goshawk, but the plan must also include related standards and guidelines to assure that a DC or DCs are compliant with the planning rule and can be met. For example, standards should be written that assure, for example, that criteria for retaining: old trees and large trees, etc. The plan must be specific about what spatial scale these criteria apply.

> ***DC-VEG-8:*** *All development stages of the forested terrestrial ecosystems are well represented at the landscape scale and occur Forestwide within the ranges identified in Table 6. (Forestwide)*

Table 6 (Draft Plan at 39) displays the RGNF's determination regarding how these systems are departed from NRV based on structural stage. For example, spruce-fir is showing an over-representation of young forest and under-representation of mature-closed forest and warm-dry mixed conifer is showing and over-representation of mature-closed forest and under-representation of young forest. These ecosystem types should have their own sets of plan components, including DCs for structure at various ecological scales (i.e. landscape, patch, and stand), in order to provide sufficient specificity regarding how diversity is to be achieved. We are concerned that the structural stages on Table 6 do not account for the periodicity of natural disturbance processes, and indicate a need for an overly rigid management regime.

How does the DC (and OBJ-VEG-1) apply specifically to the spruce-fir ecosystem? The DEIS indicates that the "abundance" of young forest vs mid- and mature-closed forest in the spruce-fir ecosystem is undesirable (DEIS at 87-88). In spruce-fir forest, how does the RGNF propose to

bring structural conditions back in line with its approach to NRV analysis and the interpretation of results?

The management implications of Table 6 (Draft Plan at 39) and vegetation management changes to the proposed plan do not square with conclusions from the Terrestrial Assessment (at 18) and statements in the DEIS (at 72-73), which acknowledge the difficulty in determining whether the spruce-fir ecosystem is outside NRV based on structural stage proportions. The Terrestrial Assessment and DEIS also acknowledge the lack of scientific consensus noted on page 18 of the Terrestrial Assessment between peer-reviewed published science and the results of the vegetation modeling the RGNF commissioned. Of particular importance is that the model did not include large beetle outbreaks that may be within NRV (an also included the lodgepole pine). The issue is captured in this statement in the Terrestrial Assessment (at 18):

> This result is not necessarily in agreement with the published literature. The modelling of historic conditions included moderate spruce beetle outbreaks, but did not include the rare, extreme spruce beetle outbreaks like the one the Rio Grande National Forest is currently experiencing. Literature (Eager et al. 2012, Romme et al. 2009) indicates that in these spruce-fir forests, spruce beetles generally persist in low-level, widespread populations that have little effect on forest structure, but that they periodically have very large outbreaks, where the "beetles may kill millions of mature pine or spruce trees over areas of thousands of hectares." Since the modelling did not include these large, explosive outbreaks, the spruce-fir forests may not be nearly as departed from the natural range of variation as the modelling suggests.

The Terrestrial Assessment (at 18) indicates that the spruce-fir ecosystem will trend toward recovery. It's not clear whether the recovery trajectory is inclusive of vegetation management activities under the current plan or under a limited or no management scenario. The Terrestrial Assessment (at 18) states,

> Future projections for the spruce-fir forest ecosystem generally show a trajectory of recovery toward the natural range of variation conditions over time. The current overabundance of grass/shrub conditions largely disappears in the first 20 years of projections, and open conifer forests are mostly replaced by mid- and closed cover forests over the first century of projections. Aspen stands increased in short-term and mid-term projections. Longer-term projections, however, show a decline of aspen stands to levels roughly 10 percent lower than under the natural range of variation, mostly due to lower levels of wildfire under contemporary conditions due to fire suppression.

An active management approach does not necessarily follow from a situation where structural conditions are out of alignment with reference conditions. Given the beetle outbreak, vegetation management in this ecosystem should only be undertaken with extreme caution and with a clear

justification based on BASI. We believe the RGNF has not sufficiently documented the BASI upon which its making planning decisions for this ecosystem. This is essential to protect the habitat of at-risk species and meet the at-risk species requirements of the planning rule.

> ***DC-VEG-9:*** *When salvaging timber following wildfire, retain tall snags for snag-associated species and snag location in the riparian management zone. (Forestwide)*

This provision is not described in a way to allow an assessment of progress toward its achievement during monitoring. It is not clear if this DC applies to riparian management zone only or to other areas and ecosystems of the forest. This DC is written like a standard, and it should be a standard because it provides a constraint on activities, e.g., vegetation management, that impacts necessary snag elements of forest ecosystems. See Appendix 2: Snag and Downed Wood Targets and Appendix 3: Salvage Logging Impacts.

> ***OBJ-VEG-1:*** *Diversify the structure class distribution for various forest types via management on 100 acres annually in the first decade and 1,200 acres in the second decade, to work toward or maintain the desired conditions in Table 6, above. (General Forest Geographic Area, Specially Designated Geographic Area)*

Does 100 acres annually apply to all forest types combined or does this mean 100 or 1,200 acres for each forest type, e.g. spruce-fir and/or mixed conifer?

> ***OBJ-VEG-2:*** *Annually restore 150–300 acres of dry mixed-conifer and ponderosa pine areas to move these forest types toward a species composition and landscape pattern where fire can function in its natural role. (General Forest Geographic Area)*

There must be a DC for species composition and landscape pattern the is linked to the objective.

> ***OBJ-VEG-3:*** *Annually, for the first decade, salvage harvest about 3,000 acres per year of spruce-fir to provide for economic sustainability within the region. (General Forest Geographic Area)*

There must be a DC for species composition and landscape pattern the is linked to the objective.

> ***OBJ-VEG-5:*** *Annually, for the second decade of the plan, offer commercial timber and other products for sale at an average annual potential wood sale quantity of 15,600 CCF. (General Forest Geographic Area)*

The objective must be linked to a specific DC.

> ***S-VEG-1:*** *Timber may not be harvested for the purpose of timber production on lands not suited for timber production. Timber harvest may occur on these lands for the following purposes: protecting other multiple-use values, protecting or enhancing biodiversity or wildlife habitat, scenic-resource management, research or*

administrative studies consistent with geographic or management area direction, and salvage, sanitation, public health, or safety. (General Forest Geographic Area)

There needs to be independent plan direction for those values in non-suited lands in order to guide these harvest activities. The plan must describe and define these values, habitat, etc. This statement does not provide any direction.

S-VEG-4: *Select harvest systems to achieve desired conditions and objectives or to meet site-specific project needs, not primarily for the greatest dollar return or timber output. (General Forest Geographic Area)*

This standard is too vague to provide clear direction to project planners. It offers almost complete discretion to project managers and provides no actual constraint(s) on management activities.

S-VEG-5: *Clearcutting may be used where it has been determined to be the optimum method, and other types of even-aged harvest shall be used only where determined to be appropriate. Determinations shall be based on site-specific conditions and the desired conditions for vegetation, wildlife habitat, scenery, and other resources. (General Forest Geographic Area)*

This is not written in a way that complies plan direction for standards in the planning rule. The plan requires a desired condition linked to this standard. The set of plan components pertaining to clearcutting should: define "optimum method," describe the conditions for which clearcutting would be appropriate, and references the "desired conditions for vegetation, wildlife habitat, scenery, and other resources" so the linkages are clear. The DEIS must address the potential conflicts between clearcutting and other uses, including at-risk wildlife and plan recovery and viability.

S-VEG-6: *Openings will not be created larger than 40 acres, regardless of forest type. Openings larger than 40 acres may be created when one of the following is true:*

- *Proposals for larger openings have been approved by the regional forester, following a 60-day public review,*
- *Larger openings are the result of natural catastrophic conditions (including those resulting from fire, insect or disease attack, or windstorm), or*
- *When the area that is cut does not meet the definition of created openings. (General Forest Geographic Area)*

We are guessing that this standard is meant to protect wildlife habitat. Is this correct? Please be specific about the intent. In bullet 3, what is the definition of "created openings." The bullet point is confusing and requires clarification.

G-VEG-1: *Even-aged stands shall generally have reached or surpassed culmination of mean annual increment (achieving 95 percent of culmination of mean annual increment, as measured by cubic volume) prior to regeneration harvest, unless the following conditions have been identified during project development:*

a) *When such harvesting would modify fire behavior to protect identified resource, social or economic values*
b) *When harvesting of stands will trend landscapes toward desired conditions*
c) *When harvest uses uneven-aged silvicultural systems, thinning, or other intermediate stand treatments that do not regenerate even-aged or two-aged stands*
d) *When harvest is for sanitation or salvage of timber stands that have been substantially damaged by fire, wind-throw, or other catastrophe or that are in imminent danger from insect or disease attack*
e) *When harvest is on lands not suited for timber production and the type and frequency of harvest is due to the need to protect or restore multiple use values other than timber production. (General Forest Geographic Area)*

To operationalize this guideline, there would need to be a desired condition for fire behavior. There must be a DC linked with point d). Point e) allows for clearcutting outside of suitable lands, and there is a need to define the condition for "protecting and restoring multiple use values," which the current plan does not adequately do. The intention of point c) is unclear.

Wildlife and Plants

The following draft plan components relate to key characteristics regarding "connectivity and human-caused fragmentation."

> ***DC-WLDF-3:*** *Sufficient habitat connectivity is present in each vegetation type to facilitate species movement within and between daily home ranges, for seasonal movements, for genetic interchange among species (including Canada lynx and others), and for long-distance movements across boundaries. (Forestwide)*

"Sufficient" is a subjective term that provides no direction if it is not defined. What are the specific ecosystem conditions required by at-risk species for which habitat connectivity is an essential requirement, such as lynx and American marten. See table above.

> ***DC-WLDF-7:*** *Wood legacies, including snag components, occur in adequate numbers, distribution, and patterns to contribute to landscape connectivity, particularly in spruce-fir forests highly influenced by spruce beetle outside of developed recreation sites. (Forestwide)*

"Adequate" is a subjective term that provides no direction if it is not defined. It is not clear where, among plan documents, the information about the current and desired distribution and patterns of wood legacies or snag components exists; without this, there is no way to achieve such a desired condition.

> ***DC-WLDF-10:*** *Where possible, retain public ownership of wildlife travelways adjacent to public highways, or where public lands are identified as a key component in maintaining the integrity of seasonal movements by wildlife. (Forestwide)*

Be specific about the direction for identifying lands "as a key component in maintaining the integrity of seasonal movements by wildlife."

> ***DC-WLDF-11:*** *Maintain habitat components of size, quality, and spatial extent necessary on the landscape to provide for connectivity of movement between seasonal habitats (i.e., wildlife travelways) as identified and mapped by Colorado Parks and Wildlife or other science-based partners (e.g., Colorado Natural Heritage Program). (Forestwide)*

This DC indicates that the information from Colorado Parks and Wildlife and the Colorado Natural Heritage Program exists now. It should have been included in assessment reports to inform the plan revision to develop more precise desired conditions. It should be used now for further development of the revised plan.

Fire

The following draft plan components relate to key characteristics regarding "landscape disturbances and patterns."

> ***DC-FIRE-1:*** *Major vegetation types reflect little or no departure from historic natural range of variation of fire frequency and intensity (e.g., reflects Fire Regime Condition Class 1). (Forestwide)*

In Terrestrial Assessment (at 25), historic reference conditions for fire are provided for "annual acres burned" and "fire return interval" (which are given in specific values not ranges). The Terrestrial Assessment does not indicate the BASI sources for the reference numbers. There is no information at all about NRV for fire severity by forest type. It's not clear how this DC will be met.

> ***S-FIRE-1:*** *All unplanned human-caused ignitions will be suppressed in the safest and most effective manner possible. (General Forest Geographic Area, Specially Designated Geographic Area)*

There is no justification in the plan documents for suppressing all human-caused fire ignitions, especially given that current vs. historic conditions are showing a fire deficit. There may be a rationale for the standard; the plan should be clear about it.

b) Comments on the DEIS for Forested Ecosystems and Associated At-risk Species

We found the effects analysis related to forested ecosystems and associated at-risk species consistent with problematic patterns found throughout the DEIS. For example, the analysis presents no accounting of effects of 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 conflicting findings, providing documentation that explains which information is considered the BASI is essential. It's not always clear the assessment findings are driving decisions, and the DEIS must document when and why this is justified. The effects analysis related to forested ecosystems fails to assess effects from livestock grazing, mining, energy development, climate change, roads, and possibly other sources of effects influenced by draft plan proposed management direction, and these could have significant adverse effects; this is a deficiency. The assessment of impacts from recreation is insufficient.

The DEIS states, "Resistance and resilience of vegetation are important concepts as they relate to integrity and sustainability of the ecosystem in the face of future uncertainties" and then goes on the use a definition of resilience provided by Holling (1973) (DEIS at 62). The planning directives include a definition for resilience (FSH 1909.12, Ch. Zero Code, 05):

> Resilience. The ability of an ecosystem and its component parts to absorb, or recover from the effects of disturbances through preservation, restoration, or improvement of its essential structures and functions and redundancy of ecological patterns across the landscape.

What is the justification for the RGNF choosing an alternative definition? This is one of the many ways the draft plan deviates from the planning rule and directives that we find perplexing.

This section is organized similarly to the DEIS that assesses impacts to selected key characteristics and then, later in the DEIS, at-risk species.

Diversity of Vegetation

The Forest has not consistently used the same classifications for ecosystem types, and this is confusing. We appreciate the crosswalk (DEIS at 67, Table 22) but we're concerned that the different units of analysis have resulted in multiple findings that are difficult to interpret. The vegetation modeling presented in the RGNF's Terrestrial Assessment, for example, lumped ponderosa pine with mixed conifer forest and lodgepole pine with spruce-fir while the draft plan and DEIS differentiates these ecosystems in its analysis of vegetation diversity. And different ranges of variation for key characteristics and different conditions based on these different ranges have made following the DEIS analysis difficult. We recognize that the Forest has acknowledged this (DEIS at 72).

The draft plan components and plan alternatives based on geographic and management areas enable a significant amount of diversifying forest structure through logging and other active vegetation treatments, and the BASI does not fully support this. Given the scientific uncertainties, especially related to the spruce beetle outbreak, we urge precaution and an analysis of an alternative that

proposes plan components that offer a clear passive, low, or limited vegetation management approach.

In assessing the direct and indirect effects of the alternatives on vegetation diversity, the Forest has made determinations about current conditions and desired conditions based on NRV information that it acknowledges cannot be substantiated empirically. Based on the management proposals in the DEIS (at 88-91), it appears as though the DEIS is making particular decisions about the types of management to be applied in the different ecosystems when the plan should be proposing this direction instead.

Late Successional and Old Growth Forest

The plan documents must clearly document the BASI that supports the desired conditions presented in Table 27 (DEIS at 74). Several pages later, the DEIS (at 93) states,

> One important distinction among alternatives is the criteria used to define old forest. Alternative A defines old forest from Mehl (1992). This definition was general and not customized for the somewhat harsher and slower-growing conditions on the Forest. This definition was used as a starting point. The criteria were also changed so that most, but not all, of the characteristics need to be present for an area to be called old forest. Historically, although many old forest characteristics might be present, in most cases one of the characteristics was not present or was less than the amount needed for the area to be called old forest. The updated version of the old forest definition allows for more flexibility in determining old forest and allows areas with most, but not all, of the old forest criteria to be called old forest. The criteria used to define old forest is available in Appendix A for the draft forest plan.

However, the same report that provided the Mehl (1992) paper cited above was used to develop the criteria in Appendix A of the draft plan. As we asked above, what is the specific source that support the new criteria? It seems that the information in Appendix A in the draft plan comes from the 1992 General Technical Report RM-213. This is not new information. Given that it is such an important source for decisionmaking, it should have been included in the initial assessment evaluations.

The DEIS provides no analysis of the impacts of salvage logging, fire management, potential energy development, and other factors that may affect old growth conditions based on the proposed direction.

Snags and Downed Woody Material

The DEIS notes of the draft plan's snag and downed wood desired conditions other plan direction, "These recommendations would meet the need to provide sustainable wildlife habitat and ecosystem

function" (DEIS at 95). None of the plan documents identify the at-risk species to which the desired conditions are targeted. Do they meet the needs of the snag and downed wood dependent species associated with the RGNF? We believe they don't. See the snag requirements for the American marten in the table above, for example. See Appendix 2: Snag and Downed Wood Targets. As we stated above, the draft plan and DEIS must define what "planning unit" means in the case of snags and downed wood (see DEIS at 96). The "planning unit" scale, versus the "project area" scale, may not provide for sufficient snag distribution across the forest. The DEIS (at 96) also states, "The presence, abundance, and distribution of long lasting, large-diameter snags depends entirely on the presence, abundance, and distribution of species and size classes of trees across the landscape in varied ecosystem types." The Forest offers no rationale for the change in scale, and the EIS must do this and compare the effects of each alternative.

Landscape Disturbances and Patterns – Insects and Disease

We have not been able to locate any science in the plan documents that supports the management activities listed in the DEIS on page 79. Their use, under the draft plan, apparently won't be governed by plan components, and this is problematic. The DEIS (at 99) states,

> Thinning treatments and sanitation harvests may provide an opportunity to prevent or reduce insect and disease outbreaks by reducing the density of trees, removing diseased and high risk trees, and increasing diversity. The removal of suppressed or dying trees would increase the overall growth and vigor of the remaining stand, which would decrease the susceptibility of those trees to many insects and diseases.

Again, we cannot find any sources of BASI that support this assertion among planning documents. And the effects analysis related to insects and disease does not distinguish between forest ecosystem types to enable an understanding of the different impacts of divergent types of management (or no active management) on the different forest types.

The DEIS and additional plan documents have explained that the science cannot provide certainty regarding whether or not the spruce beetle outbreak has pushed the spruce-fir forest type outside of NRV. The Forest acknowledges that tree stress and mortality from insect and disease is natural and important for maintaining the ecological integrity of forested systems. Despite this, the DEIS seems to be making the assumption that not actively managing forest systems puts them at "risk,"

> Alternatives that increase the amount, extent, or tree density of mature development stages would generally increase the risk of insect outbreaks or widespread disease. As a result of lower management rates, alternative D would have a greater likelihood of an increased amount and extent of mature, dense forest, and would therefore result in a slightly greater risk for insect outbreaks, or widespread disease, than other alternatives. (DEIS at 99) (emphasis added)

Does this mean at risk mean at risk of losing resilience or something else? This needs to be clear. Perhaps the statement should use the term "probability" instead of "risk." Regardless, the analysis of effects is inadequate.

Landscape Disturbances and Patterns – Timber Harvest

The DEIS (at 100) states,

> Action alternatives reduce the minimum stocking levels for ponderosa pine and Douglas fir from alternative A. The lower density values are more aligned with the natural range of variation for these species and increase resilience to stressors such as climate change, insects, and diseases. Silvicultural systems by cover type were also expanded in alternatives B, C, and D. Other plan components that are applicable to the action alternatives are contained in the Rio Grande National Forest Draft Revised Land Management Plan. All alternatives include guidance that should produce conditions similar to those that occurred under natural disturbance regimes …

The analysis is based on an assumptive leap not supported by BASI in the planning documents. The analysis suffers from the other similar problems discussed elsewhere (e.g., no assessment of the effects of plan components).

See Appendix 4: Timber Suitability Analysis Issues.

Climate Change

The draft plan provides no direction for climate change adaptation and no analysis of climate change effects in the DEIS. See Appendix 5: Planning for Climate Change.

At-risk Species

The comment regarding the DEIS analysis of effects to at-risk species apply to species associated with forested ecosystems. The DEIS provides no analysis of proposed plan components on forest-associated at-risk species. There are no analyses of the effects of proposed management direction on any of the key characteristics or "ecological conditions and features" that are specific to individual at-risk species. The conditions and features associated with forest associate species include:

- Large trees and snags, late-successional forests
- Large aspen trees
- Snags

There are no analyses of the effects of habitat stressors and threats (DEIS at 250-254). The DEIS is deficient with regard to assessing plan impacts to at-risk species.

Regarding the Canada lynx, the Forest is using outdated Lynx Analysis Unit (LAU) baselines, which are from 2011 and have not been updated since the spruce beetle outbreak. The revised plan must incorporate new LAU analyses and the DEIS must conduct an effects analysis based on this new information. Additionally, the Forest must incorporate updated results from the Squires et al. study described in Appendix 1: Canada Lynx Comments.

Literature Cited in this Section

See Appendix 6: Literature Cited in the Forested Ecosystems Comment Section.

2. Aquatic and Riparian Ecosystems, Watersheds and Associated At-risk Species

a) Comments on Plan Components for Aquatic and Associated Riparian Ecosystems, Watersheds and related At-risk Species

We appreciate the Goal 1: "Protect and restore watershed health, water resources, aquatic ecosystems, and the systems that rely on them" (Draft Plan at 3) but question whether the Forest meant to state that the goal is to protect watersheds, water and aquatic systems, and the species that rely on them. The concept of protecting systems in order to protect the systems that depend on those systems is confusing to us because it leads the reader to think there are ecosystems nested within ecosystems. We do note that the Forest chose not to follow the aquatic ecosystem classification structure offered in the Assessment; this choice probably deserves an explanation and discussion on the implications for ecosystem integrity.

Fisheries

The plan components are intended to provide ecological conditions necessary for the persistence of Rio Grande cutthroat trout (RGCT), Rio Grande chub (RGC), and Rio Grande sucker (RGS). Both the Rio Grande chub and Rio Grande sucker have been petitioned for listing under the ESA with a positive 90-day finding (and the Forest would be wise to develop plan direction that meets requirements for "recovery" under the planning rule to avoid a future amendment in the event one of both of those species is listed under the ESA). A determination not to list the RGCT was "based primarily on ongoing conservation activities including those by the Rio Grande Cutthroat Conservation Team" (DEIS at 166). (Highlighting the fact that those activities should be codified in the forest plan to meet legal requirements to provide for viability.)

DC-FISH-1: *Populations of native and desired nonnative fish and other aquatic species are distributed, or are expanding into previously occupied habitat, with interconnectivity among and within metapopulations. The amount, distribution, and characteristics of life-stage habitats are suitable to maintain or reach viable populations of native and desired nonnative species. Habitat conditions are not a primary factor in listing species under the Endangered Species Act or adding species to the species of conservation concern list.*

The plan must provide a list of "desired nonnative fish and other aquatic species." The Assessment for Ecosystem Integrity, Systems Drivers and Stressors for Aquatic Ecosystems (Aquatic Assessment) informs us that ~680 miles of rivers and streams in the Forest are occupied by nonnative trout, and that non-trout species also occupy and negatively affect aquatic systems. The Assessment states that the presence of these species is one of the "driving concerns" for aquatic ecosystem dysfunctionality (Aquatic Ecosystem Assessment at 12). The threat of nonnative trout to the viability of RGCT is documented within the conservation strategy for that species. The DEIS states that "While nonnative fish such as brook and rainbow trout are desirable in many locations, there are places where they are not" (DEIS at 170). The plan should articulate desired conditions separately for native and nonnative fish so that the DEIS can evaluate impacts to native fish to support a determination that rule requirements for viability are met. The plan should also determine specific areas where nonnative fish are not desirable.

In addition, the plan should clearly state, "with enough detail so that the condition of on-the-ground achievement is clear and progress toward their achievement can be measured or evaluated" (FSH 1909.12_22.11), the desired interconnected distribution of native fish; as written the public, as well as implementation teams, cannot discern what is to be done to implement this desired condition. Similarly, we are not able to discern what the Forest means by "suitable" "life-stage habitats." The purpose of desired conditions for ecological conditions that are necessary to provide for viable populations of at-risk species is to describe in measurable terms those habitat conditions. Under this phrasing, "suitable" habitat for viability will be determined outside of the forest planning process, which clearly does not meet planning rule/NFMA requirements.

DC-FISH-2: *Aquatic populations during critical life stages are distributed and abundant.*

We are not sure what the target populations are for this component. Is this referring to all populations, including nonnative populations? What are the critical life stages for the target populations? Is there a desired condition for distribution, or only that the population is simply "distributed" in any manner? How will abundance be measured so that progress toward achievement can be measured/evaluated?

DC-FISH-3: *Healthy aquatic habitat provides for sustainable fish populations for recreational and cultural significance.*

The term "healthy" used in this context may be desirable but is not measurable. Please provide an explanation of how this parameter will be measured/evaluated. Similarly, please provide an explanation of how sustainable fish populations will be measured/evaluated. Also, please provide information on which fish populations (native/nonnative) are the target for this desired condition.

> ***DC-FISH-4:*** *Fish populations have adequate habitat and water quality to thrive in lakes and streams on the Forest. Natural fish habitat is preferred and promoted over human-made habitat.*

Please provide an explanation of how "adequate" habitat and water quality will be measured/evaluated. Also, please provide an explanation of how a fish population's ability "thrive" will be measured/evaluated. Also, please provide an explanation of what it means to "prefer and promote" natural fish habitat within a forest planning and implementation context. Does this mean that certain areas will be avoided and/or targeted in project implementation?

> ***DC-FISH-5:*** *Habitat for native and desired nonnative fish species is not fragmented by the design and implementation of management actions.*

This component offers some conservation value in preventing the fragmentation of habitat for native fish who likely require that condition for viability, but should be a standard or a guideline in order to contribute to meeting rule requirements.

> ***OBJ-FISH-1:*** *Restore connectivity in currently fragmented habitat where the risk of genetic contamination, predation, or competition from undesired nonnative fish species is not a concern by completing 10 fish connectivity projects (combination of removing 10 barriers and/or replacing 10 aquatic organism passage structures" over the life of this plan. Prioritize improvements to existing culverts, bridges, and stream crossings identified for fish passage based on the Rio Grande cutthroat trout conservation strategy and Rio Grande chub and Rio Grande sucker conservation strategy as applicable.*

Please provide more information on areas where the risk of genetic contamination, predation, or competition from undesired nonnative fish species is not a concern, or criteria for identifying these areas. Conversely, it is imperative that the plan articulate areas where these risks are present, presuming that these are risks to native fish viability. Regarding the RGCT conservation strategy, we did not find projects that had a scheduled year of completion later than 2016, indicating that the strategy may not capture future (life of the plan) priority improvements; this can be one of the downsides in relying on outside conservation planning documents to support forest planning and implementation.

> ***OBJ-FISH-2:*** *Take action to maintain or restore structure, composition, or function of habitat for fisheries and other aquatic species along 30 to 50 miles of stream total over a 10-year period, with a focus on larger individual stream segments when possible (i.e. 3 to 5 miles annually).*

The purpose of a plan objective is to make progress toward attaining desired conditions; in some cases, those desired conditions will also be conditions that are necessary for the recovery, conservation or viability of at-risk species/populations. Therefore, for OBJ-FISH-2 and other similar objectives, there must be measurable desired conditions for habitat structure, composition and function, which, with connectivity, comprise the four dimensions of ecological integrity. The aquatic assessment reminds us that "Aquatic ecosystem integrity is a requirement…measured by (1) whether or not the dominant characteristics of the ecosystem (stream flow, timing, water quality, water quantity, stream temperature, sedimentation, etc.) are within" the natural range of variability "and (2) can stay within that range as each ecosystem is influenced by stressors such as climate change, as well as developments and uses of the forest" (Aquatic Assessment at 1). To accomplish this requirement the forest plan must include the necessary direction, and the EIS must provide analysis that allows for a determination that requirements are being met. The Assessment provided ten key characteristics of aquatic ecosystem integrity; for some reason, the plan appears to be ignoring that relevant information and not specifying conditions needed for aquatic system integrity and fish viability. The DEIS fails to demonstrate how this approach to planning will meet rule requirements for integrity and viability (more comments on the DEIS below).

> ***S-FISH-1:*** *When authorizing new surface diversion in fish-bearing waters, provide upstream and downstream passage designed for all fish species that are threatened, endangered, or sensitive, and for species of conservation concern, and if needed include either fish screens or other means to prevent fish entrapment/entrainment.*

> ***G-FISH-1:*** *New surface diversions in intermittent and perennial streams should provide passage and habitat for native and desired nonnative aquatic species. Flows in intermittent and perennial non-fish-bearing waters that are adequate for fish to pass would also be sufficient for other aquatic species to pass.*

To effectively implement this guideline and rely on it to establish compliance with rule requirements it will be necessary to have a desired condition for habitat and flows.

> ***G-FISH-2:*** *Habitat should be determined for aquatic threatened, endangered and sensitive species, and for species of conservation concern, within or near the planning area. Surveys to determine presence should be conducted for those species with suitable habitat.*

It seems that activities implementing the plan that could affect potential yet undetermined habitat should not be allowed to proceed until this requirement has been met; otherwise how can the Forest determine that population viability requirements are being met?

> ***G-FISH-3:*** *Construct perennial stream crossings and aquatic organism passages to allow natural streamflow, and bidirectional movement of adult and juvenile fish and other aquatic species.*

To effectively implement this guideline and rely on it to establish compliance with rule requirements it will be necessary to have a desired condition for "natural streamflow."

Groundwater-Dependent Ecosystems

DC-GDE-1: *Fens are identified and continue to accumulate peat and provide habitat for species of conservation concern, including:*

- Little grapefern,
- Mud sedge,
- Colorado woodrush, and
- Spiny-spore quillwort.

G-GDE-1: *Protect the functions and services of groundwater-dependent ecosystems, including fens. Provide special emphasis to large-size fens, unusual kinds of fens (such as iron fens and calcareous fens), and fens in especially pristine condition – along with the hydrologic features influencing them.*

G-GDE-2: *Design projects to avoid impacting the function or ecological services of fens. Rehabilitate and restore damaged fen resources and the ecological conditions that sustain them.*

Fens are unique and irreplaceable wetland types (DEIS at 80) that are known to be threatened by management activities including roads and trails, motorized use, and livestock grazing. It is not likely that the plan direction above will provide for the integrity of fens and other GDEs nor the species that depend on them for persistence. A more compliant forest plan would articulate measurable desired conditions for the "functions and services" of GDEs, so that those conditions could be protected, rehabilitated and restored. A desired condition for fens in the "especially pristine" condition should be established so that that condition can be maintained.

The DEIS fails to effectively analyze the effects of the forest plan on GDEs. The DEIS acknowledges that management activities have the ability to impact these resources, including system roads and trails, "uncontrolled" motorized use, and livestock grazing (DEIS at 186). The reader is then informed that alternative D would likely have the "fewest impacts" on these resources and that alternative C would likely have the "greatest impacts." The reader has no idea whether the draft plan direction will provide for the ecological integrity of these system types, nor the viability of the species dependent on them.

The discussion of grazing impacts to GDEs within the DEIS is particularly interesting. First, the Aquatic Assessment found that while most wetlands on the Forest are in excellent to good condition, the integrity of low elevation seeps and springs frequently used for livestock and/or wildlife troughs was considered low due to water diversions, trampling, and other impacts, most often in drier areas (Aquatic Assessment at 4). Based on this information, clearly there is a need for the forest plan to include plan direction to 1) maintain excellent/good condition in areas with that

condition and 2) protect and restore integrity to low elevation seeps and springs threatened by water diversions, trampling etc.

The DEIS then notes that

> Livestock grazing can have, and has had, an influence on overall health of low-elevation riparian systems, including seeps and springs. As noted previously, the amount of suitable rangeland remains the same in all alternatives. *No change to livestock grazing is anticipated; therefore, this impact to low-elevation riparian systems would continue.* (DEIS at 102)

The DEIS further confuses this analysis by stating that "The (livestock grazing) impacts described above are typically avoided through proper rangeland management, which entails the application of the standards, guidelines, and management approaches detailed in this forest plan revision, along with a variety of other tools" (DEIS at 187).

We are confused. The Assessment provides information that indicates that low elevation aquatic systems have low integrity due to management threats. The DEIS provides information that those threats will continue, but that they can be avoided with the application of the forest plan components. Can the Forest please provide information in the EIS that states which plan components are addressing the condition noted in the Assessment, whether the negative effects are likely to continue or not, and whether the plan is likely to provide for ecological integrity of aquatic ecosystems and viability of associated species of conservation concern?

Riparian Management Zones (RMZ)

Requirements for riparian areas are described in 219.8(a)(3) of the planning rule. The ecological integrity of riparian areas must be maintained or restored, including plan components to maintain or restore the structure, function, composition and connectivity of riparian areas. In addition, widths must be established for RMZs within which the components apply. "Plan components must ensure that no management practices causing detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment that seriously and adversely affect water conditions or fish habitat shall be permitted within the riparian management zones or the site-specific delineated riparian areas."

> ***DC-RMZ-1:*** *Riparian areas are healthy, fully functioning ecosystems. Vegetation consists of desirable native species and age classes. Populations of riparian vegetation are diverse, vigorous, and self-perpetuating. Invasive species, including plants and animals, in riparian and wetland ecosystems are rare. There is sufficient vegetative cover to provide bank stability, trap and retain sediment, regulate temperature, and contribute to floodplain function. Riparian ecosystem composition, structure and function can generally be restored and enhanced by beaver habitat.*

"Healthy" is not particularly useful in this case, as we question how it will be measured/evaluated. Please note the desirable native species and the desired condition for age classes. Please provide more information so that the public can measure/evaluate progress towards "diverse" and "vigorous" conditions (we don't question that those are the appropriate conditions, and believe there are means to evaluate diversity and vigor within plant communities). Please provide more information on how the Forest intends to evaluate "sufficient vegetative cover." There need to be measurable desired conditions for riparian composition, structure and function, likely employing key characteristics that were presented within the Assessment.

DC-RMZ-2: *Aquatic ecosystems, riparian ecosystems, and watersheds exhibit high ecological integrity.*

This is essentially a rule requirement and does not add value to this forest planning process.

DC-RMZ-3: *Hydraulic regimes of riparian and wetland ecosystems contribute to appropriate channel and floodplain development, maintenance, and function.*

Please provide a measurable desired condition for hydraulic regimes and define "appropriate channel and floodplain development, maintenance and function" – we don't know what the Forest means by appropriate.

DC-RMZ-4: *Riparian and wetland ecosystems are resilient and withstand disturbance from natural and management activities, including flood, fire, drought, changes in timing and frequency of weather events, recreation, and herbivory.*

This is an excellent goal statement: "Goals may be appropriate to describe a state between the current conditions and desired conditions but without specific amounts of indicators" (FSH 1909.12_22.16). Please describe the resilient condition in terms that the public is able to measure/evaluate. For management threats to resiliency, plan direction that abates the threat so that rule requirements are met will be necessary.

DC-RMZ-5: *Habitats sensitive to management activities, such as riparian management zone vegetation, meet the needs of resident amphibians, fish, and migratory birds.*

Please provide a measurable description of the ecological needs of the target species. For management threats to sensitive habitats, plan direction that abates the threat so that rule requirements are met will be necessary.

OBJ-RMZ-1: *Over the planning period, work with cooperators to prioritize and restore at least 300 acres of riparian and/or wetland areas.*

S-RMZ-1: *Management activities within the riparian management zones must maintain or restore the connectivity, composition, function, and structure of riparian and wetland areas over the long term.*

Without measurable desired conditions for RMZ structure, composition, function and connectivity, this standard cannot be effectively implemented and does not contribute to meeting rule requirements; you cannot enforce a standard to maintain or restore an undefined condition.

G-RMZ-1: *To maintain ecological integrity and connectivity, limit the construction of roads and infrastructure in the riparian management zone.*

Similar to the standard above, without a measurable condition for integrity, it is not possible evaluate or regulate the construction of roads and infrastructure in the RMZs. If a road is proposed in an RMZ, the Forest must have plan direction sufficient to form the basis for a decision.

G-RMZ-2: *Grazing and other management activities in the riparian management zone should provide healthy willow carrs, which can provide the structural nesting habitat requirements for riparian-associated birds.*

Again, the Forest must define the target structural condition (healthy willow carrs) in order to make this guideline meaningful; at present, it does not contribute to meeting rule requirements.

G-RMZ-3: *Grazing, grazing infrastructure, and other activities in the riparian management zone should prevent or minimize the introduction and spread of cowbirds in riparian willow systems.*

Watersheds

DC-WA-1: *Physical channel characteristics are in dynamic equilibrium and are commensurate with the natural ranges of discharge and sediment load provided to a stream. Streams have the most probable form and the expected native riparian vegetation composition within the valley landforms that they occupy; they function correctly without management intervention. Historically disturbed and degraded stream channels recover through floodplain development and establishment of riparian vegetation, and demonstrate stable channel geomorphic characteristics. Beaver reintroduction, and the persistence of beaver habitat, can contribute to channel recovery and floodplain function. Roads, trails, and impervious surfaces minimally affect hydrologic processes within watersheds.*

We do not understand how the condition of physical channel characteristics will be measured; what does "commensurate with the natural ranges of discharge and sediment load" mean? What IS the most probable form? What does correct function mean in this context? Please describe the Forest's interpretation of "minimal effects" to hydrologic processes.

DC-WA-2: *Aquatic systems and riparian habitats express physical integrity, including physical integrity of shorelines, banks, and bottom configurations, within their natural range of variation. Upland areas function properly and do not contribute to stream-channel degradation.*

We don't know how this condition will be evaluated. Here is our position on this issue: The Planning Rule requires that plan components provide ecological integrity (36 CFR 219.8(a), 36 CFR 219.9(a)(1)), and defines "ecological integrity" to occur when "dominant ecological characteristics (for example, composition, structure, function, connectivity and species composition and diversity) "occur within the natural range of variation" (36 CFR 219.19).When plan components simply repeat the requirement for NRV (or other requirements of the Planning Rule) it means that *someone implementing the plan has total discretion to determine what is needed for ecological integrity*. This violates the requirement in the Planning Rule that plan components do so, which is necessary because integrity is a landscape condition that cannot be determined on a project-by-project basis. Furthermore, the planning documentation, using the effects analysis within the EIS, must demonstrate that ecological integrity of each ecosystem is restored and maintained. This will require a determination of NRV and a comparison to the projected future conditions.

> ***DC-WA-3:*** *The sediment regime within water bodies is within the natural range of variation. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

See comment above.

> ***DC-WA-4:*** *Within the constraints of existing water rights decrees, the timing and magnitude of flood events is within the natural range of variation. Floodplains are accessible to water flow and sediment deposits. Overbank floods allow floodplain development and support healthy riparian and aquatic habitats. Floods also allow the propagation of flood-associated riparian plant and animal species.*

See comment above.

> ***DC-WA-6:*** *Aquifers maintain natural conditions of recharge, discharge, and groundwater quality, especially where they are important to surface features dependent on groundwater for their existence (including but not limited to caves, springs, seeps, lakes, riparian areas, wetland ecosystems, fens, and intermittent and perennial streams).*

Please define "natural conditions" so that they can be measured/evaluated. The use of the term "especially" is interesting because it implies that the plan direction will be implemented inconsistently (some aquifers that are less important may not move towards the desired condition).

> ***DC-WA-7:*** *Watersheds provide clean, safe water suitable for public consumption after adequate and appropriate water treatment.*

This sounds like a good goal statement. Does the Forest believe this is measurable, or is the assumption that we all know what "clean" and "safe" mean for planning purposes?

OBJ-WA-1: *Improve condition class on at least one identified priority watershed, as defined by the national Watershed Condition Framework, within 10 years of plan approval.*

The plan should have desired conditions for condition class to support implementation of this objective. The Watershed Condition Framework (WCF) is a useful tool to support forest planning for watershed integrity. Its indicators of ecological, hydrologic, and geomorphic condition should be used to develop forest plan components for watershed integrity, not just for the three priority watersheds identified in the plan.

OBJ-WA-2: *Over the planning period, conduct the necessary data collection to evaluate the need to move instream flow quantification points to the current Forest boundary.*

It would be helpful to understand the implications for watershed/ecosystem integrity planning and management under the current instream flow quantification scheme.

OBJ-WA-3: *Over the next 5 years, quantify minimum instream flows at new quantification points for stream reaches impacted by federal land acquisitions such as the Baca Tract.*

It would be helpful to understand the implications of not having this information for watershed/ecosystem integrity planning and management.

S-WA-1: *Incorporate project-specific best management practices described in FS 990A or as updated in land-use and project plans as a principle mechanism to maintain or restore water quality and meet desired watershed conditions.*

Please see our comment on this standard in a separate letter submitted by Defenders and other organizations.

G-WA-1: *Management activities should maintain or restore water quality to meet State of Colorado water quality standards. In watersheds where State of Colorado 303(d) listed impaired water bodies exist, management activities should assist in achieving State water quality standards.*

G-WA-2: *Management actions should not cause long-term degradation to water resources, including lakes, streams, wetlands, and groundwater. Particular attention should be paid to public water supplies, sole source aquifers, and source water protection areas.*

Please provide an explanation of what "long-term degradation" means in the context of rule requirements. Please provide an explanation of what the Forest means by "particular attention" (if these areas are to be treated differently than other areas, the Forest should produce specific direction for them.)

Species of Conservation Concern

The plan provides several plan components for aquatic/riparian associated species; presumably based on a determination that the ecological needs of those species will not be met via the coarse-filter components evaluated above. The plan and the EIS should provide the rationale as to why these components were necessary (and why additional plan components were not for other at-risk species).

> ***DC-SCC-2:*** *Habitat diversity along reaches or sections of perennial stream includes tall, undisturbed grass cover and large, woody riparian complexes. Livestock access is limited in these areas to protect habitat for small, at-risk mammal species, such as the New Mexico meadow jumping mouse. Habitat refugia is available for small mammals that are sensitive to management activities. (Forestwide)*

We appreciate the measurability of "undisturbed grass cover" and note that accompanying plan direction will be necessary to maintain that condition. The reference to "large, woody riparian complexes" should be further specified. If possible, the areas should be mapped or alternatively, defined using clear criteria to allow the public to understand where livestock access will be limited. Please list all of the target at-risk mammal species so that the public can determine whether their ecological needs are being met via this plan direction. "Habitat refugia" must be defined in measurable terms so that one can determine whether the needs of the target species are being met. Standards/guidelines should be in place to protect well defined habitat refugia areas; this decision cannot be postponed to project-level decisionmaking.

> ***S-SCC-2:*** *Avoid or mitigate impacts to boreal toad breeding sites and winter hibernacula within 100 feet from May 15 to September 30.*
>
> - *Consider management actions related to the protection and maintenance of potential summer movements of adult boreal toads away from the sites.*
> - *Ensure that sites are identified in the wildland fire decision support system to avoid exposure from retardant. (Forestwide)*

The plan component is somewhat difficult to interpret. It appears that a 100-foot seasonal buffer is placed around all breeding sites and winter hibernacula, but that activities will be allowed in those zones as long as impacts are "mitigated." More information is needed on how activities will be mitigated so that the ecological needs of boreal toads will be met; a standard barring activities is likely more effective. In addition, more information is required on how and when sites will be identified for protection. Merely "considering" management actions to protect boreal toad movement is not adequate to provide necessary conditions for persistence.

We also note that the DEIS makes the following statement concerning boreal toad:

> Some species that are not adequately assessed using the coarse-filter approach may require additional species-specific plan components, particularly to help in recovering federally recognized species or where it may not be possible to maintain ecological conditions that support viable populations of some at-risk species within the plan area. This need may also be associated with circumstances beyond the authority of the Forest Service or due to limitation in the inherent capability of the land. Examples include local species such as boreal toad… (DEIS at 191)

It appears that the Forest is declaring that it does not have the inherent capability and/or authority to maintain viable boreal toad populations. Please clarify if this is the finding. If it is, the Forest must meet the applicable requirements within 219.9(b)(2).

> ***G-TEPC-1:*** *Reduce impacts to the abundance and distribution of willows to maintain or improve the ecological integrity of riparian area and wetland ecosystems for southwestern willow flycatchers and other sensitive woody-riparian associated birds. (Forestwide)*

For this guideline to be effective there must be measurable desired conditions for the abundance and distribution of willows and riparian/wetland integrity (see comments above). The direction to "reduce impacts" is not likely to be effective at conserving southwestern willow flycatchers; it provides no assurance that impacts will be compatible with the ecological needs of the target species. Please list the other sensitive bird species that are intended to be protected by this direction.

> ***G-TEPC-3:*** *To limit impacts to Gunnison sage-grouse habitat:*
>
> - *Manage riparian areas and wet meadows to meet proper functioning condition while striving to attain reference state vegetation relative to the ecological site description. [second bullet]*

Apparently, the Forest determined that coarse-filter direction was insufficient to meet the ecological needs of Gunnison sage-grouse, yet this component does not add protection; it simply paraphrases rule requirements for ecosystem integrity. As written we do not understand the direction or how it will effectively conserve Gunnison sage-grouse habitat.

> ***G-TEPC-5:*** *Avoid impacts to the southwestern willow flycatcher in riparian willow stream reaches and reference sites where browse-related issues suggest a management concern. (Forestwide)*

The reader cannot determine the likely effectiveness of this direction. Presumably the Forest does not believe that coarse-filter components are adequate to contribute to the recovery of this species; we agree based on our analysis above. What are the necessary ecological conditions to contribute to the recovery of southwestern willow flycatcher? Apparently, some security from "browse-related issues" is necessary. We know the Forest contains suitable and potential habitat (DEIS at 224). The plan must describe those habitat conditions in measurable terms so that efforts to avoid habitat

degradation can be evaluated. Please provide more information on the areas where the "browse-related" issues suggest a concern.

> ***DC-WLDF-12:*** *Maintain dense, interior riparian willow habitat where needed for maintenance of suitable nesting habitat conditions for veery and other ground or low-level shrub-nesting riparian species. Avoid or limit activities that increase edge habitat and contribute to impacts from cowbird nest parasitism. (Forestwide)*

Please provide more information on the areas where this condition is needed. This component must describe the suitable nesting habitat conditions for the target species; including measurable parameters for edge.

> ***DC-NNIS-1:*** *Populations of aquatic and terrestrial nonnative invasive species do not occur or are low in abundance. Those that do occur do not disrupt ecosystem function. (Forestwide)*

Please describe or reference the location in the plan where the measurable conditions for "ecosystem function" are presented.

> ***G-NNIS-1:*** *To reduce and control aquatic nuisance species during wildland fire operations, as practicable, follow guidelines and best management practices put forward in Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations (National Wildfire Coordinating Group 2017). (Forestwide)*

Given the threat of aquatic invasive species to the integrity of aquatic systems and the persistence of aquatic at-risk species this component should specify the guidelines and BMPs; the Forest cannot rely on outside plan direction to provide the conditions necessary for integrity and persistence.

> ***MA-NNIS-2:*** *Coordinate with Colorado Parks and Wildlife staff to reduce the potential for introduction and/or control the spread of aquatic invasive species by recreational users of Forest waters by promoting effective prevention and control measures for aquatic nuisance species. (Forestwide)*

Please define "effective prevention and control measures" somewhere in the plan.

b) Comments on the DEIS for Aquatic and Riparian Ecosystems, Watersheds and related At-risk Species

<u>Aquatic Ecosystems</u>

The DEIS at 167 states,

> [N]early all land management direction implemented and described in this analysis has the potential to indirectly, adversely affect aquatic and riparian resources to some degree. Activities that alter the quantity, timing, or quality of water resources have the greatest

> potential for adverse effects, and the risk of adverse effects generally decreases as the distance away from streams or wetlands increases.

On that same page, the DEIS concludes,

> [W]atershed conservation practices, best management practices, forest plan standards and guidelines, and management approaches prescribe extensive measures to protect soil, riparian, and therefore aquatic ecosystems. When applicable measures are implemented and effective, adverse effects to these resources from management activities will be minimized or eliminated.

The DEIS then proceeds to "summarize" effects. This statement is highly problematic.

First, as we've stated above, the DEIS can only rely on plan components to determine the effects of the plan.

Second, we don't agree that the plan direction "prescribe extensive measures"; the DEIS must document all of the measures and let the reader decide if they are extensive and prescriptive.

Third, the statement assumes that measures will be implemented and will be effective. What is the basis for this assumption? As noted in our comments above, the plan depends heavily on desired conditions to meet rule requirements.

The DEIS analysis for vegetation management effects on aquatic ecosystems is insufficient. Although the DEIS flags likely impacts from roads, sedimentation, mechanical fuels reduction, rangeland treatments, timber sales, utility corridors, ski area modification/expansions, reduction of streamside vegetation, it simply concludes that the "greatest impacts" would be under alternative C, followed by A, B, and D and that "all of the action alternatives contain updated plan components, which provide adequate protection for aquatic ecosystems" (DEIS at 168). This is totally insufficient. The DEIS must demonstrate through analysis that the plan components provide such protection and do so in a manner that supports a determination that the plan meets regulatory requirements.

The DEIS analysis for fire management effects (DEIS at 168) is insufficient and needs to explain how the updated fire management zones and plan components protect aquatic ecosystems. Please list the plan components and their effects. Please describe how the use of guidelines and BMPs put forward outside of the forest plan "provide protection" in the regulatory context of the planning rule. Please provide more information on how the use of aerial fire retardant avoidance maps "provide protection" in the regulatory context of the planning rule.

The DEIS acknowledges effects from livestock grazing due to "degraded habitat resulting from erosion and sedimentation and increased stream temperatures caused by long-term concentrated grazing in riparian areas where streambank trampling and trailing, stream widening, and streamside vegetation removal an occur, resulting in insufficient overhead cover for fish" (DEIS at 169). The DEIS then concludes on the same page that "Application of plan direction in alternatives B, C, and D should ensure proper grazing management and reduce the effects to fisheries and aquatic ecosystems." This is totally insufficient. Please explain the "should ensure" determination in the regulatory context of the planning rule. What is the likelihood that plan direction will not ensure *proper* grazing management and therefore not reduce effects to fisheries and aquatic ecosystems? What is the relationship between "proper grazing management" and rule requirements for ecosystem integrity and species persistence, given the draft plan components? Elsewhere in the DEIS (at 187) the Forest explains that "proper rangeland management…entails the application of the standards, guidelines, and management approaches detailed in this forest plan revision, along with a variety of other tools." This is insufficient. Please describe in detail each of the standards and guidelines that ensure compliance with rule requirements for ecological integrity and species conservation. The Forest cannot rely on optional management approaches and "other tools" to demonstrate compliance with the planning rule.

The conclusory statement on road impact to aquatic ecosystems is not sufficient (DEIS at 169). Please provide analysis that demonstrates how "application of plan direction (especially related to riparian management zones and activity periods)" will "more effectively minimize potential impacts to fisheries and aquatic ecosystems." Please describe how minimizing potential impacts relates to meeting the requirements for ecosystems and species under the planning rule. Positive integrity and viability effects stemming from alternatives should be thoroughly evaluated for their contribution to meeting rule requirements. The DEIS acknowledges that alternative D is superior to other alternatives in managing specially designated areas for aquatic ecosystem protection. The difference between the alternatives should be stated in terms of likelihood of meeting rule requirements for integrity and species persistence. The DEIS must do a better job of presenting information on what plan components address habitat connectivity, and how those components affect determinations of compliance with rule requirements for ecological integrity (DEIS at 171). If at-risk species rely on plan direction for connectivity for persistence or recovery, the DEIS needs to explain the relationship.

Please further explain how the plan reduces risks posed by nonnative fish to the viability of RGCT, RGC and RGS (DEIS at 170). Please further explain the effects from "possible sediment inputs resulting from new construction, grooming, or maintenance at Wolf Creek Ski Area" (DEIS at 170).

Please elaborate on how the maximizing the connectivity of habitat under alternative D contributes to ecosystem integrity and species persistence (DEIS at 170).

Please elaborate on how "improved direction" for recreational dredging "protect spawning and recruitment periods for core populations of Rio Grande cutthroat trout" (DEIS at 171). While we appreciate the guidance in the plan on this issue, some of the components are flawed. For instance, guideline G-MIN-1 does not define "substantial" with regard to surface disturbance. G-MIN-2 should define the "critical life-stage periods" and the plan should map the relevant streams. The DEIS should take a very close look at the effectiveness of each of these components in meeting rule requirements for viable populations. We are concerned with the statement in the DEIS that forest plan direction will need to be coupled with "project-specific mitigation" to protect aquatic species. Moreover, the DEIS states that such measures are only "expected" to offer protections. There needs to be a more comprehensive discussion of the assumption and risks surrounding this impact.

In the cumulative effects discussion for aquatic ecosystems the DEIS (at 171) asserts,

> If all applicable measures are implemented and if they are effective, then adverse effects from any of the alternatives should be minimized. It is unlikely that plan components will prevent all adverse effects from occurring for each and every action that may be implemented on the Forest. Therefore, alternatives that propose higher levels of activity for various resources pose greater inherent risks to aquatic and riparian resources.

This statement is highly troubling.

First, what is the likelihood that all measures will be implemented under the plan? The Forest is certainly aware that to comply with rule a project or activity simply must be found to "not foreclose the opportunity to maintain or achieve" a desired condition (219.15(d)(1)). As noted above, the DEIS must disclose the possibility of desired conditions not being achieved. (This is coupled with the fact that most of the plan's desired conditions cannot be measured.). Second, the DEIS acknowledges that adverse effects are likely upon implementation and that some alternatives are riskier than others with regard to aquatic and riparian resources. The DEIS must disclose those risks within a context that will allow for a determination of whether alternatives are likely to meet rule requirements.

<u>Watershed Resources</u>

The DEIS states,

> It can be reasonably anticipated that the greatest future impacts to watershed resources would come from those management activities that are already known to be primary influences on current forest conditions, namely system roads and trails, uncontrolled motorized use on unauthorized roads and trails, and livestock grazing in riparian areas (Assessment 2). Relative to natural conditions, these activities have the potential to lead to accelerated soil erosion and compaction, sediment delivery to streams and wetlands, and

> alterations to stream channel form and function. Expansion of both system road and unauthorized network of roads and trails would be the most likely activities to impact watershed resources. (DEIS at 178)

The DEIS must assess the likelihood of these impacts given specific plan direction. It is not sufficient to use a relative approach to evaluating alternatives; for example, the assertion that "The potential watershed impacts of alternative B represent a relative midpoint among alternatives" does not satisfy NEPA (DEIS at 178).

Within the analysis of effects of vegetation management on watershed resources, the Forest appears to use a single metric to evaluate loss of forest canopy and increases in water yield/flow, stating that flow increases "are not measurable until 25 percent of the basal area of a forested watershed is affected (USDA Forest Service 1980)." The DEIS then concludes that "It is not expected that watersheds would receive timber harvesting treatments that exceed 25 percent basal area removal over the life of the plan; therefore, detectable changes in water yield would, generally, not be a concern" (DEIS at 179). More explanation on the applicability of the cited 1980 study is necessary to support the conclusion that the plan provides for the integrity of watersheds. The DEIS then discloses site-specific concerns for "certain sensitive watersheds" but that impacts to those watersheds is considered on a project-by-project, site-specific basis. For years, the Forest Service has been avoiding addressing broad-scale effects during project analysis by saying that they are "beyond the scope" of that analysis. Now that it is time to consider those effects at the forest plan level, we expect the Forest Service to take a serious and rigorous look at the choice of plan components that will drive future projects and their impacts.

Regarding sediment, the DEIS at 179 states that "Implementation of the water conservation practices, guidelines, and relevant forest plan direction applied to all timber harvesting activities are typically effective in preventing or reducing sediment delivery to water bodies." Please see our comments above regarding assumptions concerning implementation. In addition, please expand on the implications for watershed integrity on the assumption that forest plan direction is "typically effective." Please expand on the analysis supporting the generalized conclusion that "In general, fuels treatments would not be expected to result in measurable impacts to water yield because such treatments…primarily target the understory and small-diameter trees; therefore, they may not measurably alter basal area" (DEIS at 179). Please describe in more detail what the Forest means when it declares that "alternative C would be expected to have the most watershed impacts from timber harvest" (DEIS at 179). This analysis should be done within the context of the rule requirements for watershed integrity.

For livestock grazing impacts to watersheds (DEIS at 180) please remedy the insufficient analysis that seems to conclude that "various plan direction" that places "increased emphasis on the health and functionality of various watershed components" will meet planning rule requirements. Please list the relevant plan components. The DEIS must project the future conditions of key ecosystem

components under the plan components and compare that to the desired conditions for watershed integrity. The analysis within the EIS should provide an actual "result" in terms of ecosystem characteristics necessary for ecological integrity and ecological conditions relevant to at-risk species. It cannot substitute qualitative or subjective judgments of sufficiency for actual analysis of effects.

For fire management effects, the DEIS does not appear to make any findings. The EIS must properly account for the effects of wildfire on watershed integrity. A key part of the analysis will be how the effects of wildfire are accounted for. They may be positive (accomplishing restoration) as well as negative in relation to the plan's purpose and need. Also, the effect of plan components on wildfire must be clearly described. Any statements about vegetation treatments increasing the watershed or ecosystem integrity by reducing wildfire should have strong scientific support. The EIS should identify any BASI it relies on to conclude that active management is better than passive management for ecological and/or watershed integrity (or that restrictions on fire management lead to lack of integrity). Since this information is essential to making this decision, if it is incomplete or unavailable, compliance with 40 C.F.R. §1502.22 would be necessary.

The DEIS must also properly account for the effects of fire suppression on watershed/ecosystem integrity. If there are parts of the forest where suppression (no fire) is a desired condition, especially where that is not the historic ecological condition, the effects of limiting or eliminating fire on watershed/ecosystem integrity should be disclosed. If it is expected that mechanical treatment will be needed to prevent fires, those effects must also be disclosed. If there are no plan components that address fire suppression, there is no basis for showing that alternatives have different amounts or effects. In addition, the DEIS must properly account for the effects of post-fire salvage logging on watershed/aquatic ecosystem integrity. The demonstrated negative ecological effects associated with postfire salvage logging are probably the most consistent and dramatic of any wildlife management effects ever documented for any kind of forest management activity.

The DEIS makes no conclusions regarding road impacts to watershed integrity based on plan components. We only learn of the assertion that alternative C "would likely have the greatest watershed impacts from roads, trails, and travel management" (DEIS at 181). We don't find this analysis very helpful. Certainly, the Forest knows that according to 219.14(a) of the rule that "the responsible official shall record approval of a…revision in a decision document prepared according to Forest Service NEPA procedures (36 CFR 220)" and that "the decision document must include: 1) The rationale for approval; 2) An explanation of how the plan components meet the sustainability requirements of 219.8 (and) the diversity requirements of 219.9." The EIS is the appropriate place to support a determination that rule requirements for integrity and species persistence are likely to be met based on an assessment of the individual plan components.

While it is good to know that "the impacts of waters uses and developments are unlikely to vary by alternative" (DEIS at 182) the DEIS must disclose the actual effects so that a determination that the plan provides for watershed integrity can be made. The same is true for mineral extraction effects,

where the DEIS discloses that "mining activities can be expected to impact both watershed health and water quality" (DEIS at 182).

Riparian, Wetlands, and Fens

Our comments above concerning the deficiencies in the effects analysis for aquatic ecosystems and watersheds apply to the DEIS treatment of riparian systems, wetlands and fens. For example, livestock grazing impacts to riparian and wetland ecosystems "are expected to remain consistent with those observed in the previous planning period" (DEIS at 186). The Assessment seems to indicate that current conditions (governed by the current plan) result in low integrity for certain wetland types. The EIS needs to support a determination that livestock grazing impacts will not violate planning rule requirements, not a finding that historical impacts will continue. The analyses for the various activity impact areas suffer from the same deficiencies described above.

Aquatic Species of Conservation Concern

The DEIS is not clear on which SCCs are to be protected by which coarse filter plan components. Aquatic related SCCs include Rio Grande cutthroat trout, Rio Grande chub, Rio Grande sucker (addressed in Fisheries) and little grapefern, mud sedge, Colorado woodrush and spiny spore quillwort (addressed in groundwater dependent ecosystems). The DEIS should provide a table showing each SCC, their necessary ecological conditions, and the plan components that are intended to provide those conditions.

For RGCT, RGC and RGS, the DEIS concludes that "alternatives B, C, and D would provide the ecological conditions that support persistence of these 3 fish species, with the caveat that additional monitoring would likely be required to adequately determine success in meeting plan component direction" (DEIS at 172). (This caveat would seem to negate a finding that alternative C is likely to meet rule requirements.) We don't believe that the DEIS supports this conclusion.

To determine that the plan will provide the necessary conditions for these species, the EIS must document the ecological conditions needed by each. The information in the EIS should align with the information provided in the Assessment; while it appears that the DEIS generally tracks to the Assessment, we believe the EIS could do a more systematic job of presenting 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. The conditions evaluated in the DEIS are here:

	Willow/Cottonwood	Nonnative fish	Overhang veg.	Coarse substrate
RGCT		X	X	
RGC		X		X
RGS	X	X	X	X

There is no assessment that affirms that these ecological conditions will be provided (either via coarse filter components or species specific). In the cumulative effects section (DEIS at 253) we see some discussion of effects to actual ecological conditions. Regarding Willow Thickets and Cottonwood Galleries, the DEIS (at 253-254) states,

> Human activities in the planning area include grazing, removal of trees, and construction of dams and diversions that regulate water flow, block aquatic organisms, and alter erosional processes. Declining groundwater levels and the elimination of flooding have altered plant composition and structure, notably causing the decline of cottonwoods and willow systems. At the programmatic scale, the cumulative effects on species of conservation concern are not expected to increase beyond current trends.

This analysis is clearly not intended to support viability determinations. We find this analysis to be totally insufficient.

The EIS cannot include unsubstantiated reliance on a coarse filter strategy that addressed species almost entirely by addressing ecosystems. If the Forest intends to provide for the viability of SCCs based mostly on coarse filter measures alone, the EIS must allow the reader to fully understand the assumptions inherent in this approach and how they may affect conclusions about species viability.

3. Sagebrush and Associated At-risk Species

a) Comments on Plan Components for Sagebrush Associated At-risk Species

See Appendix 7: Sagebrush Ecosystem and Associated At-risk Species Comments.

b) Comments on DEIS for Sagebrush Associated At-risk Species

Gunnison Sage-grouse

The DEIS notes that the U.S. Fish and Wildlife Service (USFWS) found the Poncha Pass area not capable of supporting sage-grouse in its 2014 rule designating critical habitat for the species (79 Fed. Reg. 69312). However, higher elevation sagebrush steppe like Poncha Pass may be key to the species' persistence as climate change continues to affect lower elevation habitat elsewhere. The Bureau of Land Management (BLM) considers the Poncha Pass area as "occupied habitat" and has stated, "… the Poncha Pass area does currently support GUSG [Gunnison sage-grouse] and the BLM will treat it as such unless and until it no longer meets the criteria" (BLM 2016: ii).

There is no assessment of the current conditions of Gunnison sage-grouse habitat and potential recovery habitat on the Forest in the plan documents, so it's impossible based on the existing information whether the ecosystem requires maintenance and/or restoration to contribute to recovering the population. The 2005 Gunnison Sage-Grouse Rangewide Conservation Plan does have some limited information on the current condition of the Poncha Pass area along with potential future threats (GSGRSC 2005: 291), so we find this an odd omission given the draft plan references the 2005 Rangewide Plan to provide the RGNF plan direction (see below). The lack of information on current conditions limits the ability to analyze the effects of plan components on sagebrush and sage-grouse.

The DEIS states (DEIS at 220),

> Revised management direction in all action alternatives ensures that the fire and fuels management programs play a large role in maintaining and restoring the natural conditions of areas, including objectives specific to existing sagebrush ecosystems, the modification of fire behavior, restoration of native plants, and creation of landscape patterns that benefit habitat.

This is not true. There are no objectives included in the draft plan "specific to existing sagebrush ecosystems," including "the modification of fire behavior, …" etc. There is one guideline that addresses fuels treatment in Gunnison sage-grouse habitat, G-TEPC-3. The guideline states, "Design fuels treatment objectives…," and the plan does not include any fuels treatment objectives related to sagebrush ecosystems. The draft plan does not describe how fuels treatments can help provide the conditions for sage-grouse recover, listed on page 219-220 of the DEIS. It's not at all clear if the fuels treatments mentioned in G-TEPC-3 are meant to reduce or increase fire in the ecosystem. How are the proposed fuel treatments intended to change to current fire regime? The Terrestrial Assessment states, based on information from other regions, "If these estimates are correct for the Rio Grande National Forest sagebrush shrublands, than they are not likely very departed from their historic fire intervals" (at 14). The assessment doesn't support modifying fire behavior, as G-TEPC-3 suggests it should. The DEIS does not provide additional or new BASI that would justify a change in the fuels treatment approach. The DEIS does not provide an analysis of the effects of specific plan components that relate to fire management in the sagebrush ecosystem, and it must do this.

The DEIS acknowledges that livestock grazing is a "threat to sage-grouse habitat" but that "effective regulation of range practices coupled with effective monitoring as needed would help to prevent potential impacts" (DEIS at 221). The "effective regulation" is apparently predicated on "the grazing-related management practices described in the Gunnison Sage-Grouse Rangewide Conservation Plan (Gunnison Sage-Grouse Rangewide Steering Committee 2005)" (DEIS at 221). The USFWS decided to list the Gunnison sage-grouse as threatened in 2014, after the Rangewide Plan was developed, determining that the plan was insufficient to address listing factors. The

Rangewide Plan does not provide a regulatory framework but merely a list of discretionary guidelines not standards. The DEIS states, "Grazing remains a suitable activity for Forest and neighboring lands on Poncha Pass, although any impacts would be minimal" (DEIS at 221), yet the DEIS cannot draw this conclusion. There is no analysis of the effects of the Rangewide Plan on sagebrush or sage-grouse of the direction the RGNF indicates it will adopt. Moreover, these provisions must be clearly incorporated into the plan as plan components. The analysis of the effects of livestock grazing under the draft plan is inadequate.

The complete DEIS analysis of roads and off-highway motorized travel states (DEIS at 221),

> Revised management direction in all action alternatives allows for seasonal road closures, when needed, to protect resource values. This would allow roads through sage-grouse habitat to be closed during mating season. Use of existing, designated routes will not cause further harm to current sage-grouse habitat, but may harass any remaining birds. There is a moderate chance of some adverse effect resulting from unintentional harassment by motor vehicle users and other recreationists; however, this risk is not new and was analyzed when the reintroductions were planned.

We appreciate the acknowledgment that roads and motorize and recreation use will likely remain threats to Gunnison sage-grouse on the RGNF. And these uses are among the most significant threats to the habitat and species on the RGNF. Although the risk of vehicle use and recreation is "not new," these existing uses may be a factor as to why the RGNF supports few to no birds. There are no plan components to limit human disturbance. Seasonal road closures are discretionary under the draft plan. The above statement indicates a deficiency in the plan: the lack of sufficient plan components to contribute to the species' recovery.

The DEIS states, "All action alternatives include revised management direction for abandoned mine lands and recreational dredging; neither activity is likely to occur" (DEIS at 222). Specifically, what are the likely effects of this "revised management direction"?

We agree that alternatives B, C, and D providing roadless designation to part of the region is likely to have beneficial effects. However, the draft plan does not otherwise include sufficient plan components that would assure any change of management direction that would contribute to the recovery of the species. The DEIS states, "Habitat quality in the Poncha Pass area is also considered to be good or very good" (DEIS at 222). Yet, the Terrestrial Assessment found the sagebrush ecosystem to be departed from NRV (at 17, Table 5) and this is repeated in the DEIS (DEIS at 247). The cumulative effects analysis in the DEIS states (DEIS at 222),

> Local threats include potential impacts to habitat caused by the proximity of State Highway 285 and the electric transmission line corridor. Other threats impacting Gunnison sage-grouse to a lesser extent include overgrazing, mineral extraction, pinyon-juniper

encroachment, fences, invasive plants, wildfire, large-scale water development, predation (primarily associated with human disturbance and habitat decline), and recreation. The fragmented nature of existing habitat amplifies the negative effects of these other threats (U.S. Fish and Wildlife Service 2014).

The DEIS concludes cumulative effects on sage-grouse will likely be "minor and not significant due to restrictions and protections required" under the ESA. The USFWS has not developed a recovery plan for the species, and the Forest Service is required under the planning rule (as stated elsewhere in these comments) to include plan components in its revised plan that contribute to recovery. The analysis of direct, indirect, and cumulative effects of the weak or non-existent but necessary plan components contradicts the conclusion in the DEIS.

Brewer's Sparrow

There is no analysis of effects of coarse-filter or fine-filter components in the proposed plan on the Brewer's sparrow. The effects analysis of the sagebrush ecosystems seems to merely repeat the Terrestrial Assessment's findings.

Literature Cited in this Section

BLM (Bureau of Land Management). 2016. Gunnison Sage-grouse Rangewide Draft Resource Management Plan Amendment and Draft Environmental Impact Statement. U.S. Department of the Interior, Bureau of Land Management. August.

GSGRSC (Gunnison Sage-Grouse Rangewide Steering Committee). 2005. Gunnison Sage-Grouse Rangewide Conservation Plan. April.

4. Grassland and Grassland Associated At-risk Species

a) Comments on Plan Components for Grassland Associated At-risk Species

We appreciate the plan components aimed at maintaining Gunnison's prairie dog viability and that the RGNF intends to work with Colorado Parks and Wildlife to mitigate for sylvatic plague.

G-SCC-5: Maintain and restore Gunnison's prairie dog habitat in montane grasslands by:

- *Discouraging recreational shooting*
- *Livestock grazing*
- *Improving public understanding of prairie dog roles*
- *Avoiding the use of poison to control of eliminate prairie dogs*
- *Working with partners to translocate prairie dogs. (Forestwide)*

Regarding the first point, we urge the plan to include a standard that bans prairie dog shooting on the Forest with a penalty for violations. Shooting can be a significant threat to prairie dogs, especially small, depressed prairie dog populations (Pauli and Buskirk 2007). Prairie dog predators who eat shot carcasses are at risk to lead poisoning (Stephens et al. 2009). We are not finding BASI in the assessment or other planning documents that supports the idea that livestock grazing benefits prairie dogs. The RGNF's wildlife overview for the Gunnison's indicates that livestock grazing may be a threat (RGNF undated, *Cynomys gunnisoni*). Please remove "livestock grazing" as a bullet in G-SCC-5. Please also remove "Avoiding the use of poison to control of eliminate prairie dogs" from G-SCC-5; this part of the guideline enables prairie dog poisoning, which is a significant threat to the species' persistence. Instead, provide a standard that prohibits poisoning. We cannot see a reason why prairie dogs would need to be poisoned.

b) Comments on DEIS for Grassland Associated At-risk Species

Impacts to Gunnison's prairie dogs are analyzed in the DEIS only to the extent that the proposed Spruce Hole/Osier/Toltec Special Interest Area might have positive effects on prairie dog habitat. The Forest did not undertake an analysis of the effects on plan components on the species, which it must do.

Literature Cited in this Section

Pauli, J.N., and S.W. Buskirk. 2007. Risk-disturbance overrides density dependence in a hunted colonial rodent, the black-tailed prairie dog Cynomys ludovicianus. Journal of Applied Ecology 44(6): 1219-1230.

RGNF (Rio Grande National Forest). undated. Gunnison's Prairie Dog (*Cynomys gunnisoni*). Wildlife Overview. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd534301.pdf.

Stephens, R., A. Johnson, R. Plumb, K. Dickerson, M. McKinstry, and S.H. Anderson. 2009. Risk assessment of lead poisoning in raptors caused by recreational shooting of prairie dogs. In R. Watson, M. Fuller, M. Pokras, and W. Hunt. Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans. Boise, Idaho: The Peregrine Fund: 232-234.

5. Federally Protected Species Not Included in the Effects Analyses

The DEIS provides no assessment of effects for the following species or the ecosystems upon which they depend. The Forest Service is apparently utilizing one of the criterion intended to direct SCC identification to also select and reject federally protected species for consideration in the revised management plan. Applying the criterion that a species must be "known to occur in the plan area" (FSH 1909.12, ch. 10, 12.52c) to be considered for SCC designation is not consistent with

planning direction for identifying federally endangered and threatened. The planning directives call for coordination between the USFWS and the Forest Service to make decisions about selecting relevant federally protected species for the purposes of planning (FSH 1909.12, Ch. 10, 12.51). Federally recognized species must be addressed by plan components if they "may be present" in the plan area (50 C.F.R. 402.12(c)(1), (d)) or if they are not present but would be expected to occur there to contribute to recovery.

Mexican Spotted Owl

Assessment Report 5 (at 23) noted that 14,103 acres of potential habitat may exist on the Forest based on a modeling exercise conducted in 2006. Assessment 5 (at 22) and the DEIS (DEIS at 223) state that "Based on survey efforts, it is becoming increasingly unlikely that suitable nesting habitat for the Mexican spotted owl occurs on the Forest." The vegetation modeling reported in the Terrestrial Assessment found dry mixed conifer forest to be slightly departed from NRV (at 17). Could it be that the current condition of old forest in terms of habitat quality and quantify is not sufficient for Mexican spotted owl occupancy or conditions that would promote recovery. We don't know, because the plan documents do not provide an adequate analysis.

Southwestern Willow Flycatcher

The DEIS acknowledges that the species has been sighted on the Forest and that suitable habitat exists on the Forest (DEIS at 224).

Western Yellow-billed Cuckoo

The DEIS notes that the species is rare in the region but that there have been sightings and nest records.

Wolverine

The RGNF is within the historic range of the wolverine. The DEIS notes that a disputed sighting occurred in 1997 in the Forest. The narrative in the DEIS seems to imply the lack of verified sightings is a rationale for ignoring the species in the management plan, which is not valid basis for failing to include a proposed or candidate species in planning under the planning rule. If lack of sightings is the rationale for ignoring the species, the RGNF is ignoring information provided in its wolverine overview prepared for the plan assessment (RGNF undated, *Gulo gulo luscus*), which lists sightings on the Forest in 1911, 1973, 1978, 1992, and 1997. A wolverine with a GPS collar was confirmed in Colorado, having traveled from Wyoming, in 2009 (CPW undated). See Need et al. (1985) for information on additional confirmed occurrence records from Colorado. The RGNF plan must include plan components to contribute to the conservation of the wolverine, and must analyze effects of the plan to wolverines in the environmental impact statement.

Literature Cited in this Section

CPW (Colorado Parks and Wildlife). Undated. Wolverine, Species Profile. http://cpw.state.co.us/learn/Pages/SpeciesProfiles.aspx.

Need, D.M., J.C. Halfpenny, and S. Bissell. 1985. The status of wolverines in Colorado. Northwest Science. 8(4): 286-289.

RGNF (Rio Grande National Forest). Undated. North American Wolverine (Gulo gulo luscus). Wildlife Overview. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd534367.pdf.

Recommendations: Consistent with subpart A and the substantive requirements of the 2012 Planning Rule, the final plans should provide a suite of plan components aimed at protecting and restoring terrestrial and aquatic ecosystems and watersheds under 219.8(a)(1), and providing 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 219.9(b)(1). Defenders of Wildlife presented science-based species conservation recommendations in its scoping letter of October 28, 2016 that would enable the Forest to develop into plan components that would help achieve these goals. The Forest must analyze the effects of proposed plan components, suitability determinations, and all alternatives on wildlife, including each at-risk species identified in the planning process as protected under the ESA or as a SCC; this includes all plan components that may affect at-risk species. Adequate NEPA analysis and plan direction on the related to ecosystems and at-risk species may require a supplemental DEIS.

II. Transportation System

The transportation system is fundamental to forest operations, condition, and sustainability. The road and trail system facilitates every forest program as well as visitor enjoyment and recreation. It is well accepted by land managers that places with roads are more degraded than places without out, and that that the healthiest ecosystems are those that are roadless (Anderson et al, 2012). We are disappointed that the significant impacts associated with the forest road system are not meaningfully analyzed in the DEIS and that the draft plan provides little meaningful direction for moving towards an ecologically and fiscally sustainable road system, as required under the 2012 Planning Rule and subpart A of the Forest Service travel management regulations, 36 C.F.R. part 212. To date, we have offered extensive comments on the transportation system in letters submitted on April 13, 2015 offering input into the development of the draft assessment, April 23, 2016 commenting on the draft assessment, and April 28, 2016 offering comments on scoping.

A. Background and Regulatory Framework

1. The best available scientific information shows that the forest road system is economically and environmentally unsustainable.

The RGNF provides a range of significant environmental and societal benefits, including clean air and water, habitat for myriad wildlife species, and outdoor recreation opportunities for millions of visitors and local residents each year. The forest's extensive and under-maintained road system, however, poses a principle threat to its ability to provide critical environmental, ecosystem, and recreation services into the future. Nationwide, the national forests contain over 370,000 miles of system roads (excluding tens of thousands of additional miles of unclassified, non-system, temporary, and user-created roads). That is nearly eight times the length of the entire U.S. Interstate Highway System. Much of the system is in a state of serious disrepair: as of 2015, the national forest road system had a nearly 3-billion-dollar maintenance backlog (USDA Forest Service 2015a).

The story on the RGNF is similar. The RGNF has 2,262 miles of system roads and 399 miles of motorized system trails in the forest. Final Assessment Report Chapter 11 at 5. Seventy-two percent of these road miles are high clearance or stored (closed to motorized use) while only 28% can be accessed by passenger vehicles. DEIS at 256. The RGNF has 1,093 miles of roads that are ranked as low benefit and low risk, and 194 miles of roads that are ranked as high risk and low benefit (USDA Forest Service, 2015b). Sustainability of the road system is a serious concern. Forest Assessment Report, Chapter 11 at 7 and 8 ("The deferred maintenance backlog will continue to increase and this trend is not sustainable. The deferred maintenance is a safety issue for the public and the employees of the Rio Grande."). Population is predicted to increase while road and trail maintenance budgets are not. *Id at 7.* The creation of unauthorized user-created routes is also on the rise. *Ibid.* The road system is in disrepair due to a major annual shortfall between annual maintenance funding and needed funding. According to the 2015 Travel Analysis Report, the RGNF has an annual road maintenance budget of $688,860 and an annual maintenance need of $9.558 million, or said another way, the RGNF receives funding to maintain 7.8% of its road system (USDA Forest Service 2015b).[4] Currently, the RGNF has deferred maintenance costs of $33.4 million and $6.6 million for roads and trails, respectively. About 10% of the deferred maintenance on roads is health and safety critical. Final Assessment Report Chapter 11 at 2. Inadequate maintenance leads to resource impacts,

[4] Even if the RGNF implemented its recommended minimum road system (as described in the Travel Analysis Report) reducing its annual road maintenance need to $8,257,200 it still would only be able to maintain a paltry 8.3% of its road system. The recommended minimum necessary road system identified in the 2015 Travel Analysis Report pursuant to 36 CFR 212.5(b)(1) consists of 779 (30%) miles of passenger vehicle roads, 722 miles of open high clearance roads (28%), and 1,093 miles (42%) of stored roads. Two hundred and fifty-five miles (139 ML 1 roads and 86 ML2 roads, 9% of current system) are unneeded roads available for decommissioning (USDA Forest Service 2015b at 36).

particularly to water resources, and eventually leads to health and safety risks to forest staff and the visiting public.[5]

While well-sited and maintained roads provide important services to society, the adverse ecological and environmental impacts associated with the Forest Service's massive and deteriorating road system are well-documented. Those adverse impacts are long-term, occur at multiple scales, and often extend far beyond the actual "footprint" of the road. The attached literature review (see Exhibit 1) surveys the extensive and best-available scientific literature (including the Forest Service's General Technical Report, Gucinski et al. 2001, synthesizing the scientific information on forest roads) on a wide range of road-related impacts to ecosystem processes and integrity on National Forest lands.

For example, erosion, compaction, and other alterations in forest geomorphology and hydrology associated with roads seriously impair water quality and aquatic species viability. DEIS at 164, *also see* Exhibit 1. Roads disturb and fragment wildlife habitat, altering species distribution, interfering with critical life functions such as feeding, breeding, and nesting, and resulting in loss of biodiversity. S*ee* Exhibit 1. Roads also facilitate increased human intrusion into sensitive areas, resulting in poaching of rare plants and animals, human-ignited wildfires, introduction of exotic species, and damage to archaeological resources. *Id.*

Climate change intensifies the adverse impacts associated with roads. For example, as the warming climate alters species distribution and forces wildlife migration, landscape connectivity becomes even more crucial to species survival and ecosystem resilience. *Id. See also* USDA Forest Service 2011a (National Roadmap for Responding to Climate Change recognizes importance of reducing fragmentation and increasing connectivity to facilitate climate change adaptation). Climate change is also expected to lead to more extreme weather events, resulting in increased flood severity, more frequent landslides, altered hydrographs, and changes in erosion and sedimentation rates and delivery processes. *Id.* Many National Forest roads, however, were not designed to any engineering standard, making them particularly vulnerable to these climate alterations. And even those designed for storms and water flows typical of past decades may fail under future weather scenarios, further exacerbating adverse ecological impacts, public safety concerns, and maintenance needs (USDA Forest Service 2010).

These road-related impacts are of significant concern on the RGNF. For instance, the forest assessments recognize that high road densities have fragmented certain habitat types, and degraded the integrity of aquatic ecosystems. *See* RGNF Assessment Report Chapters 1 and 3 (Terrestrial) at 5; 14 (roads need attention in riparian areas); 17("the roads associated with these activities, even

[5] The Assessment Report's Chapter 11 affirms the challenges to achieving a fiscally sustainable roads system, stating that "…with aging infrastructures and continued budget decreases, maintenance to a desirable standard is difficult. The deferred maintenance backlog will continue to increase and this trend is not sustainable. The deferred maintenance is a safety issue for the public and the employees of the Rio Grande." *See* Assessment Report Chapter 11, Page 8.

temporary ones, can negatively impact the forest and its ecosystems"); 24; and 34. Roads are a source of sediment on the forests – a problem that is exacerbated by the massive maintenance backlog – and a significant barrier to aquatic connectivity. *See* RGNF Assessment Report, Appendix to Chapters 1 and 3 (Aquatic) at 17 ("[R]oads can profoundly contribute to the diminution and degradation of native aquatic and wetland ecosystems by altering natural drainage area. In addition, roads have facilitated the consumptive use and in some cases, extirpation, of indigenous plants and animals by human beings."). In the context of the impact of roads and trails on watershed health, the RGNF has ranked 74% of the 6th level HUC watersheds as at risk and 7% as impaired. Assessment Report, Chapter 2, Page 87. Eighty-one out of 166 6th level HUC's have road/motorized trail densities over one mile per square mile,[6] a widely used threshold over which large carnivores and other wide-ranging species suffer ill-effects from human disturbance and fragmentation (see Exhibit 1), and 788 roads have moderate to high watershed risks.[7] Roads are also a key risk factor to numerous threatened and endangered species and potential species of conservation concern. *See* Exhibit 1.

2. Regulatory Framework

a. Road management

To address its unsustainable and deteriorating road system, the Forest Service promulgated the Roads Rule in 2001. 36 C.F.R. part 212, subpart A, 66 Fed. Reg. 3206 (Jan. 12, 2001). The rule directs each National Forest to conduct "a science-based roads analysis," generally referred to as the travel analysis process. 36 C.F.R. § 212.5(b)(1).[8] Based on that analysis, forests must "identify the minimum road system [MRS] needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands." 36 C.F.R. §212.5(b)(1). The Rule defines the MRS as:

> the road system determined to be needed [1] to meet resource and other management objectives adopted in the relevant land and resource management plan . . . , [2] to meet applicable statutory and regulatory requirements, [3] to reflect long-term funding expectations, [and 4] to ensure that the identified system minimizes adverse environmental impacts associated with road construction, reconstruction, decommissioning, and maintenance.

[6] See Appendix to Travel Analysis Report, *supra*, entitled Road Density Map available at http://www.fs.usda.gov/detailfull/riogrande/landmanagement/projects/?cid=fseprd484850&width=full.
[7] See Appendix to Travel Analysis Report, *supra*, entitled Aquatics Rankings, available at http://www.fs.usda.gov/detailfull/riogrande/landmanagement/projects/?cid=fseprd484850&width=full.
[8] Forest Service Manual 7712 and Forest Service Handbook 7709.55, Chapter 20 provide detailed guidance on conducting travel analysis.

Id. Forests also must "identify the roads . . . that are no longer needed to meet forest resource management objectives and that, therefore, should be decommissioned or considered for other uses, such as for trails." *Id.* § 212.5(b)(2).[9]

While subpart A does not impose a timeline for agency compliance with these mandates, the Forest Service Washington Office, through a series of directive memoranda, ordered forests to complete the initial travel analysis process and produce a travel analysis report (TAR) by the end of fiscal year 2015, or lose maintenance funding for any road not analyzed.[10]The memoranda articulate an expectation that forests, through the subpart A process, "maintain an appropriately sized and environmentally sustainable road system that is responsive to ecological, economic, and social concerns." They clarify that TARs must address *all* system roads – not just the small percentage of roads maintained for passenger vehicles to which some forests had limited their previous Roads Analysis Process reports or TARs. And they require that TARs include a list of roads likely not needed for future use. Nationwide,

Once the TARs are finalized, the next step is "to use the travel analysis report to develop proposed actions to identify the MRS" and unneeded roads for decommissioning at a scale of the 6th HUC watershed or larger and undertake appropriate NEPA review. 2012 Weldon Memo.[11] "The MRS for the administrative unit is complete when the MRS for each subwatershed has been identified, thus satisfying Subpart A." *Id.* In addition, travel analysis recommendations must be meaningfully incorporated into land management planning decisions, as discussed in more detail in subsection 4(b), below.

b. National Forest System Land Management Planning

The 2012 Planning Rule guides the development, amendment, and revision of forest plans, with an overarching goal of promoting the ecological integrity and ecological and fiscal sustainability of National Forest lands:

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[9] The requirements of subpart A are separate and distinct from those of the 2005 Travel Management Rule, codified at subpart B of 36 C.F.R. part 212, which address off-highway vehicle use and corresponding resource damage pursuant to Executive Orders 11644, 37 Fed. Reg. 2877 (Feb. 9, 1972), and 11989, 42 Fed. Reg. 26,959 (May 25, 1977).

[10] Memorandum from Joel Holtrop to Regional Foresters *et al.* re Travel Management, Implementation of 36 C.F.R., Part 212, Subpart A (Nov. 10, 2010) (Exhibit XII.2); Memorandum from Leslie Weldon to Regional Foresters *et al.* re Travel Management, Implementation of 36 C.F.R., Part 212, Subpart A (Mar. 29, 2012) (Exhibit XII.3); Memorandum from Leslie Weldon to Regional Foresters *et al.* re Travel Management Implementation (Dec. 17, 2013) (Exhibit XII.4).

[11] Memorandum from Joel Holtrop to Regional Foresters *et al.* re Travel Management, Implementation of 36 C.F.R., Part 212, Subpart A (Nov. 10, 2010) (Exhibit XII.2); Memorandum from Leslie Weldon to Regional Foresters *et al.* re Travel Management, Implementation of 36 C.F.R., Part 212, Subpart A (Mar. 29, 2012) (Exhibit XII.3); Memorandum from Leslie Weldon to Regional Foresters *et al.* re Travel Management Implementation (Dec. 17,
2013) (Exhibit XII.4).

> Plans will guide management of [National Forest System] lands so that they are ecologically sustainable and contribute to social and economic sustainability; consist of ecosystems and watersheds with ecological integrity and diverse plant and animal communities; and have the capacity to provide people and communities with ecosystem services and multiple uses that provide a range of social, economic, and ecological benefits for the present and into the future.

36 C.F.R. § 219.1(c). To accomplish these ecological integrity and sustainability goals, the rule imposes substantive mandates to establish plan components – including standards and guidelines – that maintain or restore healthy aquatic and terrestrial ecosystems, watersheds, and riparian areas, and air, water, and soil quality. *Id.* § 219.8(a)(1)-(3); *see also id.* § 219.9(a) (corresponding substantive requirement to establish plan components that maintain and restore the diversity of plant and animal communities and support the persistence of native species). The components must be designed "to maintain or restore the structure, function, composition, and connectivity" of terrestrial, riparian, and aquatic ecosystems, *id.* § 219.8(a)(1) & (a)(3)(i); must take into account stressors including climate change, and the ability of ecosystems to adapt to change, *id.*§ 219.8(a)(1)(iv); and must implement national best management practices for water quality, *id.*§ 219.8(a)(4). The rule also requires the Forest Service to establish riparian management zones for which plan components "must ensure that no management practices causing detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment that seriously and adversely affect water conditions or fish habitat shall be permitted." *Id.* § 219.8(a)(3)(ii)(B). In addition, plans must include plan components for "integrated resource management to provide for ecosystem services and multiple uses," taking into account "[a]ppropriate placement and sustainable management of infrastructure, such as recreational facilities and transportation and utility corridors." *Id.* § 219.10(a)(3). Plan components must ensure social and economic sustainability, including sustainable recreation and access. *Id.* § 219.8(b). And the Forest Service must "use the best available scientific information" to comply with these substantive mandates. *Id.* § 219.3.

c. Climate Change

The Forest Service's 2014 climate adaptation plan recognizes that the wide range of environmental and societal benefits provided by our national forests "are connected and sustained through the integrity of the ecosystems on these lands." USDA Forest Service 2014. The plan highlights USDA's 2010-2015 Strategic Plan Goal 2 of "[e]nsur[ing] our national forests . . . are conserved, restored, and made more resilient to climate change, while enhancing our water resources." *Id.*[12] The plan identifies numerous climate change risks – including increased wildfire, invasive species, water temperatures, extreme weather events, and fluctuating precipitation and temperature – that "pose challenges to sustaining forests and grasslands and the supply of goods and services upon which

[12] USDA's updated FY2014-FY2018 Strategic Plan retains Goal 2.

society depends, such as clean drinking water, forest products, outdoor recreation opportunities, and habitat." *Id.* With respect to transportation infrastructure specifically, the plan recognizes that, "[w]ith increasing heavy rain events, the extensive road system on NFS lands will require increased maintenance and/or modification of infrastructure (e.g. larger culverts or replacement of culverts with bridges)." *Id.* The adaptation plan points to several actions to address these risks. For example, the plan highlights the 2012 Planning Rule as a mechanism to ensure that "National Forest System . . . land management planning policy and procedures include consideration of climate change." *Id.*[13] The final directives to the planning rule echo the importance of designing plan components "to sustain functional ecosystems based on a future viewpoint" and "to adapt to the effects of climate change." FSH 1909.12, ch. 20, § .23.11. The adaptation plan also points to Forest Service Manual 2020, which provides "Ecological Restoration and Resilience" directives designed "to restore and maintain resilient ecosystems that will have greater capacity to withstand stressors and recover from disturbances, especially those under changing and uncertain environmental conditions, including climate change and extreme weather events." USDA Forest Service 2014.

The Council on Environmental Quality (CEQ) also recently reinforced the importance of integrating climate change into land management planning processes in its final guidance on addressing climate change in NEPA reviews. The guidance acknowledges that "[c]limate change is a fundamental environmental issue, and its effects fall squarely within NEPA's purview":

> Identifying important interactions between a changing climate and the environmental impacts from a proposed action can help Federal agencies and other decision makers identify practicable opportunities to reduce GHG emissions, improve environmental outcomes, and contribute to safeguarding communities and their infrastructure against the effects of extreme weather events and other climate-related impacts.

Council on Environmental Quality, *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*, § I, 81 Fed. Reg. 51,866, (Aug. 5, 2016). The guidance goes on to recognize the increased vulnerability of resources including transportation infrastructure, due to a changing climate, and clarifies that NEPA requires agencies to analyze proposed actions and alternatives in the context of climate change, including the vulnerability of particular resources including transportation infrastructure, and to consider opportunities for climate adaptation and resilience. *Id.* § III(B).[14]

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[13] *See also* 36 C.F.R. § 219.8(a)(1)(iv) (ecosystem integrity plan components must take into account stressors including climate change, and the ability of ecosystems to adapt to change); *id.* § 219.6(b)(3) (forest assessments must "[i]dentify and evaluate existing information relevant to the plan area for . . . the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change"); *id.* § 219.5(a) (planning framework designed to allow the Forest Service "to adapt to changing conditions, including climate change"); *id.* § 219.12(a)(5)(vi) (monitoring programs must address "[m]easurable changes on the plan area related to climate change and other stressors").

[14] While this guidance was withdrawn April 5, 2017 for further consideration (see 81 FR 51866 (April 5, 2017)), its general findings related to climate science and NEPA application still apply.

3. Existing plan direction is inadequate to comply with regulatory requirements.

Existing plan direction for the RGNF does not meet the substantive requirements of subpart A or the 2012 Planning Rule. Specifically, the current plans do not offer direction on identifying or achieving a minimum road system, removing unneeded system roads, or otherwise promoting sustainable transportation infrastructure that helps maintain and restore ecological integrity. Moreover, current plan direction does not address the role of climate change, which likely will be dominant in road management decision-making over the life of the revised plans.

4. The Forest Service must address the road system in its plan revision.

a. The substantive requirements of the 2012 Planning Rule require meaningful plan direction on roads.

The substantive requirements of the 2012 Planning Rule require the Forest Service to comprehensively address the road system in its plan revision. Given the significant aggregate impacts of that system on landscape connectivity, ecological integrity, water quality, species viability and diversity, and other forest resources and ecosystem services, the Forest Service cannot satisfy the rule's substantive requirements without providing management direction for transportation infrastructure. As described above, plans must provide standards and guidelines to maintain and restore ecological integrity, landscape connectivity, water quality, and species diversity. 36 C.F.R. § 219.8(a). Those requirements simply cannot be met absent integrated plan components directed at making the road system considerably more sustainable and resilient to climate change stressors.

The Forest Service's final directives on infrastructure recognize this: "[t]he central consideration in land management planning for infrastructure is that the integrated desired conditions and other plan components set a framework for the sustainable management of the plan area's infrastructure and mitigation of adverse impacts." FSH 1909.12, ch. 20, §23.23l. To that end, plan components should "reflect the extent of infrastructure that is needed to achieve the desired conditions and objectives of the plan" and "provide for a realistic desired infrastructure that is sustainable and can be managed in accord with other plan components including those for ecological sustainability." *Id.* § 23.23l(1)(b); *see also id.* § 23.23l(2)(a) (desired condition for roads "should describe a basic framework for an appropriately sized and sustainable transportation system that can meet [identified access and other] needs"). Plan components also must ensure fiscal sustainability. 36 C.F.R. § 219.8(b); *see also id.* §219.1(g) (plan components generally must be "within . . . the fiscal capability of the unit"); FSH 1909.12, ch. 20, § 23.23l(1)(c) (same).

More generally, the revised plan is the logical and appropriate place to establish a framework for management of the forest road system. Plans "provide[] a framework for integrated resource

management and for guiding project and activity decisionmaking." 36 C.F.R. § 219.2(b)(1); *see also id.* § 219.15(e) (site-specific implementation projects, including travel management plans, must be consistent with plan components). Plans allow the Forest Service to comprehensively evaluate the road system in the context of other aspects of forest management, such as restoration, protection and utilization, and fiscal realities, and to integrate management direction accordingly. Plans also provide and compile regulatory direction at a forest-specific level for compliance with the Clean Water Act, Clean Air Act, Endangered Species Act, and other federal environmental laws relevant to the road system and its environmental impacts. *See id.* § 219.1(f) ("Plans must comply with all applicable laws and regulations . . . ."). And plans allow forest managers and the public to clearly understand the management expectations around the road system and develop strategies accordingly. With frequent turnover in decision-making positions at the forest level, a plan-level management framework for the road system and transportation infrastructure is particularly critical. Moreover, with climate change anticipated to necessitate forest-wide upgrades and reconfigurations of transportation infrastructure, it is especially important that plans provide direction for identifying and achieving an environmentally and fiscally sustainable road system under future climate scenarios.

Lastly, the Forest Service does not have another planning vehicle to direct long-term and forest-wide management of the road system and to ensure compliance with current policy and regulatory direction. Travel Management Plans (TMPs) under subpart B of 36 C.F.R. part 212 are not a substitute for the integrated direction for transportation management that land management plans must provide. The main purpose of TMPs is to designate roads, trails, and areas that are open to motorized travel – not to achieve a sustainable transportation system, decommission unneeded roads, or otherwise meet the ecological restoration mandates of the 2012 Planning Rule.

b. The plan revision should address subpart A.

Complementing the substantive requirements of the 2012 Planning Rule, subpart A requires each National Forest to identify its minimum road system (MRS), as well as unneeded roads for decommissioning or conversion to other uses. 36 C.F.R. § 212.5(b)(1)-(2). As explained above, the MRS must, among other things, reflect long-term funding expectations. *Id.* § 212.5(b)(1). Completion of the travel analysis process is a crucial first step in achieving compliance with subpart A, but forests then must utilize that analysis to identify the MRS and unneeded roads for decommissioning and implement those decisions in order to achieve compliance with subpart A.

The plan revision is the appropriate place to ensure that subpart A's requirements will be met over the next 10 to 15 years, and to set standards and guidelines for achieving an environmentally and fiscally sustainable MRS through decommissioning or repurposing unneeded roads and upgrading the necessary portions of the system. Subpart A defines the MRS as that "needed for safe and efficient travel[;] for administration, utilization, and protection of [forest] lands[; and] to meet resource and other management objectives adopted in the relevant . . . plan." 36 C.F.R. § 212.5(b)(1). With forest plans determining the framework for integrated resource management and "an

appropriately sized and sustainable transportation system," direction for identifying and achieving that MRS belongs in the forest plan. *See* FSH 1909.12, ch. 20, § 23.23l(2)(a). Indeed, the regulatory history of the Roads Rule makes clear that the Forest Service intended that forest plans would address subpart A compliance. In response to comments on the proposed Roads Rule, the Forest Service stated:

> The planning rule provides the overall framework for planning and management of the National Forest System. The road management rule and policy which are implemented through the planning process must adhere to the sustainability, collaboration, and science provisions of the planning rule. For example, under the road management policy, national forests and grasslands must complete an analysis of their existing road system and then incorporate the analysis into their land management planning process.
>
> 66 Fed. Reg. at 3209 (emphasis added).

If the revised plans do not provide plan direction towards achieving a sustainable MRS, it is unlikely that the Forest Service will satisfy the requirements of subpart A during the life of the plans (as evidenced by the lack of direction in the existing plans and the inability of forests to achieve environmentally and fiscally sustainable road systems to date). Forest managers and the public need forest-specific direction on how to achieve the desired MRS and ensure its sustainability in the face of climate change, all within realistic fiscal limitations of the unit. The purpose of a forest plan is to provide that direction, and it would be arbitrary for the Forest Service to fail to do so in its plan revision. At the very least, the revised plan must include standards and guidelines that direct compliance with subpart A within a reasonable timeframe following plan adoption.

Recommended plan components to satisfy the requirements of subpart A are provided in Exhibit 2, attached.

c. The Forest Service must analyze the significant impacts associated with the road system under NEPA.

In addition to the requirements of the 2012 Planning Rule and subpart A, NEPA requires the Forest Service to analyze its road system as part of the forest plan revision process. Because they constitute "major Federal actions significantly affecting the quality of the human environment," forest plan revisions require preparation of an environmental impact statement (EIS) under NEPA. 42 U.S.C. § 4332(2)(C); 36 C.F.R. § 219.5(a)(2)(i). The EIS must analyze in depth all "significant issues related to [the plan revision]." 40 C.F.R. § 1501.7; *see also id.* § 1502.1 (an EIS "shall provide full and fair discussion of significant environmental impacts" and "shall focus on significant environmental issues and alternatives"). Management of the forest road system and its significant environmental

impacts on a range of forest resources undoubtedly qualifies as a significant issue that must be analyzed in the plan revision EIS.[15]

A robust NEPA analysis of the forest road system and its environmental and social impacts is especially critical in the context of climate change. NEPA requires agencies to analyze proposed actions and alternatives in the context of climate change, including the vulnerability of resources such as transportation infrastructure, and to consider opportunities for climate adaptation and resilience.

Importantly, adequate analysis of the forest road system cannot be provided in a piecemeal fashion under other, individual resource topics in the EIS. That approach would preclude comprehensive analysis of the significant impacts associated with the road system and could result in fragmented and conflicting management direction that fails to satisfy the substantive mandates of the 2012 Planning Rule and subpart A.

B. The Draft Plan and DEIS fail to meaningfully address the transportation system.

1. The DEIS inappropriately concludes that land management plans do not establish a framework for transportation management.

The RGNF in preparing its DEIS inappropriately concluded that the land management plan has limited reach in affecting transportation management. DEIS at 257 (Guidance for the transportation system in the forest plan is limited to the management of roads and trails, and does not extend to where roads and trails are allowed or how they are allowed.) While it is true that site-specific travel management decisions are appropriately made in a travel management plan (which the DEIS establishes will be undertaken subsequent to the land management plan revision, DEIS at 12, 271, 162, 276), the land management plan is the appropriate place to establish a transportation management framework that will guide subsequent mid-level plans and projects (like the travel management plan). In fact, as we explain above in considerable detail, not only is the land management plan precisely the venue for establishing large-scale direction for the transportation system, it is the only venue currently available to the Forest Service for establishing a large-scale framework for transportation management and assuring that the RGNF will achieve its legal and policy responsibilities under the planning rule, travel management rule and other relevant authorities. See subsection A(4)(a) above.

[15] NEPA analysis as part of a previous travel management planning process under subpart B does not satisfy the Forest Service's duty to comprehensively analyze the impacts of its road system in the EIS for the plan revision. As explained above, the purpose of the TMP is to designate existing roads and trails available for off-road vehicle use, not to identify and provide a framework for a sustainable road system.

There are numerous examples of how land management plans provide framework direction to subsequent mid-level transportation-related plans and projects. Most obviously, land management plans directly affect where motorized vehicles are authorized or not authorized. Land management plans allocate places within the plan area to various management zones. Management zones are managed according to the direction set forth by plan components and management approaches, which can authorize, prohibit, or restrict motorized vehicle use. Plan components also can establish suitability for the management area (or parts of it) for certain uses such as road building or motorized access. Further, plan components establish recreation opportunity settings (ROS) settings for specific places. See DEIS discussion of ROS settings starting at 269. ROS settings define where motorized vehicles are authorized, and not authorized, and how. For example, semi-primitive and primitive non-motorized ROS settings disallow motorized vehicles, while the roaded natural setting has passenger vehicle roads that provide a "park-like" experience. Plan components can also establish route densities to protect wildlife and water resources in specific management areas or forest-wide, and direct the accomplishment of specific activities, e.g., the decommissioning of a specific number of miles of unneeded and unauthorized routes.

It is incorrect as well as negligent to assert that land management plans are not the venue for establishing a transportation management framework. This conclusion is particularly egregious when the RGNF has significant and growing deferred maintenance, receives annually a small fraction of what it needs to maintain its current transportation system, and risks from climate change induced storm events are on the rise. *See* DEIS at 374 ("Due to budgetary limitations, numerous infrastructure resources have had necessary maintenance deferred. A number have been listed as health and safety critical, including roads…. Deferred maintenance backlog is not sustainable. If not funded, numerous locations will need to be closed, which has the potential to limit access, reduce water quality…".

In contrast, we assert (both in our scoping comments and here) that land management plans must include meaningful plan components that will drive progress over the life of the plan toward a sustainable road system (fiscal and ecological) and full compliance with subpart A of the travel management rule and with the substantive provisions of the planning rule. We have excerpted the relevant portion of our scoping comments that recommend a suite of plan components in Exhibit 2 and we summarize the elements of a framework here:

- The desired condition for transportation infrastructure should be a well-maintained and appropriately sized system of needed roads that is fiscally and environmentally sustainable and provides for safe and consistent access for the utilization, administration, and protection of the forest.
- Forest plans should include concise, measurable, and time-specific objectives that will drive progress towards achieving a sustainable minimum road system over the life of the plan. Objectives should address decommissioning of unneeded roads and maintaining needed roads with the most benefit in achieving the desired condition.

- Forest plans should include standards and guidelines that are designed to achieve the stated desired condition for the transportation infrastructure, ensure roads do not impair ecological integrity and otherwise satisfy the substantive requirements of the 2012 Planning Rule and subpart A of the travel management rule. Standards and guidelines should be designed to ensure, at the very least, that:
  - ❖ The RGNF identifies its minimum road system and makes progress toward implementing it.
  - ❖ Project-level decisions with road-related elements implement recommendations in travel analysis reports and advance implementation of the minimum road system.
  - ❖ Project-level decisions with road-related elements advance restoration objectives. Examples may include implementing motorized route density thresholds, removing unneeded or unauthorized roads in areas important for ecological sustainability (e.g., roadless areas, municipal watersheds, conservation watersheds), reconstructing impactful road structures to move them out of the floodplain, and restoring lands and waters where ecological integrity is impacted by roads.
  - ❖ The RGNF develops and implements over the life of the plan a strategy for making the transportation system climate-ready. This includes identifying where the system needs modification based on a range of climate scenarios, assigning priorities, establishing an action plan, and implementing project-level decisions.
  - ❖ All roads, including temporary roads, comply with applicable and identified Forest Service best management practices (BMPs) for water management.
  - ❖ Temporary roads are tracked to ensure that they are removed by the schedule set in project plans and associated NEPA documentation.
- The monitoring program ensures progress toward Desired Future Condition using meaningful monitoring questions/indicators.

The DEIS' erroneous conclusion may be a fatal wound. Due to this approach, the RGNF has not offered a range of alternatives for managing the transportation system, has failed to take a hard look at the effects of the alternatives, and has failed to provide plan direction compliant with subpart A of the travel management rule and the substantive provisions of the planning rule, as discussed below.

2. The DEIS does not have a reasonable range of alternatives related to the transportation system.

The analysis of alternatives under NEPA is the "heart" of an EIS. 40 C.F.R. § 1502.14. An agency must "[r]igorously explore and objectively evaluate all reasonable alternatives" to a proposed action. *Id.* § 1502.14(a); *see also* 42 U.S.C. § 4332(2)(E) (agencies must "study, develop and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources"). Consistent with NEPA's basic policy objective to protect the environment, this includes more environmentally protective

alternatives. 40 C.F.R. § 1500.2(e) (agencies must "[u]se the NEPA process to identify and assess reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment"); *see also, e.g.*, *Kootenai Tribe of Idaho v. Veneman*, 313 F.3d 1094, 1121-22 (9th Cir. 2002) (citing cases), *abrogated on other grounds by The Wilderness Soc'y v. U.S. Forest Serv.*, 630 F.3d 1173, 1178-80 (9th Cir. 2011) (en banc). "The existence of a viable but unexamined alternative renders an [EIS] inadequate." *Mont. Wilderness Ass'n v. Connell*, 725 F.3d 988, 1004 (9th Cir. 2013) (quotations and citation omitted). The "touchstone" of the inquiry is "whether an EIS's selection and discussion of alternatives fosters informed decision-making and informed public participation." *Id.* at 1005 (quotations and citation omitted).

The DEIS does not vary its transportation management approach across the alternatives. DEIS at 257 ("None of the alternatives propose changing the current road system."). The Wilderness Society in its scoping comments proposed a transportation framework. See The Wilderness Society's scoping letter submitted October 28, 2016, pages 40-44 (relevant excerpt attached as Exhibit 2). This proposed framework was a reasonable alternative in that it proposed an integrated set of plan components designed to meet the stated Need for Change (B5: "Revise the current plan to include management direction that ensures sustainable infrastructure related to recreation, forest health, and habitat connectivity"),[16] and based on regulatory and policy direction, on best available science (which is summarized in the attached literature review at Exhibit 1 and which the Forest Service is required to utilize under the 2012 Planning Rule), and on examples of road plan components from existing forest plans (see non-comprehensive compilation - attached as Exhibit 3). Reasonable alternatives are those that are viable, feasible, meet the stated goals of the project, or are reasonably related to the purposes of the project. *Idaho Conservation League v. Mumma*, 956 F.2d 1508, 1519 (9th Cir. 1992); *City of Carmel-By-The-Sea v. U.S. Dept. of Transp.*, 123 F.3d 1142, 1155 (9th Cir. 1997); *Trout Unlimited v. Morton*, 509 F.2d 1276, 1286 (9th Cir. 1974). The DEIS does not acknowledge our proposal, and does not explain why it rejected it for analysis. 40 C.F.R. §1502.14(a) ("for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.")

The failure to include our alternative in the range of alternatives, and more generally to provide a range of reasonable alternatives, is a violation of NEPA. The RGNF should rectify this deficiency by supplementing the DEIS with additional alternatives including the one proposed by The Wilderness Society. This would ensure an adequate range of alternatives and a robust analysis of the trade-offs and impacts.

3. The DEIS fails to take a hard look at the road system and its effects under the alternatives.

[16] Need for Change, Version 2, July 2016 available at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd514178.pdf, page 5.

Our scoping comments made clear that the forest transportation system is a significant issue that must be meaningfully analyzed under NEPA. *See* 40 C.F.R. §§ 1501.7, 1502.1. The DEIS' section on infrastructure, of which the transportation system is a part, is three pages and provides very little information and virtually no analysis related to the transportation system. DEIS at 59-61. Beyond the section on infrastructure, the DEIS does provide a smattering of information related to general impacts of roads on air quality, soils, aquatic systems, watersheds, riparian & wetlands & fens, at-risk species, habitat connectivity, wildlife and plant species, and species of conservation concern. *See* DEIS at 60; 159-160; 164 and 169-170; 181; 186; 206, 215, 221; 227 and 229; 283; 251. However, it provides very little information specific to the RGNF, and does not provide science-based analyses to support conclusions around effects. For instance, the DEIS does not describe or disclose:

- The condition of the transportation system;
- The fiscal and ecological sustainability of the transportation system, including a description of how the transportation system interacts with the hydrologic system (number of stream/route crossings; proximity of roads to streams; spatial intersection of routes and erosive soils; spatial relationship of routes and water bodies with excessive sedimentation);
- The number, miles and location of routes that are in wildlife movement areas and possibly impeding wildlife movement;
- The number, miles and location of routes that are proximal to streams with Rio Grande cutthroat trout and other at-risk species, and the degree to which the route segments are impacting or threatening species' habitats; and
- How climate change may impact the road system and its effects on other resources.

Importantly, while the DEIS makes clear that the current transportation system is unsustainable and leading to resource damage. *See,* for instance, DEIS at 374 and 162 ("Poorly maintained and designed roads can lead to significant amounts of erosion. Budget cuts have led to longer intervals in between road maintenance cycles, which increases erosion"), it does not evaluate or disclose the adverse impacts to natural resources that will occur if adequate transportation management funding is not available. In fact, in places the DEIS' impact analysis actually relies on the presumption that the RGNF will have management capacity to mitigate impacts. For example, the DEIS at 164-165 states:

> Roads and road networks under Forest jurisdiction can be managed to reduce or potentially eliminate negative impacts to aquatic, riparian, and wetland ecosystems. The benefits that accrue to aquatic and wetland ecosystems by correctly designing, constructing, and maintaining National Forest System roads are many. Considering the likely future increase in road use, the probability of incurring additional resource damage and destruction to aquatic, riparian, and wetland ecosystems is relatively high. Appropriate road and travel management will be necessary, and will include managing the transportation system and removing unwanted roads. Locating roads away from streams undoubtedly reduces sediment delivery into streams.

Given the fact that the RGNF has received a tiny fraction of the road maintenance it requires for the past several years, and the funding projections for the next several years appears bleak, the

RGNF must evaluate and disclose the impacts to and from the road system if the RGNF lacks the capacity to adequately manage the transportation system.
The absence of a hard look is a violation of NEPA and should be rectified in the final EIS. Please note that we urged that the DEIS include a robust analysis of the effects of the transportation system in our scoping comments. *See* The Wilderness Society scoping comments dated October 28, 2016 at 39-40.

4. The DEIS alternatives do not satisfy the purpose and need for the proposed action, or address the Need for Change.

The DEIS states its purpose and need as follows:

> The purpose and need for revising the forest plan is the changed ecological, social, and economic conditions in the plan area that have occurred since the current forest plan was approved in 1996….
>
> Compliance with the 2012 Planning Rule drove additional needs for change related to species of conservation concern, identification of key ecosystem characteristics, ecosystem and habitat connectivity, inventory and evaluation of wilderness, and a re-evaluation of areas for wilderness and wild, scenic, and recreational rivers designation.

The final Need for Change document includes the following need for change:

> B5: Revise the current plan to include management direction that ensures sustainable infrastructure related to recreation, forest health, and habitat connectivity.
>
> Final Need for Change Statement. Page 5. The document states that a basis for including B5 was the 2012 planning rule. In saying how the RGNF will address the need, the Need for Change document states "Considerations would be included in the analysis." *Id.*

The DEIS alternatives all propose the same direction for managing the transportation system. The plan direction (components and management approaches) for roads and trails is listed in Exhibit 4, attached. The direction consists almost entirely of desired conditions and management approaches, neither one of which results in definitive actions over the life of the plan and certainly does not ensure "sustainable infrastructure related to recreation, forest health, and habitat connectivity" as anticipated in the Need for Change document. For instance, the direction does not ensure that the RGNF over the life of the plan will identify its MRS or move towards a more sustainable road system. It does not provide direction for addressing the serious current and growing deferred maintenance needs necessary to ensure sustainable recreation and forest health.

Secondly, the DEIS alternatives will not as developed achieve compliance with the planning rule's substantive provisions, outlined above in section A(2)(b), and hence meet one of the primary

purposes for revising the forest plan. The planning rule imposes substantive mandates to establish plan components – including standards and guidelines – that maintain or restore healthy aquatic and terrestrial ecosystems, watersheds, and riparian areas, and air, water, and soil quality. *Id.36 C.F.R.* § 219.8(a)(1)-(3); § 219.9(a). The DEIS in several places explains that the transportation system is unsustainable and as such is causing adverse resource damage and likely will continue to. For example, the DEIS at 374 states that "Due to budgetary limitations, numerous infrastructure resources have had necessary maintenance deferred. A number have been listed as health and safety critical, including roads…. Deferred maintenance backlog is not sustainable. If not funded, numerous locations will need to be closed, which has the potential to limit access, reduce water quality…". Similarly, the DEIS states at 164-165: "Roads can have some of the greatest effects to watersheds and aquatic biota. Roads can change the runoff characteristics of watersheds, increase erosion, alter sediment composition and nutrient delivery to streams, and alter channel morphology ….Considering the likely future increase in road use, the probability of incurring additional resource damage and destruction to aquatic, riparian, and wetland ecosystems is relatively high."

5. The Draft Plan and DEIS fail to provide meaningful direction for managing the road system, as required.

The draft plan does not provide comprehensive or meaningful direction on the transportation system. The DEIS alternatives all propose the same direction for managing the transportation system. The plan direction (components and management approaches) for roads and trails is listed in Exhibit 4, attached. The direction consists almost entirely of desired conditions and management approaches, and contains very few standards or guidelines. There is nothing in the draft plan to ensure that the forests identify and implement a sustainable minimum road system, as required by subpart A. *See* subsection A(2)(a), above. Nor is there meaningful direction to ensure that the under-maintained, oversized, and decaying road system does not continue to degrade key components of ecological health and integrity, as required under the 2012 Planning Rule. *See* subsection A(2)(b), above. While a handful of infrastructure, watershed, and wildlife desired future conditions[17] briefly touch on the transportation system, they do not go nearly far enough in defining what an ecologically and fiscally sustainable road system would look like, and the plan fails to include other plan components, including standards and guidelines, to achieve those desired conditions.

For instance, the infrastructure-specific desired conditions fail to provide any vision for achieving a sustainable minimum road system. Nor does the draft plan provide any other plan components to ensure compliance with subpart A. The only direction related to subpart A is MA-INFR-13 that says that the RNGF will "Consider the travel analysis process during project-level analysis to move toward a sustainable road system." Draft Plan at 61. This is a management approach and not a plan component and therefore holds little sway in the enforceability or accountability of the plan. Similarly, the aquatics, watershed, and wildlife plan components provide a tiny bit of

[17] These are: DC-INFRA-1, DC-INFRA-2, DC-INFRA 4, DC-WA-1, G-FISH-3, S-WA-1, and DC-WLDF-5.

direction which is not nearly sufficient to meet the substantive requirements related to these resources in the planning rule, and fundamentally do not address long-term sustainability given projected increases in use of the transportation system and declining budgets.

Overall, the draft plan provides wholly inadequate direction to address the deteriorating and unsustainable forest road system and its significant ecological and fiscal impacts. Exhibit 2 recommends plan components that are necessary to achieve an ecologically and fiscally sustainable road system and that should be included in the final plan. Section B(1) above summarizes this recommended direction.

6. The proposed monitoring related to transportation is inadequate.

The Draft Plan at 109 proposes one monitoring question related to the transportation system: "MQ19: What is the status and trend of roads and trails in terms of access, use, and condition?" It then lists five indicators that will be used to answer the question. These are:

- Miles of roads and trails open year-round or open seasonally
- Miles of roads and trails built and decommissioned
- Miles of roads and trails maintained by maintenance level
- Miles of roads and trails maintained or improved to standard
- Use of roads and trails

This approach will provide a snapshot in time of the work the forest has done but will not illuminate about the overall condition of and trends related to the transportation system (e.g., how many roads and trails meet their maintenance objective by maintenance level, how many miles of roads and trails by maintenance level are impacting water quality?) or the sustainability of the system (e.g., what percent of road and trail miles were maintained to standard? What is the deferred road and trail maintenance, and how much did it change? What percent of the forest outside of wilderness has an identified minimum road system? What percent of the forest outside of wilderness has an implemented minimum road system?). We provide sample monitoring questions in Exhibit 2. We recommend that you review these and add at least some to your list of indicators.

Recommendations: Consistent with subpart A and the substantive requirements of the 2012 Planning Rule, the final plans should provide a suite of plan components aimed at achieving an ecologically and fiscally sustainable transportation system over the life of the plans. Recommended plan components are included in Exhibit 2. The Forest Service also must analyze the significant ecological and fiscal impacts associated with the forest road systems in the EIS. Adequate NEPA analysis and plan direction on the road system may require a supplemental DEIS.

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Exhibits

Exhibit 1: The Wilderness Society. 2014. Transportation Infrastructure and Access on National Forests and Grasslands: A Literature Review.

Exhibit 2: EXHIBIT 2: RECOMMNENDED TRANSPORTATION FRAMEWORK AND RELATED PLAN COMPONENTS (EXCERPT FROM THE WILDERNESS SOCIETY'S SCOPING LETTER, DATED OCTOBER 28, 2016)

Exhibit 3: EXAMPLES OF ROAD PLAN COMPONENTS FROM EXISITNG NATIONAL FOREST LAND MANAGEMENT PLANS

Exhibit 4: TRANSPORTATION MANAGEMENT DIRECTION IN THE DRAFT PLAN

Appendix 1
Canada Lynx Comments

CANADA LYNX (*Lynx canadensis*)

1. The Plan's Lynx Provisions Need Clarity and Strengthening

As an initial matter, we are pleased that the DEIS states the Forest will consult under Section 7 of the ESA with the U.S. Fish and Wildlife Service (USFWS) (DEIS at 198). The Forest Service should make its Biological Assessment available to the public and should also promptly post the Biological Opinion from USFWS on the RGNF's plan revision website as soon as it is complete and received by the Forest. We look forward to seeing the result of this legally required consultation process.

The changed ecological conditions in the forest resulting from the recent multi-year, large-scale spruce bark beetle outbreak necessitate a precautionary approach to forest management, with a high priority on maintaining or restoring ecological conditions necessary to contribute to the recovery of Canada lynx (lynx). Generally, viable populations of native wildlife species are resilient to natural disturbances, even large-scale changes. The assessment presented inconsistent science regarding whether the current forest conditions are outside of their NRV based on structure, composition, function, and connectivity characteristics. Though population estimates and trend data for the Southern Rockies' lynx population do not exist, there is no indication that numbers are sufficient to consider the population viable. Given the likelihood that the population has remained small, it may be more vulnerable to perturbations, even those that occur naturally.

The management actions and projects that are within the Forest Service's control and have the potential to impact lynx and lynx habitat must only occur with extreme care and strict adherence to strong and clear direction from the forest's management plan. We are pleased that the proposed plan has retained the Southern Rockies Lynx Amendment (SRLA) plan components. Now is not the time to make radical changes in management direction. The SRLA components are necessary to contribute to lynx recovery but we are concerned that they are not fully sufficient, owing to the condition on the forest. We recommend strengthening plan components, incorporating additional direction, and modifying some definitions in the SRLA to meet the threatened and endangered species recovery requirement of the planning rule (219.9(b)(1)) (see above).

The RGNF was prudent to help support a study on the response of lynx to mass spruce tree mortality associated with the beetle outbreak. The progress report (Squires et al. 2017) providing preliminary results should inform the revision and refinement of plan components as should final results, when these are available. The study results should be considered a significant part of the BASI informing lynx direction. The progress report noted that lynx depend on forest stands of value for salvage harvest. The Squires et al. (2017) progress report noted the following:

- "Lynx actively selected forest stands with high horizontal cover and high snowshoe hares density." At 11. They tended to prefer "areas with ≥50% horizontal cover in the summer and ≥40% in the winter." At 9.
- "Lynx selected forest stands with abundant ABLA [subalpine fir] in the understory." At 11.
- "Canopy cover (live + dead) is higher in stands selected by lynx relative to random…". At 11.
- "Lynx selected forest stands with high tree (i.e., ≥3 inches DBH [diameter at breast height]) densities; generally >400 trees/acre …". At 11.
- "Abundant large live trees, and medium, large, and very large dead trees appear to be important forest components selected by lynx." At 11.
- "Live ABLA [subalpine fir] and PIEN [Engelmann spruce] tree (i.e., ≥3 inches DBH [diameter at breast height]) densities as well as beetle-killed PIEN tree densities appear to be the species-specific components selected for by lynx. At 12.

Salvaging trees in significant areas of beetle-affected spruce-fir forest could have devastating effects on lynx habitat without a comprehensive set of plan components that fully account for the changed condition. Vegetation management (e.g., timber harvest, salvage or sanitation harvest, precommercial thinning, and fuels treatment), is considered a "first tier" threat according to the RGNF's wildlife overview for the lynx (RGNF Undated, *Lynx canadensis*), which references the Interagency Lynx Biology Team's Canada Lynx Conservation Assessment and Strategy (LCAS 2013) (ILBT 2013). The LCAS 2013 provides a compilation and synthesis of the BASI up to 2013. Vegetation management can create forest openings that lynx avoid, forest fragmentation that present barriers to movement, and risks to den sites from disturbance, for example.

Other anthropogenic stressors to lynx habitat include snow compaction resulting from over-snow vehicle use and roads and trails, livestock grazing—particularly in riparian-willow areas, and disturbance to lynx from recreational activities. Management can limit the impacts of these activities. Climate change is also a stressor. With climate change impacts already apparent on the forest, it is imperative that the forest plan provide protection to lynx and lynx habitat from threats it can control.

We make the following recommendations to improve the revised plan's ability to contribute to lynx recovery.

Desired Conditions

The plan must include desired conditions for the ecological characteristics necessary for lynx recovery in relation to structural, compositional, functional, and connectivity elements of ecosystem integrity. The proposed plan includes a variety of desired conditions related to vegetation types as defined by the RGNF, including the spruce-fir forest type. However, the existing desired conditions are too vague, general, and incomplete, in the aggregate, to provide meaningful guidance and the ability to determine progress toward their achievement as required by the planning rule. For example, DC-WLDF-3 (Plan at 25) pertaining to connectivity, which states, "[s]ufficient habitat connectivity is present in each vegetation type to facilitate species movement…" must define what "sufficient" means. As we've stated elsewhere, we believe DC-

VEG-4 and DC-VEG-5 (Plan at 38) should be modified to be plan guidelines; but desired conditions to retain green tree patches and maintain mature late-successional spruce-fir forest must also be developed and linked to the guidelines.

Objectives

> ***OBJ-LYNX-1:*** *Over the planning period, reduce adverse highway effects on Canada lynx by working with other agencies to provide for movement and habitat connectivity, and to reduce the potential for mortality. (Forestwide)*

It is not clear which desired condition this objective is linked with.

Standards and Guidelines

Part of the proposed new standard – VEG S7 (S-LYNX-7) – is a needed addition to the existing direction for the SRLA. It recognizes that lynx are still using areas with substantial, or even complete, overstory mortality that have an understory that provides dense horizontal cover. Standard Veg S 7 (Plan at 22) would apply limitations on vegetation management in areas with less than 40 percent canopy cover that still have enough understory to provide quality lynx habitat. Importantly, however, the definition for what qualifies as a Standard VEG S7 stand is not part of the actual standard itself. We request that this definition be moved into the standard itself so that there is no ambiguity as to the nature of this definition. Additionally, the relationship between this definition and the SRLA Definition 24 for "Lynx habitat in an unsuitable condition" should be explained. We believe that SRLA definition 24 is outdated and while in part correct, should be read along with the new definition related to Standard VEG S7.

However, part 2 of this standard would allow salvage harvest "when incidental damage to understory and standing green trees is minimized." "[M]inimized" is not defined. Damage to the understory during project implementation should not be allowed unless the lynx habitat remains suitable with no loss of quality, and that it will remain connected to adjacent habitat. Similarly, any damage to live trees must be minimized.

Additionally, the standard does not describe who has the obligation to minimize damage. Is the burden on the Forest Service in designing salvage projects? Or is the burden only on the third-party operator to minimize damage as they implement the activity, and if so, what is the penalty for non-compliance?

The VEG S7 standard should also be modified to clearly define whether the 200-foot vegetation management zone articulated in the standard's paragraph 1 applies to all recreation sites, as defined by the Plan at 138, or to either dispersed recreation sites or developed recreation sites. While we understand that this language tracks the language in SRLA Standard VEG S6, we would encourage the Forest to eliminate ambiguity. We also encourage the Forest to have the 200-foot vegetation management zone only apply to developed recreation sites.

Additionally, we believe this standard does not do enough, and additional direction must be added to the standard or additional standards must be developed. The Squires et al. (2017)

progress report demonstrated the importance of retaining live trees in lynx habitat, and a standard that will accomplish that is necessary. There are important conservation measures included in the LCAS (ILBT 2013: 86-96), based on BASI, that have not been incorporated in the Plan. For example, there is additional direction to prevent or limit: impacts of recreation (ILBT 2013: 94), forest/backcountry roads and trails (ILBT 2013: 94), and livestock grazing in riparian-willow areas (ILBT 2013: 94). Furthermore, several of the lynx-related Management Approaches are written as if they were standards, and should be reframed as standards in the final Plan. We discuss those in the section related to Management Approaches below.

The Supplement to Standard S1 (Plan at 24) should be clarified to reflect that this is a supplement to Standard VEG S1.

With regard to the existing SRLA requirements that are being incorporated into the revised Plan, we offer several suggestions for improvement of the SRLA to modernize it and reflect the best available scientific information.

SRLA Standard VEG S2 must be amended to reflect the new definition for unsuitable habitat found in what the draft Plan lists as MA-LYNX-2. VEG S2 specifically contemplates salvage harvest in insect-killed stands and allows such harvest to occur without contributing to the 15 percent regeneration of lynx habitat when such treatment would not change lynx habitat to an unsuitable condition, and then cites to current SRLA definition 24. The revised plan should tie the definition for unsuitable habitat to that in MA-LYNX-2 to ensure that there is no loophole allowing logging of what we now know is suitable lynx habitat.

We also recommend that certain SRLA guidelines be upgraded to standards. In particular, we believe that SRLA Guidelines VEG G5 and VEG G11 should be standards. Given that MA-LYNX-2 seems intended to protect primary prey habitat (i. e., for hare), the SRLA Guideline VEG G5, which seeks to protect secondary prey habitat, should be a standard. Guideline VEG G11, which relates to lynx denning habitat, should also be a standard.

Denning habitat is vitally important for lynx, and seems to be overlooked in many Forest Service planning processes in lynx habitat. The USFWS discussed the importance of denning habitat to lynx, and included denning habitat as a Primary Constituent Element "that provide[s] for a species' life-history processes and [is] essential to the conservation of the species" when determining which lands should be designated as Canada lynx critical habitat. 79 Fed. Reg. 54782, 54811-2 (Sept. 12, 2014). USFWS explained that "a feature or habitat variable need not be limiting to be considered an essential component of a species' habitat. Both denning and matrix habitats are essential components of landscapes capable of supporting lynx populations in the DPS because without them lynx could not persist in those landscapes." 79 Fed. Reg. at 54786.

Because lynx denning habitat "is an essential component of the boreal forest landscapes that lynx need to satisfy a key life-history process (reproduction)," USFWS identified "denning habitat to be a physical or biological feature needed to support and maintain lynx populations over time and which, therefore, is essential to the conservation of the lynx [distinct population segment]." 79 Fed. Reg. at 54810. The LCAS also notes: "Maintaining good quality and distribution of

denning and foraging resources within a LAU will help to assure survival and reproduction by adult females, which is critical to sustain the overall lynx population." LCAS at 87. Given the clear and undeniable importance of denning habitat to lynx, SRLA Guideline VEG G11 should be converted to a standard (reword "should" to "must") in the revised Plan. Not only should the Forest do this of its own accord, but it is also required to do so given the 2012 planning rule's requirements related to recovery of ESA-listed species, as discussed elsewhere in these comments.

Management Approaches

As discussed above, management approaches are optional plan content intended to describe strategies or priorities, relate to desired conditions, and describe processes such as inventory and monitoring (FSH 1909.12.22.4). They are meant to provide additional clarity and detail. Several of the following management approaches are confusing and don't seem to provide any additional guidance regarding how to meet desired conditions. Additionally, some of the management approaches highlight areas that would be appropriate for inclusion in the monitoring program.

We believe and appreciate that some of the provisions captured in these management approaches are meant to guide vegetation management activities and salvage harvest projects now, under the existing plan. However, they must comply with the requirements of the 2012 planning rule for the plan revision.

Most importantly, management approaches are not regulatory mechanisms. If any are necessary to contribute to lynx recovery, they must be revised to meet planning rule requirements for plan components and incorporated into the plan as components.

> ***MA-LYNX-1:*** *The Forest intends to use existing lynx habitat baseline conditions or other existing information, new science, data, and/or analysis tools to assess whether a lynx analysis unit meets Southern Rockies Lynx Amendment standards S1 (30 percent total unsuitable limit) and S2 (15 percent management induced unsuitable limit over 10-year period). If the limit for either standard is attained, further conversion to unsuitable (stand initiation) cannot occur unless a site-specific plan amendment is developed. (Forestwide)*

This list: "existing lynx habitat baseline conditions or other existing information, new science, data, and/or analysis tools" does not assure that information sources and methodologies will be based on BASI. In fact, the approach may be undermining the BASI requirement or any scientifically accepted method for selecting the most accurate and highest quality of information and analysis. For example, "data" sets no acceptable scientific threshold for quality relative to other available data. Once this list is updated to properly incorporate planning rule requirements related to BASI, this information should all be included in the monitoring program, so that the Forest has an official process by which to continuously monitor and report related to these changes.

The second sentence seems to restate the requirements of Standard VEG S1 and VEG S2. It's not clear what the purpose of this management approach is. A management approach cannot set a threshold for when a standard cannot be met that would trigger a plan amendment.

> ***MA-LYNX-2:*** *Definitions used to determine suitable versus unsuitable lynx habitat due to the conditions associated with the spruce beetle outbreak are:*
>
> - *Unsuitable habitat: stands with less than 25 percent live (green) canopy without understory that provides at least 20 percent horizontal density (e.g., 1 to 3 meters above average snow depth or snowshoe hare winter foraging habitat condition).*
>
> - *Suitable habitat: stands that have greater than 25 percent live canopy with or without understory, or stands that contain 0 to 25 percent live canopy and understory trees that provide at least 20 percent horizontal density in winter snowshoe hare foraging habitat condition. (Forestwide)*

Based on the BASI, these two definitions are necessary to contribute to lynx recovery; they seem to be intended to help maintain habitat for snowshoe hares – lynx primary prey. However, as with the other definitions for terms referenced in the SRLA, these definitions must be tied to specific plan components. The definition for "suitable habitat" is new and not tied to any plan components. For it to truly take effect, it must be incorporated into and referenced by a SRLA standard or a new standard specific to the Plan. If "unsuitable habitat" is intended to substitute for "lynx habitat in an unsuitable condition," defined in the SRLA (Southern Rockies Lynx Management Direction, Record of Decision, October 2008, Attachment 1-12), the mechanism for making that change must be explained and appropriately documented in the plan.

We recommend the two definitions be re-developed as standards to assure that they will serve as regulatory plan direction. The new standards must show the direct linkages between the SRLA plan components and the new definitions. The plan must show how the definitions will be applied with sufficient clarity to enable project planners to understand how they are to serve as management direction.

We understand MA-LYNX-2 is intended to provide direction that would allow for making changes without amending the plan. We appreciate that definitions related to lynx direction may need to change when the Squires et al. study is finalized and when other science indicates other necessary changes. However, in the case of changing plan direction that might change how management could affect habitat for a federally threatened species, an amendment is the most appropriate, and likely necessary, mechanism for modifying plan direction.

Finally, we recommend that the phrase "due to the changed conditions associated with the spruce beetle outbreak" be changed to "on the Forest." These definitions should apply regardless if a stand has been struck by spruce beetle kill or some other event that decreases canopy cover or horizontal density, such as fire, a different insect outbreak, windthrow, climate change, or vegetation management. Although spruce beetle outbreak is indeed the largest landscape level changed condition that the Forest is currently dealing with, it is unlikely to be the only changed

condition that the Forest experiences during the life of the revised Plan, and therefore should anticipate that its provisions will apply to other situations as well.

> ***MA-LYNX-3:*** *Prioritize the placement of snag clumps and/or other leave areas around good or high-quality winter foraging habitat to meet multiple wildlife habitat objectives. (Forestwide)*

This is written as a plan standard, and likely should be a plan standard with some modification. For example, "good" and "high-quality winter foraging habitat" must be defined. It is not clear if these concepts are meant to be different or synonymous. To which proposed plan objectives is this referring? The "multiple wildlife habitat objectives" must be spelled out in the plan. Furthermore, it is questionable that the Forest Service could reasonably meet MA-LYNX-3 because it lacks the necessary information on the location of good or high-quality winter foraging habitat, whatever those are, across the forest, thereby negating its ability to prioritize placement of snag clumps and/or other leave areas near such areas. The Forest Service should define what good and high-quality winter foraging habitat is, and also add "good-quality foraging habitat" and "high-quality winter foraging habitat" to the monitoring program so that the Forest identifies where this habitat exists, keeps it up to date based on changing conditions, and then is able to use it to identify priority placement of snag clumps and/or other leave areas.

> ***MA-LYNX-4****: Under the landscape conditions associated with the spruce beetle outbreak, additional considerations may be needed to provide for habitat connectivity within and between lynx analysis units. These considerations include: …*

The RGNF's Canada lynx overview makes clear that habitat connectivity between and within LAUs is a necessary condition for recovery (RGNF undated, *Lynx canadensis*), and this is supported by the 2013 LCAS (ILBT 2013: 93). The importance of protecting areas that enable lynx movement between core habitat areas is supported by a great body of science, including several recent studies that should further inform the plan (c.f., ILBT 2013; Squires et al. 2013; Kosterman 2014; Holbrook et al. 2017; Vanbianchi et al. 2017). Therefore, the bulleted points must be more than mere considerations. The threshold or trigger for when and where this direction is "needed to provide for habitat connectivity" should be specified. We have some concerns about the four bullet pointed "considerations," and these must be clarified.

- *Assessing habitat connectivity at multiple scales at the project level. Recommended foundation for assessment is an established sub-basin (e.g. 8th-level hydrologic unit code).*

It's not clear what this means. The various scales must be specified (e.g., the patch-scale, the LAU-scale, the project-scale?). What is the rationale for the HUC-8 foundation for this assessment?

- *Use remaining and recently changed late successional stands as foundations for connectivity patches. Recognize that both stand and landscape-level patches may be influential.*

This is written as a standard and should be modified to be a standard. It implies plan direction but does not provide sufficient information for a project planner to apply the provision. The second sentence is vague to the point of being meaningless. What does "influential" mean, for example? Influential on what? If influential, what does that mean for project planning and implementation? Furthermore, the phrase "recently changed" should be clarified as we assume the intent is recently changed as of now, but readers of the plan in 2025 may have a different view of what "recently changed" means.

- *Consider using some stream corridors for movement within and between the planning area and lynx analysis units. Stream corridors that are intended to provide functional habitat connectivity for lynx and other meso-carnivores should be at least 400 to 600 feet wide in total, and designed to promote movement within and between suitable habitat patches, sub-watersheds, and lynx analysis units, where desired based on existing landscape conditions.*

This management approach seems like it could be helpful. It reads like a guideline, and we recommend modifying it to be a guideline. It's not clear what "using" means. Are the 400-600 feet wide (minimum) corridors to become corridors through management activities? Appropriate terminology based on planning rule language would be "maintaining or restoring" with details on how to identify and protect such corridors. For example, how would these stream corridors be maintained or restored in places where livestock grazing or impactful recreational activities occur?

- *Recognize contiguous understory patches of 0.5 acre or larger as particularly valuable to snowshoe hare densities. (Forestwide)*

Specify the plan component linked to this management approach. The word "[r]ecognize" is vague here and conveys no guidance in terms of strategy or prioritization, etc. Clarify the intent of this statement.

Finally, we recommend that the phrase "associated with the spruce beetle outbreak" be deleted. These items should be considered now in response to the spruce beetle outbreak, but should also apply in the future to other potential events in the future that may be broader than the spruce beetle outbreak. Although the spruce beetle outbreak is indeed the largest landscape level changed condition that the Forest is currently dealing with, it is unlikely to be the only changed condition that the Forest experiences during the life of the revised Plan, and therefore should anticipate that its provisions will apply to other situations as well.

> ***MA-LYNX-6:*** *Where desired, based on use information or other local conservation criteria, provide additional considerations for lynx denning habitat and/or known current or past denning areas. These considerations include: …*

As has been recommended in previous comments (see Defenders of Wildlife's scoping comments on the RGNF's Proposed Action, October 28, 2016) that denning areas and known den sites must be better protected by plan components, including standards, given the changed forest condition. The introductory language is also vague and leaves too much room for

interpretation down the road. For example, the phrase "where desired" implies that there could be scenarios where the Forest Service does not care about lynx denning habitat and would choose to ignore these considerations. The phrase "where needed" or "where denning habitat is degraded" would improve this provision. Similarly, the phrase "local conservation criteria" is vague and open to too much interpretation. The Forest must be more specific. It is vitally important that this be rewritten as a standard, as it is highly doubtful any project planner would incorporate these considerations if given the leeway provided by the phrase "where desired."

- *Use existing den site layer to inform historic and potential denning activity during management activities, as needed.*

What is the "existing den site layer"? This management approach must be clarified to enable the public to understand what this means. This may be an appropriate management approach with some necessary details and specificity.

- *Use local denning model to inform presence and extent of potential denning habitat. Combine with local knowledge and field review to define potential high-quality denning habitat.*

Our recommendation for the management approach direction just above applies to this management approach as well.

- *Protect known or potential high quality denning habitat through considerations for habitat connectivity, snag patch leave areas, or through suitable lynx habitat retention needs.*

This is direction that is necessary to contribute to lynx recovery. It is written as a standard, and must be a standard in the revised plan. And "protect" must be defined in a way the project planners can apply it.

- *Recognize that lynx may use several maternal den sites in the vicinity of a natal den until the post-denning period (August). Provide for continuing availability of lynx foraging habitat in proximity to denning habitat where applicable.*

Again, this should be a standard. The language must be modified to meet the requirements of a plan standard. For example, project planners must do more than "recognize." This is supported by conservation measures recommended in the 2013 LCAS (ILBT 2013: 91). Further, "provid[ing]" for continued availability of lynx foraging habitat is too vague and needs additional clarification so that it can be a useful provision for project planners.

Monitoring and Reporting

The SRLA imposes several reporting requirements on the Forest Service regarding its implementation of the SRLA. The Forest should ensure that in the final revised plan, it is clear that any monitoring and reporting obligations related to SRLA implementation or deviations from SRLA guidelines do not just extend to the provisions listed in the SRLA itself, but should

be expanded to include anything related to items in the Plan. While the USFWS may not technically require that as part of the SRLA, the Forest should still endeavor to do this as a partner in lynx recovery.

The draft Plan's monitoring program contains several requirements for USFS monitoring, including several related to Canada lynx. And while the list in the proposed plan is a good start, the Forest should fine tune the monitoring program to reflect the various lynx-specific components so that it can ensure that accurate, up-to-date information is available to project planners and the public. In particular, while the broad monitoring questions seem to cover a wide-variety of potential items to monitor, the indicators that are actually monitored are relatively limited. Any habitat metric that is mentioned in a standard, guideline, objective, desired condition, or management approach should be tied to the monitoring program in some way. Some missing indicators that should be included are:

- Acres/Location of suitable/unsuitable lynx habitat.
- Acres/Location of good/high-quality lynx denning habitat
- Acres/Location of disturbance and management actions for lynx linkage areas and areas identified as providing connectivity between lynx analysis units.

2. <u>The DEIS Analysis is Inadequate</u>

The DEIS for the Rio Grande National Forest Revised Land Management Plan lacks sufficient analysis of the effects of the revised Forest Plan on a variety of wildlife species, but in particular Canada lynx. As an initial matter, the DEIS repeatedly directs readers to a wildlife report, but fails to identify where it can be found, its title, its author, or a website where a reader might find it to see any additional analysis contained therein. For example, the DEIS at page 214 states: "More detailed consideration of the effects of vegetation management on lynx habitat can be found in the wildlife report in the project record." However, review of the RGNF's forest plan revision website does not contain any such document, nor is one included in the references section of the DEIS.

The approach taken by the Rio Grande National Forest does not meet the planning rule's emphasis on transparency in the plan revision process. Without identifying with particularity what document this is referencing, where it can be found, and actually making it available to the public, the Forest is violating NEPA's primary goals: to inform to the public of the potential environmental impacts of its actions before making a decision. Nor can the Forest rely on anything contained in the wildlife report because it has not met NEPA's requirements for incorporation by reference, which requires "incorporated material [to be] cited in the statement and its content briefly described" and additionally the material must be available for inspection by interested persons. 40 C.F.R. § 1502.21.

We did, however, request the Wildlife Report from the Forest Service and were provided with an expanded, but draft, version of the DEIS Chapter 3 effects on wildlife section that appeared to be a draft (containing track changes and comment bubbles from USFS staff). The language in the DEIS implies that there was a separate and finalized Wildlife Report containing additional

analysis – in our mind, similar to a Biological Evaluation or Wildlife Specialist Report prepared for a project-level NEPA analysis. We were disappointed to discover that there is no such document, but rather only an early draft version of a DEIS chapter section (though admittedly, containing more information than the eventual DEIS).

Even though this document was provided promptly to us on request, we still assert that the Forest Service has not made the Wildlife Report available to the public and it has also failed to comply with the NEPA requirements for incorporation by reference. The Forest Service cannot rely on any information contained within the purported Wildlife Report to meet its NEPA obligations to analyze the direct, indirect, and cumulative impacts of the new forest plan.

The Rio Grande National Forest represents some of the best Canada lynx habitat in Colorado. As such, it is vitally important that the RGNF employ the precautionary principle and ensure that the Forest is providing conditions conducive to lynx recovery. Of particular concern is that the RGNF is in the middle of very important lynx habitat in Colorado, both for resident populations, and serving as a corridor for lynx movement into northern New Mexico. Theobald and Shenk (2011) show that the Forest overlaps with areas of high, moderate, and low intensity lynx use (based on data generated from 1999-2010). *See* Theobald, David and Shenk, Tanya, Areas Of High Habitat Use From 1999 - 2010 For Radio Collared Canada Lynx Reintroduced To Colorado (March 31, 2011) at 11. Ivan (2012) similarly shows that predicted winter *and* summer use by lynx in the Project area is incredibly high. Ivan, Jake et al., Predictive Map Of Canada Lynx Habitat Use In Colorado (2012).

Although the U.S. Fish and Wildlife Service declined to designate lynx critical habitat in Colorado, Dr. Tanya Shenk – one of the leading lynx researchers in Colorado – stated that Colorado, including the Project area, "may serve as one of the best 'higher elevation habitats within the range of the DPS [distinct population segment] that would facilitate long-term lynx adaptation to an elevational shift in habitat should one occur.' As such, the Southern Rocky Mountains, including areas in Colorado, northern New Mexico and southern Wyoming should be included as critical habitat." Shenk, Tanya, Peer Review Comments On Revised Designation Of Critical Habitat For The Contiguous U.S. Distinct Population Segment Of The Canada Lynx And Revised Distinct Population Segment Boundary, Communication to Jim Zelenak–USFWS (January 29, 2014). This all underscores the importance of the Rio Grande National Forest to Canada lynx, and counsels extreme caution in undertaking any management activities that may be detrimental to this important threatened species.

NEPA has dual goals: it "is intended to foster 1) informed agency decision-making and 2) informed public participation in the agency decision-making process." *Sierra Club v. U.S. Forest Service*, No. 1:09-vs-131 (March 7, 2012) (citing *Citizens' Comm. to Save Our Canyons v. Krueger*, 513 F.3d 1169, 1177-78 (10th Cir. 2008)). NEPA imposes an obligation on the Forest Service to disclose and analyze environmental information and consequences of federal action. *Baltimore Gas & Elec. Co. v. Nat. Res. Def. Council*, 462 U.S. 87, 97 (1983) (agency must take a "hard look" at environmental consequences before taking action). "The purpose of the 'hard look' requirement is to ensure that the 'agency has adequately considered and disclosed the

environmental impact of its actions and that its decision is not arbitrary and capricious.'" *Colo. Envtl. Coal. v. Salazar*, 875 F. Supp. 2d 1233, 1250 (D. Colo. 2012) (citing *Baltimore Gas & Elec. Co.*, 462 U.S. at 97).

Federal "[a]gencies must 'take a hard look at the environmental consequences of proposed actions utilizing public comment and the best available scientific information.'" *Biodiversity Cons. Alliance v. Jiron*, 762 F.3d 1036, 1086 (10th Cir. 2014) (internal citation omitted). This hard look "assessment of all 'reasonably foreseeable' impacts must occur at the earliest practicable point, and must take place before an 'irretrievable commitment of resources' is made." *Colo. Envtl. Coal. v. Ofc. of Legacy Mgmt.*, 819 F. Supp. 2d 1193, 1208 (D. Colo. 2011) (citing *New Mexico ex rel Richardson v. Bur. of Land Mgmt.*, 565 F.3d 683, 718 (10th Cir. 2009) reconsid. granted in part on other grounds, 2012 WL 628547 (D. Colo. Feb. 27, 2012). "An agency meets the 'hard look' requirement when it has 'made a reasoned evaluation of the available information and its method was not arbitrary or capricious.'" *Jiron*, 762 F.3d at 1086 (internal citation omitted).

An EIS must "furnish such information as appears to be reasonably necessary under the circumstances for evaluation of the project." *Utahns for Better Transp. v. U.S. Dep't of Transp.*, 305 F.3d 1152, 1176 (10th Cir. 2002). *See also Hillsdale Envtl. Loss Prevention, Inc. v. U.S. Army Corps of Eng'rs*, 702 F.3d 1156 (10th Cir. 2012) ("NEPA imposes procedural, information-gathering requirements on an agency"); *Nat'l Parks & Conservation Ass'n v. Babbitt*, 241 F.3d 722, 731 (9th Cir. 2001) ("The purpose of an EIS is to obviate the need for speculation by insuring that available data are gathered and analyzed prior to the implementation of the proposed action."). As explained throughout this comment subsection, the Forest Service fails to provide necessary baseline information to allow for informed, meaningful public comment.

NEPA statutory standards found in Council on Environmental Quality (CEQ) regulations recognize that intelligent decision-making can only derive from high quality information. *See* 40 C.F.R. §§ 1500 *et seq*. "Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in [EISs]." 40 C.F.R. § 1502.24. Information included in NEPA documents "must be of high quality. Accurate scientific analysis . . . [is] essential to implementing NEPA." 40 C.F.R. § 1500.1(b). If an agency has outdated, insufficient, or no information on potential impacts, it must develop information as part of the NEPA process or in the very least explain the lack of information. The draft Plan and DEIS do not meet this standard. At a minimum, the Forest must more adequately explain what information it has, what information it lacks, and why it cannot obtain any lacking information, especially as it relates to Canada lynx and the baseline conditions for its habitat on the RGNF.

Specifically, NEPA requires the Forest Service to disclose and analyze the direct, indirect, and cumulative impacts and consequences of its activities. 40 C.F.R. §§ 1502.16(a), 1502.16(b), 1508.25(c), 1508.27(b)(7). Direct effects include those "which are caused by the action and occur at the same time and place." 40 C.F.R. § 1508.8(a). Indirect effects are those "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." 40 C.F.R. § 1508.8(b). Cumulative impacts include "impact on the environment which results from the incremental impact of the action when added other past, present, and

reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions." 40 C.F.R. § 1508.7. Importantly, "[c]umulative impacts can result from individually minor but collectively significant actions taking place over a period of time." *Id*. Largely, the DEIS fails to disclose and analyze the direct, indirect, and cumulative impacts and consequences of implementation of the revised Forest Plan, especially as it relates to Canada lynx.

Lynx avoid areas that have been clearcut, logged, and even thinned. The Interagency Lynx Conservation Assessment and Strategy (August 2013) (LCAS) includes vegetation management as one of the top four anthropogenic threats to lynx. *See* LCAS at 71. The LCAS also recognizes that managing forests to the extent that the canopy is opened discourages use of those stands by lynx. LCAS at 73. Further, reduction in horizontal cover, one of the potential results of plan implementation, degrades the quality of winter habitat for lynx. *Id*. The LCAS also notes that lynx avoid clearcut areas, especially during winter. *Id*. Dr. John Squires, a leading lynx researcher, also emphasizes the importance of maintaining and recruiting lynx winter habitat—as opposed to winter hare habitat—because that is what is most important to conserve lynx, especially in winter when lynx are most taxed. *See* Squires, John et al., Seasonal Resource Selection Of Canada Lynx In Managed Forests Of The Northern Rocky Mountains, 74 J. Of Wildlife Mgmt. 1648–1660 (2010).

The impact of forest management activities on lynx habitat frequently is limited to an analysis of effects on snowshoe hare, a primary prey species for lynx. However, lynx winter habitat may actually be more important than producing habitat for snowshoe hare. In other contexts, the Forest Service has confused these two things and has failed to analyze and disclose the effects of forest management activities on lynx winter habitat, as well as any effects on snowshoe hare. The NEPA analysis must fully disclose and analyze effects to lynx winter habitat, both in terms of retention and recruitment of lynx, and it currently does not. This violates NEPA.

Although lynx winter habitat is of great importance, the Forest Service still must analyze the effects of the project on snowshoe hare densities, including an analysis of the baseline, and of anticipated effects. Curiously, the DEIS does not discuss or analyze hare densities and how they may be impacted by the various proposed lynx provisions in the revised Forest Plan. Further, because lynx in Colorado tend to consume greater proportions of secondary prey in their diets than elsewhere, the Forest Service must thoroughly examine potential effects to lynx secondary prey, including red squirrel. The LCAS (2013) explains that, in "Colorado, 66.4±5.6% of annual documented kills by lynx (n=604) were hares, varying annually from 30.4–90.8%, while an average of 22.6±5.7% were red squirrels (Shenk 2009)." LCAS (2013) at 18. In contrast, in "Montana, Squires and Ruggiero (2007) reported that even in areas with consistently low densities (0.1–0.6 hares/ha [0.04–0.02 hares/ac]), snowshoe hares still accounted for 96% of biomass in the lynx diet, with red squirrels and grouse accounting for only 2% each of the biomass in lynx diets during winter." *Id.* Because of the particular importance of red squirrel to lynx in Colorado as a secondary prey source, the Forest Service must thoroughly examine the baseline for red squirrel abundance and habitat on the Forest, as well as anticipated effects to red squirrel populations and habitat on the Forest from implementation of the revised Forest Plan.

The DEIS is also deficient in its discussion of effects on lynx denning habitat. The U.S. Fish and

Wildlife Service discussed the importance of denning habitat to lynx, and included denning habitat as a Primary Constituent Element "that provide[s] for a species' life-history processes and [is] essential to the conservation of the species" when determining which lands should be designated as Canada lynx critical habitat. 79 Fed. Reg. 54782, 54811-2 (Sept. 12, 2014). FWS explained that "a feature or habitat variable need not be limiting to be considered an essential component of a species' habitat. Both denning and matrix habitats are essential components of landscapes capable of supporting lynx populations in the DPS because without them lynx could not persist in those landscapes." 79 Fed. Reg. at 54786. Because lynx denning habitat "is an essential component of the boreal forest landscapes that lynx need to satisfy a key life-history process (reproduction)," FWS identified "denning habitat to be a physical or biological feature needed to support and maintain lynx populations over time and which, therefore, is essential to the conservation of the lynx [distinct population segment]." 79 Fed. Reg. at 54810. As such, extensive discussion of denning habitat and effects to it from implementation of the alternatives are needed in the DEIS. The LCAS (2013) explains that areas with large amounts of dead trees can actually enhance lynx habitat in both the short term and long term:

> After large dead trees fall to the ground, they provide cover and may enhance lynx foraging habitat in the short term and potential denning habitat in the longer term, depending on post-disturbance stand conditions. Standing snags also may provide sufficient vertical structure and cover to allow lynx to traverse long distances (>1 km [>0.6 mi]) across burned habitat (Maletzke 2004).

LCAS at 76.

Because lynx denning habitat must occur near lynx foraging habitat (see LCAS at 29), the Forest Service must discuss and analyze the current state of lynx denning habitat on the Forest, especially as it relates spatially to lynx foraging habitat. Without this baseline, there can be no legitimate determination of the effects of the revised Forest Plan on lynx denning habitat. The environmental analysis should disclose (preferably on a map) and analyze what portions of the project area currently is considered to be lynx denning habitat, what portions of the project area are considered to be foraging habitat for lynx, what portions of that lynx denning habitat would be subject to treatments, what portions of lynx denning habitat would be degraded as a result of treatments, and how long it would take for degraded or destroyed denning habitat to once again become lynx denning habitat.

Importantly, the NEPA analysis must disclose what percentage of each LAU is made up of lynx denning habitat, how much coarse woody debris currently exists within the denning habitat in each LAU, or what anticipated changes to coarse woody debris in each LAU's denning habitat would result from the Project's implementation. These issues should be addressed both qualitatively and quantitatively. If the Forest Service does not have this information, it must explain what information it lacks and why it cannot reasonably obtain that information or data.

The DEIS mentions that there are four lynx linkage areas on the Forest, and then names two of them: Wolf Creek Pass and North Pass. DEIS at 209. NEPA requires that the Forest Service discuss all four linkage areas by name and location, how the lynx provisions in the draft forest plan might help protect them, and how imp[lamentation of the alternatives might impact the

linkages. In particular, we recommend that the Forest Service include a map in the FEIS clearly showing all four linkage areas so that the public has a better sense of where they are located and how they might impact management of forest resources.

Similarly, there is no list of the Lynx Analysis Units (LAUs) on the Forest. This should be a necessary component of the DEIS. In addition to a list, a map of the LAU locations (which could be combined with the linkage map) would be very helpful to the public and future project planners. Information on the LAUs should also be provided, including all information that is reported to the USFWS about each LAU under the SRLA's reporting requirements. The size of the LAUs, their current condition, how much habitat is suitable, how much management each LAU has seen, and any other information that the Forest has on LAUs should be documented in the DEIS, along with a discussion of potential effects from implementation of the revised Forest Plan on the LAUs.

The Rio Grande National Forest is uniquely situated in that it shares a border with both the State of New Mexico and the Carson National Forest. Despite this, the Canada lynx section of the DEIS contains no discussion about connectivity and lynx movement between the RGNF and the Carson NF. This section of the DEIS should also discuss the Carson's revised Forest Plan lynx provisions and how they relate to the Rio Grande's similar provisions. The DEIS does note the importance of linkages: "Connective habitat between administrative units in the San Juan Mountains and beyond is essential for facilitating movement of Canada lynx across the landscape." Id. at 209.

The DEIS provides several statistics for the amount of suitable and unsuitable lynx habitat on the Forest. There is no indication, however, as to what definition of suitable and unsuitable lynx habitat the Forest is using. While we anticipate that the total amount of lynx habitat on the Forest based on flights conducted from 2010 to 2014 reflects the SRLA's suitable lynx habitat definition, it is unclear for the 2017 statistic related to baseline conditions for unsuitable lynx habitat. *See* DEIS at 209. We recommend that the Forest Service clarify what definition it is using for the various statistics related to lynx habitat in the DEIS.

Under Threats and Risk Factors for lynx, the DEIS discusses a number of threats and risk factors from the 2000 LCAS and the 2008 SRLA. *See* DEIS at 211-212. Although helpful, there is no specific analysis as to how implementation of the revised Forest Plan or any alternatives might impact these threats and risk factors. And while the Forest does include some threats and risk factors specific to the post-spruce beetle environment, DEIS at 212, it also omits some threats and risk factors. In particular, there is no mention of the considerably newer LCAS from 2013 which identifies additional threats. In particular, the 2013 LCAS describes two tiers of "anthropogenic influences." LCAS 2013 at 68. The first tier includes: climate change, vegetation management, wildland fire management, and habitat fragmentation. *Id*. The second tier includes: incidental trapping, recreation, minerals/energy development, illegal shooting, forest roads/trails, and grazing. LCAS 2013 at 78-85. Although we assert that few of these identified "anthropogenic influences" are considered by the DEIS, in particular, there is no analysis of climate change or habitat fragmentation as it relates to lynx and the revised Forest Plan. This violates NEPA's requirement that the Forest Service take a hard look at all potential direct, indirect, and cumulative effects.

Although the SRLA can provide a framework for analysis, the Forest Service must remember that the SRLA is nearly 10 years old and is outdated. The Forest Service has an obligation to update its analysis, including the scope of that analysis, based on new scientific information about lynx and threats to its recovery. Similarly, page 213 of the DEIS states: "The Southern Rockies Lynx Amendment provides an overview of all activities that might influence Canada lynx…". But as already discussed, this statement is inherently wrong as there is considerable new scientific information since the SRLA came out in 2008 about activities that might impact lynx, and as such, the DEIS must be updated to account for this.

For the various "Effects on Canada lynx" sections on a variety of threats (DEIS at 214 et seq.), the Forest Service fails to consider new information since 2008. This includes climate change, the 2013 LCAS, new published papers related to Canada lynx, including Dr. Squires and Dr. Ivan's work (as well as the work of others) in Colorado and specifically on the RGNF related to lynx. As such, it is inappropriate and a NEPA violation to merely rely on the SRLA analysis of effects and to conclude "[t]here is no expected increase in effects to lynx or lynx habitat" from vegetation management. DEIS at 214. This conclusion is unjustified, especially given the large salvage logging program under the proposed plan and alternatives. The Forest Service must complete a thorough effects analysis that the public has an opportunity to comment on.

In particular, the Forest is adding a number of new provisions to the Forest Plan related to lynx, including a new standard, new definitions, and various Management Approaches. See discussion above in subsection 1. None of these were analyzed in the SRLA or either LCAS, and therefore potential effects from their implementation must be analyzed in the DEIS. Failure to do so violates NEPA. As part of this analysis, the Forest must disclose sufficient baseline data about the state of the Forest. Obviously the Forest has seen dramatic changes in recent years as a result of beetle kill, but the Forest should still disclose additional baseline data, including: amount and location of the different types of lynx habitat (denning, foraging, winter habitat) and hare habitat, and information on Lynx Analysis Units on the Forest.

Furthermore, the Forest Service must also disclose and analyze the effects of implementation of the various new lynx provisions on other at-risk species, such as American marten, boreal owl, and other Species of Conservation Concern, as well as on the provision of ecosystem services from implementation of these new lynx-specific provisions. Although the provisions are designed to aid lynx recovery, they will have impacts on other Forest resources, and those impacts need to be analyzed to comply with NEPA's obligation that the Forest Service disclose and analyze all potential direct, indirect, and cumulative effects of its proposed revised Forest Plan and alternatives to it.

Table 53 on page 216 of the DEIS must be updated. It is not appropriate to use a table from a 2007 document as baseline information for a 2018 revised Forest Plan. The Forest should update the table based on current information, or explain in detail why it cannot do so. Additionally, this table should include information on temporary roads that exist on the Forest, including ones that have been administratively closed or that are scheduled for decommissioning in the future. Temporary roads have significant effects on a variety of Forest resources when they are present

on the landscape, and baseline information about their presence should be included in the DEIS, along with a discussion of their effect on Forest resources, including lynx.

The USFWS is under a court-ordered deadline of January 15, 2018 to complete a recovery plan for Canada lynx. *See Friends of the Wild Swan v. Ashe*, Case No. 13-cv-57-DWM, Docket Number 30 at 1 (D. Mont. June 25, 2014). Given that USFWS has not yet released a draft recovery plan or completed the required public notice and comment period, it will be impossible for USFWS to meet the January 15, 2018 deadline. When and if the final Recovery Plan is released for lynx, the Forest Service must review and consider it as significant new information and determine what, if any, effect it has on the proposed revised Forest Plan. The Forest should also allow the public to submit comment on the effect of the recovery plan on the proposed revised Plan.

Appendix 2
Snag and Downed Wood Targets

Snags and down wood were identified as key ecosystem characteristics in the assessment for evaluating ecological integrity. The document used in Appendix A (Plan at 153) to set snag and downed wood targets is over 25 years old. While some species information published around that time, even before, is still relevant, much research conducted after 1992 has provided new information about species' habitat requirements and characteristics. Compare the proposed plan recommendations with snag and down wood targets for forest-dependent at-risk species. For example, we find the desired conditions that outline snag metrics for spruce-fir associate species must be modified to better protect snag and downed wood requirements for wildlife.

The snag recommendations in **DC-VEG-1** aren't sufficient to provide for the habitat needs of, for example, the American marten and boreal owl—both potential SCC. As stated above, there is a need to clarify the definition of "planning unit" as applied to this DC; it must apply to the appropriate scale, i.e., the project scale.

Modified Table 5 (Plan at 37): Recommended snags and downed wood for wildlife habitat and ecosystem processes (Spruce-fir)

Forest Type	Snags			Downed Wood[1]
	Minimum diameter at breast height	Minimum/Acre in Planning Unit	Minimum height (feet)	Tons/Acre
Spruce-fir	[2]12	6	25	10–15

[2] At least 50 percent of the required snag numbers should represent the largest size classes available

We are especially concerned about snag desired conditions in relation to boreal owl and American marten needs; they do not squre with BASI synthesized in the RGNF's wildlife overviews (RGNF undated, *Martes americana*; RGNF undated, *Aegolius funereus*) and additional BASI related to the marten (Hargis et al. 1999; Powell et al. 2003; Buskirk and Ruggiero 1994; Buskirk and Zielinski 1997; Ruggiero et al. 1998) and owl (Ryder et al. 1987; Hayward et al. 1987, 1993; Hayward 1994; Herren et al. 1996).

Boreal owls are subalpine secondary cavity nesters and the largest cavity nesting species in the Southern Rockies (Hayward 2008). They need large snags and trees for nesting: a minimum of 9 snags per acre at 13 inches in diameter at breast height (dbh). To enable retention of sufficient snags for boreal owl nesting, projects cannot manage to the minimum. The average snag size is 25 inches dbh, and some snags must be retained at much larger diameters than 12 inches (the recommendation in DC-VEG-1). The American marten requires snags greater than 16 inches dbh.

American martens are depended on snags and down wood. They need at least 9 snags per acre at >16 inches dbh and at minimum 47 logs per acre at >16 inches in diameter (see scientific references above).

> ***DC-VEG-9:*** *When salvaging timber following wildfire, retain tall snags for snag-associated species and snag location in the riparian management zone. (Forestwide)*

This DC is written as a standard. As written, it doesn't meet the planning rule requirements for a DC or standard. This should be a standard, because it provides a constraint on protect activities. We state more about this below.

> ***DC-SCC-5:*** *Large log (generally greater than 18" diameter) components contribute to the downed woody material remaining in the post-treatment environment. Log decks and slash piles provide supplementary habitat features for marten and other forest species. (General Forest Geographic Area)*

Down wood related to species' habitat characteristics tends to be measured by metrics including stem and log density and stem and log size vs. by weight. Table 12 on page 38 of the Terrestrial Ecosystems Assessment provides a down wood metric by density. We appreciate the inclusion of a DC the helps capture some of the understory requirements of at-risk species, e.g., the American marten and also Canada lynx. Including a density target to this DC is necessary to better assure that the plan contributes to viability and recovery of at-risk species.

> ***MA-VEG-10:*** *In areas suitable for timber production, dead or dying trees (due to fire, insects, disease) are salvaged to recover the economic value of the wood while providing for ecosystem function, including but not limited to retention of downed woody material, habitat, and snags as well as public safety. (General Forest Geographic Area)*

To achieve DCs (with the modifications we recommend), a standard or standards and guidelines must be developed to put constraints on vegetation management activities that impact snag and downed wood retention. This is necessary to meet requirements for at-risk species. A management approach is adequate to achieve this. The following is an example of a standard from the Flathead National Forest's Revised Draft Plan of May 2016 (at 45-46) that lays out parameters for snag retention. Though we do not necessarily endorse the substance of the standard, it demonstrates how a standard can be written to provide clearer direction to project planners and evaluative criteria for monitoring achievement toward the associated DC.

> In the absence of a site-specific analysis that supports an alternative prescription for snags or decadent live trees, timber harvest areas shall retain at least the minimum number of snags and/or decadent live trees displayed in table 16. The intent is to provide sufficient habitat both short and long term, well distributed across the landscape, for wildlife species associated with snags and decadent live trees, particularly those that are larger and longer lasting (refer to appendix C). All western larch, ponderosa pine, and black cottonwood snags greater than 20 inches shall be left. If present, decadent live trees greater than 20 inches d.b.h., especially those with evidence of wildlife use, may be used as a substitute for 20 inch d.b.h. snags, to achieve minimum levels in table 16. Exceptions to this snag retention standard may occur, for example in areas where the minimum number or snags or decadent live trees are not present prior to management activities; where there are issues of human safety (i.e., developed recreation sites); and in areas

within 200 feet of a road that is open to firewood cutters. Refer to appendix C for guidance on implementing this snag retention guideline.

Table 16. Snag levels to retain (where they exist) in timber harvest areas

Biophysical setting	Minimum number of snags per acre	
	Greater than or equal to 15 inches d.b.h.[ab]	Greater than or equal to 20 inches d.b.h. [c]
Warm-Dry	3	1.4
Warm-Moist	8	2
Cool-Moist/Mod. Dry	5	2
Cold	3	1

a. This minimum number includes snags greater than or equal to 20 inches d.b.h.
b. If snags greater than 15 inches are not available, then snags greater than 12 inches should be retained.
c. If snags greater than 20 inches are not available, then additional snags or decadent live replacement trees greater than 20 inches d.b.h. should be left if available.

Below is a corresponding guideline example from the Flathead National Forest's draft plan (at 48). Again, we do not necessarily endorse the guideline, but it illustrates a guideline that is linked to a specific DC and describes the intent of the guideline and constraint.

> In the absence of a site-specific analysis that supports an alternative prescription for downed wood retention, retain a minimum of approximately 10 tons per acre of down woody material greater than 3 inches in diameter within timber harvest units, where available. The maximum amount of total downed woody material should generally not exceed 35 tons per acre. Retained material should consist of the longest and largest available, and where possible, consist of intact pieces of a variety of species, sizes and stages of decay, including cull tops and cull logs. The intent is to contribute to forest structural diversity and provide forest components that are important to many wildlife species. Exceptions may occur, for example when there is insufficient material of suitable size prior to harvest, within developed recreation sites, or where fuel reduction is desired to decrease expected fire behavior (e.g., within wildland-urban interface).

We urge the RGNF to revised its plan components related to retaining sufficient snag and down wood components in forested ecosystem based on key characteristics needed by at-risk species.

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Appendix 3

Salvage Logging Impacts

Based on years of science, we know that post-disturbance salvage logging, and the same or similar practices labeled with different terminology (e.g., sanitation harvest), can severely degrade forest ecosystems and harm wildlife and plant species (c.f., Beschta et al. 2004; Karr et al. 2004; Donato et al. 2006; Noss et al. 2006; Shatford et al. 2007; Thompson et al. 2007; Lindenmayer et al. 2004, 2008). For example, Hutto et al. (2016) provide a comprehensive survey of negative ecological impacts of post-fire salvage logging, stating,

> Unfortunately, salvage harvesting activities undermine the ecosystem benefits associated with fire (Lindenmayer et al. 2004, Lindenmayer and Noss 2006, Swanson et al. 2011). For example, postfire salvage logging removes dead, dying, or weakened trees, but those are precisely the resources that provide nest sites and an abundance of food in the form of beetle larvae and bark surface insects (Hutto and Gallo 2006, Koivula and Schmiegelow 2007, Saab et al. 2007, 2009, Cahall and Hayes 2009). No fire-dependent bird species has ever been shown to benefit from salvage logging (Hutto 2006, Hanson and North 2008). The ecological effects of salvage logging on aquatic ecosystems are also largely negative (Karr et al. 2004). In fact, the demonstrated negative ecological effects associated with postfire salvage logging are probably the most consistent and dramatic of any wildlife management effects ever documented for any kind of forest management activity (Hutto 2006).

Given social and political pressure to salvage harvest, the past extent and impacts of such activities must be examined in the assessment.

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Appendix 4
Timber Suitability Analysis Issues

The Planning Rule requires that, "The responsible official shall identify lands within the plan area as not suited for timber production…" when they meet at least one of six criteria (36 CFR §219.11(a)). Appendix C explains how each of the criteria were applied on the Rio Grande, but does not explain why in some cases. We would like to see that documentation in conjunction with the final plan. It should explain what "high mass movement potential" is and why that is the only criterion that was used for irreversible resource damage (like erosion). It should also explain the choice of elevations and aspects used for the restocking criterion, as well as provide the assumptions regarding management system and restocking levels, as shown in Planning Handbook 61.13, Exhibit 01. A map showing the results of each criterion should be provided.

We also think that additional lands should be identified as not suitable for legal reasons: National Scenic and Historic Trails (including a ½ mile buffer on each side), National Recreation Trails (including a ½ mile buffer on each side) and National Scenic Rivers. The criterion for excluding these lands from timber suitability is prohibition of timber production. We believe that while the designation of these areas may allow continued timber harvest, regular harvest of a "crop of trees" is not compatible with the requirements of the designation. Because the forest planning process cannot change these prior designations they will not be included as suitable in any alternative, and they should not be included as lands that would contribute to the sustained yield limit.

We are most concerned about the lack of explanation for lands that are suited for timber production because they are compatible with the desired conditions and objectives for the land areas. The Planning Handbook provides five criteria for making this determination (§61.2), and the rationale for each land unit must be provided in terms of these criteria. The DEIS says nothing about why such areas were found to be suitable. The only comments about suitable lands are that two of the categories have been changed from unsuitable to suitable (relating to grasslands and bighorn sheep). There is an even greater burden for providing a rationale in these cases to explain why what was unsuitable is now suitable. The plan documentation must provide a rationale for each unit with different management direction (management area), and possibly subdivisions based on different resource conditions within a management area that relate to achieving their desired conditions and objectives.

Table 20 summarizes acres suitable for timber production by alternative. The failure to explain in greater detail the reasons for suitability leaves us wondering how the no-action alternative could have the fewest suitable acres – especially because the legal/technical factors have not changed, but most roadless areas would have been considered suitable in the current plan. We expected suitable acres to decline. Please show all suitable acres that were added to the current plan and the associated rationale for their suitability.

The sustained yield limit calculation does not comply with NFMA. NFMA requires that plans "limit the sale of timber from each national forest to a quantity equal to or less than a quantity which <u>can be removed</u> from such forest annually in perpetuity on a sustained-yield basis"

(emphasis added). When determining this sustained yield limit, what "can" be removed requires that the calculation take into account the effects of plan components on timber harvest, and so it must vary by alternative. Other volume can't be removed on a sustained-yield basis so may not be included in this calculation. A sustained yield limit that is too high may lead to violating the NFMA requirement for sustained yield. (The Planning Handbook is incorrect in this regard, but the Timber Resource Planning Handbook, FSH 2409.13, Chapter 30, properly reflects NFMA requirements.) Please also provide any valid reasons for a change in the long-term sustained yield from the current plan.

The assumptions displayed in Table 19 are helpful. However, these are the assumptions that would be used for optimum timber production. It is also necessary to show how these assumptions would change by management area where there are resource needs that would be incompatible with optimum timber production, but would be compatible with reduced intensity of timber production. The rationale for how management areas affect timber volume must be explained.

The adjustment to timber volume for mortality must be explained further. Mortality due to insects and disease is considered in determining harvest volume, but why is mortality due to fires not treated similarly? Table 28 indicates that salvage volume from this mortality would be not treated as "timber products." What assumptions have been made to come up with "estimated salvage volume?" How are they affected by plan components?

Table 28 shows the results expected timber quantities by alternative but there is no explanation of the assumptions behind these figures. It appears from Table 28 that there would be no timber harvest on unsuitable lands, but there is no discussion of this. This contributes to an impression that there are lands not compatible with timber production that are being treated as suitable so that timber harvest may occur there.

Appendix 5
Planning for Climate Change

"Climate change is a huge challenge; meeting it will take bold and ambitious action." – Forest Service Chief Tom Tidwell, July 2016.

2016 was the hottest year ever recorded on earth, marking three consecutive record setting years. [1] For Defenders of Wildlife, the extinction of imperiled species and the associated loss of biodiversity accelerated by climate change is alarming. There is an urgent need to confront this growing threat.

This report explains how the U.S. Forest Service, working with the American public, can take bold and ambitious actions to address climate change impacts on America's national forests, which harbor a significant quantity of the nation's at-risk fish and wildlife populations. As the primary steward of America's national forests, the Forest Service must lead the response to the climate crisis facing America's national forests by making climate-based conservation a centerpiece of the agency's agenda. The report discusses how the agency's *2012 Planning Rule* can be used as an affirmative vehicle for systematic climate conservation planning and action.

This is the third in a series of reports issued by Defenders of Wildlife associated with the conservation of national forest lands, waters and wildlife under the Forest Service's 2012 Planning Rule. Readers may find the two previous reports – *Planning for Diversity* and *Planning for Connectivity* – valuable background reading in understanding the 2012 Planning Rule. [2]

INTRODUCTION

Because of specialized habitat needs, limited distributions and restricted dispersal abilities, imperiled fish and wildlife populations experience heightened vulnerability to climate change impacts (Thomas et al., 2004). America's national forests are strongholds for at-risk fish and wildlife, supporting more than 400 animals and plants listed under the Endangered Species Act (ESA) and over 3,000 other at-risk species, many of which will have difficulty adapting or moving in response to likely future climates. To put this in perspective, nearly one in three species listed under the ESA depends on national forests to some degree for their survival, including roughly one in three listed birds, and nearly

Nearly one in three species listed under the Endangered Species Act depends on national forests to some degree for persistence.

[1] http://www.noaa.gov/stories/2016-marks-three-consecutive-years-of-record-warmth-for-globe

[2] Available at: www.defenders.org/publication/planning-diversity and www.defenders.org/publication/planning-connectivity

40 percent of listed mammals, including iconic species such as gray wolves, Canada lynx, jaguars, Florida panthers and brown bears.

There are also 200,000 miles of streams in America's national forests, and national forests support many at-risk aquatic species, including over 50 percent of the nation's listed amphibians, one of the most vulnerable taxonomic groups to climate change impacts. In addition, roughly two-thirds of the fish species listed under the ESA occur on national forests, or are potentially affected by national forest management, along with nearly one-third of listed crustaceans (e.g. shrimp and crayfish), and a stunning 80 percent of listed mollusks (e.g. snails, slugs, and mussels). Many freshwater mussels concentrated in national forest streams in America's south are being pushed to the brink by warming waters, drought, development and pollution.

As one of the nation's primary drinking water providers, climate change impacts to national forest watersheds will profound implications for human communities.

National forests are the headwaters of America's watersheds. In the American west, mountain snowpack accounts for roughly 75 percent of streamflows. Altered streamflows and rising water temperatures pose an acute threat to these waters, including to iconic and commercially valuable cold-water dependent species such as native trout and salmonids. Considerable research attention is being focused on the conservation of cold-water ecosystems and cold-adapted native salmonids (Nelson et al., 2016).

As one of the nation's primary drinking water providers, climate change impacts to national forest watersheds also have profound implications for human communities. About 20 percent of the nation's waters originate in national forests and some 180 million people rely on these sources for their drinking water, including the urban residents of Los Angeles, Portland, Denver, Atlanta and many other large cities. National forest based water has been valued at over $7 billion.

One quarter of Alaska's 5.4 million acre Chugach National Forest, the northernmost of all the national forests, is covered by retreating snow and ice.

Climate change impacts will be particularly severe in certain regions. For example, Alaska is warming at twice the rate than the rest of the United States (Haufler et al., 2010). In 2015, driven by warm temperatures and uncharacteristically dry and flammable vegetation, wildfires burned over 5 million acres in Alaska, the second largest number of acres burned since 1940. Alaska is also annually losing 75 billion metric tons of ice from glaciers (Larsen et al., 2015). One quarter of Alaska's 5.4 million acre Chugach National Forest, the northernmost of all the national forests, is covered by now retreating

snow and ice. The Forest's coastal glacial fjords, bays and glacier fed streams support abundant fish and wildlife, including the imperiled Kittlitz's murrelet, a seabird which utilizes glacial habitat for nesting and foraging, as well as all five species of pacific salmon, which in addition to playing a keystone role in ecosystem productivity, contribute more than 230 million dollars per year to the commercial fishing economy. According to the forest's proposed revised forest plan: "Recent and increasing climate change effects represent perhaps the most pervasive environmental alterations affecting the Chugach National Forest" (USDA, 2015a). The forest is particularly concerned with the spread of the highly invasive *Elodea spp.* (waterweed), which has been discovered in the Copper River Delta – one of the largest and most productive wetlands of the world – and is known to degrade water quality, reduce dissolved oxygen, and impact native fisheries.

The Third National Climate Assessment, the definitive report compiled by more than 300 experts summarizing the impacts of climate change on the lands and waters of the United States, concluded that "(c)limate change is increasing the vulnerability of many forests to ecosystem changes and tree mortality through fire, insect infestations, drought, and disease outbreaks" (Joyce et al., 2014). Forests have always been shaped by wildfire, insects and disease, but their natural resiliency was maintained in the absence of human-driven impacts that lead to habitat loss, degradation and fragmentation. The immediate repercussions of a changing climate, such as persistent drought and longer dry seasons, will be significant changes in the magnitude of wildfire, insect and disease disturbances. These uncharacteristic disturbances, in combination management-based stressors such as invasive species, inappropriate grazing, road building, and fire suppression, pose a serious threat to the resiliency and persistence of national forest ecosystems and resident biodiversity (Vose et al., 2012).

Increases in the frequency and severity of wildfire due to climate-driven drought and longer fire seasons – coupled with ongoing management stressors like invasive species and fire suppression – could result in unprecedented and devastating changes to forests.

Increases in the frequency and severity of wildfire due to climate-driven drought and longer fire seasons could result in unprecedented and devastating changes to forests and the fish and wildlife they harbor (McKenzie et al., 2004; Gaines et al., 2012). A recent study estimated that climate change accounted for more than half of the documented increases in forest aridity found in Western U.S. forests over the past four decades, and is the primary driver expanding the seasonal duration, extent and severity of wildfires (Abatzoglou and Williams, 2016).

The Forest Service is expending an enormous amount of resources fighting and suppressing wildfires, a problem that becomes more acute as more people move into the areas adjacent to national forests, and more acres burn due to climate impacts. For example, 2015 was a record for wildland fire in the United States: it marked the first time that over 10 million acres burned, and federal fire suppression

costs exceeded $2 billion for the first time ever.[3] Firefighting now consumes over 50 percent of the Forest Service's budget and, barring a fix to the budgeting process and changes in suppression policies, is expected to account for two of every three dollars of the agency's budget by 2025 (USDA, 2015b).

Systematic conservation planning on national forests will be critical to support the conservation of fish and wildlife habitat in the face of climate change. Due to their location, elevation, size and management focus, national forests provide distinctive and critical conservation and climate protection values.

For many climate and management-stressed populations of fish and wildlife, national forests may offer climate refugia; areas likely to experience less change than the surrounding landscape.

National forests will play a critical role in providing climate refugia for a significant number of climate and management-stressed fish and wildlife populations. Climate change effects will not be uniform in space and time. Climate refugia can be defined as habitat areas likely to experience less change than the surrounding landscape, and many national forests will need to provide these valuable climatic conditions.

For example, in 2013 the U.S. Fish and Wildlife Service (USFWS) identified climate change as the primary threat to the wolverine in the continental United States (USDI, 2013). Wolverines rely on deep spring snow to rear their young, so they are especially vulnerable to the loss of their alpine habitat due to climate change. Scientists predict that wolverines in the coterminous United States may lose two-thirds of their suitable, snow-covered habitat by the end of the century. Much of the remaining suitable habitat will be found in high-elevation national forests, such as those in Montana's northern Rockies. These forests will need to recognize the key role they play in the species' conservation, manage alpine refugia habitat to alleviate other threats (for example from motorized recreation), and proactively plan to provide for connections between increasingly isolated snowy alpine habitats.

Similarly, national forests will play a major role in maintaining and restoring climate-resilient conditions for species such as bull trout, which were listed as threatened under the ESA in 1999 and rely upon cold, pristine streams and lakes throughout their range. Rising temperatures and lower stream flows, along with management stress brought on by grazing and inappropriate timber harvest, degrade the cold-water habitat conditions that bull trout require for spawning and rearing. But the loss of cold-water habitat will not be uniform throughout the range of bull trout; some areas are more likely than others to retain cold-water conditions over time, due to factors such as high elevation, low

[3] https://www.nifc.gov/fireInfo/fireInfo_statistics.html

exposure to solar radiation, or high rate of groundwater inflow, thus providing climate refugia for the fish (USDI, 2015). The promulgation of a new forest planning regulation provides the Forest Service with a mandate to consider climate change in the conservation of climate-stressed species such as bull trout.

THE 2012 PLANNING RULE

Conserving fish and wildlife populations on national forests in the face of climate change will require science-driven, systematic and well-coordinated landscape-scale conservation planning efforts to assess and respond to climate-driven threats to habitat (Margules and Pressey, 2000).

Management in the face of climate change is commonly referred to as climate change adaptation, defined by the Intergovernmental Panel on Climate Change (IPCC) as "the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" (McCarthy et al., 2001). Climate adaptation planning involves the development of forward-looking goals and strategies "specifically designed to prepare for and adjust to current and future climatic changes, and the associated impacts on natural systems and human communities" (Stein et al., 2014). The Forest Service can help ameliorate climate-driven and compounding anthropogenic impacts through strategic conservation planning and targeted action to increase the likelihood that ecosystems and species will persist over time.

Thanks to a regulation adopted in 2012, the Forest Service is well positioned to do this. In 2012 the Forest Service adopted a new regulation to guide the development of land management plans – commonly called forest plans.

Forest plans dictate where and how to conserve and recover at-risk species, or where to harvest timber or graze livestock. Importantly, forest plans balance the conservation of habitat with management activities so that fish and wildlife populations will be sustained.

The 2012 Planning Rule is a regulation that implements the National Forest Management Act (NFMA, 1600 U.S.C. § 1600 et seq.), the primary law governing management and conservation of our national forests, watersheds and occupant fish and wildlife. Every national forest has a forest plan to guide conservation actions and management projects. For example, forest plans dictate where and how to conserve and recover at-risk species, or where to harvest timber or graze livestock. Importantly, forest plans balance the conservation of habitat with management activities so that fish and wildlife populations will be sustained.

The planning rule's adaptive framework mirrors those proposed in other adaptation planning guidances (Cross et al., 2012; Stein et al. 2014), and reflects primary principles for adaptation planning, including the establishment of clear conservation goals, adaptive management, the use of vulnerability assessment, best available science and science-management partnerships (Joyce et al., 2009; Littell et al., 2012; Peterson et al., 2011).

The 2012 Planning Rule explicitly pushes the Forest Service to address climate change impacts on fish and wildlife populations during the forest planning process. For instance, one of the primary policy goals of the planning rule is to "emphasize restoration of natural resources to make our (national forest) lands more resilient to climate change" (Preamble, 21164). The rule itself states that one of its purposes is to allow "the Forest Service to adapt to changing conditions, including climate change…" (§219.5(a)). Forest plans developed under the 2012 Planning Rule will also reflect the conservation goals and objectives of the Forest Service' strategic plan, one of which is to "(f)oster resilient, adaptive ecosystems to mitigate climate change" (USDA, 2015c). The Planning Rule's directives – the procedural policies that prescribe the development of forest plans – have numerous instructions over how to incorporate climate change into the planning process.

Assessing Climate Change Impacts to Ecosystems and At-risk Species

The planning rule requires an assessment to appraise "the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change" (§219.6(b)(3)).

The planning rule adopts an adaptive planning framework that includes: 1) an assessment of climate impacts to ecosystems, watersheds, fish and wildlife; 2) the development of the forest plan, including strategies and actions to sustain those resources in the face of climate threats, and; 3) a monitoring and evaluation program to determine whether the forest plan's climate conservation strategies are effective.

The forest planning process begins with an assessment of social, economic and ecological conditions and trends within the forest planning area. The purpose of this assessment is to determine how the revised forest plan can meet the requirements of the planning rule and sustain these values and resources.

The ecological assessment applies the best available scientific information to evaluate climate change impacts to the ecosystems, watersheds, and at-risk species within the forest planning area. The planning rule specifically requires the assessment to appraise "the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change" (§219.6(b)(3)). To support adaptive management, the assessment should also identify information gaps, uncertainties, and assumptions associated with ecosystem and species adaptation to climate change.

The purpose of the assessment is to determine how the revised forest plan can meet its conservation objectives in the face of climate impacts. It will therefore evaluate climate impacts on 1) the sustainable condition - or in the jargon of the rule, the ecological integrity – of the forest's ecosystems and watersheds, and 2) the biological and physical environments (in the rule, the ecological conditions) that support the ability of at-risk fish and wildlife populations to persist on the forest (Table 1).

Table 1: Conservation objectives of the 2012 Planning Rule for ecosystems and species

Ecological Integrity	Requirement: Maintain or restore the *ecological integrity* of terrestrial and aquatic ecosystems and watersheds in the plan area, including their structure, function, composition, and connectivity. Definition: The quality or condition of an ecosystem when its dominant ecological characteristics (for example, composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence.
At-risk Species *Threatened and Endangered* *Candidate and Proposed* *Species of Conservation Concern (SCC)*	Requirement: Determine whether or not the (ecosystem) plan components provide the ecological conditions necessary to: contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern within the plan area. If the responsible official determines that the (ecosystem) plan components are insufficient to provide such ecological conditions, then additional, species-specific plan components, including standards or guidelines, must be included in the plan to provide such ecological conditions in the plan area. Definition of ecological conditions: The biological and physical environment that can affect the diversity of plant and animal communities, the persistence of native species, and the productive capacity of ecological systems. Ecological conditions include habitat and other influences on species and the environment. Examples of ecological conditions include the abundance and distribution of aquatic and terrestrial habitats, connectivity, roads and other structural developments, human uses, and invasive species.

Managing for "coarse-filter" ecosystem conditions is expected to support the majority of biodiversity found in national forests; however, the planning rule appropriately acknowledges that some fish and wildlife populations are not likely to be conserved through an ecosystem approach alone (Noon, 2003). The rule therefore establishes a second set of conservation targets at the species-level of biological organization for conservation and adaptation planning. At-risk species include species listed, proposed for listing, or candidates for listing under the ESA, and others designated by the Forest Service as being species of conservation concern (SCC).[4] Climate threats may be a factor in determining that a species is of conservation concern on the forest.

[4] A species of conservation concern is a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the

The assessment will identify the ecosystems and the at-risk species within the forest planning area. For each of the forest's ecosystems, a limited set of measurable ecosystem characteristics will be evaluated to determine the integrity of the ecosystem (Table 2). In addition to reflecting the conservation needs of individual species associated with the ecosystem, the chosen characteristics should be selected because they are helpful for understanding the effects of climate change; for example, the characteristic may be vulnerable to climate impacts (e.g., wildfire frequency and severity, or water temperature).

Table 2: Key Ecosystem Characteristics

Ecosystem Characteristic	*Definition*	*Examples*
Composition	The biological elements within the different levels of biological organization, from genes and species to communities and ecosystems.	Major vegetation types, patches, habitat types, soil types, landforms, and wildlife populations
Structure	The organization and physical arrangement of biological elements such as, snags and down woody debris, vertical and horizontal distribution of vegetation, stream habitat complexity, landscape pattern, and connectivity.	Arrangement of patches within a landscape, habitat types within a forest, trees within a forest stand, wildlife within a planning area
Function	Ecological processes that sustain composition and structure, such as energy flow, nutrient cycling and retention, soil development and retention, predation and herbivory, and natural disturbances such as wind, fire, and floods.	Types, frequencies, severities, patch sizes, extent and spatial pattern of disturbances such as fires, landslides, floods, and insect and disease outbreaks
Connectivity	Ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long distance range shifts of species, such as in response to climate change.	Size, number and spatial relationship between habitat patches; mapped landscape linkages and corridors Measure of ability of native species to move throughout the planning area and cross into adjacent areas

The assessment will also identify the ecological conditions that are necessary to support each of the at-risk species and will evaluate likely climate impacts on those conditions. There will likely be overlap between key characteristics of ecosystem integrity and ecological conditions necessary to support at-risk species. For example, stream flows and flow regimes, stream temperature, the fragmentation of stream segments, and the composition of native vegetation within a streamside zone, are key

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best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area.

ecosystem characteristics that are also ecological conditions that support the persistence at-risk cold-water native fish. It is very important that the assessment explicitly articulate (for example through the use of a conceptual or species-habitat models) the proxy relationship between the ecological condition and the conservation of the species.

The assessment will evaluate likely climate impacts – operating in concert with other stressors (such as sedimentation from roads, barriers to connectivity, or water withdrawals) – on ecosystem characteristics and ecological conditions for at-risk species. To do this, the assessment compares the status and trend of the characteristics and conditions against a climate-informed reference model using information on the natural range of variation (NRV). The reference condition can be thought of as the "natural" condition that would be expected in the absence of human influence, considering likely climate effects; it is often estimated using historical ecological information, but needs to take into account expected changes in climate.

The assessment will evaluate likely climate impacts – operating in concert with other stressors (such as sedimentation from roads, barriers to connectivity, or water withdrawals) – on ecosystem characteristics and ecological conditions.

A projected departure from the climate-informed reference condition for a key characteristic or ecological condition indicates that the ecosystem or wildlife population may not be sustained. The threat to sustainability could be caused by management stressors, by climate impacts operating in concert with management stressors, or by climate impacts alone. The purpose of the assessment is to alert the forest planning process to the vulnerability of the characteristic or condition, and to identify the specific threat so that it can be addressed, if feasible, within the forest plan.

Climate change adaptation requires an understanding of how climate change may impact a given biological system so that appropriate management strategies can be identified. Vulnerability to climate change refers to the degree to which an ecological community or individual species is likely to experience harm as a result of changes in climate (Schneider et al. 2007). Vulnerability is a function of exposure to climate change – the magnitude, intensity and duration of the climate changes experienced, the sensitivity of the species or community to these changes, and the capacity of the species or system to adapt (IPCC 2007, Williams et al. 2008). A vulnerability assessment can help to identify which species or systems are likely to be most strongly affected by projected changes in climate and provides a framework for understanding why particular species or systems are likely to be vulnerable (Glick et al. 2011). Such an assessment informs conservation planning by identifying

climate-related threats and resulting stresses, which then become part of the decision-making process undertaken to identify and prioritize conservation strategies.[5]

For example, an assessment may find that seasonal stream flows – a condition necessary to sustain at-risk fish – are departed from historical/reference levels due to climate-driven changes in precipitation patterns, and exacerbated by ongoing water withdrawals. While the forest plan may not be able to address the underlying climate change stress, it may be able to affect the withdrawals. Or, an assessment may find that uncharacteristic wildfire severity (i.e., outside of the expected natural range) may be driven by climate-driven drought acting in concert with fire suppression actions, which could be modified within the forest plan by allowing fires to burn under certain circumstances. (See Appendix A for a discussion of how conceptual models can be employed to illustrate such complex relationships and support decisionmaking.)

Developing a robust science-based method to estimate future reference conditions is a key, yet challenging, process in forest and climate planning. The Okanogan-Wenatchee National Forest developed a method to estimate a future range of variation for key indicators of forest ecosystems in order to address climate-driven vulnerabilities to ecological integrity and conditions for at-risk species.

The method assumed drier and warmer conditions under a future climate change scenario. To establish the reference conditions, existing empirical data from an ecosystem that was warmer and drier than the ecosystem undergoing planning was used. The condition of the planning ecosystem was then measured against that reference "warmer and drier" ecosystem for certain indicators to determine departure from a future NRV (Gartner et al., 2008; USDA., 2012). Measurable desired future conditions for integrity could then be established for planning and adaptive management.

The Okanogan-Wenatchee National Forest developed a method to estimate a future range of variation for key indicators of forest ecosystems in order to address climate-driven vulnerabilities to ecological integrity and conditions for at-risk species.

The assessment results in status determinations on the likely future condition of ecosystems, watersheds and conditions for at-risk species, assuming climate effects and continued implementation of the current forest plan (i.e., the plan that is being revised). Some ecosystem characteristics and conditions for at-risk species will be functioning and require continued maintenance and protection

[5] Excerpted from the Defenders of Wildlife report: *Integrating Climate Change Vulnerability Assessments into Adaptation Planning.*

within the new forest plan; others will be departed from reference conditions and may require restorative conservation actions.

The Forest Service is making a concerted effort to make vulnerability assessments available for use in forest planning and other management processes. For example, the Northern Rockies Adaptation Partnership (NRAP) is a science-management collaboration involving the 13 national forests of the Northern Region, the Forest Service's Pacific Northwest and Rocky Mountain Research Stations, the National Park Service (Glacier, Yellowstone and Grand Teton) and other academic and non-governmental institutions. NRAP conducts vulnerability assessments to develop adaptation strategies for use in national forest planning. A draft 2017 report assessed climate vulnerability of water resources (including snowpack and glaciers), cold-water salmonids, forest and rangeland vegetation, ecological disturbance and wildlife across the region (Halofsky et al., 2017).

Forest Plan Climate Conservation Strategies

The findings presented in the assessment are used to develop the forest plan, which will outline the strategies and actions necessary to maintain or restore ecosystems and fish and wildlife habitats in the face of climate change. Because ecosystems and fish and wildlife populations are generally not adapted to the rapid environmental change brought upon by climate change, it will be necessary to manage for their adaptation to those changing conditions.

In cases where the assessment has indicated that an ecosystem characteristic or condition for an at-risk species is likely to persist in the face of likely climate effects, the forest plan should adopt a resistance-oriented strategy. Resistance-oriented (or maintenance) strategies are intended to build resistance to climate-related stresses, and often capitalize on opportunities to protect areas projected to have less exposure to climate change impacts.

It is likely that forests will have to designate and protect areas outside of existing reserves to offer landscape-scale refugia networks for fish, wildlife and plants displaced from existing protected areas due to climate impacts.

Forest plans should identify, designate and protect predicted climate refugia; these areas likely meet the rule's test of fulfilling a unique and special purpose on the forest. It is likely that forests will have to designate and protect areas outside of existing reserves to offer landscape-scale refugia networks for fish, wildlife and plants displaced from existing protected areas due to climate impacts; a new study estimates that only a fraction of existing protected areas will offer stable climatic habitat conditions in the future (Batllori et al., 2017). Importantly, in addition to designating landscape-scale climate-reserve networks, the forest plan

will need to establish non-reserve – or matrix-based strategies – to constrain management actions that may degrade conditions outside of protected reserves (Lindenmayer and Franklin, 2002).

For example, within the range of bull trout, forest plans should identify and prioritize the conservation of bull trout cold-water habitats that are most likely to resist the effects of climate change. Specifically, cold-water habitats fed by springs are expected to be more resistant to climate change impacts than other warmer and lower-elevation habitats, due to the uniformity of groundwater temperature. In addition, forest plans may need to provide the necessary constraints on projects and activities that could degrade cold-water conditions for bull trout, for example by limiting the impacts of the "Four Horsemen of the Apocalypse" for native trout: livestock grazing, logging (and related road networks), mining and harmful water management (Behnke and Tomelerri, 2002).

In cases where the assessment has indicated that a characteristic or condition for an at-risk species is degraded or is likely to be degraded in the future due to climate and/or other threats, the forest plan should adopt a resilience-oriented strategy.

In cases where the assessment has indicated that a characteristic or condition for an at-risk species is departed from future reference conditions, or is likely to be departed in the future, the forest plan should adopt a resilience-oriented strategy. Resilience-oriented (or restorative) strategies recognize the need to adapt to change, and are intended to minimize the severity of climate change impacts, reduce vulnerability, and improve the ability of ecosystems and species to "bounce back" from a climate-related stress. Many of these strategies will include restorative or resiliency-enhancing management that improve the functionality of an ecosystem by moving it towards the climate informed reference condition. Resiliency actions may focus on altering ecosystem structure and composition in order to prepare the system for climate-driven changes in disturbance regimes.

For many at-risk fish and wildlife populations, abating management threats and maintaining existing suitable habitat conditions may not be enough to ensure persistence; it will also be necessary to restore key conditions for which the species is adapted or more likely to adapt to. For example, returning to the previous example, bull trout require streams with complex habitat structure, including deep pools, overhanging banks, riparian vegetation, and large woody debris (USFWS, 2015). For many national forest streams, each of these key characteristics may be departed from the reference conditions that are necessary to recover bull trout populations.

Finally, there may be cases, given the rapid or significant nature of the climate effects, where maintenance or restoration strategies are unlikely to sustain a specific fish or wildlife population. In these cases, transformation-oriented strategies may be necessary to manage systems so that they respond in new ways. For instance, a forest plan may need to facilitate a shift in the range of a climate-threatened fish, wildlife or plant population.

In 2009 the Tongass National Forest planted yellow-cedar, on a trial basis, near Yukutat, Alaska, an area where the species did not previously grow, and which is at the northern limit of the species range. Survival of more than 90 percent of the planted trees indicates that facilitated range shift may be a viable adaptation strategy for the species.

For example, climate-driven snow loss and the transition from snow to rain-dominated precipitation conditions impact soil temperature by diminishing the insulation function provided by snow. Yellow-cedar, found in southeast and coastal Alaska, is threatened by spring freezing, which increasingly occurs in the absence of snowy thermal cover. A recent article estimated that half of the yellow-cedar's native range in coastal Alaska is threatened by this climate driven mortality (Buma et al., 2016). Because yellow-cedar is long-lived and has low productiveness, the species is limited in its ability to adapt to climate change and may require intentional transformation-oriented adaptation strategies. For instance, in 2009 the Tongass National Forest planted yellow-cedar, on a trial basis, near Yukutat, Alaska, an area where the species did not previously grow, and which is at the northern limit of the species range. Survival of more than 90 percent of the planted trees indicates that facilitated range shift (sometimes referred to as "assisted migration") may be a viable adaptation strategy for the species (Hennon et al., 2016).

Plan Components

Forest plans will guide climate conservation strategies through the development of plan components, which shape and direct the management actions that will be implemented under the plan. Plan components include desired conditions objectives, standards, guidelines, and suitability of lands (Table 3). Plan components must have clear geographic applicability, which means they can be applied to certain areas of the forest identified as being important to maintaining or restoring necessary climate conservation conditions for fish and wildlife populations.

Table 3. Plan components associated with adaptation strategies under the 2012 Planning Rule

Plan Component	*Description*
Desired Conditions	A description of specific social, economic and/or ecological characteristics of the plan area (or a portion of the plan area) toward which management of the land and resources should be directed. Desired conditions must be described in terms specific enough to allow progress toward their achievement to be determined, but do not include completion dates.
Objectives	A concise, measurable and time-specific statement of a desired rate of progress toward a desired condition or conditions. Objectives should be based on reasonably foreseeable budgets.
Standards	A mandatory constraint on project and activity decision-making established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects or to meet applicable legal requirements.
Guidelines	A constraint on project and activity decision-making that allows for departure from its terms as long as the purpose of the guideline is met. Guidelines are established to help achieve or maintain a desired condition or conditions, to avoid or mitigate undesirable effects or to meet applicable legal requirements.

Desired conditions

Generally, forest plans must include clear and measurable descriptive statements about the desired future conditions for the key ecosystem characteristics and ecological conditions identified as being necessary for the persistence of the at-risk species. The characteristics and conditions employed in the assessment should be carried forward into the plan as plan components. To continue a prior example, for forest plans within the range of bull trout, there should be measurable desired condition statements for each of the key conditions necessary for recovery. Desired conditions should clearly describe desired habitat complexity, including the desired depth of pools, the desired riparian vegetation composition and structure, and the amount and location of large woody debris.

For characteristics and conditions that are less vulnerable to climate effects, there will be a desire to maintain the condition; for example, for some forest ecosystems existing high-frequency and low-severity fire regimes may be predicted under likely future climate conditions, and the forest plan would encourage that continuation; however, it may be necessary to remove management stressors that prohibit maintaining the current condition.

In other cases, the assessment may indicate that in the future a characteristic or condition will be departed from climate-informed reference conditions. The desired condition in this case should reflect the expected range of future conditions, while acknowledging uncertainty, and subject to monitoring. Desired conditions that don't acknowledge likely climate changes, such as a shift to more frequent and severe fire regimes in some forest ecosystems, will not be effective; they will in essence ignore reality. Yet because many elements of the ecosystem will not be adapted to those changing

conditions, a combination of resistance, resiliency-building, and transformative strategies will need to be adopted to sustain resources into the future. Restoring the structure and composition of ecosystems so that they can withstand changes in dominant ecological processes is a logical approach to prepare for dramatic changes in disturbance; however, at some point those new disturbance regimes will need to be embraced, at least in some places. The plan should specify priority areas for maintenance and restoration.

Desired conditions can be applied across the forest, throughout an entire ecosystem type, or can be targeted to specific areas. The application of plan components within specific areas (e.g. management areas, geographic areas, or other areas designated to maintain unique and special characteristics) should be used to concentrate climate change response and climate conservation strategies within specific areas of the forest.

To be most effective in guiding climate conservation actions at the project-level, and to enable effective monitoring, it is critical that desired conditions be articulated for specific characteristics and conditions, and described in terms specific enough to allow progress toward their achievement to be objectively determined.

To be most effective in guiding climate conservation actions at the project-level, and to enable effective monitoring, it is critical that desired conditions be articulated for specific characteristics and conditions, and described in terms specific enough to allow progress toward their achievement to be objectively determined. We have found that many desired condition statements in current forest plan revisions are subjective and lack necessary specificity.

Desired conditions should articulate the actual measurable desirable reference conditions. This desired condition from the Flathead National Forest is good in that it ties the desired condition for watersheds to actual reference watersheds within the planning area (which should facilitate monitoring and adaptive management), but it could be improved with a fuller description of the desired reference condition for each of the key characteristics and habitat features:

> Instream habitat conditions for managed watersheds move in concert with or towards those in *reference watersheds*. Aquatic habitats are diverse, with channel characteristics and water quality reflective of the climate, geology, and natural vegetation of the area. Stream habitat features across the forest, such as *large woody material, percent pools, residual pool depth, median particle size, and percent fines are within reference ranges* as defined by agency monitoring (USDA, 2016a, emphasis added).

In contrast, the Draft Revised Land Management Plan for the Sequoia National Forest included the following desired condition for fire regimes in the Upper Montane ecosystem, which is more measurable:

> At the landscape scale, fire is a key ecological process, restoring and maintaining patchy fuel loads and increasing heterogeneity and understory plant vigor. Fires occur irregularly, generally every 15 to 100 years, with frequency averaging about 40 years. Fires in this vegetation type burn with low, moderate or mixed severity, with minimal patches of very high severity (greater than 90 percent basal area mortality), rarely greater than 300 acres in size. The proportion of areas burned at high severity within a fire is generally less than 10 to 15 percent. Due to existing high levels of fuels and weather variability, greater proportions of areas of high severity burn (up to 50 percent) may be unavoidable during large landscape prescribed fires or wildfires managed to meet resource objectives. Some patches of high severity burn reach 1,000 acres in size (USDA, 2016b).

Desired conditions should reflect the forest's distinctive roles and contributions to conserving habitat in the face of climate change; for example, many forests will have desired conditions to maintain the resilient conditions of areas that are expected to provide future climate refugia conditions not found on the surrounding landscape. For example, the Flathead National Forest developed the following desired condition for connectivity between important areas, including habitat refugia:

> Spatial connectivity exists within or between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, *and intact habitat refugia*. These network connections provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic, riparian-associated, and many upland species of plants and animals (USDA, 2015a, emphasis added).

Objectives

Objectives should be used to prioritize the most important climate conservation actions in the forest planning area.

Specific, climate-informed desired conditions establish the underlying purpose for climate conservation actions, but are not sufficient in and of themselves to ensure that conservation actions will occur. Other direction within forest plans is necessary to guide implementation.

The purpose of plan objectives is to ensure that progress is actually made toward the desired conditions. Objectives should be used to prioritize the most

important climate conservation actions in the forest planning area, for example, those cases where the assessment documented clear vulnerability to climate change impacts and noted activities that could restore the characteristic or condition or alleviate threats that compound the magnitude of the climate impact.

The following is a typical objective supporting implementation of a desired condition to increase forest heterogeneity and restore species composition:

> Increase forest heterogeneity, reduce forest density and surface fuels, and restore species composition (i.e. increase black oak and pine) on 9,000 to 15,000 acres of the montane, upper montane, and portions of the foothill landscape, using mechanical treatment, often in combination with prescribed fire, within 10 to 15 years following plan approval (USDA, 2016b).

And here is a restoration objective from the Flathead National Forest to maintain or restore key characteristics of streams (note that there should be affiliated desired conditions for large woody debris, road networks, riparian vegetation composition and structure, and channel conditions):

> Enhance or restore 50 to 100 miles of stream habitat to maintain or restore structure, composition, and function of habitat for fisheries and other aquatic species. Activities include, but are not limited to, berm removal, large woody debris placement, road decommissioning or stormproofing, riparian planting, and channel reconstruction (USDA, 2016a).

The Planning Rule also requires that the forest plans identify priority watersheds for restoration. The identification of such watersheds is tiered to the Forest Service's *Watershed Condition Framework* (USDA, 2011), the objective of which is to improve watershed conditions including their ability to moderate the effects of climate change. Forest plans should therefore identify priority adaptation and conservation actions for these watersheds.

The Flathead National Forest's draft revised forest plan prioritized identified a subset of watersheds, called the *Conservation Watershed Network*, to prioritize conservation of bull trout and pure westslope cutthroat trout. These watersheds received a set of unique plan components to guide management. For example, there is an objective which states that "Conservation Watershed Network are the highest priority for restoration actions for native fish. Stormproof 15 to 30% of the roads in Conservation Watershed Network prioritized for restoration as funding allows to benefit aquatic species, e.g. bull trout" (USDA, 2016a).

Standards and Guidelines

Standards and guidelines constrain projects and activities that may pose a threat to key characteristics or conditions for at-risk species, and will frequently be used to maintain desired conditions by avoiding harmful effects. Because standards and guidelines are geared towards management actions, they will be used to address particular interacting management stressors that magnify climate effects. For instance, forest plans can use standards and guidelines to prohibit certain types of timber harvest in riparian areas in order to ensure that a key characteristic or condition is sustained.

Standards and guidelines constrain projects and activities that may pose a threat to key characteristics or conditions for at-risk species, and will frequently be used to maintain desired conditions by avoiding harmful effects.

For example, water howellia (*Howellia aquatilis*) is a plant species listed under the ESA that occurs on the Flathead National Forest; it is threatened by management activities (timber harvest, livestock use, invasion of non-native plants, and conversion of wetland habitat) and climate change, which is affecting wetland inundation processes. The Draft Revised Forest Plan for the Flathead National Forest included the following standard to avoid stresses to the plant's wetland habitat:

> Retain a buffer of a minimum width of 300 feet from the margins of ponds (occupied and unoccupied) that provide *Howellia aquatilis* habitat, for the purpose of maintaining or creating a favorable physical environment in and around the ponds, protecting against adverse hydrological changes, and maintaining the structural and floristic diversity of the vegetation (USDA, 2016a).

Connectivity

Connectivity is a dimension of ecological integrity, as well as a condition necessary to support many at-risk species. Because well-distributed populations are more resilient than isolated ones, managing for connectivity is especially important for enabling adaptation to changing stressors, including climate change. In fact, a review of 22 years of recommendations for managing biodiversity in the face of climate change found improving landscape connectivity is the most frequently recommended strategy for allowing biodiversity to adapt to new conditions (Heller and Zaveleta, 2009). Connectivity should therefore play a prominent role in forest planning for climate conservation.

Assessments should determine a reference condition for landscape pattern that will support the ability of fish and wildlife populations to adapt to changing climate conditions. Barriers to connectivity should be identified and prioritized for removal within forest plans. Generally, forest plans should

aspire to create a more resilient transportation network, given the significant negative effects roads and other routes have on ecosystem functionality, watershed conditions, and species persistence. Areas important for connectivity should be identified within forest plans.

Reconnecting fragmented habitat for fish and other aquatic species should be a high priority adaptation strategy on all national forests, given that there are more miles of road within the National Forest System than stream, resulting in at least 40,000 places where roads cross streams.

Reconnecting fragmented habitat for fish and other aquatic species should be a high priority adaptation strategy on all national forests, given that there are more miles of road within the National Forest System (375,000) than stream (200,000), resulting in at least 40,000 places where roads cross streams.

For example, the Santa Fe National Forest has proposed the following desired condition that emphasizes the role of connectivity in facilitating species migration and genetic exchange:

> Aquatic habitats are connected and free from alterations (e.g., temperature regime changes, lack of adequate streamflow, barriers to aquatic organism passage) to allow for species migration, connectivity of fragmented populations and genetic exchange (USDA, 2017).

This desired condition could be supported by an objective to prioritize areas for restoration of connectivity and possibly standards or guidelines to constrain management actions that may impede achievement of the desired connected condition.

To improve aquatic ecosystem integrity and provide necessary habitat conditions for at-risk fish and other aquatic species, the Forest Service is embarking on a major effort to improve aquatic organism passage by removing or upgrading the thousands of culverts that fragment aquatic habitat on national forest lands. All forest plans will likely have plan components similar to this objective within the Flathead's Draft Revised Forest Plan: "Reconnect 10 to 20 miles of habitat in streams disconnected by roads or culverts where aquatic and riparian-associated species' migratory needs are limiting distribution of the species" (USDA, 2016a).

Implementation, Monitoring and Evaluation

After the plan has been finalized, projects and activities will be implemented in order to achieve the plan's desired conditions and objectives; all projects and activities must be consistent with the plan components.

The forest should begin implementing the priority climate conservation activities to fulfill the desired conditions; many of these will be resiliency-oriented strategies to restore key ecosystem characteristics and conditions for at-risk species that have been degraded by management actions and are not likely to be resilient to future climates.

The forest should begin implementing the priority climate conservation activities to fulfill the desired conditions; many of these will be resiliency-oriented strategies to restore or enhance key ecosystem characteristics and conditions for at-risk species that have been degraded by management actions and are not likely to be resilient to future climates. Priority implementation actions should be undertaken in key areas identified within the forest plan.

The forest will also implement other plan direction, including activities to fulfill other multiple-use objectives, such as timber harvest, grazing, mineral development and recreation management. Some of these activities may contribute stress to climate-threatened resources (and should have been identified and evaluated in the assessment), in which case the management constraints of the forest plan (standards and guidelines) will be employed to avoid or mitigate the stress to ecosystem characteristics and conditions supporting at-risk species. Project-level analysis will be conducted to disclose environmental effects and ensure the activity is consistent with the forest plan.

In addition, a monitoring program will evaluate the plan's effectiveness, including the efficacy of the climate conservation strategies. The monitoring program establishes monitoring questions and indicators to evaluate the effect of the plan on watershed conditions, key ecosystem characteristics, and ecological conditions for at-risk species.

Forest monitoring programs will also directly monitor changes in the condition of focal species, which will be selected to provide insight into the integrity of the ecosystem to which they belong. Forest plans should select focal species sensitive to climate impacts to evaluate whether strategies to maintain, restore or enhance ecosystem integrity are effective. For example, the Chugach National Forest designated Dolly Varden char, rainbow, and cutthroat trout as a focal species group, and will monitor changes in their distribution to evaluate climate change impacts on aquatic ecosystem integrity and adaptive capacity (USDA, 2015a). Similarly, the Flathead National Forest identified western white pine as a focal species; the five-needle pine is vulnerable to the interacting stressors of climate change, fire suppression, white pine blister rust, and mountain pine beetles (Loehman et al., 2011). Species that are known to play an important role in enhancing and maintaining ecological integrity, such as beavers, should be considered as focal species.

Focal species can be selected from the pool of at-risk species; if there is uncertainty over the relationship between an at-risk species and the conditions needed to support its persistence, the forest should consider direct monitoring of the species within the plan area, if monitoring methods are available and feasible.

At-risk species vulnerable to climate effects can be directly monitored, even if not designated as focal species. For example, the Flathead National Forest will monitor the condition of whitebark pine, a candidate for listing under the ESA.

While the rule encourages the monitoring of the ecological conditions that support at-risk species, it should be noted that at-risk species vulnerable to climate effects can be directly monitored (i.e. distribution, occupancy, or demographic rates), even if not designated as focal species. For example, the Flathead National Forest will directly monitor the condition of cold-climate adapted whitebark pine, a candidate for listing under the ESA. The forest will also evaluate the effectiveness of actions to restore whitebark pine populations, including prescribed burning and the planting of white pine blister rust-resistant seedlings; the non-native fungus, interacting with fire suppression and rising temperatures, threaten the persistence of whitebark throughout much of its range.

Forest-level monitoring programs will operate in conjunction with broader-scale monitoring strategies developed by the at the regional level; many climate change impacts will likely be most effectively monitored and evaluated at scales larger than individual national forests, and it is important that forest-level and broader-scale climate monitoring be well-coordinated.

There will be at least two primary areas of uncertainty associated with the climate conservation strategies that should be addressed and reduced through the monitoring program. First, it is likely that some of the underlying assumptions behind the climate conservation strategy, such as predicted precipitation levels or changes in disturbance regimes, do not come to pass. The monitoring program must track actual climate-driven changes within the plan area so that the plan can be adjusted if necessary. Science-based partnerships and coordination with climate researchers will be fundamental in acquiring new information. New information and advances in best available science, outside of the forest monitoring program, can also illicit changes in the forest plan. For instance, science may reveal concerning vulnerabilities to fish or wildlife populations previously thought to be secure within the planning area.

It is likely that some of the climate conservation actions assumed to improve ecosystem or wildlife population resiliency may in fact not have the desired effect, and will need to be adjusted in the forest plan.

Second, it is likely that some of the climate conservation actions assumed to improve ecosystem or wildlife population resiliency may in fact not have the desired effect, and will need to be adjusted in the forest plan. For instance, in some settings, the assumption that reductions in stand densities will create more resilient conditions to climate-driven wildfire disturbances may be contradicted by effectiveness monitoring. Or, monitoring may reveal that resiliency-building actions have unforeseen negative effects on other resources that were not considered during the development of the plan.

Given the uncertainty associated with climate change effects, as well as the high degree of uncertainty over the efficacy of climate conservation actions, a robust and well-funded adaptive monitoring program is an absolute necessity; it must not be an afterthought or abandoned, as has been the unfortunate case over the years in natural resource management (Lindenmayer and Likens, 2010). In addition, it is important to not equate uncertainty with flexibility; forest plans need to establish a range of measurable future conditions based on the best available science, as hypotheses for testing, as opposed to open-ended plans, which lack both accountability and the necessary direction for effective conservation.

CONCLUSION

Climate change poses an enormous risk to our forests and the fish, wildlife and biodiversity they harbor; it also threatens our communities and way of life, which are so intertwined with our national forests.

Some biologists called the Yellowstone fish kill a "perfect storm" of stressful events, but in fact what happened on the Yellowstone in the summer of 2016 is likely the "new normal."

In the summer of 2016 thousands of fish, including native mountain whitefish and iconic Yellowstone cutthroat trout, died in the waters of Montana's famed Yellowstone River, which originates in the Absaroka Range of the Bridger-Teton National Forest. The fish were killed by acute Proliferative Kidney Disease (PKC) brought on by a parasite. With summer water flows at dangerously low levels due to premature snowpack loss and stream temperatures exceeding suitable levels by as much as 20 degrees °F., the cold-water adapted fish succumbed to the extreme stress brought on by the highly contagious parasite. After closing over 180 miles of river to fishing and boating to reduce stress on the fishery, the Governor of Montana declared the situation to be an emergency; one with major

implications for the fishing and outdoor recreation-based economy of the region. Some biologists called the Yellowstone fish kill a "perfect storm" of stressful events, but in fact what happened on the Yellowstone in the summer of 2016 is likely the "new normal."

That same summer Forest Service Chief Tom Tidwell gave a speech on the subject of forest restoration in the era of climate change, in which he painted the dire picture facing America's national forests:

> (O)ur forests are facing some of the greatest challenges in history. In California alone, we have 66 million dead trees due to extreme drought and epidemic insect outbreaks. Years of fire suppression and fuel buildups, along with the hot, dry conditions that come with climate change, are causing immense wildfires. These fires release enormous amounts of carbon dioxide, sterilize soils, and severely hamper carbon sequestration.

Yet the Chief concluded his speech on a positive note, reminding people that meeting the climate change challenge will take bold and ambitious action, but that the Forest Service had the tools to do so:

> In 2012, we adopted a landmark forest planning rule – the first such rule in a generation – to guide management of the 77 million hectares of national forests and grasslands. As units revise their land management plans, they evaluate climate stressors and monitor impacts on forest health.

The Forest Service, along with all of the stakeholders involved in forest planning, have the opportunity to take the necessary bold and ambitious actions that will support the persistence of forests, fish and wildlife. We hope this report contributes to that effort.

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Appendix 7
Sagebrush Ecosystem and Associated At-risk Species Comments

Plan components are not adequate to restore and maintain ecological integrity for the sagebrush ecosystem. Gunnison sage-grouse, a threatened species, and Brewer's sparrow, a potential SCC, require this habitat.

The Poncha Pass area is within the Gunnison sage-grouse historic range (see 79 Fed. Reg. 69192, 69194, 2014), though habitat conditions must be improved to contribute to the recovery (79 Fed. Reg. 69313, November 20, 2014). Higher elevation sagebrush steppe like Poncha Pass may be key to the species' persistence as climate change continues to affect lower elevation habitat elsewhere. Including lands managed by the Bureau of Land Management (48%), the Forest Service (26%), private parties (24%), and the Colorado State Land Board (2%), GSRCS (2005) estimated the range of the population to be 20,400 acres (GSRCS 2005: 91).

Terrestrial Ecosystems Assessment 1 and 3 was inadequate to determine the ecological condition of sagebrush on the RGNF, and this may be a contributing factor as to why the proposed plan falls short of providing the conditions to achieve integrity, sage-grouse recovery, and Brewer's sparrow persistence. The Assessment concluded that the ecosystem was "slightly departed" from NRV, but how the results of the Assessment's modeling data have been interpreted to make this determination is not clear. Important information about the vegetation composition, function, and connectivity does not seem to be included. For example, what percentage of the ecosystem contains sagebrush verses perennial and annual grasses, such as cheatgrass, and pinyon-juniper woodlands? What is the extent of fragmentation in the system to enable an assessment of connectivity? It's not clear how heavily the model weighted wildfire data in Table 19 of the Assessment 1 and 3 (at 65).

Despite the Assessment's limitations, a sufficient collection of best available scientific information (BASI) exists to improve proposed plan components in a way that they better assure sagebrush integrity can be maintained or restored. The proposed plan includes no components specific to the sagebrush ecosystem. We make the assumption that improving and developing plan components to provide the conditions that would contribute to the recovery of Gunnison sage-grouse and the viability of the Brewer's sparrow would promote the integrity of the ecosystem.

Key Ecosystem Characteristics and Plan Components

For the most part, the Gunnison sage-grouse and Brewer's sparrow depend on similar key ecosystem characteristics. The DEIS (Table 58 at 244) identified "sagebrush" as the only key ecosystem characteristic associated with the Gunnison sage-grouse. We outline essential key characteristics with references to BASI and comment on corresponding plan components and management approaches below.

Large, contiguous, unfragmented patches of sagebrush across the landscape. Sage-grouse are a landscape species (Connelly et al. 2011a). Migratory populations have large annual ranges that can encompass 1,042 mi^2 (667,184 ac) (Knick and Connelly 2011, *citing* Dalke et al. 1963; Schroeder et al. 1999; Leonard et al. 2000) (the species may use up to 2,500 mi^2 per population (Rich and Altman 2001)). Large-bodied birds are generally more strongly affected by habitat loss and fragmentation (Winter et al. 2006). Conserving large expanses of sagebrush steppe is the highest priority to conserve sage-grouse (Aldridge et al. 2008; Connelly et al. 2011b; Manier et al. 2013: 25-26). Maintaining or restoring so that at least 70 percent of the land cover is sagebrush steppe essential for supporting sage-grouse (SGNTT 2011: 6; Doherty et al. 2010; Wisdom et al. 2011; SGNTT 2011: 7; Karl and Sadowski 2005; Doherty 2008; Connelly et al. 2000: 977, Table 3; Knick et al. 2013: 5-6) with 15 to 40 percent sagebrush canopy cover (Connelly et al. 2000; SGNTT 2011; Hagen et al. 2007). (See also Winter et al. 2006; Connelly et al. 2011b; Manier et al. 2013: 25-26; RGNF undated, *Centrocercus minimus*;). For information more specific to the Brewer's sparrow, see RGNF (undated, *Spizella breweri*).

Developing and implementing conservation strategies at regional or landscape scales will have the greatest benefit for sage-grouse and their habitat (*see* Doherty et al. 2011), and for Brewer's sparrows. Protecting large expanses of sagebrush steppe must be high priorities (Connelly et al. 2011a; Wisdom et al. 2005b). Given the importance of public lands to sagebrush conservation, the sensitivity of these lands to disturbance, longer recovery periods and variable response to restoration, and their susceptibility to invasion by exotic plants (Knick 2011), land uses that negatively affect these lands should be avoided or prohibited in key habitat areas to conserve sage-grouse habitat. Establishing a system of habitat reserves in sagebrush steppe will also help conserve essential habitat and ecological processes important to sage-grouse conservation.

> ***DC-WLDF-3:*** *Sufficient habitat connectivity is present in each vegetation type to facilitate species movement within and between daily home ranges, for seasonal movements, for genetic interchange among species (including Canada lynx and others), and for long-distance movements across boundaries. (Forestwide)*

The word "sufficient" must be quantified. There is no way to measure progress toward the achievement of the desired condition (DC). A DC should be developed to be specifically applicable to sage-grouse in relation to the species' connectivity needs based on the BASI referenced above.

> ***DC-SCC-1:*** *A healthy sagebrush steppe ecosystem meets the needs of sagebrush obligate species including, but not limited to, Brewer's sparrow. (Forestwide)*

Healthy is too subjective and vague for this DC to meet planning rule requirements. While the Assessment is flawed, it claimed the sagebrush ecosystem is outside of its NRV. The DC should outline the natural range of variability (NRV) for the key characteristics necessary for Brewer's sparrows (and sage-grouse) and describe how restoring the ecosystem toward NRV can be achieved.

DC-TEPC-1: *Occupied or potential Gunnison sage-grouse habitat is maintained for habitat integrity and diversity using information provided by the local interagency working group and/or Range-wide Conservation Plan. (Forestwide)*
DC-TEPC-2: *Occupied or potential Gunnison sage-grouse habitat provides for habitat integrity and diversity using information provided by the local interagency working group and/or Range-wide Conservation Plan. (Forestwide)*

Plan at 24.

DC-TEPC-1 and **DC-TEPC-2** are virtually identical. Both require additional specificity regarding how to provide for "habitat integrity." It's not clear what "diversity" means, and this must be clarified. The revised plan cannot simply refer to external policy for direction. It is fine to use such direction when it reflects the BASI, but the direction must be written into the revised plan. In the case of these two proposed plan components, it's not clear: 1) what precisely the "local interagency working group" or the "Range-wide Conservation Plan" are, 2) what "information" will be used, and 3) how the "information" will be used. We're assuming the "Range-wide Conservation Plan" is the 2005 plan of which the Forest Service is a signatory. If so, this plan is outdated. The Gunnison sage-grouse was listed as threatened under the ESA by the USFWS in part because this and other plans were found to be inadequate to conserve and recover the species.

Tall and medium height grasses and shrub cover at nest sites, >7.5 inches. Gregg et al. (1994: 165) noted that "[l]and management practices that decrease tall grass and medium height shrub cover at potential nest sites may be detrimental to sage grouse populations because of increased nest predation. … Grazing of tall grasses to <18 cm would decrease their value for nest concealment. … Management activities should allow for maintenance of tall, residual grasses or, where necessary, restoration of grass cover within these stands." Hagen et al. (2007) conducted a quantitative meta-analysis of existing research on greater sage-grouse nesting and brood-rearing habitat and confirmed that female sage-grouse typically select nesting sites with greater sagebrush cover and grass height compared to random locations, and that brood areas usually had less sagebrush, taller grasses, and greater forb and grass cover than at random sites. (Gregg et al. 1994; Hagen et al. 2007); Connelly et al. 2000; Hagen et al. 2007; Braun et al. 2005)

S-WLDF-6: *Retain residual grass cover from the previous growing season where tall, dense cover is desired for ground-nesting birds. (Forestwide)*

Plan at 27.

We agree with the concept of this standard, and believe it's an important standard with some added specificity. A standard must be developed to provide for the specific requirement of >7.5 inches of grass height during nesting season that is specific to the Gunnison sage-grouse.

High quality winter habitat. Sage-grouse typically show high fidelity to winter habitat, and a single area may support several different breeding populations. Consequently, the loss or fragmentation of wintering areas can have a disproportionate impact on sage-grouse population size. Scientists have also observed that the quality of winter habitat appears to influence the abundance and condition of female sage-grouse and their nesting effort and clutch sizes in spring (Moynahan et al. 2007; Caudill et al. 2013). Again, the plan must provide specific components related to sage-grouse and habitat that, in aggregate, will contribute to the recovery of the species; this means identifying winter habitat and assessing the conditions of this habitat.

Riparian areas and wetlands. Sage-grouse use riparian areas and wetlands.

> ***G-TEPC-3:*** *To limit impacts to Gunnison sage-grouse habitat:*
>
> - *Manage riparian areas and wet meadows to meet proper functioning condition while striving to attain reference state vegetation relative to the ecological site description.*

Plan at 24-25.

This is also an important guideline. It must be linked to a DC that describes target ecological conditions (the "reference state"). The plan must define "properly functioning condition." See Connelly et al. (2000).

Ecosystem Stressors and Threats

Sagebrush areas are underrepresented in that national wilderness preservation system and have been underappreciated as habitat essential for sagebrush obligate species. Livestock grazing, roads, and invasive species are stressors, for example, and both the sage-grouse and Brewer's sparrow are sensitive to human disturbance.

> ***G-SCC-4:*** *Avoid impacts to Brewer's sparrow habitat by:*
>
> - *Mitigating fragmentation of sagebrush by motorized and mechanized activities*
> - *Use grazing systems that discourage fragmentation and promote and maintain late seral understory plant composition*
> - *Maintaining large patches of sagebrush that provide suitable habitat and display a variety of structural conditions. (Forestwide)*

Plan at 20.

Again, the guidelines must be linked to a DC that describes the conditions for which the guideline is intended to provide direction. For example, if "late seral understory plant composition" is necessary

for Brewer's sparrow viability, this must be provided for by DCs, guidelines, and standards. What are the structural conditions?

Livestock grazing. Domestic livestock and other ungulates alter vegetation, soils, hydrology, and wildlife species composition and abundances that exacerbate the effects of climate change on western landscapes. Removing or reducing livestock grazing across large areas of public land would alleviate a widely recognized and long-term stressor and make ecosystems less susceptible to the effects of climate change. Cattle grazing exacerbates cheatgrass (*Bromus tectorum*) dominance in sagebrush steppe by decreasing bunchgrass abundance, shifting and limiting bunchgrass composition, increasing gaps between perennial plants, and trampling biological soil crusts. Grazing was also not found to reduce cheatgrass cover, even at the highest grazing intensities. (Beschta et al. 2012; Reisner et a. 2013)

See additional comments on livestock grazing elsewhere.

> ***S-WLDF-7:*** *Manage livestock grazing from April 15 to July 1 provide cover for ground-nesting bird species that prefer undisturbed cover. (Forestwide)*

Plan at 27.

This is an important standard. However, it must be clear what "manage" means in order to provide unambiguous direction. Additional strategies could then be described in management approaches. Restrict grazing until the completion of sage-grouse breeding and nesting period, and seasonally remove livestock from late brood-rearing habitat to allow sufficient regrowth of native grasses to ensure adequate residual height.

> ***G-TEPC-3:*** *To limit impacts to Gunnison sage-grouse habitat:*
>
> - *Design projects or activities to mitigate or avoid the direct or indirect loss of habitat necessary for maintenance of the local population. …*
> - *Ensure livestock grazing is compatible with nesting and brood-rearing objectives in sage habitats and riparian areas.*

Plan at 24-25

This is potentially an important guideline, but it must be modified. The proposed plan has provided no "nesting and brood-rearing objectives." What are these objectives? Native, perennial grass cover must exceed 7.5 inches during nesting and brood-rearing season, in accordance with the BASI, and this must be a standard. Livestock grazing should be restricted where cheatgrass (*Bromus tectorum*) occurs in sagebrush (Reisner et al. 2013; Chambers 2008; Reisner 2010). Utilization levels should not exceed 25 percent annually on uplands, meadows, flood plains and

riparian habitat (Holecheck et al. 2010; BLM & USFS 1994).[1] This guideline must be linked to a DC that is clear and specific about the ecological conditions necessary to achieve integrity for the sagebrush ecosystem. It's not enough to "maintain" the local population. The RGNF must work toward restoring conditions and recovery of the population.

> ***MA-RNG-1:*** *After all other solutions have been extensively considered, remove livestock from the grazing unit or allotment when further utilization on key areas will exceed allowable-use criteria, allotment management plan guidance, or annual operating instructions. Damage from use can result from many things including but not limited to wildlife, recreation, flooding, and livestock grazing, none of which should push the use beyond what is allowed. (Forestwide)*

This should be a standard. See our comments on this under Specific Issues with Forest-wide Management Direction.

Additionally, we recommend plan components that support limits on winter grazing to enable sufficient residual grass height for nesting for the next breeding season (See *W. Watersheds Project v. Salazar*, 843 F.Supp.2d 1105, 1115 (D. Idaho 2012), *citing* Braun (2006, unpublished); *W. Watersheds Project v. Dyer*, 2009 WL 484438, at * 21 (D. Idaho 2009)). Components are also needed to provide direction to avoid new structural range and livestock water developments in essential habitat, and institute best management practices to prevent, or limit and mitigate, the potential spread of West Nile virus (SGNTT 2011: 17).

Ground disturbing activities by humans. Sage-grouse require sagebrush-dominated landscapes containing minimal levels of anthropogenic disturbance. Ninety-nine percent of remaining active sage-grouse leks were in landscapes with less than 3 percent disturbance within 5 km of the lek, and 79 percent of the area within 5 km was in sagebrush cover (Knick et al. 2013).

> ***S-WLDF-1:*** *Avoid or minimize disturbances as much as possible during the local nesting season (April 15 – July 1 for most passerine birds). Evaluate the effects of projects and activities on migratory and resident birds, with a focus on species of management concern (species of conservation concern, and birds of conservation concern identified by the U.S. Department of Interior Fish and Wildlife Service). Consider important life history needs such as nesting requirements, post-fledging areas, and stop-over habitats. Incorporate conservation measures and principles, as applicable and needed, from local bird conservation plans (e.g., Colorado Bird Conservation Plan, Rio Grande National Forest Avian Monitoring Analysis documents) and/or other references into project design to eliminate or minimize potential adverse effects. (Forestwide)*

Plan at 26-27.

[1] "A community is considered to be at its natural potential when the existing vegetation is between 75-100 percent of the site's potential natural plant community." BLM & USFS 2004: 3-26.

Define what "disturbance" means for this DC. Change the first sentence to: "Avoid disturbances during the local nesting season (April 15 – July 1 for most passerine birds) as needed to contribute to recovery of sage-grouse and the viability of Brewer's sparrows and protect other breeding birds." Be specific about which "conservation measures and principles" should be followed from the listed documents. The BASI demonstrates the importance of limiting surface disturbance to less than 3 percent per section in habitat (SGNTT 2011: 21, 24; Holloran 2005; Doherty et al. 2010; Doherty 2008).

Energy development. The proposed plan does not provide adequate direction for protecting sagebrush and sage-grouse and Brewer's sparrows. There should be no surface occupancy associated with energy development in sagebrush habitat (Moynahan et al. 2007; Walker 2007; Doherty et al. 2008; Carpenter et al. 2010).

> ***MA-WLDF-21:*** *Locate and design wind energy structures to minimize or prevent wildlife mortality. (Forestwide)*

Plan at 30.

Exclude renewable energy development in sage-grouse habitat as recommended by the BASI (SGNTT 2011: 13; Jones 2012). If development is permitted (e.g., valid existing rights), locate turbines and infrastructure at least four miles from sage-grouse leks (Manville 2004; Jones 2012). Do not site wind energy development in or adjacent to sage-grouse wintering areas.

Invasive plants. Pinyon-juniper encroachment and the spread of the non-native, annual cheatgrass are detrimental to sagebrush and incompatible with sage-grouse and Brewer's sparrow occupancy.

> ***G-TEPC-3:*** *To limit impacts to Gunnison sage-grouse habitat:*
>
> - *Design fuels treatment objectives to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns that benefit habitat. (Forestwide)*

Plan at 24-25.

The guideline is necessary but does not provide sufficient specificity to allow for project-level direction. Develop plan components that provide direction for the following, based on BASI: In areas of pinyon/juniper, avoid treating old-growth or persistent woodlands. In areas where sagebrush is prevalent or where cheatgrass is a concern, utilize mechanical methods rather than prescribed fire. Prohibit prescribed fire in sagebrush steppe with less than 12 inches annual precipitation (SGNTT 2011: 26, *citing* Connelly et al. 2000; Hagen et al. 2007; Beck et al. 2009) or areas with moderate or high potential for cheatgrass incursion (Miller et al. 2011). Prohibit herbicide application within 1 mile of sage-grouse habitats during season of use; prohibit use of insecticides

(Blus et al. 1989). Restore non-native seedings with native vegetation where it would benefit sage-grouse (SGNTT 2011: 16-17).

Roads and power-line rights of way. The proximity of transmission lines was, among other factors, predictive of nest location for common ravens in/near sagebrush steppe. The research supports other findings that transmission lines provide favorable conditions for ravens, a predator of sage-grouse. (Howe et al. 2014)

MA-INFR-8: *Manage road use by seasonal closure if:*

- *Use is causing unacceptable damage to soil and water resources due to weather or seasonal conditions*
- *Use is causing unacceptable wildlife conflicts or habitat degradation*
- *Use is resulting in unsafe conditions due to weather conditions*
- *The road(s) serve a seasonal public or administration need*
- *The area accessed has seasonal need for protection or non-use. (General Forest Geographic Area, Specially Designated Geographic Area)*

Plan at 61.

To protect sagebrush and associated at-risk species from road effects, specific plan components—not merely management approaches—must be developed based on the BASI. See below:

- Exclude new rights-of-way in sagebrush habitat (SGNTT 2011: 12).

- Develop valid existing rights-of-way in essential habitat in accordance with National Technical Team report prescriptions (SGNTT 2011: 13).

- Limit motorized travel to designated routes trails in essential habitat (SGNTT 2011: 11). Implement appropriate seasonal restrictions on motorized travel to avoid disrupting sage-grouse during season of use (Holloran 2005; Aldridge et al. 2012).

- Close existing trails and roads to achieve an open road and trail density not greater than 1 km/1km^2 (.6 mi/.6 mi^2) in sage-grouse habitat (Knick et al. 2013).

- Where valid existing rights-of-way are developed, restrict road construction within 1.9 miles of sage-grouse leks (Holloran 2005).

- Bury existing transmission lines in essential habitat, where possible (SGNTT 2011: 13).

- Install anti-perching devices on transmission poles and towers (SGNTT 2011: 64). Dismantle unnecessary infrastructure.

See additional comments on Infrastructure components under Specific Issues With Forest-Wide Direction.

Anthropogenic noise. Anthropogenic noise from energy development and roads can cause greater sage-grouse to avoid otherwise suitable habitat and increase stress responses in birds that do remain, which could adversely affect disease resistance, survival and reproductive success. The effects of noise from many common activities in the sagebrush biome significantly expands the human footprint on the landscape and impacts on sage-grouse (Blickley et al. 2012). The RGNF plan should have a standard that prohibits noise levels associated with any anthropogenic activity to not exceed 10 dBA above scientifically established natural ambient noise levels at the periphery of sage grouse mating, foraging, nesting, brood-rearing, and winter habitat during each season of use by sage-grouse (Patricelli et al. 2013; SGNTT 2011: 64, citing Patricelli et al. 2010). Patricelli et al. (2012) recommend measuring compliance with noise objectives at the edge of areas critical for foraging, nesting and brood-rearing rather than at the edge of the lek.

Additional Recommended Plan Components

Measures for ameliorating the effects of climate change on species and landscapes include increasing the size and number of protected areas, maintaining and enhancing connectivity between protected areas, and identifying and protecting areas likely to retain suitable climate/habitat conditions in the future (even if not currently occupied by the species of concern). Management should also repulse invasive species, sustain ecosystem processes and functions, and restore degraded habitat to enhance ecosystem resilience to climate change (Chester et al. 2012; NFWPCAS 2012).

Designate restoration sage-grouse habitat to focus habitat restoration efforts to extend sage-grouse habitat and mitigate for future loss of priority habitat (BLM Memo MT-2010-017). Restoration habitat may be degraded or fragmented habitat that is currently unoccupied by sage-grouse, but might be useful to the species if restored to its potential natural community. Restoration habitat should be identified in management planning based on its importance to sage-grouse and the likelihood of successfully restoring sagebrush communities (Meinke et al. 2009; Wisdom et al. 2005a). Effective restoration requires a regional approach (e.g., sub/regional EISs) that identifies appropriate options across the landscape (Pyke 2011). Passive restoration is preferred for restoring these areas over active restoration methods.

Although cooperation among many federal and state agencies and private land owners will be necessary to conserve sage-grouse and sagebrush habitat (Stiver et al. 2006), the federal government and federal public land are key to achieving these goals. Federal agencies must prioritize sagebrush conservation if sage-grouse are to persist (Connelly et al. 2011a).

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