November 1, 2021

USDA Forest Service Southwest Region
Attn: Objection Reviewing Officer
333 Broadway Blvd SE
Albuquerque, NM 87102

Subject: Santa Fe National Forest plan revision objection
Responsible Official: Debbie Cress, Forest Supervisor, Santa Fe National Forest
Submitted via: objections-southwestern-regional-office@usda.gov

Dear Objection Reviewing Officer:

Pursuant to 36 CFR Part 219 Subpart B, the Center for Biological Diversity, Defenders of Wildlife, WildEarth Guardians, Sierra Club and New Mexico Wilderness Alliance are filing this administrative objection to the Santa Fe National Forest revised land management plan, Final Environmental Impact Statement, and Draft Record of Decision.

Sincerely,

Joe Trudeau, Lead Objector
Southwest Conservation Advocate
Center for Biological Diversity
[redacted]

Adam Rissien
ReWilding Advocate
WildEarth Guardians
[redacted]

Lauren McCain
Senior Federal Lands Policy Analyst
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Camilla Feibelman
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Logan Glasenapp
Staff Attorney
New Mexico Wild
[redacted]

Contents

1 Introduction

We are filing this administrative objection with the United States Forest Service (Forest Service) to the Santa Fe National Forest's final revised land management plan (Revised plan) because the planning process and substance of the Revised plan fail to comply with a set of laws and their implementing regulations and associated policy. With the Revised plan and supporting analyses for this agency action, the Forest Service[1] is in violation of the National Forest Management Act (NFMA; 16 USC 1600 et seq.)—particularly its "diversity requirement" (16 USC 1604(g)(3)(B)), NFMA's regulations governing management planning—the 2012 Planning Rule (36 CFR 219 Subpart A), the National Environmental Policy Act (NEPA; 42 USC 4321 et seq.) and several implementing regulations under 40 CFR 1500-1508, and the United States Endangered Species Act (ESA; 16 USC 1531 et seq.).

Each Objector previously submitted timely specific written comments regarding the Santa Fe National Forest's plan revision process and plan documents during designated opportunities for public comment, which occurred during the assessment, scoping, and draft plan phases of planning. Each of the issues discussed in this objection was raised in objectors' prior comments, and objectors hereby incorporate those comments by reference. These comments are referenced in the objection as noted below.

- CBD et al. 2015. Center for Biological Diversity, New Mexico Wilderness Alliance, Rio Grande Chapter of the Sierra Club, Amigos Bravos, Defenders of Wildlife, Back Country Horsemen of New Mexico, New Mexico Sportsmen, WildEarth Guardians, and Archaeology Southwest. Comments: Feedback on the Santa Fe National Forest's Draft Assessment for Forest Planning. December 10, 2015.

- CBD et al. 2016. Center for Biological Diversity, Defenders of Wildlife, WildEarth Guardians, and the Wildlands Project. Scoping Comments for the Santa Fe National Forest's Plan Revision Process. August 17, 2016.

- Defenders et al. 2019. Defenders of Wildlife and Center for Biological Diversity. Comments on the Santa Fe National Forest Draft Land Management Plan and Draft Environmental Impact Statement. November 7, 2019.

- TWS et al. 2019. The Wilderness Society, New Mexico Wilderness Alliance, Backcountry Horsemen of New Mexico, New Mexico Sportsmen, Rio Grande Valley Broadband of the Great Old Broads for Wilderness, WildEarth Guardians, Albuquerque Wildlife Federation, Center for Biological Diversity. 2018. Comments on the Santa Fe National Forest Draft Land Management Plan and Draft Environmental Impact Statement. November 7, 2019.

[1] The Responsible Official, the Forest Service's planning team, Region 3 staff involved in developing the Revised plan will generally be referred to as "the Forest Service" in this Objection.

- Sierra Club et al. 2019. Sierra Club, Santa Fe Forest Coalition, Wild Watershed, New Mexico Wilderness Alliance, Center for Biological Diversity, WildEarth Guardians, and New Mexico Sportsmen. Comments on the Santa Fe National Forest Draft Land Management Plan and Draft Environmental Impact Statement. October 31, 2019.

We have mailed a USB storage device to the Regional Office containing exhibits cited in this objection. Please see Appendix A and B for a list of these selected references. The parcel is postmarked November 1, 2021.

2 Sustainable Road System

2.1 Our Objection: The Revised Plan fails to include adequate plan components to ensure it can achieve an environmentally and fiscally sustainable forest road system, violating NFMA, NEPA, and the Travel Management Rule.

Our comments explained the need for the Revised Plan to include meaningful plan components that will drive progress toward a fiscally and ecologically sustainable road system that is consistent with the Travel Management and the 2012 Planning Rule. We were encouraged that the Forest Service recognized the need to address its overburdened road system stating "[t]here is a need for: Plan direction to ensure sustainable infrastructure (e.g., roads, recreation and administrative facilities, range improvements, and maintenance), and standards and guidelines that address negative impacts of existing roads."[2] Yet, the Revised Plan fails to include the necessary components to effectively meet this need, and specifically to identify a minimum road system (hereafter, "MRS"), remove unneeded system roads, or otherwise provide for sustainable transportation infrastructure that helps maintain and restore ecological integrity as the 2012 Planning Rule requires. Specifically, the lack of sufficient plan components precludes the agency from complying with the sustainability requirements under 36 C.F.R. § 219.8.

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.[3] 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.[4]

[2] Revised Plan, p. 14.

[3] 42 U.S.C. § 4332(2)(C); 36 C.F.R. § 219.5(a)(2)(i).

[4] 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

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.

As it stands, the agency fails to adequately respond to our comments, provide the requisite analysis in its FEIS as NEPA requires, or demonstrate compliance with the 2012 Planning Rule, in particular its sustainability requirements. The following sections explain further and provide specific examples, but by no means are exhaustive.

2.1.1 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. Plans must provide standards and guidelines to maintain and restore ecological integrity, landscape connectivity, water quality, and species diversity.[5] 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."[6] 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

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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.

[5] 36 C.F.R. § 219.8(a).

[6] FSH 1909.12, ch. 20, §23.23l.

accord with other plan components including those for ecological sustainability."[7] Plan components also must ensure fiscal sustainability.[8]

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."[9] 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.[10] 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 forestwide 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 is 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.

2.1.2 The Revised Plan lacks road density thresholds and the agency fails to adequately consider their inclusion.

Our comments explained that the Forest Service should use the plan revision process as an opportunity to examine current road densities in the forest, identify their cumulative impacts, and determine how proposed management direction will influence these densities over the life of the

[7] 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*").

[8] 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).

[9] 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).

[10] See id. § 219.1(f) ("*Plans must comply with all applicable laws and regulations . . . .*").

Revised Plan. We urged the agency to analyze the impacts of road densities and determine what density thresholds are necessary to protect ecological values in the forest, with a particular focus on sensitive areas such as watersheds, wildlife habitat and migration routes, and areas that are vulnerable to flooding (which may wash out roads and cause harm). While the Forest Service does consider road densities in its analysis, it failed to take a hard look at the environmental consequences road densities will cause under each alternative. For example, the analysis lists four indicators for analyzing the effects each alternative will have on surface water conditions, which includes motorized route density, yet the agency disclosed that "[o]nly the restoration activities indicator was used to examine effects on watershed."[11] The omission is particularly troubling given the Forest Service utilized the Watershed Condition Framework (WFC) to assess restoration activities and "forecast how effective each alternative will be at moving watersheds toward "properly functioning" condition."[12] The WCF utilizes 12 indicators to assess four broad categories of watershed processes, including two for terrestrial processes, one of which is the "Road and Trail Indicator" that includes a broadly defined road density attribute.[13] By not considering road densities as an analysis indicator for watersheds, the Forest Service constrains its analysis and fails to disclose how each alternative would affect the Road and Trail Indicator or the road density attribute. Instead, the agency focuses only on the overall WCF rankings, for example how well each alternative moves a watershed from an "impaired" condition to one that is "functioning at risk."[14] Yet, the analysis does not disclose changes to each WCF indicator, the resulting road densities that would remain under each alternative, or how those would affect the terrestrial watershed processes. While the analysis is programmatic, it is still reasonable to list current and expected indicator rankings under each alternative and demonstrate the degree to which each alternative would achieve the desired condition of having properly functioning watersheds across the forest.[15]

Further, where the Forest Service did consider motorized route densities for analyzing surface water, the agency fails to disclose how those would change under each alternative. The omission is glaring since the FEIS did include a table listing current road densities, though it did not include Maintenance Level (ML) 1 roads that still need basic custodial maintenance and should

[11] FEIS, Vol. 1, p. 182.

[12] *Id.* at 201.

[13] Potyondy and Geier, 2011. Watershed Condition Classification Technical Guide at 5, Figure 1. The WCF utilizes a broad road definition ("the term "road" is broadly defined to include roads and all lineal features on the landscape that typically influence watershed processes and conditions in a manner similar to roads. Roads, therefore, include Forest Service system roads (paved or nonpaved) and any temporary roads (skid trails, legacy roads) not closed or decommissioned, including private roads in these categories. Other linear features that might be included based on their prevalence or impact in a local area are motorized (off-road vehicle, all-terrain vehicle) and nonmotorized (recreational) trails and linear features, such as railroads."). *Id.* at 26.
https://www.fs.fed.us/biology/resources/pubs/watershed/maps/watershed_classification_guide2011FS978.pdf

[14] Revised Plan, p. 71-72.

[15] *Id.* at 71, ("Watersheds are functioning properly according to metrics described by the Watershed Condition Framework, other current protocols, and Properly Function Condition (PFC) protocols.").

have been included in the analysis.[16] Our comments also explained this analysis was inadequate to fully assess the impacts of road density since this raw data tells us nothing about the distribution or location of the roads in question. In addition, the Revised Plan includes approximately ⅙ of the decommissioning objective compared to the current plan, and the analysis fails to adequately explain how the significantly lower number (just 100 miles over 10 years) will effectively achieve the desired conditions, let alone an environmentally and fiscally sustainable road system.[17] More so, the agency may not even decommission those roads since the objective allows for road mitigations to achieve improved watershed function. Certainly, the agency can address deteriorating road conditions without decommissioning, but mitigation should be a separate objective such as maintaining 100 miles of road annually or ensuring all roads meet their Road Management Objectives over a 10-year period. As it stands, the Revised Plan contains no maintenance objectives in its Roads chapter.

Finally, the agency's arbitrarily dismissed our call for specific road density thresholds as plan components asserting that "[b]ecause road impacts to both wildlife and watersheds are more complex than simple road densities and may be equally affected by road design and location, we chose not to identify road densities in the Revised Plan as a unit of measure."[18] Given the Forest Service did include a table listing road densities by subwatershed, it was certainly within the agency's ability to include road density thresholds, and while road design and location are important factors to consider when determining potential effects to both watershed function and wildlife habitat, road or motorized route densities are readily measurable, and their inclusion in the WCF and the FEIS (though arbitrarily limited) demonstrates that it is both appropriate and feasible to include them as part of the Revised Plan's components. The attached literature review summarizing the extensive body of science discussing the ecological consequences of forest roads includes a scientifically supported table of road density thresholds the agency should consider for establishing such components.[19]

2.1.3 The Revised Plan and FEIS fail to adequately address fiscal sustainability of the forest road system.

Our comments explained the urgent need for the agency to properly analyze and disclose in the Final EIS the current budget for road maintenance, explicitly state the shortfall, and explain in detail how the Revised Plan will prioritize right-sizing the road system and limit ecological damage from the forest's poorly maintained roads in light of the ongoing lack of adequate funding. Yet, the Forest Service failed to do so in any meaningful way despite acknowledging "[t]he 2012 Planning Rule requires the Plan and alternatives to be based on the fiscal capability

[16] FEIS, Vol. 1, p. 183, Table 39.

[17] Revised Plan, p. 72.

[18] FEIS, Vol. 4, p. 254.

[19] See Ex. ROAD 1 WildEarth Guardians Report: "The Environmental Consequences of Forest Roads and Achieving a Sustainable Road System." March 2020. WildEarth Guardians.

of the unit."[20] Without analyzing or disclosing the fiscal capability of the agency to meet its road management objectives (RMOs), the agency cannot in any reasonable way claim the Revised Plan meets the Planning Rule sustainability requirements, or demonstrate the road system is within the "fiscal capability of the unit."[21] For example, the Forest Service provides road maintenance costs per mile based on ML with the total annual costs, but then omits entirely the current or anticipated road maintenance budget. The agency is silent on how many miles of roads are not currently meeting their objective maintenance level per the RMOs, or sufficiently discuss the ecological consequences from the lack of funding and capacity. Rather, the Forest Service simply states that "[r]oad maintenance budgets have declined by 58 percent over the last decade. The declining road maintenance budgets have caused a large backlog of deferred maintenance needs across the forest."[22] The analysis fails to disclose the actual backlog and does not include maintenance funding as an effects indicator for analyzing each alternative so it is impossible to know how the Revised Plan will affect the agency's ability to reduce the backlog or meet its desired road conditions. The Forest Service response to our comments is simply that "[w]e address maintenance concerns in the Plan under FW-Roads-DC-1."[23] To be clear and as we stated above, the Revised Plan contains no objective for annual road maintenance or other such direction to achieve the cited desired condition.

The omission here and the lack of analysis we explain above, preclude the Forest Service from making any claim that the Revised Plan provides sufficient ecological sustainability as required under the 2012 Planning Rule, in particular where it directs the following:

> The plan must include plan components, including standards or guidelines, to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity, taking into account: Conditions in the broader landscape that may influence the sustainability of resources and ecosystems within the plan area.[24]

Overall, the Forest Service fails to respond to our comments in violation of NEPA, fails to perform the requisite analysis NEPA requires, and fails to comply with the 2012 Planning Rule.

[20] FEIS, Vol. 4, p. 254.

[21] 36 C.F.R. 219.1(g), ("The responsible official shall ensure that the planning process, plan components, and other plan content are within Forest Service authority, the inherent capability of the plan area, and the fiscal capability of the unit.").

[22] FEIS, Vol. 1, p. 429.

[23] FEIS, Vol. 4, p. 250.

[24] 36 CFR § 219.8(a)(1)(iii).

2.1.4 The Revised Plan and FEIS fail to adequately address climate change in the context of the forest's transportation system.

Our comments explained the agency's analysis did not adequately address the impacts of climate change on the forest's road system or assess how the Santa Fe National Forest can increase resilience to these impacts. The omissions were critical flaws that we asked to be addressed in the Final EIS and with specific components added to the Revised Plan to effectively address climate impacts on the forest's roads and trails or increase their resilience to these stressors. The Forest Service response was not to change the analysis or incorporate our recommendations into the Revised Plan, rather the agency states "[a]lthough we do not analyze climate change directly as an indicator in the FEIS, we address it as a driver and stressor that will affect resources, "while at the same time explaining wildfire and floods are the main stressors on the transportation system.[25]

Arguably, climate change is the ultimate issue of our time and certainly should be considered more than a stressor, but as an actual issue appropriate for analysis in the FEIS. For example, the agency should have considered how increased flooding will affect the agency's ability to maintain the transportation network, especially given agency budget shortfalls noted above. In addition, it may be necessary to place more ML 2 roads into long term storage and hydrologically disconnect them to ensure flooding does not cause more culvert failure than the agency can address. As we explained in our comments, the failure to address climate change in the context of transportation is extremely short-sighted given that climate change is already affecting the forest's roads and trails, and these impacts are likely to become more severe over the life of the plan. The FEIS failed to disclose the impacts of climate change on roads or discuss in any meaningful way how the Forest Service plans to address these challenges in coming years. We also strongly urged the agency to incorporate recommendations from the agency's own transportation resilience guidebook that identifies opportunities for the Forest Service to identify and address climate vulnerabilities in its transportation systems. The guidebook specifically mentions forest plans as an example of planning processes that provide "an opportunity to analyze baseline conditions and climate change vulnerabilities and to develop climate resilient strategies for the future."[26] Yet, the Forest Service did not respond to our comment or incorporate any of the climate resilient strategies specific to the road system.

2.1.5 The Forest Service must strengthen Revised Plan components, and specifically incorporate direction to achieve the minimum road system.

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.[27] As explained above, the MRS must, among other

[25] *Id.* at 255.

[26] U.S. Forest Service Transportation Resiliency Guidebook: Addressing Climate Change Impacts on U.S. Forest Service Transportation Assets (Sept. 2018), https://www.fs.fed.us/eng/transp/documents/pdf/USFSTransportationResiliencyGuideBook.pdf, at 39.

[27] 36 C.F.R. § 212.5(b)(1)-(2).

things, reflect long-term funding expectations.[28] 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."[29] 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.[30] 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 <u>into their land management planning process</u>.[31]

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.

Our comments provided specific plan components to ensure the Forest Service provides for a sustainable road system, and in particular we urged including an objective to implement the

[28] *Id.* § 212.5(b)(1).

[29] 36 C.F.R. § 212.5(b)(1).

[30] *See* FSH 1909.12, ch. 20, § 23.23l(2)(a).

[31] 66 Fed. Reg. at 3209 (emphasis added).

minimum road system pursuant to the Travel Management Rule under subpart A.[32] As we detail in the section above, with forest plans determining the framework for integrated resource management over the next 10-15 years or more, the revision process is precisely the place to ensure that the requirements of subpart A are satisfied and to establish direction for achieving a sustainable minimum road system. Indeed, the substantive ecological integrity and ecological and fiscal sustainability provisions of the 2012 Planning Rule complement and reinforce the requirements of subpart A. As documented in Exhibit 1, the adverse environmental and fiscal impacts associated with existing forest road system (e.g., erosion, compaction, sedimentation and impairment of water quality, fragmentation of wildlife habitat, interference with feeding, breeding, and nesting, spread of invasive species) directly implicate these substantive requirements.[33]

In response, the Forest Service explains the following:

- "Through the TMR process, a minimum road system was determined, which can be found on the motor vehicle use map (MVUM) that is published and updated annually pursuant to 36 CFR 212.51."[34]

- The minimum publicly accessible road system was identified during the Travel Management Process, which occurred as a process separate from the forest planning process.[35]

We recognize that the Travel Planning Process that completed in 2012 complied with the Travel Management Rule under subpart B, and was supported by a Travel Analysis Process (TAP) report issued in 2008 that explained, "[t]his analysis will recommend a minimum road system; the rest of the roads currently on our system will be identified as unneeded."[36] The TAP report recommended 3,737 miles of road for the minimum road system and 3,239 miles were recommended as unneeded.[37] As we explained in our comments, the next steps toward compliance with subpart A is for the agency to use its travel analysis report to analyze the recommendations in a site-specific NFPA-compliant analysis in order to actually identify the minimum road system. Once the agency issues a final decision that does so, it can then work to implement the minimum road system. In other words, a TAP report is not a decision document and its recommendations for a minimum road system do not equate to compliance with the TMR under subpart A, a fact reflected in the agency's own Travel Management Plan Record of

[32] 36 C.F.R. § 212.5(b).

[33] See Ex. ROAD 1 WildEarth Guardians Roads Report, "The Environmental Consequences of Forest Roads and Achieving a Sustainable Road System." March 2020. WildEarth Guardians.

[34] FEIS, Vol. 4, p. 258

[35] *Id.* at 259.

[36] USDA Santa Fe National Forest. June, 2008. Travel Analysis Process Report at 18.

[37] *Id.* at 37, Table. 9.

Decision that states: "[t]he purpose of this project is to comply with the Travel Management Rule by providing a system of roads, trails, and areas designated for motor vehicle use by class of vehicle and time of year on the Santa Fe National Forest (36 CFR 212.50)."[38] Given that the Santa Fe National Forest now has 6,918 miles of road, which is 3,181 miles more than what the TAP report recommended in 2008. That means the Forest Service has made scant progress on reducing the miles of recommended unneeded roads, just 58 miles of the last 13 years!

Obviously, there is a significant need for the Revised Plan to include components to identify and implement the minimum road system, and decommissioning just 100 miles over the next 10 years, while feasible, is hardly adequate.

Our comments provided specific plan components to help achieve an environmentally and fiscally sustainable road system, and incorporating them in the Revised Plan is not only necessary but would also reflect the Forest Service's current roads policy framework, relevant legal requirements, and best available science.

2.2 Suggested Resolution for a Sustainable Road System.

The Forest Service must prepare a Supplemental EIS that incorporates the plan components we recommended in our comments, especially those that address road density, identifying/implementing the minimum road system, and additionally, setting road maintenance objectives separate from decommissioning targets that need to be much higher. In addition, the Supplemental EIS must provide a full and comprehensive corresponding analysis that addresses the deficiencies we explain above and in our comments, particularly as it relates to the environmental consequences of the climate crisis and the capacity to maintain the current and projected road system necessary to implement the Revised Plan, and that explains in detail how the Revised Plan will prioritize right-sizing the road system in a manner that limits ecological damage from roads.

3 Climate Change and Carbon Storage

3.1 Our Objection: The Forest Service fails to comply with NEPA, MUSYA, and the NFMA in its analysis of the plan's impact on carbon stores.

3.1.1 Legal Background

3.1.1.1 The Forest Service's NEPA Obligations.

Under the National Environmental Policy Act (NEPA), every federal agency that takes a major federal action "significantly affecting the quality of the human environment" is required to create a detailed statement discussing: (i) the environmental impact of the proposed action; (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented; (iii) alternatives to the proposed action; (iv) the relationship between local short-term uses of

[38] Record of Decision for Travel Management on the Santa Fe National Forest. June 2012. USDA Forest Service Santa Fe National Forest New Mexico at 6 (citing the purpose and need).

man's environment and the maintenance and enhancement of long-term productivity; and (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.[39] When, as here, any significant environmental impacts might result from the proposed action, the agency must complete a meticulous environmental impact statement (EIS).[40]

NEPA imposes "action forcing procedures … requir[ing] that agencies take a *hard look* at environmental consequences."[41] The sufficiency and utility of an EIS rely heavily on the scope and depth of the analysis of environmental impacts. The EIS must include the full scope of environmental effects, including direct, indirect, and cumulative impacts.[42] To ensure that the agency has taken the required "hard look," courts hold that the agency must utilize "public comment and the best available scientific information."[43]

[39] 42 U.S.C. § 4332(2)(C)(i)–(v).

[40] *Sierra Club v. Van Antwerp*, 661 F.3d 1147, 1153 (D.C. Cir. 2011) (citing *Sierra Club v. Peterson*, 717 F.2d 1409, 1415 (D.C. Cir. 1983)); *see also* 40 C.F.R. §§ 1508.11, 1508.27 (1978).

[41] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989) (citations omitted) (emphasis added).

[42] 40 C.F.R. §1508.25(a)(c)(1)–(3) (1978). The terms "effects" and "impacts" are used synonymously in the CEQ regulations interpreting NEPA. 40 C.F.R. § 1508.8 (1978). Although CEQ issued a final rulemaking in July 2020 fundamentally rewriting those regulations, the new rules apply only "to any NEPA process begun *after* September 14, 2020," or where the agency has chosen to "apply the regulations in this subchapter to ongoing activities." 40 C.F.R. § 1506.13 (2020) (emphasis added). Scoping on this project began in October 2015, long before September 14, 2020, and neither the Draft nor Final EIS indicates that the agency is opting to use the 2020 CEQ NEPA regulations. The Final EIS repeatedly discloses the proposed plan's cumulative effects, a term the 2020 regulations specifically eliminated. *See, e.g.,* Final EIS at iv-vi (table of contents indicating the EIS discloses "Cumulative Environmental Consequences" for each resource analyzed). Where agencies have applied the pre-2020 NEPA regulations to actions approved before September 14, 2020, the courts have as well. *See, e.g., Bair v. California Dep't of Transp.,* 982 F.3d 569, 577 n.20 (9th Cir. 2020) ("Because [the agency at issue] applied the previous [NEPA] regulations to the Project, so do we."); *Cascade Forest Conservancy v. Heppler*, 2021 U.S. Dist. LEXIS 30332, at *25 n.7 (D. Or. Feb. 15, 2021) ("Because the Federal Defendants applied the previous regulations to the Project, the Court does so as well.") (citing *Bair*); *City of Crossgate v. United States Dep't of Veterans Affairs*, 2021 U.S. Dist. LEXIS 51130, at *7, n.4 (W.D. Ky. Mar. 18, 2021) ("Because the VA applied the previous regulations to its NEPA process, the Court will do so as well.") (citing *Bair*). In any event, the 2020 regulations have been challenged as illegal in no fewer than four pending lawsuits, and this administration has proposed to restore key components of the 1978 regulations. *See, e.g., Environmental Justice Health Alliance v. CEQ*, Case 1:20-cv-06143 (S.D.N.Y. Aug. 6, 2020); *Wild Virginia v. CEQ*, Case 3:20-cv-00045-NKM (W.D. Va. July 29, 2020); *Alaska Community Action on Toxics v. CEQ*, Case 3:20-cv-05199-RS (N.D. Ca. July 29, 2020); *State of California v. Council on Environmental Quality,* Case No. 3:20-cv-06057 (N.D. Cal. Aug. 28, 2020); Council on Environmental Quality, NEPA Implementing Regulation Revisions, 88 Fed. Reg. 55,757 (Oct. 7, 2021) (proposing to restore, inter alia, the 1978 regulations' definition of impacts, including cumulative impacts).

[43] *Biodiversity Cons. Alliance v. Jiron*, 762 F.3d 1036, 1086 (10th Cir. 2014) (internal citation omitted).

NEPA also requires agencies to explain opposing viewpoints and their rationale for choosing one viewpoint over the other.[44] Courts will set aside a NEPA document where the agency fails to respond to scientific analysis that calls into question the agency's assumptions or conclusions.[45]

The agency must "provide a full and fair discussion of significant environmental impacts" in order to "inform decisionmakers and the public of the reasonable alternative which would avoid or minimize adverse impacts."[46] This includes numerous factors on context and intensity set out at 40 C.F.R. § 1508.27 (1978). Among these are the degrees to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.[47]

To take the required "hard look" at impacts, an EIS must "study, develop, and describe" reasonable alternatives to the proposed action.[48] This alternatives analysis "is the heart of the environmental impact statement."[49] The "touchstone" for courts reviewing challenges to an EIS under NEPA "is whether an EIS's selection and discussion of alternatives fosters informed decision-making and informed public participation."[50]

NEPA's implementing regulations require that an agency "[r]igorously explore and objectively evaluate *all* reasonable alternatives."[51] The agency's purpose and need statement sets the parameters for what constitutes a reasonable alternative.[52] Although agencies "enjoy[] considerable discretion" in defining their objectives and are not required to consider an unlimited number of alternatives,[53] they may not dismiss an alternative unless they have, in "good faith,"

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[44] 40 C.F.R. § 1502.9(b) (1978) (requiring agencies to disclose, discuss, and respond to "any responsible opposing view").

[45] *See Ctr. for Biological Diversity v. U.S. Forest Serv*., 349 F.3d 1157, 1168 (9th Cir. 2003) (finding Forest Service's failure to disclose and respond to evidence and opinions challenging EIS's scientific assumptions violated NEPA); *Seattle Audubon Soc'y v. Moseley*, 798 F. Supp. 1473, 1482 (W.D. Wash. 1992) ("The agency's explanation is insufficient under NEPA – not because experts disagree, but because the FEIS lacks reasoned discussion of major scientific objections."), aff'd sub nom. *Seattle Audubon Soc'y v. Espy*, 998 F.2d 699, 704 (9th Cir. 1993) ("[i]t would not further NEPA's aims for environmental protection to allow the Forest Service to ignore reputable scientific criticisms that have surfaced").

[46] *Id*. §§ 1502.1, 1502.14 (1978); *accord California v. Block*, 690 F.2d 753, 767 (9th Cir. 1982).

[47] 40 C.F.R. §1508.27(b)(5) (1978).

[48] 42 U.S.C. § 4332(2)(C)(iii), (2)(E).

[49] 40 C.F.R. § 1502.14 (1978).

[50] *California v. Block,* 690 F.2d 753, 767 (9th Cir. 1982).

[51] 40 C.F.R. § 1502.14 (emphasis added); *see also New Mexico*, 565 F.3d at 703 (quoting same); *Custer Cty. Action Ass'n v. Garvey*, 256 F.3d 1024, 1039 (10th Cir. 2001) (agencies must "rigorously explore all reasonable alternatives … and give each alternative substantial treatment in the environmental impact statement.").

[52] *See Dombeck*, 185 F.3d at 1174–75.

[53] *Colo. Envtl. Coal. v. Salazar*, 875 F. Supp. 2d 1233, 1245 (D. Colo. 2012).

found it to be "too remote, speculative, or impractical or ineffective,"[54] or not "significantly distinguishable from the alternatives already considered."[55] Further, "[t]he existence of a viable but unexamined alternative renders an environmental impact statement inadequate."[56] The agency's obligation to consider reasonable alternatives applies to citizen-proposed alternatives.[57] Courts routinely set aside agency NEPA analysis, including those by the Forest Service, where the agency arbitrarily failed to consider a reasonable alternative.[58]

Courts hold that an alternative may not be disregarded merely because it does not offer a complete solution to the problem.[59] Even if additional alternatives would not fully achieve the project's purpose and need, NEPA "does not permit the agency to eliminate from discussion or consideration a whole range of alternatives, merely because they would achieve only some of the purposes of a multipurpose project."[60] If a different action alternative "would only partly meet the goals of the project, this may allow the decision maker to conclude that meeting part of the goal with less environmental impact may be worth the tradeoff with a preferred alternative that has greater environmental impact."[61]

[54] *Colo. Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1174 (10th Cir. 1999) (quotation omitted).

[55] "NEPA does not require agencies to analyze the environmental consequences of alternatives it has in good faith rejected as too remote, speculative, or impractical or ineffective." *New Mexico ex rel. Richardson v. BLM*, 565 F.3d 683, 708 (10th Cir. 2009) (quotation omitted). Moreover, "an agency need not consider an alternative unless it is significantly distinguishable from the alternatives already considered." *Id*. at 708-09.

[56] *Westlands Water Dist. v. United States DOI*, 376 F.3d 853, 868 (9th Cir. 2004).

[57] *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin*., 538 F.3d 1172, 1217-19 (9th Cir. 2008) (finding EA deficient, in part, for failing to evaluate a specific proposal submitted by petitioner); *Colo. Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1171 (10th Cir. 1999) (agency's "[h]ard look" analysis should utilize "*public comment* and the best available scientific information") (emphasis added).

[58] *See, e.g., See High Country Conservation Advocates v. United States Forest Serv.*, 951 F.3d 1217, 1224-27 (10th Cir. 2020) (finding Forest Service NEPA analysis failed to consider a reasonable alternative concerning roadless area protection, and ordering the lower court to vacate the agency's decision); *New Mexico ex rel. Richardson v. BLM*, 565 F.3d 683 (10th Cir. 2009) (setting aside BLM's EIS concerning oil and gas leasing in the Otero Mesa area); *Wilderness Workshop v. U.S. Bureau of Land Management*, 342 F. Supp. 3d 1145 (D. Colo. 2018) (BLM's range of alternatives violated NEPA by omitting any option that would meaningfully limit oil and gas leasing and development within the planning area); *Colorado Environmental Coalition v. Salazar*, 875 F. Supp. 1233 (D. Colo. 2012) (BLM was obliged to consider an alternative requiring extraction of oil and gas to be conducted through extended-reach multilateral wells).

[59] *Natural Resources Defense Council, Inc. v. Morton*, 458 F.2d 827, 836 (D.C. Cir. 1972).

[60] *Town of Matthews v. U.S. Dep't of Transp.*, 527 F. Supp. 1055 (W.D. N.C. 1981).

[61] *North Buckhead Civic Ass'n v. Skinner*, 903 F.2d 1533, 1542 (11th Cir. 1990).

The courts also require that an agency adequately and explicitly explain any decision to eliminate an alternative from further study.[62]

3.1.1.2 NEPA Requires Agencies to Disclose Climate Impacts of Proposed Actions.

NEPA requires agencies to undertake meaningful consideration of greenhouse gas emissions (GHGs) and carbon sequestration (carbon storage).[63] As the Ninth Circuit has held, in the context of fuel economy standard rules:

> The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct. Any given rule setting a CAFE standard might have an "individually minor" effect on the environment, but these rules are "collectively significant actions taking place over a period of time."[64]

Courts have held that a "general discussion of the effects of global climate change" does not satisfy NEPA's hard-look requirement.[65]

Further, courts have ruled that federal agencies must consider indirect GHG emissions resulting from agency policy, regulatory, and fossil fuel leasing decisions. For example, agencies cannot ignore the indirect air quality and climate change impact of decisions that would open up access to coal reserves.[66] A NEPA analysis that does not adequately consider the indirect effects of a proposed action, including climate emissions, violates NEPA.[67] The disclosure of merely the volume of GHG emissions is insufficient; agencies must also disclose the impacts of those emissions.[68]

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[62] *See Wilderness Soc'y*, 524 F. Supp. 2d at 1309 (holding EA for agency decision to offer oil and gas leases violated NEPA because it failed to discuss the reasons for eliminating a "no surface occupancy" alternative); *Ayers v. Espy*, 873 F. Supp. 455, 468, 473 (D. Colo. 1994).

[63] *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin*., 538 F.3d 1172, 1217 (9th Cir. 2008). We use the terms "carbon storage" and "carbon sequestration" interchangeably.

[64] *Id*., 538 F.3d at 1216 (quoting 40 C.F.R. § 1508.7 (1978)). *See also WildEarth Guardians v. BLM*, 870 F.3d 1222, 1237 (10th Cir. 2017) (failure to disclose climate impacts of various alternatives "defeated NEPA's purpose").

[65] *High Country Conservation Advocates v. U.S. Forest Serv.*, 52 F. Supp. 3d 1174, 1189-90 (D. Colo. 2014).

[66] *See Mid States Coal. For Progress v. Surface Transp. Bd*., 345 F.3d 520, 532, 550 (8th Cir. 2003); *High Country Conservation Advocates*, 52 F. Supp. 3d at 1197-98; *Montana Environmental Information Center v. U.S. Office of Surface Mining*, 274 F. Supp. 3d 1074 (D. Mont. 2017), *amended in part, adhered to in part*, 2017 WL 5047901 (D. Mont. 2017).

[67] *Ctr. for Biological Diversity v. Bernhardt*, 982 F.3d 723, 2020 U.S. App. LEXIS 38033, *20 (9th Cir. 2020).

[68] *Utah Physicians For A Healthy Env't v. United States BLM*, 2021 U.S. Dist. LEXIS 57756 (D. Utah Mar. 24, 2021).

NEPA requires "reasonable forecasting," which includes the consideration of "reasonably foreseeable future actions … even if they are not specific proposals."[69] That an agency cannot "accurately" calculate the total emissions expected from full development is not a rational basis for cutting off its analysis. As the Ninth Circuit has explained, "[b]ecause speculation is … implicit in NEPA," agencies may not "shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry."[70] The D.C. Circuit has echoed this sentiment, rejecting the argument that it is "impossible to know exactly what quantity of greenhouse gases will be emitted" and concluding that "agencies may sometimes need to make educated assumptions about an uncertain future" in order to comply with NEPA's reasonable forecasting requirement.[71]

Agencies cannot allege that they can forego quantify the project's climate impacts by relying on NEPA regulations concerning "incomplete or unavailable information." Those NEPA provisions require the agency to identify the information as such, to "make clear that such information is lacking," and nonetheless include the information in the NEPA document if the overall costs of obtaining it are not "exorbitant" and the information is "essential to a reasoned choice among alternatives."[72]

The 2016 final CEQ *Guidance on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Review* provides useful direction on the issue of federal agency review of greenhouse gas emissions as foreseeable direct and indirect effects of a proposed action.[73] The CEQ guidance provides instructs agencies to conduct a lifecycle greenhouse gas analysis that quantifies GHG emissions and storage because the modeling and tools to conduct this type of analysis are available:

> If the direct and indirect GHG emissions can be quantified based on available information, including reasonable projections and assumptions, agencies should consider and disclose the reasonably foreseeable direct and indirect emissions when analyzing the direct and indirect effects of the proposed action. Agencies should disclose the information and any assumptions used in the analysis and explain any uncertainties. To compare a project's estimated direct and indirect emissions with GHG emissions from the no-action alternative, agencies should draw on existing, timely, objective, and authoritative analyses, such as those by the Energy Information Administration, the Federal Energy Management Program, or Office of Fossil Energy of the Department of

[69] *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1079 (9th Cir. 2011) (citation omitted).

[70] *Id*. (citations omitted).

[71] *Sierra Club v. Federal Energy Regulatory Commission*, 863 F.3d 1357, 1373-74 (D.C. Cir. 2017).

[72] 40 C.F.R. § 1502.22.

[73] Notice available at 81 Fed. Reg. 51,866 (Aug. 5, 2016); full guidance attached as Ex. CARB1, and available at https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa_final_ghg_guidance.pdf (last viewed Oct. 26, 2021).

> Energy. In the absence of such analyses, agencies should use other available information.[74]

The guidance further specifies that estimating GHG emissions is appropriate and necessary for actions such as the management of federal forests, including logging projects.

> In addressing biogenic GHG emissions, resource management agencies should include a comparison of estimated net GHG emissions and carbon stock changes that are projected to occur with and without implementation of proposed land or resource management actions. This analysis should take into account the GHG emissions, carbon sequestration potential, and the changes in carbon stocks that are relevant to decision making in light of the proposed actions and timeframes under consideration.[75]

The guidance shows that CEQ expects that agencies will perform such analysis at a programmatic or plan level, and also at the level of an individual project (such as an individual prescribed burn).

> Biogenic GHG emissions and carbon stocks from some land or resource management activities, such as a prescribed burn of a forest or grassland conducted to limit loss of ecosystem function through wildfires or insect infestations, may result in short-term GHG emissions and loss of stored carbon, while in the longer term a restored, healthy ecosystem may provide long-term carbon sequestration. Therefore, the short- and long-term effects should be described in comparison to the no action alternative in the NEPA review.[76]

Although the Trump administration withdrew the 2016 CEQ guidance, President Biden on January 20, 2021 rescinded that Trump Executive Order, and directed CEQ to "review, revise, and update" its 2016 climate guidance.[77] On February 19, 2021, CEQ effectively reinstated the 2016 GHG guidance:

> CEQ will address in a separate notice its review of and any appropriate revisions and updates to the 2016 GHG Guidance. In the interim, agencies should consider all available tools and resources in assessing GHG emissions and climate change effects of their proposed actions, including, as appropriate and relevant, the 2016 GHG Guidance.[78]

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[74] *Id*. at 16 (citations omitted).

[75] *Id*. at 26 (citations omitted).

[76] *Id*. at 18.

[77] Executive Order 13,990 (Jan. 20, 2021), Sec. 7(e), 86 Fed. Reg. at 7042, attached as Ex. CARB2.

[78] Council on Environmental Quality, National Environmental Policy Act, Guidance on Consideration of Greenhouse Gas Emissions, 86 Fed. Reg. 10,252 (Feb. 19, 2021), attached as Ex. CARB3, and available at https://www.govinfo.gov/content/pkg/FR-2021-02-19/pdf/2021-03355.pdf (last viewed Oct. 26, 2021).

Further, whatever the state of federal guidance, the underlying requirement from federal caselaw to consider climate change impacts under NEPA, including indirect and cumulative combustion impacts and loss of sequestration foreseeably resulting from commercial logging decisions, has not changed.[79]

The Interagency Social Cost of Carbon was developed specifically to provide agencies with a way to quantify and compare those impacts, and agencies have regularly used this method to disclose the climate impacts of federal actions. Courts have found agency action arbitrary and capricious where agencies failed to explain why they refused to use the social cost of carbon.[80]

3.1.1.3 The Forest Service's Obligations Under MUSYA, NFMA, and the 2012 Planning Rules

The National Forest Management Act ("NFMA") directs the Secretary of Agriculture ("Secretary") to develop, maintain and revise management plans for units of the National Forest System.[81] The plans must provide for the multiple use and sustained yield of the products and services obtained from the Forest in accordance with the Multiple–Use Sustained–Yield Act of 1960 ("MUSYA").[82]

NFMA requires that:

> In developing, maintaining, and revising plans for units of the National Forest System pursuant to this section, the Secretary shall assure that such plans—
>
> (1) provide for multiple use and sustained yield of the products and services obtained therefrom in accordance with the Multiple-Use Sustained-Yield Act of 1960 [16 U.S.C. 528–531], and, in particular, include coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness; and

[79] *See S. Fork Band Council of W. Shoshone v. United States Dept. of Interior*, 588 F.3d 718, 725 (9th Cir. 2009); *Ctr. for Biological Diversity*, 538 F.3d at 1214-15; *Mid States Coalition for Progress*, 345 F.3d at 550; *WildEarth Guardians v. United States Office of Surface Mining, Reclamation & Enf't*, 104 F. Supp. 3d 1208, 1230 (D. Colo. 2015) (coal combustion was indirect effect of agency's approval of mining plan modifications that "increased the area of federal land on which mining has occurred" and "led to an increase in the amount of federal coal available for combustion."); *Diné Citizens Against Ruining Our Env't v. United States Office of Surface Mining Reclamation & Enf't*, 82 F. Supp. 3d 1201, 1213-1218 (D. Colo. 2015); *High Country Conservation Advocates*, 52 F. Supp. 3d at 1174; *Utah Physicians For A Healthy Env't*, 2021 U.S. Dist. LEXIS 57756, at *15-*23.

[80] *High Country Conservation Advocates*, 52 F. Supp. 3d at 1190-93 (finding Forest Service violated NEPA by failing to disclose the climate impacts via the social cost of carbon); *Wildearth Guardians v. Bernhardt*, 2021 U.S. Dist. LEXIS 20792, CV 17-80-BLG-SPW (D. Mont. Feb. 3, 2021) at *25-*31 (finding Office of Surface Mining violated NEPA by failing to disclose the climate impacts via the social cost of carbon). *See also* CEQ, 2016 NEPA Climate Guidance (Ex. CARB1) at 32-33 (noting the appropriateness of monetizing climate impacts).

[81] 16 U.S.C. § 1604(a).

[82] 16 U.S.C. §§ 528–531. *See also*, 16 U.S.C. §§ 1604(b), (d), and (e) (NFMA provisions concerning preparation of management plans, including the need to provide for multiple uses).

> (2) determine forest management systems, harvesting levels, and procedures in the light of all of the uses set forth in subsection (c)(1), the definition of the terms "multiple use" and "sustained yield" as provided in the Multiple-Use Sustained-Yield Act of 1960, and the availability of lands and their suitability for resource management.[83]

"Multiple use" means:

> The management of all the various renewable surface resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.[84]

The Forest Service's Planning Rule implementing NFMA requirements mandate that plans must take into account "system drivers, including … climate change" and "reasonably foreseeable risks to ecological … sustainability."[85] The Rules require that Forest Service address "measurable changes on the plan area related to climate change" in its plan monitoring program.[86] Plans must also provide for "ecosystem services," which include "regulating services such as long term storage of carbon."[87]

In preparing a Forest Plan Revision, the agency must also undertake a "baseline assessment of carbon stocks" for the management unit.[88] As the Forest Service stated in its response to comments on the Rule:

> The rule sets forth an adaptive land management planning process informed by both a comprehensive assessment and the best available scientific information. Section 219.6(b)(3)-(4) requires responsible officials to identify and evaluate information on

[83] 16 U.S.C. § 1604(e) ("required assurances").

[84] 16 U.S.C. § 531(a).

[85] 36 C.F.R. §§ 219.8(a)(1)(iv), 219.10(a)(7).

[86] *Id*. at § 219.12(a)(5)(vi).

[87] *Id*. at §§ 219.10, 219.19.

[88] 36 C.F.R. § 219.6(b)(4); *see also* Forest Carbon and Conservation Management: Integration with Sustainable Forest Management for Multiple Resource Values and Ecosystem Services (Pinchot Institute, May 2015), at 6-7, attached as Ex. CARB4.

> climate change and other stressors relevant to the plan area, along with a baseline assessment of carbon stocks, as a part of the assessment phase. Section 219.8(a)(1)(iv) requires climate change be taken into account when the responsible official is developing plan components for ecological sustainability. When providing for ecosystem services and multiple uses, the responsible official is required by § 219.10(a)(8) to consider climate change. Measureable changes to the plan area related to climate change and other stressors affecting the plan area are to be monitored under § 219.12(a)(5)(vi). Combined with the requirements of the Forest Service Climate Change Roadmap and Scorecard, these requirements will ensure that Forest Service land management planning addresses climate change and supports adaptive management to respond to new information and changing conditions.[89]

Plans must include desired conditions ("description[s] of specific social, economic, and/or ecological characteristics of the plan area … toward which management of the land and resources should be directed") (DCs) and objectives ("concise, measurable, and time-specific statement[s] of a desired rate of progress toward a desired condition or conditions.").[90] The Rules also require that plans must ensure that "[t]imber harvest [for any purpose] would be carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and aesthetic resources."[91]

The Rules also provide that "[n]o timber harvest for the purposes of timber production may occur on lands not suited for timber production."[92] Land is not suited for timber production if "[t]imber production would not be compatible with the achievement of desired conditions and objectives established" by the relevant plan.[93] In balancing the factors for consideration in the suitability analysis, the Forest Service must provide justification for elevating production goals over other factors.[94] More broadly, the Rules require the use of "the best available scientific information to inform the planning process."[95]

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[89] Forest Service, 2012 Forest Planning Rule, 77 Fed. Reg. 21,162, 21,194 (Apr. 9, 2012).

[90] 36 C.F.R. §§ 219.7(e)(1)(i) & (ii).

[91] *Id*. at § 219.11(d)(3).

[92] *Id*. at § 219.11(d)(1).

[93] *Id*. at § 219.11(a)(1)(iii).

[94] *Citizens for Envtl. Quality v. U.S.*, 731 F. Supp. 970, 988 (D. Colo. 1989) ("if production goals are to be given greater weight in the suitability analysis, then adequate reasons must be set forth for so doing. Defendants must provide justification for allowing production goals, or any other factor required by [the NFMA] and the regulations, to weigh more heavily than other factors.").

[95] 36 C.F.R. § 219.3.

3.1.2 The Need to Manage National Forests for Carbon Sequestration and Carbon Storage

3.1.2.1 The Climate Crisis

The climate crisis is the overriding environmental issue of our time, threatening to drastically modify ecosystems, alter coastlines, worsen extreme weather events, degrade public health, and cause massive human displacement and suffering. Its impacts are already being felt in the United States, and recent studies confirm that time is running out to forestall the catastrophic damage that will result from 1.5 degrees Celsius of warming.[96] More recent studies have confirmed that climate change is accelerating, making the need to protect carbon stores even more urgent than it was just a few years ago.[97]

Climate change is impacting New Mexico now. Most of the state has warmed at least one degree Fahrenheit in the last century. Heat waves are becoming more common, and snow is melting earlier in spring. In the coming decades, the climate crisis "is likely to decrease the flow of water in the Colorado, Rio Grande, and other rivers; threaten the health of livestock; increase the frequency and intensity of wildfires; and convert some rangelands to desert."[98] In the southwestern United States, including New Mexico, other observed and projected impacts include warmer temperatures, lower soil moisture levels, increased frequency and intensity of wildfires, and increased competition and demand for scarce water resources.[99]

The Forest Service needs to be part of the solution to the climate crisis, not part of the problem.

3.1.2.2 President Biden Requires Prompt Action to Assess and Reduce Climate Pollution.

On the day he was inaugurated, President Biden committed to overturning the prior administration's failure to address, and its outright denial of, the climate emergency.

> It is, therefore, the policy of my Administration to listen to the science; to improve public health and protect our environment; to ensure access to clean air and water; to limit exposure to dangerous chemicals and pesticides; to hold polluters accountable, including those who disproportionately harm communities of color and low-income communities; *to reduce greenhouse gas emissions; to bolster resilience to the impacts of climate change*; to restore and expand our national treasures and monuments; and to prioritize

[96] *See* IPCC, Summary for Policymakers, Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways (2018), attached as Ex. CARB5.

[97] *See, e.g.*, H. Fountain, Climate Change Is Accelerating, Bringing World 'Dangerously Close' to Irreversible Change, The New York Times (Dec. 4, 2019), attached as Ex. CARB6.

[98] *See* EPA, What Climate Change Means for New Mexico (Aug. 2016), available at https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-nm.pdf (last viewed Oct. 26, 2021), and attached as Ex. CARB7.

[99] *See* Fourth National Climate Assessment (2018), Chapter 25: Southwest, available at https://nca2018.globalchange.gov/chapter/25/ (last viewed Oct. 26, 2021).

> both environmental justice and the creation of the well-paying union jobs necessary to deliver on these goals.
>
> To that end, this order directs all executive departments and agencies (agencies) to immediately review and, as appropriate and consistent with applicable law, take action to address the promulgation of Federal regulations and other actions during the last 4 years that conflict with these important national objectives, and *to immediately commence work to confront the climate crisis*.[100]

Days later, President Biden further committed to taking swift action to address the climate crisis. Per Executive Order 14,008, he recognized that "[t]he United States and the world face a profound climate crisis. We have a narrow moment to pursue action at home and abroad in order to avoid the most catastrophic impacts of that crisis and to seize the opportunity that tackling climate change presents."[101] Pres. Biden announced that under his administration,

> The Federal Government must drive assessment, disclosure, and mitigation of climate pollution and climate-related risks in every sector of our economy, marshaling the creativity, courage, and capital necessary to make our Nation resilient in the face of this threat. Together, we must combat the climate crisis with bold, progressive action that combines the full capacity of the Federal Government with efforts from every corner of our Nation, every level of government, and every sector of our economy.[102]

Addressing the need for the accurate assessment of climate costs, Pres. Biden announced on day one that "[i]t is essential that agencies capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account."[103] The President also re-established the Interagency Working Group on the Social Cost of Greenhouse Gases, on which the Secretary of Agriculture serves.[104] The President directed the Working Group to publish interim values for the social cost of carbon by February 19, 2021.[105] The Working Group that month set that price at $51/ton at a 3% discount rate.[106]

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[100] Executive Order 13,990, 86 Fed. Reg. 7037 (Jan. 20, 2021) (Ex. CARB2) at Sec. 1 (emphasis added).

[101] Executive Order 14,008, 86 Fed. Reg. 7619 (Jan. 27, 2021), attached as Ex. CARB8.

[102] *Id*. at 7622 (Sec. 201).

[103] Executive Order 13,990 (Ex. CARB2), 86 Fed. Reg. at 7040, Sec. 5(a) (emphasis added).

[104] *Id*., Sec. 5(b).

[105] *Id*., Sec. 5(b)(ii)(A).

[106] Interagency Working Group on Social Cost of Greenhouse Gases, Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990 (Feb. 2021), attached as Ex. CARB9, and available at https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf (last viewed Oct. 26, 2021).

3.1.2.3 The Need to Manage the National Forests as a Carbon Reserve

To avoid the most extreme impacts of climate change, it is not enough to move beyond carbon fuel consumption, the Forest Service must also substantially increase forest protection in order to pull large quantities of CO2 out of the atmosphere. This process is known as carbon sequestration or carbon storage.

Scientific studies support the need for forests, including national forests, to play a key role in responding to the climate crisis by responding to the need for carbon storage. For example, a 2018 National Academies of Sciences study states that removing carbon dioxide out of the air will be crucial to meeting global climate goals, and a 2018 study by The Nature Conservancy reports that forests and other natural systems in the U.S. could offset as much as 21% of total national greenhouse gas emissions.[107] The *United States Mid-Century Strategy for Deep Decarbonization*, released in 2016 by the Obama White House, states that federal lands will play an important role in preserving carbon storage and calls for quickly mobilizing federal lands towards this goal.[108]

The *United States Mid-Century Strategy for Deep Decarbonization* explains the importance of managing federal lands for decarbonization:

> Covering 28 percent of U.S. land and comprising nearly 20 percent of the annual U.S. carbon sink, federal lands provide an important opportunity to quickly sequester carbon at scale while programs to support carbon sequestration on private lands are gaining momentum (Zhu and McGuire 2016; Zhu, Zhiliang, and Reed 2012, 2014). Building on important progress over the past several years, federal agencies can both begin to track carbon dynamics on federal lands as part of their agency-wide GHG inventories and put in place management guidance to increase carbon sequestration potential. Federal grassland and forest carbon fluxes are reported in the U.S. GHG Inventory, and federal agencies have begun to incorporate carbon sequestration and emissions estimates into land management plans…. These data and federal processes can provide the foundation for developing and implementing guidance to include land carbon sequestration as one of the management priorities for federal lands. Research and data-supported management practices for carbon sequestration and resilience can be integrated into long-term strategic plans, such as BLM Resource Management Plans and National Forest System Land

[107] Sierra Club, Tackling Climate Change: A Climate Change Adaptation and Carbon Dioxide Removal Landscape Analysis (Feb. 2019) at 14, attached as Ex. CARB10, and available at https://content.sierraclub.org/grassrootsnetwork/sites/content.sierraclub.org.activistnetwork/files/teams/documents/Tackling%20Climate%20Change%20Report%20Feb%202019.pdf (last viewed Oct. 26, 2021).

[108] *Id*.; and *see* White House, *United States Mid-Century Strategy for Deep Decarbonization* (2016), at 15, listing the need to "[q]uickly scale up forest restoration and expansion on federal lands" as a "Long-term U.S. Mid-Century Strategy Priority"; p. 70: "Federal lands will play an important role in preserving carbon stocks and providing early action."; and p. 82 listing "quickly mobilizing federal lands" as a "Priority for Policy, Innovation, and Research" towards achieving 2050 goals." The White House Report is attached as Ex. CARB11, and available at https://unfccc.int/files/focus/long-term_strategies/application/pdf/mid_century_strategy_report-final_red.pdf (last viewed Oct. 26, 2021).

> Management Planning. Management priorities could include replanting understocked forests, promoting forest expansion where ecologically sound, and promoting agroforestry in federal grassland and pasture where appropriate…. Land managers should include carbon as a consideration for maintaining and enhancing landscape health in order to avoid undermining carbon mitigation efforts elsewhere…. To date, there has not been an assessment of additional carbon sequestration potential on federal lands. As management guidance is developed, assessing the full potential contribution of federal lands to our 2050 goals can help guide future policy priorities.[109]

Federal public land management practices and policies can enable those lands to achieve net carbon neutrality and ultimately serve as a source of negative carbon emissions by drawing down atmospheric carbon levels. Such practices will result in greater carbon storage, with associated preservation of expansive natural forests, reduced timber harvest, increases in tree species favoring late successional forest, and reduced risk of wildfire. In addition to enhancing the carbon storage potential of U.S. public lands, such practices will have the added benefit of preserving more interconnected habitat for wildlife species as they adapt to a rapidly changing climate.

3.1.2.4 A Carbon Storage Alternative in NEPA Planning

To achieve these critical climate goals, and to satisfy the Forest Service's' obligations under NEPA, MUSYA, NFMA and the 2012 Planning Rules, many of the objectors here, including Sierra Club, specifically requested that the Forest Service develop a carbon storage alternative for the Final EIS for the Sant Fe National Forest Plan revisions.[110] We recommended that such an alternative contain strong plan-level guidance and prescriptions for protection and restoration of old-growth, proforestation, afforestation and reforestation.[111] This would facilitate a shift of federal subsidies away from logging toward investments in resilient, carbon-rich ecosystems that provide wildlife habitat and steady sources of clean water. An alternative that maximized long-term carbon storage on public lands would also require changes in management, including restoring fire as a key ecological process.[112]

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[109] White House, *United States Mid-Century Strategy for Deep Decarbonization* (Ex. CARB11) at 83.

[110] *See* Sierra Club *et al*., Public Comment on Carbon Management in the Santa Fe National Forest Land Management Plans Revision (Oct. 31, 2019), attached as Ex. CARB12.

[111] "Proforestation" involves growing additional existing forests as intact ecosystems. This mitigates climate change through carbon sequestration and storage as well as promoting habitat protection and biodiversity. "Afforestation" involves planting new forests and "reforestation" involves replacing forests on de-forested lands. A sound carbon sequestration strategy would maximize all three of these practices.

[112] The Plan's fuel reduction goals are not to the contrary. Scientific evidence suggests that anthropogenic climate change is contributing to a longer fire season and more acres burned, which releases carbon into the atmosphere. As discussed in more detail below, the assumption that mechanical thinning and treatment will, in the long run, avoid the carbon emissions associated with more frequent high severity fires (*see* FEIS, Vol. 1, p. 358, and FEIS, Vol. 4, Appx. O, p. 342), is flawed. "Thinning," and other forms of commercial logging, cause a substantial net loss of forest carbon storage now, and a net increase in carbon emissions relative to no logging, and logging can increase fire intensity rather than reduce it. Bradley, C. M., C. T. Hanson, and D. A. DellaSala. 2016. *Does increased forest*

We urged that this alternative should include but not be limited to:

- Identification of the adverse impacts of climate change on the national forest;[113]
- Recognition of the need for the Forest Service to protect the national forests by managing it to slow climate change and mitigate its causes, here and as part of the national forest system, by minimizing carbon and greenhouse gas emissions and maximizing carbon sequestration and carbon storage;
- Management of the national forest for net carbon neutrality and ultimately as a carbon sink;
- Recognition that old forests accumulate and store vast quantities of carbon and are usually carbon sinks; trees accumulate and store carbon over their entire lifespan and old trees store carbon better than growing trees; and old forests accumulate carbon in soils;
- Recognition that conserving unmanaged wild forests and permanently protecting the forest and allowing it to grow free from direct human manipulation is one of the most effective methods to address the climate crisis;
- Elimination or significant reduction of timber harvest and increasing the rotation intervals for any remaining timber harvest to delay harvests;
- Elimination of mechanical thinning of trees other than suppressed small diameter trees or suppressed saplings;
- Reforestation of degraded forest lands and do not conduct post-fire logging;
- In making decisions about both "restoration" and timber harvest levels, optimizing carbon storage and sequestration by undertaking analysis that quantitatively evaluates the whole-ecosystem carbon balance based on the best available scientific information, and takes into account:
    - the synthesis presented in Anderson, M.G. 2019. Wild Carbon: A synthesis of recent findings. Northeast Wilderness Trust. Montpelier, VT USA regarding the value of mature trees and their soils with regard to carbon storage and sequestration

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protection correspond to higher fire severity in frequent-fire forests of the western United States? Ecosphere 7(10):e01492. 10.1002/ecs2.1492 at 7, 9, attached as Ex. CARB13.

[113] These include but are not limited to full analysis of impacts on snowpack, treeline, water availability, drought, temperature, wildfire, pests, and additional adverse impacts on flora and fauna and the human environment. *See e.g.*, EPA, What Climate Change Means for New Mexico (Aug. 2016), (Ex. CARB7).

- how the timing in changes in carbon storage and sequestration resulting from decisions comports with the need for urgent carbon reductions identified in the 2018 report from the IPCC. (Intergovernmental Panel on Climate Change (IPCC), Special Report on Global Warming of 1.5 °C (SR15) (October 2018), available at https://www.ipcc.ch/sr15/download/. See IPCC, Global Warming of 1.5 °C (Oct. 2018), available at http://www.ipcc.ch/report/sr15/);

- Determination of acres available for timber harvest and timber harvest volumes, and a selection of alternatives, based on the factors set forth above.[114]

3.1.3 The Forest Service's Analysis of Carbon Storage Violates NEPA.

The Forest Service should have considered the carbon storage alternative for the Santa Fe National Forest because it meets the purpose and need for the Forest Plan revision. The alternative is "significantly distinguishable" from the other alternatives already considered, and it is not "too remote, speculative, or impractical or ineffective."[115]

The Final EIS defines the plan revision's purpose and need as follows.

> A complete revision of the 1987 Forest Plan is needed to: (1) meet the legal requirements of the National Forest Management Act and the provisions of the 2012 Planning Rule, (2) guide natural resource management activities in the forest for the next 10 to 15 years, and (3) address the needs for change in management direction.[116]

The Final EIS also states that the Forest Plan Revision addresses the need to: (1) restore ecosystem resilience, including "sustain[ing] forest carbon sequestration;" (2) deliver provisioning ecosystem services (such as clean air and fresh water); (3) support traditional and cultural forest uses and local economies; (4) contribute to service-based sectors such as recreation and tourism, timber, and other multiple-use related activities and products; and (5) support for all resources, including "incorporate[ing] the best available scientific information into all plan components."[117]

The carbon storage alternative meets the Forest Plan Revision purpose and needs. It would comply with NFMA. Indeed, we discuss below why NFMA *requires* adoption of an alternative prioritizing a response to climate change. The proposed alternative would guide natural resource management activities on the forest for the next 10 to 15 years, and would address the need to for change in management direction by responding to climate change.

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[114] Sierra Club *et al*., Public Comment on Santa Fe Forest Plan (Ex. CARB12) at 8-9.

[115] *Colo. Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1174 (10th Cir. 1999) (quotation omitted).

[116] FEIS, Vol. 1, p. 4.

[117] FEIS, Vol. 1, pp. 5-8.

The carbon storage alternative would restore ecosystem resilience and sustain forest carbon sequestration; the latter is the goal of the proposed alternative. Given that the adverse impacts of climate change on the forest are caused by excessive carbon emissions into the atmosphere, and that carbon sequestration can offset these emissions and hence reduce this cause, it follows that maximizing carbon stores would deliver critical ecosystem services. Further, making the maximum effort to protect the climate would respect cultural and traditional landscapes and uses by undertaking the maximum effort to ensure that those uses could continue in the face of the climate crisis. And by reducing the harm of the climate crisis, the carbon storage alternative will also ensure that there will be multiple uses and resources left to manage. Finally, the carbon storage alternative would incorporate the best available science to achieve its goals, and would follow that science that demonstrates that the climate crisis will only worsen unless agencies (including the Forest Service) take all actions necessary to combat it.

For these reasons, the Forest Service should have considered in detail the carbon storage alternative.

3.1.3.1 The Forest Service Failed to Consider a Carbon Storage Alternative, Violating NEPA.

Despite the fact that the carbon storage alternative meets the plan revision purpose and need, is significantly distinguishable from other alternatives, and is not "too remote, speculative, or impractical or ineffective," the Forest Service declined to consider the alternative in detail.

The Final EIS states that a "number of alternatives were considered but dismissed from detailed consideration," including a "climate change and carbon sequestration focused alternative."[118] The Final EIS provides a six-sentence explanation for dismissing the carbon storage alternative.

> Although none of the alternatives is specifically designated as a climate change alternative, all alternatives incorporated climate change into the resource analyses and pinpointed desired conditions and management objectives that increase the ecological resiliency of the Santa Fe NF to predicted changes in climate. For example, the vegetation management practices outlined under all alternatives are capable of reducing drought stress and the risk of uncharacteristic fire, both of which are consequences of changing temperature and precipitation regimes, combined with uncharacteristically dense and fuel-laden forests. Management to maximize carbon sequestration over other ecosystem services is not a goal of the Plan. As with climate change in general, the Plan manages for overall ecosystem function and resiliency, which implies inherent levels of carbon sequestration. The Forest Service is required to design new facilities that reduce energy usage to reduce greenhouse gas emissions. Management practices outlined in the Forest Plan are also designed to allow for the flexibility to address changing conditions over time.[119]

[118] FEIS, Vol. 1, pp. 52, 54.

[119] FEIS, Vol. 1, p. 54.

None of the excuses supplied by the Forest Service provides a rational basis for dismissing an alternative that prioritizes carbon sequestration.

The Forest Service alleges, first, that "all alternatives incorporated climate change into the resource analyses and pinpointed desired conditions and management objectives that increase the ecological resiliency of the Santa Fe NF."[120] Incorporating analysis and aiming to increase ecological resiliency are not the same as maximizing carbon sequestration or storage, which, over the long run, will reduce carbon pollution and therefore increase resiliency.

Second, the Forest Service states: "Management to maximize carbon sequestration over other ecosystem services is not a goal of the plan."[121] This statement merely presupposes the outcome of the chosen alternative; it does not explain whether the carbon sequestration alternative meets the purpose and need or is too similar to other analyzed alternatives. It further ignores that a relatively stable climate is a necessary pre-condition for the Santa Fe National Forest providing ecosystem services, and that a relatively stable climate will not be possible unless the Forest Service and other agencies and actors take all steps necessary to limit the worst impacts of climate change.

Third, the agency asserts that "[t]he plan manages for overall ecosystem function which implies inherent levels of carbon sequestration or greenhouse gas emissions."[122] This is not a basis for dismissing a reasonable alternative; it appears to be simply a statement that the plan "manages" for carbon sequestration, not that it maximizes such sequestration as the proposed alternative would.

Fourth, the Forest Service contends: "Management practices outlined in the Forest Plan are also designed to allow for the flexibility to address changing conditions over time."[123] But allowing for the flexibility to address a changing climate is not the same as managing the Santa Fe National Forest to attempt to reduce the chances that the climate will change.

In the Final EIS's appendix responding to comments, the Forest Service provides additional rationales that appear intended to support the agency's decision dismissing the carbon storage alternative. For example, the Final EIS argues: "Favoring persistent carbon storage in fire-adapted forests can involve managing tree density to prevent catastrophic fire and the long-term conversion of resilient forests (carbon sinks) to uncharacteristic grass-forb-shrub conditions (carbon sources)."[124] This passage merely asserts that one way to achieve carbon storage

[120] FEIS, Vol. 1, p. 54. *See also* FEIS, Vol. 4, Appx. O, p. 343 (making similar claim).

[121] FEIS, Vol. 1, p. 54. *See also* FEIS, Vol. 4, Appx. O, p. 345 (making same claim).

[122] FEIS, Vol. 1, p. 54. *See also* FEIS, Vol. 4, Appx. O, p. 345 ("the Plan manages for overall ecosystem function and resiliency, which implies inherent levels of carbon sequestration.").

[123] FEIS, Vol. 1, p. 54. *See also* FEIS, Vol. 4, Appx. O, p. 343 (stating same).

[124] FEIS, Vol. 4, Appx. O, p. 341.

involves managing tree density. That does not mean it is the only way or the most effective way, and it is the most effective way that the Sierra Club et al.'s proposed alternative seeks to achieve.

The responses to comments also assert that "[t]he value of the Santa Fe NF for carbon sequestration, storage, and cycling is noted in several places in the final Plan."[125] The mere fact that the Forest Service proposes to adopt an alternative that *recognizes* the value of carbon storage does not mean that the agency can fail to analyze an alternative that would *maximize* carbon storage over time.

In sum, none of the justifications the Forest Service provides for declining to analyze in detail the carbon storage decision provides a rational basis for that decision.

3.1.3.2 The Forest Service's Failure to Take a Hard Look at Carbon Storage Impacts Violates NEPA.

The Final EIS contains some discussion of carbon storage, but that discussion fails to take the hard look at the impacts of each alternative, as NEPA requires.

First and foremost, we note the arbitrary and capricious nature of the Forest Service's handling of carbon storage in the Santa Fe plan revision FEIS as compared to the way the Carson NF forest plan revision FEIS addresses the issue.

The Carson FEIS contains a five-page section addressing the carbon storage impacts of the plan that includes a quantification of the estimated carbon stocks for each alternative, allowing at least a modest comparison among them those alternatives.[126] The Carson NF's analysis includes a bar graph displaying the "Lost potential storage of carbon because of disturbance on the Carson NF by alternative, compared to average carbon stocks between 1990 and 2011."[127] The Carson FEIS's response to comments contains additional data comparing the impacts of each alternative on carbon storage.[128] While the Carson FEIS's analysis is not sufficient to comply with NEPA, it is arbitrary and capricious for the Forest Service to attempt to quantify the carbon storage differences among alternatives in one forest plan in the Southwest, and then not to do it for the plan for a nearby forest in the Southwest Region completed at precisely the same time. At an absolute minimum, the Forest Service must explain why it chose one path for the Carson and another for the Santa Fe. The agency failed to do so.

Second, while the FEIS mentions carbon storage, acknowledging the role that forests play in that process, that does not amount to a hard look because the Final EIS fails to: disclose how each

[125] FEIS, Vol. 4, Appx. O, p. 342.

[126] Carson Forest Plan Revision FEIS, Vol. 1, pp. 255-60, excerpts attached as Ex. CARB14.

[127] *Id*. at 258.

[128] Carson Forest Plan Revision FEIS, Vol. II, Appx. A, p. 70 (including a bar graph that illustrates that "all action alternatives have a greater potential for carbon loss per year from disturbance (tree removal, insects, disease, and fire)" than the no action alternative), included in Ex. CARB14.

alternative impacts the ability of the forest to store carbon; *quantify* those different impacts in terms of carbon stored, via a life-cycle carbon analysis; and *disclose* the climate impacts of those differences using a metric such as the social cost of carbon. The FEIS fails to do any of these things.

The Final EIS states, among other things:

> Forests play an important role in carbon sequestration, which is the direct removal of carbon dioxide (CO2) from the atmosphere through biologic processes, such as forest growth. Carbon sequestration by forests mitigates greenhouse gas emissions by offsetting losses through removal and storage of carbon (USDA Forest Service 2016a) AQ9. Over at least the past several decades, temperate forests have provided a valuable ecosystem service by acting as a net sink of atmospheric carbon dioxide, partly offsetting anthropogenic emissions (Millar and Stephenson 2015). Carbon dioxide uptake by forests in the conterminous United States offset approximately 16 percent of our national total carbon dioxide emissions in 2011 (U.S. Environmental Protection Agency 2013). Forests and other ecosystems generally act as carbon sinks because, through photosynthesis, growing plants remove CO2 from the atmosphere and store it (USDA Forest Service 2015). Keeping forests as forests is one of the most cost-effective carbon storage measures. Restoration—bringing badly disturbed forests and grasslands back to producing a full range of environmental services—is another (USDA Forest Service 2015).[129]

The FEIS estimates the carbon dioxide emissions from prescribed fire and wildfire,[130] but includes no numbers on the effects of this actions on carbon stores.

The FEIS contains a rudimentary comparison of the carbon storage impacts of alternatives, but this does not constitute the "hard look" NEPA mandates. The analysis provides no quantitative estimates, nor does it even attempt to disclose the scale of those impacts, making it impossible for the Forest Service or the public to understand the nature of the impacts. The FEIS includes a table stating that: Alternative 1 will result in the "2nd least" potential for carbon storage; Alternative 2 will result in the "2nd most" potential for carbon storage, a "moderately uncertain" prediction; Alternative 3 will result in the "greatest" potential for carbon storage, a prediction made with the "least uncertainty;" and Alternative 4 result in the "least" potential for carbon storage, a prediction made with the "greatest uncertainty."[131]

These predictions appear to be based on a pair of simple assumption: that those alternatives undertaking more acres of "restoration" treatments will result in more carbon sequestration, and more fire will result in a greater amount of certainty as to impacts. For example, the FEIS states:

[129] FEIS, Vol. 1, pp. 355-56.

[130] FEIS, Vol. 1, p. 357.

[131] FEIS, Vol. 1, p. 64.

> Alternative 2 would restore approximately three and a half times more acres over a 10-year period than the current forest plan, which would result in second highest carbon sequestration and associated effects (***A10-A13***) of all alternatives over the life of the forest plan (Dore 2008). In this alternative the indirect effects would have a moderate amount of uncertainty in total emissions since it has a moderate amount of planned fire.
>
> ….
>
> Alternative 3 would restore approximately eight and a half times more acres over a 10-year period than the current forest plan, which would result in the greatest carbon sequestration and associated effects (***A10-A13***) of all alternatives over the life of the forest plan (Dore 2008). In this alternative the indirect effects would have the least amount of uncertainty in total emissions since it has the most planned fire.[132]

But the FEIS's equation (more "restoration" = more carbon storage) provides the reader with no idea of the quantity or scale of the difference among alternatives, making it impossible for the reader to weigh one alternative against another. This undermines the heart of the NEPA process, and is not the hard look NEPA mandates.

The Forest Service analysis fails to take the required hard look, because, among other things, had the FEIS considered and *quantified* the carbon sequestration and carbon storage capabilities of wilderness, for example, it might have developed and chosen an alternative with greater recommended wilderness. Instead, it rejected alternatives with the greatest wilderness, without apparent consideration of these factors.[133]

We note that CEQ's guidance on evaluating climate change in NEPA documents explicitly states:

> Agency decisions are aided when there are reasonable alternatives that allow for comparing GHG emissions and carbon sequestration potential, trade-offs with other environmental values, and the risk from – and resilience to – climate change inherent in a proposed action and its design.[134]

The Forest Service failed to heed this direction, undermining its evaluation of alternatives.

Third, while the Forest Service provides an excuse for not undertaking an analysis at all of the alternatives on carbon storage, that excuse has no merit. The agency's allegation that "[t]here are no regulatory requirements to evaluate carbon flux or to analyze and contrast future carbon among alternatives in an EIS,"[135] is false, and contradicted by a multitude of authority. President

[132] FEIS, Vol. 1, p. 359.

[133] *See* FEIS, Vol. 1, p. 72 (comparing wilderness recommendations).

[134] CEQ, 2016 NEPA Climate Guidance (CARB1), p. 15.

[135] FEIS, Vol. 4, Appx. O, p. 343.

Biden's Executive Order 14,008 explicitly requires that the "Federal Government must drive assessment, disclosure, and mitigation of climate pollution and climate-related risks in every sector of our economy." Here, the agency's decision to ignore the importance of carbon storage undermines that order.

Further, CEQ's 2016 climate guidance, which was effectively reinstated in February 2021, states that "when addressing climate change agencies should consider … [t]he potential effects of a proposed action on climate change as indicated by assessing GHG emissions (e.g., to include, where applicable, *carbon sequestration*)."[136] CEQ's guidance also recognized that models and other products existed *five years ago*, including those developed and used by the Forest Service, to estimate the carbon sequestration effects of agency actions: "These tools can provide estimates of GHG emissions, including emissions from fossil fuel combustion and estimates of GHG emissions and carbon sequestration for many of the sources and sinks potentially affected by proposed resource management actions."[137]

As discussed above, federal courts have also ruled that agencies are required to disclose the climate impacts of their actions.

In addition, the Forest Service's approach also violates NEPA because methods exist that would allow the agency to quantify climate impacts. For example, a 2018 study concludes that carbon storage impacts can be estimated, accounted for, and factored into a model that calculated the net amount of carbon lost due to forest logging in Oregon over two five-year periods.[138] This is precisely the type of analysis the Forest Service should, and could, have undertaken for Santa Fe National Forest.

Other reports and agency analysis demonstrate that quantifying climate impacts at the Forest level can be done because it *has* been done. A report from Dr. DellaSala addresses carbon stores from wood products and concluded that logging old-growth forest under the Tongass National Forest's 2016 Forest Plan would result in net annual CO2 emissions totaling between 4.2 million tons and 4.4 million tons, depending on the time horizon chosen.[139] The Bureau of Land Management more than a decade ago completed an EIS for its Western Oregon Resource Management Plan in which that agency also predicted the net carbon emissions from its forest

[136] CEQ, 2016 NEPA Climate Guidance (CARB1), p. 4 (emphasis added).

[137] *Id*., p. 12, and footnote 29.

[138] *See* B. Law et al. *Land use strategies to mitigate climate change in carbon dense temperate forests*. Proceedings of the Nat'l Academy of Sciences, vol. 115, no. 14 (Apr. 3, 2018) at 3664 ("Our LCA [life-cycle assessment] showed that in 2001–2005, Oregon's net wood product emissions were 32.61 million tCO2e [tons of carbon dioxide equivalent in net GHG emissions] (Table S3), and 3.7- fold wildfire emissions in the period that included the record fire year (15) (Fig. 2). In 2011–2015, net wood product emissions were 34.45 million tCO2e and almost 10-fold fire emissions, mostly due to lower fire emissions."). Attached as Ex. CARB15.

[139] D. DellaSala. The Tongass Rainforest as Alaska's First Line of Climate Change Defense and Importance to the Paris Climate Change Agreements. 2016. At p. 14. Attached as Ex. CARB16.

and other resource management programs.[140] Because agencies and academics have quantified and compared the carbon emissions of alternative logging proposals, NEPA requires the Forest Service to do so here. Agencies may not "shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry."[141] The agency has models and can explain their limitations to inform the public and the decisionmaker. The Forest Service's failure to do so violates NEPA.

Further, NEPA requires that agencies identify "incomplete or unavailable" information as such, to "make clear that such information is lacking," and nonetheless include the information in the NEPA document if the overall costs of obtaining it are not "exorbitant" and the information is "essential to a reasoned choice among alternatives."[142] Here, the information is neither incomplete nor unavailable, the Forest Service has simply chosen, arbitrarily, to deprive the public of the data. Because the climate crisis is the pre-eminent environmental (and social, and public health, etc.) issue of our time, the Forest Service cannot assert that the Plan's climate impact is not "essential to a reasoned choice among alternatives." The Forest Service can and should have undertaken an analysis of the impacts of the alternatives on carbon stores.

Fourth, the overbroad generalizations the FEIS contains concerning carbon storage contradict the best available science. The Final EIS assumes that logging and prescribed fire will, over an unspecified period of time, result in greater carbon storage than maintaining the status quo.

> Even though practices such as thinning and prescribed fire may release carbon in the short term, they focus growth and storage for the future on trees that are at lower risk and are more resilient to disturbance (AQ10).
>
> ….
>
> [H]igh-severity fire has the potential to be a carbon source for decades post fire compared to 2 to 3 years post treatment from prescribed fire (AQ12) (Dore 2008). Appropriate forest management and protection can substitute lighter, strategically placed, and more recoverable emissions for disturbance emissions (from unplanned fire) that would be more severe, extensive, and less reversible (U.S. Forest Service 2015). Because live trees continually sequester carbon and are a more stable carbon sink than dead biomass left on the site, treating stands is preferred for long-term mitigation of atmospheric carbon levels (AQ13) (Vegh et al. 2013).
>
> ….

[140] *See* Bureau of Land Management, Western Oregon Proposed RMP Final EIS (2009) at 165-181, excerpts attached as Ex. CARB17.

[141] *N. Plains Res. Council*, 668 F.3d at 1079 (9th Cir. 2011) (citation omitted).

[142] 40 C.F.R. § 1502.22(a).

> We stand by the balance of scientific information that thinning and prescribed fire in fire-adapted forests and woodlands favors net carbon sequestration over longer time frames (Hurteau 2017, Krofcheck et al. 2017, McCauley et al. 2019), which we discuss in the … FEIS.[143]

The Forest Service's analysis ignores the fact that recent studies agree that maintaining forests rather than cutting them down can help reduce the impacts of climate change.[144] "Stakeholders and policy makers need to recognize that the way to maximize carbon storage and sequestration is to grow intact forest ecosystems where possible."[145] One report concludes:

> *Allowing forests to reach their biological potential for growth and sequestration, maintaining large trees* (Lutz et al 2018), reforesting recently cut lands, and afforestation of suitable areas *will remove additional CO2 from the atmosphere*. Global vegetation stores of carbon are 50% of their potential including western forests because of harvest activities (Erb et al 2017). Clearly, western forests could do more to address climate change through carbon sequestration *if allowed to grow longer*.[146]

Further, a June 2020 literature review from leading experts on forest carbon storage reported:

> *There is absolutely no evidence that thinning forests increases biomass stored (Zhou et al. 2013).* It takes decades to centuries for carbon to accumulate in forest vegetation and soils (Sun et al. 2004, Hudiburg et al. 2009, Schlesinger 2018), and it takes decades to centuries for dead wood to decompose. We must preserve medium to high biomass (carbon-dense) forest not only because of their carbon potential but also because they have the greatest biodiversity of forest species (Krankina et al. 2014, Buotte et al. 2019, 2020).[147]

Two experts in the field concluded this year:

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[143] FEIS, Vol. 1, p. 358; FEIS, Vol. 4, Appx. O, p. 342.

[144] The FEIS does acknowledge that "Maintaining healthy forests and restoration—bringing badly disturbed forests and grasslands back to producing a full range of environmental services—are two of the most cost-effective carbon storage measuresE43 (USDA Forest Service 2016a) that can contribute to long-term health and safety benefits through mitigating climate change effects (i.e., drought, increased risk of extreme fires, decreased snowpack, etc.)." FEIS, Vol. 2, p. 44.

[145] Moomaw, *et al*., Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good, Frontiers in Forests and Global Change (June 11, 2019) at 7 (emphasis added), attached as Ex. CARB18. The FEIS failed to address or cite this study.

[146] T. Hudiburg *et al*., Meeting GHG reduction targets requires accounting for all forest sector emissions, Environ. Res. Lett. 14 (2019) (emphasis added), attached as Ex. CARB19. The FEIS failed to address or cite this study.

[147] B. Law, et al., The Status of Science on Forest Carbon Management to Mitigate Climate Change (June 1, 2020), attached as Ex. CARB20.

> Recent projections show that to prevent the worst impacts of climate change, governments will have to increase their pledges to reduce carbon emissions by as much as 80%. We see the next 10 to 20 years as a critical window for climate action, and believe that *permanent protection for mature and old forests is the greatest opportunity for near-term climate benefits*.[148]

Further, to address the climate crisis, agencies cannot rely on the re-growth of cleared forests to make up for the carbon removed when mature forest is logged. One prominent researcher explains: "It takes at least 100 to 350+ years to restore carbon in forests degraded by logging (Law et al. 2018, Hudiburg et al. 2009). If we are to prevent the most serious consequences of climate change, *we need to keep carbon in the forests because we don't have time to regain it once the forest is logged* (IPCC, 2018)."[149]

Unless and until the Forest Service's decision is informed by these studies, the agency cannot have taken the hard look required by NEPA or utilized the best available science.

In addition, the studies that the Final EIS relies on are flawed because they overstate the likelihood of fire intersecting with thinning treatments, and thus overstate the alleged long-term carbon benefits of that logging. Hurteau (2017)[150] assumes a 1 in 50 chance (2%) of wildfire occurrence,[151] despite the fact that studies reviewing the actual overlap of wildfire and thinning areas show that the probability that the two area areas will overlap is less than 1%.

Likewise, McCauley (2019)[152] underestimates thinning's climate impacts. Both Hurteau and McCauley project that thinning will initially decrease ecosystem carbon, but project that carbon accumulation would overtake prior carbon losses by 2200. However, McCauley states that under higher temperature scenarios, those modeling assumptions break down. Unfortunately, the global climate is on a trajectory to meet those higher temperature scenarios.

The best way for the Forest Service to address these issues is not to simply assume, based on rosy assumptions, that thinning will result, long-term, in improved (but unquantified) carbon

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[148] B. Law & W. Moomaw, Keeping trees in the ground where they are already growing is an effective low-tech way to slow climate change, *The Conversation* (Feb. 23, 2021) (emphasis added), attached as Ex. CARB21, and available at https://theconversation.com/keeping-trees-in-the-ground-where-they-are-already-growing-is-an-effective-low-tech-way-to-slow-climate-change-154618 (last viewed Oct. 27, 2021). The FEIS failed to address or cite this study.

[149] B. Law, *et al*., The Status of Science on Forest Carbon Management (Ex. CARB20) (emphasis added). The FEIS failed to address or cite this study. The FEIS failed to address or cite this study.

[150] Hurteau (2017) is relied on by the FEIS at Vol. 1, pp. 109, 358, and FEIS at Vol. 4, Appx. O, pp. 40, 308, 340-42.

[151] Hurteau, M.D. 2017. Quantifying the Carbon Balance of Forest Restoration and Wildfire under Projected Climate in the Fire-Prone Southwestern United States. Plos One 12(1): e0169275. https://doi.org/10.1371/journal.pone.0169275

[152] McCauley (2019) is relied on by the FEIS at Vol. 1, pp. 109, and FEIS at Vol. 4, Appx. O, pp. 40, 308, 341-42.

storage. To use the best available science, we urge the Forest Service to undertake a carbon life cycle analysis specific to the planning area that does not over-estimate the small chance that fires will hit thinned areas. The Forest Service should use the research-supported chance of less than 1% (Schoennagel et al. 2017), rather than simply assume 2% as Hurteau did.[153]

Further, a life-cycle analysis is necessary because Hurteau and McCauley looked only at carbon left on the forest, and failed to address all upstream (project level) and downstream (processing and transport of wood products) emissions, which may be considerable. Logging itself is a fossil-fuel intensive process; so are transporting logs to the mill, milling projects, and transporting them to market. Failure to address these facts and this best available science, and failure to undertake the necessary life cycle analysis, violates NEPA's hard look mandate.

In sum, the Forest Service's analysis of the extent to which the plan provides for the "ecosystem service" of "long term storage of carbon," 36 C.F.R. §§ 219.10, 219.19, is lacking. This flaw also violates the NFMA and NEPA requirements to base decisions on the best available scientific evidence. The Forest Service's failure to take a hard look at the impacts of the various alternatives on carbon storage and sequestration violates NEPA.

3.1.3.3 The Santa Fe National Forest's Failure to Manage the Forest for Carbon Sequestration Violates the National Forest Management Act.

The Final EIS identifies 356,716 acres as suitable for timber production under the chosen alternative, a figure the agency deems compatible with the desired conditions and objectives established by the Plan.[154] The Plan notes that vegetation, wetlands, and soils provide ecosystem services including carbon storage.[155]

Despite these plan components and the agency's duty to address climate change and carbon storage, it does not appear the Plan or the Final EIS quantify the carbon emissions from timber harvesting in comparing alternatives, especially with regard to the Plan's impacts on the carbon storage capacity of the forest.

As noted above, the 2012 Forest Planning Rule mandate that the agency disclose existing information relevant to a baseline assessment of carbon stocks for the forest management unit.[156] But it does not appear the Forest Service took the hard look at these factors in developing this Plan.

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[153] T. Schoennagel, *et al*. Adapt to more wildfire in western North American forests as climate changes. Proceedings of the National Academy of Sciences. 114 (18). May 2, 2017. Attached as Ex. CARB22, and available at https://www.pnas.org/content/114/18/4582 (last viewed Oct. 27, 2021) ("roughly 1% of US Forest Service forest treatments experience wildfire each year, on average. The effectiveness of forest treatments lasts about 10–20 y, suggesting that most treatments have little influence on wildfire.").

[154] Draft ROD at 12, Final EIS, Vol. 1, p. 390.

[155] Revised Plan, pp. 28, 30-31, 74, 94.

[156] *See Pinchot Institute Report* (Ex. CARB4) at 6-7.

Further, the agency's failure to adopt a plan mandating significant levels of carbon storage violates the Forest Planning Rule's requirement that the Forest Service consider climate change and *sustainability* in the planning process.[157] The Rule requires that plans must ensure that "[t]imber harvest [for any purpose] would be carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and aesthetic resources."[158] As climate change has the potential to adversely affect every item on that list, harvesting (logging) important carbon sinks is inconsistent with protecting these interests as doing so would exacerbate the climate crisis.

Importantly, the requirement that forest plans provide for sustainability, and that plans must ensure that timber harvests be carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, and other resources, has no balancing factor.[159] This is not a factor to consider, but a regulatory requirement that the Forest Service must follow—regardless of other interests at play. And, due to the importance of carbon sequestration in reducing the widespread ecological impacts of climate change, § 219.11(d)(3) should be applied to ensure the optimization of carbon sequestration in the plan area.[160]

The Rule also provides that "[n]o timber harvest for the purposes of timber production may occur on lands not suited for timber production."[161] Land is not suited for timber production if "[t]imber production would not be compatible with the achievement of desired conditions and objectives established" by the relevant plan.[162]

Because timber production releases carbon in the harvest process, reduces the carbon storage capacity of the forest and reduces its potential for carbon sequestration (which is not fully or timely replaced by replanting), it adds carbon to the atmosphere and is not compatible with the objective of sustaining a healthy forest ecosystem.

Inasmuch as NFMA and MUSYA require management plans provide for "multiple use and sustained yield," these laws require the Forest Service to manage the national forest for maximum carbon storage and carbon sequestration with minimum carbon emissions. The goal should be to make the forest a net carbon sink, and, moreover, to help serve the purpose of offsetting, to the maximum extent possible, the carbon emissions of the U.S. that are contributing

[157] 36 C.F.R. §§ 219.8 & 219.10.

[158] 36 C.F.R. § 219.11(d)(3).

[159] 36 C.F.R. § 219.11(d)(3).

[160] *See Pinchot Institute Report* (Ex. CARB4) at 15: "Developing optimization models in which maximizing carbon stocks is the objective function, subject to constraints to limit any diminishment of other forest resource uses and values, could help identify unexpected opportunities to enhance forest carbon stocks with a minimum of tradeoffs to other environmental, economic, and social values."

[161] 36 C.F.R. § 219.11(d)(1).

[162] 36 C.F.R. § 219.11(a)(1)(iii).

to global climate change. Given the adverse impacts of climate change on the health of the national forest, the agency should manage for carbon sequestration and storage the greatest use, for without reducing the adverse impacts of climate change the other uses of the forest (*e.g.* wilderness, recreation and timber) are all impaired, reduced and undermined.

The Forest Service's failure to elevate carbon sequestration use above timber production goals in particular is inconsistent with the 2012 NFMA rule requirements that climate change, sustainability, and the long-term storage of carbon be considered in the planning process. To put it in MUSYA terms, optimizing the carbon sequestration use of the national forest(s) "will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; ... with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output."[163]

In exercising its discretion to balance uses under MUSYA, and the plan for those uses under NFMA, the Forest Service cannot rationally ignore the urgent need to manage the forests in a manner that not only maintains or improves carbon carrying capacity, but optimizes the carbon carrying capacity of the forests in a manner consistent with making the near term reductions in carbon emissions that the October 2018 IPCC report[164] identifies as critical. Forest protection in the U.S. is a vital part of achieving those reductions. Studies from the past decade have shown that more logging occurs in U.S. forests than in any other nation in the world, making the U.S. the largest global problem in terms of carbon emissions from logging.[165] Greenhouse gas emissions from the U.S. constitute about one-quarter of the global total, and much of this is the result of fossil fuel extraction from federal public lands, including 41% of all coal extraction that occurs in the U.S.[166] Increased forest protection could account for approximately *half* of the climate change mitigation needed to keep global temperature rise to 1.5 degrees Celsius or less.[167]

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[163] 16 U.S.C. § 531(a).

[164] Available at https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf.

[165] Hansen, M.C., et al. 2013. High-resolution global maps of 21st-century forest cover change. Science 342: 850-53. Attached as Ex. CARB23; Prestemon, J.P., et al. 2015. The global position of the U.S. forest products industry. U.S. Forest Service, e-Gen. Tech. Rpt. SRS-204.

[166] *See, e.g.*, 81 Fed. Reg. 17,720, 17,224 (Mar. 30, 2016); Stockholm Environment Institute, *How would phasing out U.S. federal leases for fossil fuel extraction affect CO_2 emissions and 2°C goals?* (May 2016). Available at https://mediamanager.sei.org/documents/Publications/Climate/SEI-WP-2016-02-US-fossilfuel-leases.pdf (last visited Oct. 26, 2021).

[167] Erb, K.H., et al. 2018. Unexpectedly large impact of forest management and grazing on global vegetation biomass. Nature 553: 73-76. Attached as Ex. CARB24. Griscom, B.W., et al. 2017. Natural Climate Solutions. Proceedings of the National Academy of Sciences, Vol. 114, pp. 11645-50. Attached as Ex. CARB25.

The purpose and need that the 2012 forest planning rules were promulgated to address specifically included: "Contribut[ing] to ecological, social, and economic sustainability by ensuring that all plans *will be responsive* and can adapt *to issues such as the challenges of climate change*; the need for forest restoration and conservation, watershed protection, and species conservation; and the sustainable use of public lands to support vibrant communities."[168] Notably, this specific purpose and need was defined distinctly from the purpose and need to emphasize restoration to make the lands resilient to climate change.[169]

The Forest Service has in the past articulated its position regarding how to balance carbon reduction benefits with other land uses as follows: "Taking any tradeoffs into account, the Forest Service will work with partners *to sustain or increase carbon sequestration and storage* in forest and grassland ecosystems and to generate forest products that reduce and replace fossil fuel use. The Forest Service will balance its mitigation efforts with all other benefits that Americans get from healthy, resilient forests and grasslands, such as wildlife habitat, wood fiber, water quantity and quality, and opportunities for outdoor recreation."[170]

The emergency need for reductions described in the 2018 IPCC report makes clear that the value of the forests for climate mitigation (i.e. reducing carbon emissions) is even higher than realized at the time the National Roadmap was developed in 2011. In balancing the value of using forest lands to maximize carbon storage and sequestration to mitigate climate change, the Forest Service cannot rationally discount the extreme urgency identified by the 2018 IPCC report, nor the role of land conservation in achieving the reductions necessary by 2030.

Further, to the extent that the Forest Service is balancing the value of mitigation via increased carbon storage and sequestration against purely economic benefits (such as benefits from the sale of logged or salvaged timber), the Forest Service should conduct an explicit cost-benefit analysis to ensure that there are in fact net economic benefits when the impacts of not avoiding carbon emissions are taken into account. In other words, the Forest Service should monetize the value of avoided emissions that are being forsaken for the economic activity, using a tool such as the social cost of carbon. The Final EIS fails to do so.

Due to the failure of the Final EIS to provide an assessment specifically of how the timing, extent, and certainty of changes in net carbon emissions under each alternative compare against the urgent need for reductions by 2030, it does not provide an adequate basis for the Forest Service to assert that it is rationally balancing the benefits of climate mitigation efforts with other benefits, let alone optimizing climate mitigation efforts.

Finally, because of the severe impacts of climate change on the lands and resources in the national forest, timber production and the resulting near term carbon emissions from timber production make this Plan incompatible with the uses of those lands for resources such as fish

[168] 77 Fed. Reg. at 21,164 (emphasis added).

[169] *See id*.

[170] National Roadmap for Responding to Climate Change, FS-957b (February 2011), at 20 (emphasis added).

and wildlife, and related desired conditions and objectives.[171] In the Forest Plan and Final EIS, the Forest Service has failed to address how timber harvest could be carried out in a manner consistent with the urgent need to reduce carbon emissions, and "in a manner consistent with the protection of soil, watershed, fish, [and] wildlife … resources."[172] The agency's failure to do so violates NFMA, MUSYA, and the 2012 Forest Planning Rule.

3.2 Suggested Resolution for Climate Change and Carbon Storage

The Forest Service must prepare a supplemental EIS and analyze, in detail, the carbon storage alternative proposed by the Sierra Club et al. 2019. This supplemental EIS must utilize the best available scientific information, and take a "hard look" at the impacts of each of the alternatives on carbon storage and carbon pollution by addressing each of the failings identified above, including by using a life cycle analysis and estimating quantitatively the impacts of each alternative, using a metric such as and including the social cost of carbon. Lastly, this supplemental EIS must adopt an alternative that complies with NEPA, NFMA, and MUSYA by maximizing the carbon stored on the forest.

4 Threatened and Endangered Species

NFMA requires the Forest Service to develop planning regulations that shall "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives" (i.e., the "diversity requirement").[173] The preamble of the Planning Rule states,

> The rule contains a strong emphasis on protecting and enhancing water resources, restoring land and water ecosystems, and providing ecological conditions to support the diversity of plant and animal communities, while providing for ecosystem services and multiple uses.[174]

Additionally, management plans must:

> Contribute to ecological, social, and economic sustainability by ensuring that all plans will be responsive and can adapt to issues such as the challenges of climate change; the need for forest restoration and conservation, watershed protection, and species conservation; and the sustainable use of public lands to support vibrant communities.[175]

[171] 36 C.F.R. § 219.11(a)(1)(iii).

[172] 36 C.F.R. § 219.11(d)(3).

[173] 16 U.S.C. § 1604(g)(3)(B).

[174] 77 Fed. Reg. 21163 (April 9, 2012).

[175] 77 Fed. Reg. 21164 (April 9, 2012).

These passages clearly demonstrate that the Planning Rule affirms that wildlife and habitat protection must be given the same priority as forest uses. The Rule requirements in 36 CFR 219.8 and 36 CFR 219.9 make this principle a mandate. The Rule requires forest plans to have plan components to maintain or restore the integrity of the terrestrial and aquatic ecosystems in the plan area and the diversity of ecosystems and habitat types throughout the plan area.[176] Essentially, this requires forest plans to maintain or restore the variety of ecosystems and habitat types found on national forests and grasslands (e.g., conifer forests, wetlands, grasslands), as well as the condition of the ecosystems themselves.

In accordance with 36 CFR 219.9(b)(1), plan components must provide the "ecological conditions necessary to: contribute to the recovery of federally listed threatened and endangered species … ." This means developing desired conditions toward which management actions are achieving that can be measured through monitoring. The desired conditions must include all of the necessary ecological condition to enable each species listed under the ESA to recovery. Additionally, providing the necessary ecological conditions to contribute to recovery means including standards and guidelines to mitigate all manageable threats to these species from uses of the Forest.

A national forest or grassland management plan revision process must be integrated with the procedures outlined in NEPA, and an EIS must be prepared as part of the process.[177] Management plans propose a program of projects and activities over the life of the plan, which is usually at least 15 years. These projects and activities will have effects on at-risk species. In order to contribute to the recovery of threatened and endangered species, conserve species proposed or candidates for listing under the ESA, and maintain the viability of species of conservation concern, a plan must have significant beneficial effects and minimize adverse effects to the greatest extent possible. Adverse impacts of forest uses on at-risk species addressed by the plan must also be disclosed in the EIS. The effects analysis must be more than a subjective, qualitative, and comparative estimation—it requires in-depth analyses of significant issues, including species viability requirements.

Note that under the CEQ Regulations governing application of NEPA, agencies must, "to the fullest extent possible":

> Use all practicable means, consistent with the requirements of the Act and other essential considerations of national policy, to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment.[178]

Nowhere is this mandate more important than with at-risk species, for which impacts from human uses can drive them closer to extinction, where recovery might become impossible. A full

[176] 36 C.F.R. § 219.8(a), 219.9(a)(1), & 219.9(a)(2).
[177] 36 CFR 219.5(a)(2)(i).

[178] 40 CFR 1500.2(f).

disclosure of the impacts on these species is critical to ensuring that measures can be applied and management can be directed to facilitate their maintenance and recovery on the landscape.

Thus, the EIS must properly characterize what the plan components direct the Forest to do. The plan components comprise the "action" that must be analyzed. The analysis must detail how specific plan components affect each ecological condition needed by each at-risk species. This requires an evaluation of both plan components that are directly related to at-risk species and the ecological conditions upon which they depend and also plan components of the multiple uses that may adversely affect the species and/or the ecological conditions they depend on, such as vegetation management, livestock grazing, recreation, roads and other infrastructure, and mining. The FEIS for the proposed RGNF Plan completely fails in this regard. It is impossible to see how the RGNF can meet its NEPA obligations without producing an EIS that analyzes the effects of the desired conditions, objectives, standards, and guidelines proposed in the plan.

It is important that the Forest grasp the relationship between NEPA procedures and NFMA requirements. NEPA requires procedures - the analysis of effects. However, NFMA requires that those effects meet a substantive threshold, and that determination should be based on documented analysis found in the EIS. The Record of Decision must address compliance with the viability requirement.[179] It is not sufficient to state that a plan meets this requirement because it simply analyzed effects. The ROD must *explain* how the effects disclosed within the EIS demonstrate contributions to recovery and viability. While this analysis may be contained in a NEPA document, it is being used to demonstrate compliance with a substantive legal requirement in NFMA, and therefore requires rigor and certainty that go beyond the disclosure purpose of NEPA. The planning documents must do more than just list or restate the plan components that "support" a conclusion; they must present a reasoned rationale for viability based on reference to specific plan components. Unfortunately, the Forest has not met this bar.

The final revised land management plan and FEIS must comply with the ESA. Section 7(a)(1) of the ESA explicitly directs all federal agencies to "utilize their authorities" to carry out "programs for the conservation of endangered species and threatened species."[180] The ESA defines "conservation" to mean "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this [Act] are no longer necessary."[181] In this sense, "conservation" and "recovery" are essentially synonymous. ESA section 7(a)(2) requires the Forest Service to ensure that its actions are not "likely to jeopardize the continued existence" of any listed species or "result in the destruction or adverse modification of" critical habitat.[182] To ensure compliance with these prohibitions, the Forest Service must engage in a consultation with FWS upon proposing to

[179] 36 CFR 219.14(a)(2).

[180] 16 U.S.C. § 1536(a)(1).

[181] 16 U.S.C. § 1532(3).

[182] 16 U.S.C. § 1536(a)(2).

authorize, fund, or carry out any "agency action" that "may affect" a species or its critical habitat.[183]

4.1 Our Objection: The treatment of Mexican Spotted Owl in the Revised Plan and FEIS violates NEPA, NFMA, and the ESA.

The Mexican Spotted Owl (MSO) is a threatened species with 198,888 acres of critical habitat on the Santa Fe National Forest. The Revised Plan lists the MSO as an at-risk species with habitat in the following Ecological Response Units: Mixed Conifer with Aspen, Mixed Conifer with Frequent Fire and Ponderosa Pine Forest. The Final EIS states that there are approximately 429,966.6 acres of mixed conifer-frequent fire forest, 403,914.57 acres of ponderosa pine forest, and 40,174.07 acres of mixed conifer with aspen forest on the Santa Fe.[184]

In addition to currently designated critical habitat, the Santa Fe provides important potential Recovery Habitat for the species to utilize in the future, especially as climate change eliminates existing occupied habitat further south and at lower elevations. The Revised Plan admits the importance of the Santa Fe for the MSO in this passage: "The forest provides critical habitat for four threatened and endangered species, including habitat that supports a large portion of the Mexican spotted owl populations within the region."[185] Therefore, it is vital that potential Recovery Habitat on the Santa Fe is managed in a manner consistent with owl conservation and recovery.

The objection issues we discuss in this section are based on comments previously submitted, including CBD et al. 2015, CBD et al. 2016, and Defenders et al. 2019. In addition, we refer to recent agreements between some objectors and the Forest Service, including:

- The July 2020 understanding between the Center for Biological Diversity, U.S. Forest Service, U.S. Fish and Wildlife Service, states of New Mexico and Arizona and Eastern Arizona Counties Organization, as recorded in the workshop notes from the June 17 & 26, 2020 meeting of the MSO Leadership Forum Workgroup, dated July 3, 2020.[186]

- The October 27, 2020 stipulation letter from Elaine Kohrman (Southwestern Region USFS) and Amy Lueders (US Fish and Wildlife Service) to John Horning, of WildEarth Guardians, where the agencies describe current and ongoing commitments to ensure conservation and recovery of the MSO.[187]

[183] Id.; 50 C.F.R. § 402.14(a).

[184] FEIS, Vol. 1, p. 77.

[185] Revised Plan, p. 9.

[186] See Exhibit: Ex. MSO 1 Leadership Forum June 2020 Notes.

[187] See Exhibit: Ex. MSO 2 USFS letter to John Horning.

4.1.1 The Revised Plan fails to provide the ecological conditions necessary to contribute to Mexican spotted owl recovery, in violation of NFMA (36 CFR 219.9(a)(1) & (b)(1)).

4.1.1.1 The necessary ecological conditions that the plan needs to provide.

The FEIS states that the "Mexican spotted owl requires a variety of mixed conifer habitats, proximity to riparian areas, standing large snags for roosting and nesting, or cavities in vertical canyon walls."[188] Astonishingly, this description fails to mention the importance of large and old trees and high canopy cover to MSO. In discussing the Calaveras Management Area, the FEIS states that old growth forest is important habitat for MSO.[189] Elsewhere, the FEIS refers to common definitions of old growth to include "tree size (large trees), varied ages (particularly mature; old), trees in stages of senescence (dying, dead, snags), and varied structural components."[190] Surprisingly, the FEIS repeatedly states the importance of snags to MSO, but rarely mentions large and old trees and high canopy cover.

The Carson FEIS, on the other hand, lists these key ecological conditions for the MSO: "Structurally diverse mature forests (seral state), conifer forest, structural heterogeneity, interlocking canopy, large tree retention, tons per acre of coarse woody debris, and snag density."[191] The failure of the Santa Fe FEIS or Revised Plan to describe the scientifically supported habitat needs of the MSO like "interlocking canopy" and "large tree retention" is not only a dismissal of the best available science, but it is also an arbitrary and capricious omission of facts.

Forest stands used by spotted owls for nesting and roosting have certain structural features in common. As we explained in previous comments, these typically include relatively high tree basal area (BA), numerous large trees, multi-storied canopy, multi-aged trees, high canopy cover, and decadence in the form of downed logs and snags in varying stages of decay. Studies of MSO have consistently found higher canopy cover of trees (generally >60%) is required for MSO occupancy, survival, and reproduction.[192]

The recovery of the MSO is directly related to the protection and recruitment of key habitat features such as high basal area, canopy cover, and proportion of large trees. The 2012 MSO Recovery Plan provides the following Recovery Criteria for MSO:

1) Owl occupancy rates must show a stable or increasing trend after 10 years of monitoring; and

[188] FEIS, Vol. 1, p. 122.

[189] FEIS, Vol. 1, p. 41.

[190] FEIS, Vol. 1, p. 290.

[191] Carson NF Forest Plan FEIS, Vol. 1, p. 135.

[192] see Appendix A.

2) Indicators of habitat conditions (key habitat variables) are stable or improving for 10 years in roosting and nesting habitat. Relevant key habitat variables and recommended minimum conditions in a minimum of 10% of PPF and 25% of MCD forests are:

- Minimum canopy cover of 40% in PPF and 60% in MCD
- Diversity of tree sizes with trees 12-18 inches DBH contributing >30% of the stand basal area (BA) and trees >18 inches DBH contributing >30% of stand BA in PPF and MCD
- Minimum tree BA in stands = 110 ft^2/acre in PPF and = 120 ft^2/acre in MCD
- Minimum density of large trees (>18 inches DBH) = 12 trees per acre in PPF and MCD

For the Revised Plan to provide ecological conditions necessary to contribute to Mexican spotted owl recovery, it must demonstrate that the key habitat variables listed above will be stabilized or improved under the direction of plan components. The current FEIS and Revised Plan fail to adequately address how these variables will be inventoried, monitored, restored, retained, conserved, and protected.

4.1.1.2 The threats the plan must mitigate via standards and guidelines.

According to the 2012 MSO Recovery Plan, in 1993 the U.S. Fish and Wildlife Service listed the Mexican Spotted Owl as threatened under the ESA. Two primary reasons were cited for the original listing of the Mexican spotted owl in 1993: alteration of its habitat as the result of timber-management practices, and the threat of these practices continuing as evidenced in existing national forest plans. The 2012 revision of the recovery plan lists stand-replacing fire as the most significant threat to the MSO, in addition to human disturbances such as logging, grazing, and recreation.

The Final EIS states that threats to MSO include highly departure seral state, highly departed snag density, and uncharacteristic fire.[193] Apparently, the Forest Service has not studied the extensive body of literature on the MSO, which universally correlates the species with old growth forests dominated by large and old trees, high canopy cover, in addition to just snags and coarse woody debris.[194]

Widespread old and large tree logging, as envisioned in the desired seral state transitions, will have dire effects on MSO, northern goshawk, and other canopy dependent wildlife. The Revised Plan focuses on eliminating the threat of stand-replacing fire but does not provide any plan components to protect MSO from the potential harms of vegetation management (logging and other mechanical treatments), which is the focus of this objection issue.

[193] FEIS, Vol. 1, p. 225.

[194] We have reviewed the species ecological needs extensively in past comments.

As we explained in past comments, ongoing (not just historic) timber harvesting continues to pose real threats to MSO. Direct effects of mechanical thinning on MSO have not been studied, so the best available science comes from studies of other spotted owl subspecies, which share the preference for old growth forests and mature forest structural elements. Studies that have examined the impact of logging within a spotted owl territory have found that any reduction in canopy cover by logging harms owls by negatively impacting owl occupancy, reproduction, and survival.[195] The FEIS and Revised Plan fail to address the potential harms caused by mechanical thinning in MSO habitat.

In addition, the Revised Plan and FEIS identify the threat of uncharacteristic fire. Uncharacteristic fire is defined in the Revised Plan and FEIS as large-scale, stand-replacing fire that does not normally occur as a part of the fire regime for the ERU involved. The FEIS repeatedly states that large-scale, high-severity fire is a threat to MSO, but this assertion does not reflect the best available science on the topic. No studies to date have adequately documented significant negative effects of fire on MSO population parameters of site occupancy, survival, reproduction, or habitat selection. While extensive high-severity fire can sometimes negatively impact MSO, the assumption in the Revised Plan and FEIS that high-severity fire is a universal threat to MSO is incompatible with MSO recovery and disregards the best available science.

4.1.1.3 The fallacy of high-severity fire being universally harmful to MSO.

The 2012 MSO Recovery Plan entirely relies on the assertion that burned forest is somehow degraded or lost as MSO habitat. This assertion is made in spite of the fact that no statistically significant negative effects of fire on MSO are reported anywhere in the recovery plan, and nearly all burned sites studied were equivalent to unburned sites in every way. Remarkably, in this documented absence of any significant negative effects of fire on MSO, the MSO Recovery Plan decides habitat alteration from fire must somehow indirectly affect MSO and is therefore, in some as yet undetected manner, a threat.

The Revised Plan and FEIS takes the same leap in logic as the MSO Recovery Plan and asserts that because fires burn the forest and kill trees, it must be bad for MSO. To do so, they disregard not only the MSO and fire studies summarized in the 2012 Recovery Plan, but also subsequent studies of fire effects on MSO and other subspecies of Spotted Owl.

For example, we introduce here new information published since the draft EIS and draft plan:

Lommler, M.A. 2019. Mexican spotted owl breeding population, site occupancy, and habitat selection 13-15 years after the Rodeo-Chediski fire in east-central Arizona. Northern Arizona University Dissertation.

Lommler's work – which was not included in the FEIS – examined MSO site occupancy, breeding and habitat selection 13-15 years after a large fire (462000-ac, 36.6% burned at high severity) and subsequent salvage logging. Lommler's committee consisted of renowned MSO

[195] See, for example: Blakesley et al. 2005, Seamans and Gutiérrez 2007, Stephens et al. 2014, Tempel et al. 2014b, Tempel et al. 2016 in the folder of Exhibits.

experts Paul Beier, Ph.D., Chair, Joseph L. Ganey, Ph.D., Jamie L. Sanderlin, Ph.D., Samuel A. Cushman, Ph.D., and Tad C. Theimer, Ph.D., making this dissertation's findings extremely important.

In Chapter 3, Lommler used valid occupancy modeling with covariates to examine effects of fire and salvage logging on site occupancy and found significant positive effect of % area composed of MCD forest, significant negative effect of salvage logging, and no significant effect of fire. In Chapter 4, he examined nest and roost habitat selection and model averaged coefficients showed basal area of large trees and forest cover were significant positive effects, and no significant fire effects were found. In summary, Lommler's results contradict the FEIS because he showed MSO would be significantly harmed in terms of occupancy and nesting/roosting habitat provisions by the Revised Plans recommendations that reduce basal area and canopy cover in MCD and PPF forests.

Also relevant are publications by Lee (2018[196], 2020[197]). Since there are so few studies of fire effects on MSO specifically, the best available science is found in studies of fire and all Spotted Owl subspecies. In these two systematic reviews and meta-analyses of all published fire effects on Spotted Owls from across their entire range and including all 3 subspecies, Lee found: 15 papers representing more than 20 fires, 425 burned territories and 37 radio-tracked owls reported 50 effects from fire that could be differentiated from post-fire logging. These meta-analyses examined key life history parameters in response to fires as they have burned through spotted owl habitat in recent decades under existing forest structural, fire regime, and climate conditions, including multiple "megafires" with large patches of high-severity burn. Spotted Owls were usually not significantly affected by fire, as 83% of all studies and 60% of all effects found no significant impact of fire on mean owl parameters.

The strength of meta-analysis as an evidence-based decision support tool is that it enables managers and decision-makers to justify management decisions using patterns and trends from all available data. Contrary to current perceptions and recovery efforts for the Spotted Owl, fire does not appear to be as significant of a threat to owl populations as we are led to believe; rather, wildfire has arguably more benefits than costs for Spotted Owls. Lee (2018) found significant positive effects on foraging habitat selection and recruitment from forest fires, and significant positive effects on reproduction from high-severity fire. The absence of any widespread, consistent, and significant negative fire-induced effects and the presence of significant positive effects indicated forest fire is not the outsized threat to spotted owl populations that the FEIS and Revised Plan assume. Therefore, fuel-reduction treatments intended to mitigate fire severity in spotted owl habitat may be unnecessary and counterproductive to the species' recovery. The Forest Service's failure to address or respond to these studies violates NEPA's "hard look" mandate.

[196] Lee DE. 2018. Spotted owls and forest fire: a systematic review and meta-analysis of the evidence. Ecosphere 9:e02354. doi: 10.1002/ecs2.2354

[197] Lee DE. 2020. Spotted Owls and forest fire: Reply. Ecosphere 11:e03310. doi: 10.1002/ecs2.3310

4.1.1.4 The plan does not sufficiently provide standards and guidelines to mitigate threats.

The Final EIS and Plan provide a list of coarse and fine filter components that are proclaimed to benefit MSO under the heavy pro-logging paradigm championed by this Plan. However, these components fail to sufficiently mitigate the threats posed to the MSO, specifically, the threats caused by a dramatic expansion of logging without adequate Standards and Guidelines to mitigate potential harms. The closest the FEIS gets to recognizing the threats posted by logging is in the statement that "Timber harvest, prescribed burning, and other management activities … can still have disturbance effects to the Mexican spotted owl and its habitat."[198]

The reliance on inadequate plan components that fail to conserve existing crucial habitat structures (old and large trees, and high canopy cover) is arbitrary and capricious and is at-odds with the best available science. Here, we will explain how the plan components fail to benefit MSO.

The primary deficiency here, is that the plan only provides Desired Conditions, and not Standards or Guidelines, so they provide no actual constraints to management that would reduce the potential harm of logging on the owl. In other words, none of the Desired Conditions protect large or old trees, specify desired canopy cover, or preserve existing old and mature forest structure that are key habitat variables needed for species recovery.

On the contrary, the Desired Conditions contain regressive direction such as old growth occurs in "…generally in small areas as individual old growth components or as clumps of old growth," despite their being no scientific evidence for the natural range of variability supporting the notion that old growth would have occurred primarily in small areas as individual components. These components considered together could be used to justify cutting existing old growth structure to establish regeneration openings, and to arbitrarily reduce the size of contiguous patches into smaller clumps of old growth, which would harm MSO, northern goshawk, and other species which rely on mature forest structure.

As another example, the Desired Condition for ponderosa pine and dry mixed conifer forests that reads as follows:

"Dwarf mistletoe occurs in less than 15 percent of host trees in uneven-aged forest structures and less than 25 percent in even-aged forest structures."[199]

This Desired Condition fails to assure that essential habitat structures (dwarf mistletoe and its brooms) are retained during forestry operations. This states that dwarf mistletoe occurs less than a given percentage. A silviculturalist could eliminate every tree with any mistletoe at all under this Desired Condition, stripping the forest of crucial wildlife habitat. This type of management has recently been observed at the Little Creek Timber Sale on the Apache-Sitgreaves National

[198] FEIS, Vol. 2, p. 290.

[199] Revised Plan, p. 42 and p. 45.

Forest and the Jacob-Ryan Timber Sales on the Kaibab National Forest, two examples that the Regional Office is well aware of.

The reliance on Desired Conditions provides zero commitment to protecting and restoring owl habitat. Without specific Standards or Guidelines to instruct managers to retain old and large trees, adequate canopy cover, or sufficient downed woody debris or snags, these Desired Conditions do not provide satisfactory safeguards and as such the plan fails to provide the ecological conditions necessary to contribute to Mexican spotted owl recovery.

This deficiency should not come as a surprise to the Forest Service, though, as the agency just recently settled legal actions taken by the Center for Biological Diversity and WildEarth Guardians on these issues. During the June 2020 MSO Leadership Forum Workgroup meeting, the Forest Service, the Center, and other stakeholders agreed that Region 3 projects in MSO habitat could proceed if they demonstrated that no trees large than 18" DBH would be cut in PACs or recovery (or threshold) habitats. This includes the Bill Williams, 4FRI 1st EIS, FWPP, West Escudilla, Hassayampa, Luna, Southwest Jemez, Burro projects. On the Puerco project, the MSO Forum concluded that the "Forest Service needs to clearly display to the Public that there will not be trees > 18 DBH removed from PACs and Recovery Nest/Roost Habitat."[200] And the Forum determined that the Rio Tusas San Antonio project posed no threat to the owl because no mechanical treatments were approved for either PACs or nest-roost habitat.[201] So, the outcome of the Forum was agreement that one way to mitigate harm to the MSO is to commit to retaining large trees. The Santa Fe plan provides no assurances that old and large trees will be retained. It is clear to us that in the absence of setting Standards to retain large trees, canopy cover, coarse woody debris, and other key habitat variables, the Forest Service remains legally vulnerable to continued challenges for any projects in MSO habitat.

4.1.1.5 Plan components fail to ensure that the Revised Plan manages ecosystems for the persistence of each at-risk species.

The Revised Plan provides "coarse-filter" and "fine-filter" plan components to "ensure management for persistence of each at-risk species." These plan components, consisting of Desired Conditions, Guidelines, and Management Approaches, are assigned to the MSO in the Santa Fe FEIS in Vol. 2, Appendix E, Section A, At-Risk Species Crosswalk. The FEIS states that "These crosswalks compile forest plan guidance intended to increase viability of at-risk species." In the left column of the table below, we provide the fine-filter plan components that the Forest Service claims will ensure management for persistence of MSO. In the right column we provide our response to the assignment of these plan components to the MSO. Without exception, these "fine-filter" plan components fail to prove that "the forest plan provides for managing ecosystems for the persistence of each at-risk species."

[200] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 15.

[201] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 16.

Plan Component provided in SFNF Final EIS, Vol. 2, Appendix E, Section A, At-Risk Species Crosswalk.	**Our Response to how the Plan Components "ensure management for persistence" of the MSO.**
FW-ATRISK-DC-1 Ecological conditions (physical and biotic) contribute to the survival and recovery of federally listed, proposed, and candidate species; preclude the need for listing new species; and allow for the recovery and persistence of species of conservation concern.	A key MSO habitat requirement of high canopy cover of old and large trees, which are in fact physical ecological conditions, are not described as essential to MSO conservation and recovery in the Revised Plan or FEIS, nor are they protected where they exist by language in the Revised Plan or FEIS.
FW-ATRISK-DC-2 Intact, functioning, and sufficient habitat for terrestrial and aquatic at-risk species (defined by Desired Conditions for each Vegetation ERU) provide for opportunity for breeding, feeding, nesting, and other critical life history needs of wildlife, so the species remains viable and persistent on the landscape.	A key MSO habitat requirement of high canopy cover of old and large trees are essential elements of breeding and nesting habitat. The Revised Plan does not provide any desired conditions to ensure that high canopy cover of old and large trees is retained where it occurs, or is recruited during future management.
FW-ATRISK-DC-3 Habitats for at-risk species, including rare and endemic populations, are known (locations) to be intact, functioning, well-connected, and sufficient for species' persistence.	MSO potential habitat on the SFNF occurs across approximately 900,000 acres in several ERU's. The majority of these acres are outside designated Critical Habitat and Protect Activity Centers. Plan components for vegetation direct management to structural levels (basal area, openness, etc) below the thresholds for MSO persistence.
FW-ATRISK-G-2 Project activities and special uses occurring within federally designated critical habitat should integrate habitat management objectives and species protection measures from the most recent approved U.S. Fish and Wildlife Service (USFWS) recovery plan.	"Should" is not a mandate. This Guideline essentially says that following the Recovery Plan is optional.
FW-ATRISK-G-5 The forest should use the most current ecological guidelines to improve nesting conditions for goshawk (Accipiter gentilis).	There are some important differences between the habitats of goshawk and MSO, and goshawk habitat protection should not be a surrogate for MSO habitat protection.

FW-ATRISK-G-9 Management of coldwater streams with populations of at-risk species should include adequate vegetation cover and width-to-depth ratio to move toward a 7-day average maximum water temperature of less than 17.8 degrees Celsius.	This has no direct relevance to MSO habitat, conservation, persistence, or recovery, as the MSO is not a fish. MSO do use forested riparian areas, but they do not use water in a way relevant to this Guideline.
FW-ATRISK-G-11 Even-aged management treatments in piñon-juniper habitat should avoid creating a sharp, well-defined edge between dense woodlands and recovered shrublands for foraging habitat of at-risk species.	This has only marginal relevance to MSO habitat, conservation, persistence, or recovery, as the commonest limiting factor in MSO occupancy or fecundity is the quality of nesting and roosting habitat, as well as prey availability, in forests, not woodlands.
FW-ATRISK-G-12 Large mature cottonwood trees should be retained as habitat for at-risk species unless necessary to meet management objectives or ensure public safety.	This has some value to MSO, but not nearly as important to conservation, persistence and or recovery as retention of large conifer trees in forested ERU's, which the Plan fails to commit to.
FW-ATRISK-MA-1 Work collaboratively with other agencies (e.g., USFWS, NMDGF, New Mexico State Forestry, etc.), universities, and nongovernmental organizations for the research and management of at-risk species. Emphasis is placed on the protection and restoration of key habitats and habitat features that lead to their recovery and persistence.	Collaboration is only effective if the input of collaborators is respected and utilized, which is not always the case. The Plan as written does not provide emphasis on recovery and persistence because it does not retain the MSO's key habitat requirements of high canopy cover of old and large trees.
FW-ATRISK-MA-3 Prior to management actions, conduct surveys to identify sessile (immobile) at-risk species in areas with the following features: a. Limestone outcropping, b. Gypsum soils, c. Sandstone blended with Todilto gypsum or limestone, d. Gray to red shales and clays of the Mancos and Chinle formations in piñon-juniper woodlands, e. Volcanic pumice and unconsolidated pyroclastic ash in piñon-juniper woodland and lower montane coniferous forests	The Forest Service appears to have an incomplete understanding of MSO biology, as the species is not sessile, and is highly unlikely to occupy any of the environments listed in this Guideline.

FW-ATRISK-MA-4 Consider guidance from regional or local species conservation agreements, assessments, strategies, or guidelines to improve the status of at-risk species.	If the Forest Service had any intent on following through with this Guideline, it would adopt protections for large and old trees, and areas of high canopy cover of old and large trees, as those are universally known to be essential MSO habitat needs, and they are very difficult to replace once lost.
FW-ATRISK-MA-5 Consider using geographic information systems (GIS) as the preferred database of record to record findings of at-risk species, including negative surveys.	In 2021, we shouldn't be debating whether or not to use GIS for tracking at-risk species. This Management Approach has almost no relevance whatsoever to the conservation and recovery of MSO.
FW-ATRISK-MA-7 Collaborate with universities, State and Federal agencies (e.g., Forest Service Research and Development, U.S. Geological Survey, Natural Resources Conservation Service, New Mexico State Forestry, New Mexico Department of Game and Fish), and other organizations (e.g., The Nature Conservancy, Natural Heritage New Mexico, Native Plant Society of New Mexico, Trout Unlimited, Audubon Society, and other non-governmental organizations), to obtain data and encourage research on rare and endemic species.	Collaboration and research will have little to no effect on the retention of existing MSO key habitat requirements of high canopy cover of old and large trees. In the absence of committing to protect habitat elements where they exist, this Management Approach has virtually no relevance whatsoever to the conservation and recovery of MSO.
FW-ATRISK-MA-8 Consider alternative measures to projects that may decrease the likelihood of disease introduction or spread to at-risk species (e.g., do not dip firefighting buckets in waterbodies where didymo or whirling disease is known to exist or install drinkers instead of earthen tanks to prevent the spread of Chytrid fungus).	The Forest Service appears to have an incomplete understanding of MSO biology, as the species is not currently considered acutely threatened by disease introduction, and is highly unlikely to occupy the aquatic environments listed in this Guideline.

Based off our assessment of these fine filter plan components, most of which are completely irrelevant to MSO, the Revised Plan does not "ensure management for persistence" of the MSO, and as such violates NFMA and the ESA.

4.1.1.6 The desired vegetation conditions in the Revised Plan and FEIS are incompatible with MSO recovery and disregard the best available science.

The Revised Plans Desired Conditions for vegetation types MCD and PPF conflicts with the plans Desired Conditions for At-risk Species (specifically for MSO), which will impede the recovery of MSO. The Revised Plans Desired Conditions for At-risk species, including MSO, are:

> 1. Ecological conditions (physical and biotic) contribute to the survival and recovery of federally listed, proposed, and candidate species; preclude the need for listing new species; and allow for the recovery and persistence of species of conservation concern.
>
> 2. Intact, functioning, and sufficient habitat for terrestrial and aquatic at-risk species (defined by Desired Conditions for each Vegetation ERU).
>
> 3. Habitats for at-risk species, including rare and endemic populations, are known (locations) to be intact, functioning, well-connected, and sufficient for species' persistence.[202]

Canopy cover of large trees is vital to MSO survival, but the Revised Plan will result in a dramatic reduction of this habitat variable. We performed an online library search on 4 October 2021 using the keywords "Mexican spotted owl" in either the title or subject terms. From the results, we compiled a list of 32 published papers that had original empirical data on Mexican spotted owl habitat selection. The mean canopy cover and large tree basal area or tree densities are provided in Appendix A. In every study that examined habitat selection, Mexican spotted owls strongly selected for higher canopy cover around nest and roost sites at fine scales (always at least 60%), and high canopy of at least 55% was also prevalent within territories or PACs. Some studies showed means over 70%. Any reduction in canopy cover below these values would likely cause harm to MSO, but that's exactly what the Revised Plan would do. Consider these points:

- The FEIS calls for 72% of mixed conifer-frequent fire forest to be open canopy (10-30% canopy cover) and only 28% of mixed conifer-frequent fire forest to have >30% canopy cover.

- In ponderosa pine forest, the desired conditions are 86 percent to be open canopy (10-30% canopy cover) and only 14% having >30% canopy cover.

- There is not a single plan component that provides the conditions of >60% canopy cover in at least 25% of mixed conifer-frequent fire forest and >40% canopy cover in 10% or ponderosa pine forest, which are the minimums recommended in the 2012 MSO Recovery Plan.

[202] Revised Plan, p. 90.

- Similarly, basal area desired conditions in the Revised Plan aim for 22-89 ft^2/ac in ponderosa pine forest, levels far below the 110 ft^2/ac minimum recommended by the 2012 MSO Recovery Plan.

- The Revised Plans desired condition for old growth in mixed conifer-frequent fire is for old growth to occur "throughout the landscape, generally in small areas as individual old-growth components or as clumps of old growth." In ponderosa pine forest "old growth occurs throughout the landscape, generally in small areas (e.g., **less than 1 acre**) as individual old-growth components or as clumps of old growth." These patch sizes are far below MSO needs for nesting and roosting habitat, which is generally regarded as old growth closed-canopy forest, with protected activity centers (PACs) encompassing a *minimum* of 600 acres and nest cores a *minimum* of 100 acres. Restricting old growth to less than 1-acre patches across the landscape is highly likely to doom the MSO to extinction on the Santa Fe.

Based on these points, the Revised Plan lacks vegetation management plan components that provide the minimum canopy cover, basal area, and habitat patch size requirements for MSO recovery, thus the plan conflicts with the desired conditions for at-risk species and fails to follow the best available science.

4.1.2 The FEIS and other relevant plan documents fail to take a 'hard look' at the environmental consequences of the Revised Plan to the Mexican spotted owl, in violation of NEPA (40 CFR 1502.16).

The Revised Plan and FEIS completely ignore any possible adverse impacts that forest management can have on MSO, rendering the 'hard look' requirements under NEPA entirely deficient. In past comments, we have cited specific best available science that identifies harms caused by logging to spotted owls, and science that affirms the uncertainty around logging impacts to MSO. None of the papers we cited are discussed in the Final EIS, meaning the Forest Service has neither addressed our comments nor utilized the best available science. The EIS fails to take a 'hard look' at the plans impacts to MSO because every alternative promotes increased logging under the same set of incomplete assumptions.

It is well documented in the literature that MSO prefer higher canopy cover and higher large tree density than what the Revised Plan provides.[203] Forest structural characteristics that benefit MSO would be reduced by the logging and thinning required to achieve landscape-scale desired vegetation conditions in the Revised Plan. However, the FEIS and Revised Plan overlook logging and mechanical thinning as a known or potential threat from forest activities to MSO. Instead of seriously considering the potential for adverse impacts the new plan will increase the number of acres logged by 50%, increase "suitable timberlands" by almost 10%, and increase projected timber sale quantity by approximately 300% over the current forest plan. The Final EIS makes this massive increase in logging very clear in Table 25, which shows that Alternative 1

[203] See Appendix A.

(the existing forest plan) has 5,397 acres of mechanical treatments a year, while Alternative 2 (the Revised Plan) would have 12,725 acres of mechanical treatments a year.[204]

As discussed above, another flawed assumption underlying each alternative is the notion that mixed and high severity fire will have wholly disastrous consequences for MSO. The FEIS repeatedly states large-scale, high-severity fire is an existential threat to MSO. For example, the FEIS states "large-scale, high-intensity, stand-replacing fires in PPF and MCD can completely eliminate or severely alter ecological conditions required by at-risk species (WL7). This … has the potential to affect … Mexican spotted owl."[205] However, this assertion does not fully reflect the best available science on the topic, which is much more nuanced than the EIS suggests. For example, Lommler reports the following:

> The relationship between spotted owls and wildfire is complex. There is now considerable evidence that low- and moderate-severity fire have little effect on spotted owls (Bond 2016, Ganey et al. 2017). Our own results indicate that high-severity fire and Mexican spotted owls are not necessarily incompatible, depending upon the scale of inference and the spatial configuration of the fire.[206]
>
> It is possible that high-severity fire only has a significant negative effect on MSO when concentrated around nest and roost sites (at fine scales) or in very large, contiguous patches (at coarse scales). This is consistent with suggestions made by Jones et al. (2016) and Rockweit et al. (2017). Otherwise, high-severity fire may produce a healthy landscape mosaic that includes a balance of nesting, roosting, and foraging habitat.[207]
>
> We believe that some level of high-severity fire can help maintain Mexican spotted owl habitat over large temporal and spatial scales. However, large patches of high-severity fire may present a threat to the recovery of the owl.[208]

These three passages from this recent dissertation clearly demonstrate how nuanced the relationship between high severity fire and MSO is. Planning documents claiming that forest fires currently, or will in future, pose the greatest risk to owl habitat and are a primary threat to population viability are either outdated or highly speculative in light of Lommler's work, in combination with the Lee (2018) review and Lee (2020) reanalyses. When all available data are examined objectively in meta-analysis, the larger pattern is revealed that high-severity fire patches from climate-changed wildfire events are used by spotted owls for foraging in proportion to their availability, and more high-severity fire significantly increases reproduction, but no strong consistent negative effects are apparent. This is exactly why meta-analyses such as Lee

[204] FEIS, Vol. 1, p. 111.

[205] FEIS, Vol. 1, p. 247

[206] Lommler (2019), p. 74.

[207] Lommler (2019), p. 73.

[208] Lommler (2019), p. 97.

(2018) and (2020) are so valuable, because they provide decision-makers with the broader consistent patterns found among all studies.

Numerous systemic issues plague the way the Forest Service analyzes effects of forest management activities on MSO, which has led to the litigation and threatened litigation discussed above. These project-level issues can only be corrected if a coordinated effort is made by the Forest Service to address systemic flaws in analysis and disclosure. From our vantage, revised forest plans are the best way to provide the direction needed to ensure individual NEPA projects are planned, analyzed, and implemented in a manner that can avoid jeopardy. On the contrary, revised forest plans, such as the Santa Fe's plan, that remain vague and lack standards and guidelines that provide specific direction for management of MSO habitat, will result in future legal challenges, delays, and costs.

The MSO Leadership Forum described a "Systemic Issue" of a "disconnect between the broader scope public documents readily available for review and what actually happens on the ground during implementation."[209] This Plan and EIS continues this disconnect in providing no description of how treatments in MSO habitat will be designed or implemented. There are no sideboards (for example, diameter cutting limits or minimum canopy cover standards) to mechanical treatments in MSO habitat, so the Plan fails to show that the massive increases in logging envisioned by the plan will have no adverse effects on the owl.

The MSO Leadership Forum further explained this "Systemic Issue" when they stated that

> …the NEPA process does not analyze actual stand treatments for the MSO projects but broad ranges of allowable treatments. Actual treatments are decided during field trips prior to project implementation. NEPA analyzes actions at a broad scale and in some cases (e.g. Hassayampa) appears insufficient.[210]

We recognize that the forest plan does not propose any specific treatments, but the lesson here is that in the absence of clear direction, any future district-level project design, analysis, and implementation will vary between projects, and will fail to adequately address potential threats to the owl caused by widespread mechanical thinning. In essence, maintain the status-quo approach to management of MSO habitat that has resulted in recent legal challenges described elsewhere in this letter.

This deficiency is amplified when considering the trend towards vague condition-based management projects, which we expect the Santa Fe to utilize. In fact, the MSO Leadership Forum stated:

> There is a strong nexus between the MSO discussion and "Conditions Based Management" (CBM). There is a systemic learning point for the upcoming

[209] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 2.

[210] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 3.

> implementation of CBM: the current MSO challenges likely exemplify issues to come, NEPA-wide, when CBM gets rolled out at full scale.[211]

In addition, they stated:

> Current MSO management appears to be a precursor of the proposed general "Condition Based Management" (CBM) in the on-going NEPA Revision. Lessons learned in the MSO Workshop are likely applicable to CBM at-large, as relates to communicating to the public the treatments and monitoring that are actually implemented.[212]

Again, the revised forest plan could address this issue by providing – or at the least analyzing in one alternative – Standards and Guidelines that would ensure protection of key owl habitat features. This refusal to analyze a large tree protection alternative is a violation of NEPA.

We anticipate the Forest Service will expand on the use of CBM in projects that proceed under the new plan. This will only further complicate existing systemic issues in evaluating restoration impacts on MSO. The MSO Leadership Forum made the following statements relevant to this problem:

- There is no clear tool or method in place to account for the cumulative effect across various projects' actual treatments, and to reconcile the distribution of treatments along the spectrum of intensities (including no treatment) within the landscape, as recommended in the Recovery Plan, to establish an environmental baseline among neighboring projects."[213]

- The current management practice of relying on post NEPA field trips by a few select individuals to decide upon actual treatments is not scalable to landscape scale restoration."[214]

- Science is emerging in recent literature regarding the effectiveness of mechanical treatments in MSO habitat. A Workshop is needed to review this science and its applicability to projects in the Region."[215]

So, to summarize these three points, the Forest Service doesn't have a clear tool or method to analyze impacts to MSO and instead leaves decision making up to district level silviculturalists post-NEPA, even though emerging science questions the effectiveness of mechanical treatments in MSO habitat.

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[211] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 22.

[212] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 3.

[213] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 3.

[214] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 3.

[215] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 4.

This approach violates NEPA's mandate to take a hard look at the environmental consequences of the individual projects to the Mexican spotted owl. So far, no such workshop has been convened, and none of the systemic issues identified by the MSO Leadership Forum have been addressed, despite the fact that forest planning is the appropriate level to resolve them. Now, the Forest Service is approving numerous forest plans that fail to address any systemic issues. The revised forest plan will simply carry on this legally questionable legacy of ambiguity, as once again the Forest Service failed to take a hard look at the effects of a dramatic increase in mechanical treatment in owl habitat.

The MSO Leadership Forum concluded that Region 3 restoration projects in the planning phase need to complete their NEPA analysis "integrating the outcomes of the workshop." This is very important: the projects in question, which include the Santa Fe Landscape Resiliency Project, the 4FRI Rim Country Project, Black River Restoration Project, and the South Sacramento Restoration Project, need to "integrate the outcomes of the workshop." What this means is that if these projects don't "integrate the outcomes of the workshop," they risk failing to protect the owl, and violating the ESA. The Revised Plan should rectify this issue and set clear standards for management of MSO habitat in this (and other) forest plans. If not, the Forest Service should not be surprised when more legal challenges are directed at future projects advanced under the new plan, as the Final EIS and Plan fail to take a hard look at issues which the Leadership Forum identified as systemic in Region 3.

4.1.3 The Revised Plan fails to provide a program for Mexican Spotted Owl conservation in violation of Section 7(a)(1) of the Endangered Species Act.

The MSO Leadership Forum stated:

> The Regional Office needs to provide planning guidelines and templates for future MSO planning that are consistent with the requirements in the Recovery Plan, standardized across forests, and better representative of actual likely implementation prescriptions within PACs and Nest Roost Recovery Habitat.[216]

The urgent need for this is made evident in the June 2020 Notes, where the participants observed that:

> The NEPA prescriptions quality control and decision-making takes place at post NEPA field-trip level. This method is likely not scalable across AZ and NM if/when both States ramp up to landscape scale restoration. Shaula will not be able to visit every project in both States, especially when AZ does 50,000 acres/year and NM ramps up.[217]

This is again made evident in the following statement in the Notes:

[216] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 20.

[217] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 21.

> There is an enormous amount of unique knowledge resting in very few key individuals. For example, if Shaula, Karl, Ian and Dick were withdrawn from the process overnight, the management of MSO projects within R3 would be severely crippled, if not coming to a complete stand still. There is a need for critical knowledge to be captured and backed up, and for succession plans. This is an urgent issue as Karl is leaving the region and Dick is retiring.[218]

The MSO Forum recognized the urgent need to address the impending loss of institutional knowledge, reflected in the statement that there is a need to:

> Organize promptly the workshop(s) required to resolve the issues identified in the "Systemic Issues" section. The first workshop will be focused on consolidating and prioritizing the issues, and organizing a workplan for the Leaders' consideration to resolve the issues.[219]

To date, this workshop has not convened, and therefore the systemic issues have not been resolved. Now, the Revised Plan proceeds under a vulnerable and uncertain status quo. It is because of this that we argue that the Revised Plan fails to provide a program for MSO conservation in violation of Section 7(a)(1) of the Endangered Species Act. Region 3 has no less than six forest plans in revision that will have direct, indirect, and cumulative effects on MSO. Now, three forests Revised Plans are near completion, and no regional program for owl conservation has been provided, despite the widely recognized need to do so.

A legitimate program for MSO conservation would include robust monitoring. The June 2020 Leadership Forum Notes describe a project-level systemic issue of "Monitoring as a reasonable and prudent measure often lacks clarity and specificity at the NEPA stage and the final plan is not always appended to the BO."[220] Monitoring of MSO populations, habitats, and forest management treatments are required to assess recovery and avoid harm.

Without specific, directed, and regularly assessed monitoring as specified below, the Revised Plan will fail to achieve this Desired Condition for MSO, an at-risk species. The Monitoring Plan in Chapter 4 of the Revised Plan fails to provide the level of detail needed to evaluate whether or not projects approved under the plan "contribute to the survival, recovery, and delisting of species under the Endangered Species Act." The monitoring questions are vague, the intervals are too infrequent, and the indicators fail to capture essential habitat features needed by MSO such as canopy cover, large tree basal area, and other metrics.

The 2012 MSO Recovery Plan monitoring guidelines require the following:

[218] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 21.

[219] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 26.

[220] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, p. 3.

1. Landscape analyses must be conducted prior to initiating any management actions. These analyses should identify known owl sites, areas to be managed as replacement nest/roost habitat, potential foraging habitat, and prospective habitat corridors.

2. Forest restoration and fuels-reduction treatments must be evaluated over time using appropriate modeling, rigorous monitoring, management experiments, and/or research to assess their effectiveness in maintaining or creating owl habitat and/or their effectiveness in reducing the threat of high severity or stand-replacing wildland fire.

3. Monitoring Treatment Effects on Owls. Monitoring must be designed and implemented to evaluate effects of treatments on owls and retention of or movement towards desired conditions. The monitoring design must be rigorous and adhere to strict quality assurance/quality control standards. Designing such a monitoring study requires a coordinated effort across administrative units. Ideally, the monitoring design should be developed by a scientific committee and implemented by the action agencies.

4. In all cases where salvage logging is being considered, the PAC and a buffer extending 400 m (433 yd) from the PAC boundary should be surveyed for owls before non-occupancy is inferred. This survey should occur during the breeding season following the fire or other large-scale mortality events and should adhere to the accepted protocol (Appendix D) except that it could be completed with four visits in a single season.

The Revised Plan fails to provide clear direction to accomplish any of these guidelines, again leaving planning and implementation of individual projects up to the judgement of district level managers.

To provide an example of a specific Standard that would address this deficiency in monitoring, we again point to the MSO Leadership Forum, where the June 2020 Notes recommend that that the Pinaleno, Bill Williams, 4FRI, West Escudilla, Luna, Southwest Jemez, Puerco, and Burro projects must be corrected to specify that "Monitoring in PACs post treatment needs to be clearly stated as five years post treatment."[221] The Revised Plan should eliminate this need to chase after projects post-decision and add these crucial monitoring details after the fact. So, to address this example, the Plan should provide a Standard requiring that monitoring in PACs must be completed for five years post treatment.

There are a number of additional Standards that should be considered to address the systemic issues identified in Region 3 management of MSO habitat. Three other important examples of where stronger plan components are needed are here:

1. The need for each forest to contribute to regional owl population trend monitoring.

[221] MSO Leadership Forum Workgroup, June 17 & 26, 2020 Workshop Notes, dated July 3, 2020, numerous locations.

2. The need to assess the effects of mechanical and prescribed fire treatments on the owl and its habitat in PACs outside of core areas.

3. The need to track long-term trends in Mexican spotted owl PAC and Recovery Habitat on NFS lands of the Southwestern Region and assure retention of adequate habitat for recovery.

If these needs sound familiar, that's because they are direct commitments made by the Forest Service in settling six notices of intent to sue filed by WildEarth Guardians in 2019[222]. The Revised Plan does not include any Standards or Guidelines or Monitoring Plan components to ensure that the needs identified by the Forest Service will be met, which clearly demonstrates that the plan fails to provide a program for MSO conservation.

As a specific example this, neither the Santa Fe nor the Carson have existing or planned projects that include management experiments. Therefore, currently, the Southern Rocky Mountains Ecosystem Management Unit is not represented in the current MSO management experiment framework. The stipulation letter between the Forest Service and WildEarth Guardians says:

> The purpose of these experiments is to establish consistent and up-to-date monitoring and monitoring protocols across multiple owl Ecological Management Units (EMUs) and provide a scientific basis for the modification of forest management treatments based on lessons learned and the best available science.

One simple way for the Santa Fe to better contribute to resolving this issue at the regional scale is to provide a plan component (a standard, guideline, or management approach) that expresses a commitment to conduct future individual projects within a management experiment framework, rather than rely on results from 4FRI, FWPP, Rio Puerco, or the South Sacramento projects. The need for this is elevated, in part, because a significant portion of the FWPP management experiment burnt up in the Museum Fire, interfering with the experiment.

4.1.4 The Revised Plan fails to utilize the best available science in regard to retention of old and large trees, in violation of NFMA and NEPA (36 CFR 219.3, 36 CFR 219.9(c), 36 CFR 219.14(a)(4), and 40 CFR § 1500.1(b)).

We have consistently commented to the Santa Fe NF that the planning process must discuss and explain the importance of large and old trees to the MSO, the northern goshawk, and forest restoration in general. As an example, in our comments on the Draft Assessment we stated:

> Historically, not all ponderosa pine forests were park-like. Most important in the assessment context and with an eye toward future planning for management is the acknowledgement that ponderosa pine forest, both in reference condition (multi-storied dominated by large, old trees) and in some fire-excluded areas, is resilient to natural fire and that reintroduction and return to an active fire regime is a necessary component of

[222] See Exhibit: Ex. MSO 2 USFS letter to John Horning.

> forest restoration for this ecosystem …. There is also a need to approach forest restoration with the intent of retaining large, old trees, while reintroducing fire and maintaining heterogeneity to benefit the complete host of species that rely on our forested ecosystems.[223]

We also specifically stated: "There is a need to develop standards and guidelines to retain large and old trees."[224]

In our Scoping comments (CBD et al. 2015b) we said:

> Ecologists (Noss et al. 1995; Noss and Peters 1995) have determined that old growth ponderosa pine forests constitute one of America's most endangered ecosystems. Most old growth forests that historically existed in the project area and throughout the Southwestern Region were eliminated by logging (Covington and Moore 1994). The ecological significance of old growth habitat and large trees that comprise their structure is amply documented. Large tree removal is not necessary or beneficial to restoration of fire-adapted forest ecosystems.

Elsewhere in those scoping comments, we made two specific recommendations for the protection of large trees, none of which were considered in any way by the Forest Service, which violates NEPA. Our recommendations included the two items below, as well as detailed prescriptions in appendices:

> **Recommendation:** The Forest Service should study, develop and describe action alternatives in detail that maximize retention of existing large trees (>16-inches diameter) outside of a wildland-urban interface ("WUI") zone that includes forest lands located one-quarter (¼) mile distant from established residential and other essential community infrastructure.
>
> **Recommendation:** The 1996 Plan Amendment for the Southwestern Region (USDA 1996) includes mandatory standards and guidelines for old growth habitat management. These standards and guidelines should not be abandoned in this planning process, as they were found to be both legally and ecologically necessary for the recovery and viability of Mexican spotted owl and northern goshawk. Any changes to these standards and guidelines must be analyzed thoroughly within the DEIS for this project and the best available science to justify changes or removal of these standards must be disclosed.

In the comments on the Draft Plan submitted by the CBD and Defenders, we pointed out the following:

> The Draft Plan does not provide plan components that would encourage the retention of old or

[223] CBD et al. 2015, p. 20.

[224] CBD et al. 2015, p. 22.

large trees. The Draft Plan asserts that past failed management practices have produced

"higher densities of small-diameter trees," and notes in nearly a dozen places that thinning of small-diameter trees will support forest restoration efforts. However, the plan components do nothing to direct project design towards small-diameter thinning and the retention of old and large trees. Recent examples of proposed restoration projects on the Santa Fe National Forest, like the Santa Fe Mountains Landscape Resiliency Project, have not proposed to protect any trees under 24". The final forest plan must include meaningful guidance to encourage the retention of old and large trees, or it is not in conformance with the best available science and numerous Forest stakeholders.

Later in our comments on the DEIS, we stated: "We recommend that simple plan components be added, which could be as simple as 'Forest restoration projects will retain old trees and old growth characteristics where they exist' or 'Old and large trees should be retained when designing forest restoration projects.'" The Revised Plan fails to provide such simple direction, and thus cements this deficiency into the next several decades of forest management by failing to provide a single Standard or Guideline to ensure large and old trees are retained and promoted.

The loss of large and old trees, including by the widespread large tree logging that the plan envisions, is a serious risk to MSO and other species. Let us be very clear, the Revised Plan sets a course for extensive logging of large trees to meet arbitrary seral state proportions and basal area guidelines. Here are some of the areas in the FEIS that clearly show the Forest Service intends on extensively cutting large trees and encouraging smaller and younger trees in the mixed conifer-frequent fire and ponderosa pine ERU's, which account for most of the acres in forested types on the Santa Fe:

- In describing the mixed conifer-frequent fire ERU, including in Table 13, the FEIS[225] clearly shows the Forest Service's plan is to reduce the "large tree, closed-canopy" state which occupies 72% of the forest type down to 5%, while increasing the "medium trees, all cover classes" state from 1% to 60% of the forest type. Table 13 also shows the plan is to reduce "large tree, open canopy" from a mere 1% of the forest type down to 0%. Table 13 also shows the plan is to reduce patch size from 247 acres down to just 0.02 to 50 acres. **This dramatic change in seral states and reduction in patch size can only be accomplished with widespread and intensive large and old tree cutting.**

- The same section states that "The biggest shift has been from reference conditions of stands comprised of medium-sized trees with varied canopy closure to those characterized by large trees and closed canopies." The Forest Service has no scientific data or publication to back up the claim that reference conditions were dominated by medium trees, when in fact nearly all literature reports that historic forests were dominated by large trees. This violates NEPA and NFPA requirements to use the best available science.

[225] FEIS, Vol. 1, p. 90.

- In describing the ponderosa pine forest ERU, including in Table 14, the FEIS[226] clearly shows the Forest Service's plan is to reduce the "10 inches or larger dbh, open canopy" state from 11% of the forest type down to 0%, and to reduce the "10 inches or larger dbh, closed canopy" state from 60% of the forest type down to 0%. These reductions are shifted to a goal of transitioning 100% of the ponderosa pine type to "10 inches dbh" – not "10 inches or larger" as are the current dominant seral states. Table 14 also shows the plan is to reduce patch size from 72 acres down to just 0.02 to 1 acre. **This dramatic change in seral states and reduction in patch size can only be accomplished with widespread and intensive large and old tree cutting**.

- Table 28[227] provides information for the Revised Plans effects on old growth forest in the mixed conifer-frequent fire ERU. This table shows clearly that Alternative 2 (the Revised Plan) would reduce acres contributing to large trees and old-growth forest components down to 76,491 acres – a drastic reduction from the existing plan direction (Alternative 1) which would lead to 117,725 acres of old growth. Not only is this reduction in large trees and old growth components shocking, but it in fact also moves farther away from the desired condition of 182,736 acres. **This dramatic change in seral states and reduction in patch size can only be accomplished with widespread and intensive large and old tree cutting.**

- The FEIS then lies about the effects of the preferred Alternative 2, stating that "This alternative would provide the most support to developing old-growth forest components out of all alternatives due to the combination of mechanical treatments and fire treatments,"[228] but on the same page then admitting that the preferred alternative would in fact develop *less* old growth and large tree components than Alternatives 1 and 4! This contradictory language in the same paragraph is simply baffling.

Based on these examples, it is clear that the Revised Plan will lead to dramatic reduction in old and large trees, canopy cover, and patch size. However, the Revised Plan and FEIS somehow conclude that the plan will benefit MSO, northern goshawk, and other species which rely on mature and old growth forests. Consider these apparent contradictions in the Revised Plan:

The Revised Plan admits that the focal species for ponderosa pine forests relies on large trees, stating the following:

> Large trees (larger than 18 inches diameter) provide critical nesting, denning, feeding, and roosting sites for such goshawk prey as tassel-eared squirrel, large woodpeckers, and

[226] FEIS, Vol. 1, p. 92.

[227] FEIS, Vol. 1, p. 122.

[228] FEIS, Vol. 1, p. 124.

> blue grouse. Large trees also are good cone producers, providing seed for many prey species. Large trees also provide hunting perches and nest trees for goshawks.[229]

Despite this, the plan emphasizes ponderosa pine forest restoration with no protections for large or old trees.

In another example, the FEIS admits that large trees and mature forests are essential habitat features for a handful of at-risk species, including American marten, Lewis' woodpecker, Jemez Mountains salamander, northern goshawk, and Mexican spotted owl,[230] but the Revised Plan never specifies that large trees shall or should be retained during forest thinning.

In another example, the FEIS admits in discussion of Alternative 1 that: "Primary threats common to species that use Frequent-Fire Forest include the departure of mature forest components which include the loss of, large trees and snags, down woody debris and loss of interlocking canopy which provide nesting, roosting and foraging habitat."[231] With this statement, the Forest Service acknowledges that species in ponderosa pine and mixed conifer forests rely on large trees, canopy cover, and mature forest structure. But again, there are no Standards or Guidelines that would protect these essential elements.

In the same passage, the EIS then goes on to say that: "Sensitive species that depend on fire adapted ecosystems would benefit from the 1996 plan amendment which includes standards and guidelines supporting a variety of structural stages, canopy cover, and distribution of snags, large trees, and coarse woody debris across the landscape."[232] So here, the Forest service admits that species like the MSO and northern goshawk benefit from standards and guidelines that exist in the 1996 plan amendments. However, once again, the Revised Plan strips these protections in favor of cutting out large and old trees in pursuit of arbitrary basal area and regeneration opening objectives.

Elsewhere in the FEIS, the Forest Service admits that high elevation spruce-fir forest, wet mixed conifer forest, and a variety of woodlands are also threatened by "loss of large trees and snags, down woody debris, and loss of interlocking canopy which provides nesting, roosting, and foraging habitat."[233] Here, the Revised Plan again strips existing plan protections for large and old trees and mature forest components.

Instead of providing a single Standard or Guideline that instructs managers to retain large and old trees during thinning operations, the plan provides Desired Conditions that ultimately will

[229] FEIS, Vol. 2, Appendix F, p. 326.

[230] FEIS, Vol. 2, Appendix E.

[231] FEIS, Vol. 1, p. 316.

[232] FEIS, Vol. 1, p. 316.

[233] FEIS, Vol. 1, p. 317 and p. 320.

force silviculturalists to sacrifice large and old trees to meet structural targets (basal area and trees per acre) established in GTR-310.

In our observation of thinning projects across the southwestern region, meeting a target basal area established in GTR-310 and adopted into the Revised Plan almost always requires removal of large and old trees. This contradicts reams of best available science that instruct restoration projects to focus less on structural targets, and retain existing old and mature forest structural elements. In addition to what we have already stated in past comments, consider the following:

More than a century of fire suppression, overgrazing by livestock, and unsustainable logging practices in southwestern frequent fire adapted forests has severely depleted large and old trees and resulted in larger and more severe wildfires. This phenomenon can explain current departed conditions on the Santa Fe National Forest. Large and old trees provide a critical ecological backbone for dry to mesic pine and mixed conifer forests,[234] providing essential habitat for species like northern goshawk, Mexican spotted owl, and other species discussed in the Final EIS and Revised Plan, as well as containing most of the carbon stored on the landscape.[235]

Large and old tree retention has been a fundamental component of southwestern forest restoration since the earliest developments of science-based recommendations to guide restoration implementation, and has been a central focus of the Four Forest Restoration Initiative (4FRI) stakeholders as expressed in The Path Forward (March 24, 2010),[236] the 4FRI Old Growth Protection & Large Tree Retention Strategy (September 13, 2011),[237] The Statewide Strategy for Restoring Arizona's Forests (Governor's Forest Health Council 2007),[238] and the New Mexico Forest Restoration Principles.[239]

Recognizing that characteristic southwestern frequent fire adapted forests prior to the interruption of natural fire regimes had higher proportions of large and old trees than contemporary forests,[240] forest landscape restoration practices have focused on the need to

[234] Hessburg, P.F., D. J. Churchill, A.J. Larson, R.D. Haugo, C. Miller, T.A. Spies, M.P. North, N. Povak, R.T. Belote, P.H. Singleton, W.L. Gaines, R.E. Keane, G.H. Aplet, S.L. Stephens, P. Morgan, P.A. Bisson, B.E. Rieman, R.B. Salter, and G.H. Reeves. 2015 Restoring fire-prone Inland Pacific landscapes: seven core principles. *Landscape Ecology* 30: 1805-1835.

[235] North, M., M. Hurteau, and J. Innes. 2009. Fire suppression and fuels treatment effects on mixed-conifer carbon stocks and emissions. *Ecological Applications* 19(6):1385–1396.

[236] 4FRI Stakeholders: The Path Forward. March 2010.

[237] http://4fri.org/wp-content/uploads/2018/04/old_growth_protection-revised080812.pdf

[238] https://www fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5137128.pdf

[239] https://www fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5207898.pdf

[240] Reynolds, R.T., A.J. Sánchez Meador, J.A. Youtz, T. Nicolet, M.S. Matonis, P.L. Jackson, D.G. DeLorenzo, and A.D. Graves. 2013. Restoring composition and structure in Southwestern frequent-fire forests: A science-based framework for improving ecosystem resiliency. Gen. Tech. Rep. RMRS-GTR-310. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 76 p.

reduce densities of small and young trees to restore low intensity fire[241] and offset carbon losses resulting from uncharacteristically high severity wildfires.[242]

The best available science as well as the social tolerance for southwestern forest restoration unequivocally calls for the retention of old trees. Early forest restoration pioneers Wally Covington and Margaret Moore stated in a seminal 1999 publication that the first point in a general framework for ecological restoration treatments suggested for southwestern ponderosa pine in northern Arizona is to leave all presettlement trees (those predating the fire regime disruption date (circa 1870 to 1880).[243] Mr. Covington in fact was quoted to High Country News saying "I've made it clear for 20 years there's been a population crash of old-growth trees - leave the damn things alone!"[244]

In the most-cited scientific article in the domain of ponderosa pine forest research, a long list of prominent experts stated: "Large and old trees, especially those established before ecosystem disruption by Euro-American settlement, are rare, important, and difficult to replace. … Ecological restoration should protect the largest and oldest trees from cutting and crown fires, focusing treatments on excess numbers of small young trees."[245]

An article of similar significance, written by some of the most respected scientists alive today stated that "…cutting of old trees always should be avoided, because they have been severely depleted since European settlement…We recommend that treatments in ponderosa pine–dominated reserves be of the minimal intensity needed to restore grassy understories and protect old trees and imperiled species habitat."[246]

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[241] Agee, J.K. and C.N. Skinner. 2005. Basic principles of forest fuel reduction treatment. *Forest Ecology and Management* 211: 83–96, and Reinhardt, E.D. R.E. Keane, D.E. Calkin, J.D. Cohen. 2008. Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States. *Forest Ecology and Management* 256: 1997-2006.

[242] North, M.P., and M.D. Hurteau. 2011. High-severity wildfire effects on carbon stocks and emissions in fuels treated and untreated forest. *Forest Ecology and Management* 261:1115-1120.

[243] Margaret M. Moore, W. Wallace Covington, And Peter Z. Fule. 1999. Reference Conditions and Ecological Restoration: A Southwestern Ponderosa Pine Perspective. *Ecological Applications* 9(4): 1266-1277.

[244] https://www hcn.org/issues/47/1441

[245] Craig D. Allen, Melissa Savage, Donald A. Falk, Kieran F. Suckling, Thomas W. Swetnam, Todd Schulke, Peter B. Stacey, Penelope Morgan, Martos Hoffman, And Jon T. Klingel. 2002. Ecological Restoration of Southwestern Ponderosa Pine Ecosystems: A Broad Perspective. *Ecological Applications* 12(5): 1418-1433.

[246] Reed F. Noss, Paul Beier, W. Wallace Covington, R. Edward Grumbine, David B. Lindenmayer, John W. Prather, Fiona Schmiegelow, Thomas D. Sisk, and Diane J. Vosick. 2006. Recommendations for Integrating Restoration Ecology and Conservation Biology in Ponderosa Pine Forests of the Southwestern United States. *Conservation Biology* 14(1): 4-10.

And another similarly important paper stated: "Retaining large, fire tolerant trees is a key principle of dry forest restoration and increasing resilience, and removal of pre-settlement era trees (old trees) is not necessary to restore pattern."[247]

Large and old trees and mature and old growth forests have a prominent role in fighting climate change, but the Forest Service consistently ignores this, even though scientific studies have long concluded that old trees and old growth forest structure play an outsized role in carbon sequestration and storage. Old growth forests contain huge quantities of carbon accumulated over centuries.[248] Mature and old stands of forest take in more carbon than they release, making them carbon sinks.[249] Large trees, which are usually the oldest trees, contain most of the carbon in dry conifer stands,[250] and their retention in tree thinning operations helps offset carbon losses that result from wildfires.[251] Old growth ponderosa pine stands have been shown to assimilate more carbon and have greater drought resilience than young stands,[252] and old trees continue to sequester carbon at rates far greater than young, fast-growing trees.[253]

As we said in previous comments, we support the protection of old growth ponderosa, mixed conifer, and pinyon-juniper forests and all individual old trees. Old growth forest is essential to many species because it provides habitat attributes not found in younger forests. These include large, old trees, large standing dead trees, vertical and horizontal structural diversity, nesting cavities, broken tops, and fire-resistant "plated" bark structure. In addition to these important habitat characteristics, old growth provides a host of ecological services including overall watershed function, clean water, soil retention and storage of greenhouse gasses.

We generally consider "old trees" to be those that established prior to the onset of fire suppression, which is approximately 1870, based on arrival of cattle and sheep, which eliminated many of the fine fuels that carried frequent, low intensity fire. Therefore, any tree that is

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[247] Derek J. Churchill, Andrew J. Larson, Matthew C. Dahlgreen, Jerry F. Franklin, Paul F. Hessburg, James A. Lutz. 2013. Restoring forest resilience: From reference spatial patterns to silvicultural prescriptions and monitoring. *Forest Ecology and Management* 291: 442-457.

[248] S. Luyssaert et al. 2008. Old-growth forests as global carbon sinks. *Nature* 455:213-215.

[249] Janowiak, M., W.J. Connelly, K. Dante-Wood, G.M. Domke, C. Giardina, Z. Kayler, K. Marcinkowski, T. Ontl, C. Rodriguez-Franco, C. Swanston, C.W. Woodall, and M. Buford. 2017. Considering forest and grassland carbon in land management. United States Department of Agriculture, Forest Service, General Technical Report WO-95.

[250] M. North et al. 2009. Fire suppression and fuels treatment effects on mixed-conifer carbon stocks and emissions. *Ecological Applications* 19(6):1385–1396

[251] North, M.P. & M.D. Hurteau. 2011. High-severity wildfire effects on carbon stocks and emissions in fuels treated and untreated forest. *Forest Ecology and Management* 261:1115-1120

[252] P.M. Anthoni et al. 2002. Seasonal differences in carbon and water vapor exchange in young and old-growth ponderosa pine ecosystems. *Agricultural and Forest Meteorology* 111:203-222.

[253] N.L. Stephenson et al. 2014. Rate of tree carbon accumulation increases continuously with tree size. *Nature* doi:10.1038/nature12914.

approximately 150 years or older should be retained. Forest restoration practitioners generally agree that 150 years is the threshold of an old tree, and many NEPA projects on US Forest Service lands include protections for trees over 150 years old. Because it is difficult and time consuming to age trees during treatment design, any tree that exhibits morphological characteristics of advanced age (yellow/red bark, large diameter, deeply furrowed bark, large bark pates, broad flattened crown, drooping branches, cat-face fire scars, and other features) should be retained regardless of diameter.

Unfortunately, the Revised Plan follows in the path of GTR-310 by failing to codify these management approaches as enforceable Standards or Guidelines, disavowing the need for old and large tree protection that is the underpinning of forest restoration literature and practice. The Revised Plan should reflect this science and clearly state that "old trees (>150 years) will be retained" and that "old trees (>150 years) will not be cut." In addition, the plan should be clear that no large trees (generally those 16" dbh and larger) will be cut, except in narrowly defined circumstances.

4.1.5 The Revised Plan fails to comply with the Endangered Species Act with regard to the Mexican Spotted Owl.

4.1.5.1 The Forest Service fails to demonstrate compliance with the ESA.

Under the ESA, the Forest Service has an independent legal duty to formally consult with the U.S. Fish and Wildlife Service (FWS) to ensure the Santa Fe's Revised Plan is not likely to jeopardize the continued existence of any endangered species or threatened or result in the destruction or adverse modification of habitat of such species. 16 U.S.C. § 1536(a)(2). Here, the Forest Service completed a biological assessment dated August 2020 that determined the Revised Plan "may affect, is likely to adversely affect" the endangered New Mexico meadow jumping mouse and its critical habitat, the endangered Jemez Mountains salamander and its critical habitat, threatened MSO and its critical habitat, and endangered Holy Ghost ipomopsis.

Although the Forest Service noted that threatened Western yellow-billed cuckoo could use riparian habitat on the Santa Fe National Forest, it stated the bird is only known as a migrant and has not been documented on the forest. The threshold for preparing a biological assessment is whether, "based on the best scientific and commercial data available," a "species may be present." 16 U.S.C. § 1536(c)(1). The threshold is not whether there is known documented instances of the species on the forest. Thus, the Forest Service should have analyzed the Western yellow-billed cuckoo in its biological assessment. Because the Revised Plan may affect Western yellow-billed cuckoo, the Forest Service should have consulted with FWS regarding the effects of the Revised Plan on the species.

For the species analyzed in its biological assessment, the Forest Service formally consulted with FWS. However, the Forest Service improperly relies on the FWS's flawed Aug. 23, 2021 biological opinion for the Revised Plan, and fails to discuss information that would undercut the biological opinion's conclusion. *See, e.g., Center for Biological Diversity v. U.S. Bureau of Land Mgmt.*, 698 F.3d 1101, 1121 (9th Cir. 2012). Courts have made clear that an agency "cannot abrogate its responsibility to ensure that its actions will not jeopardize a listed species; its decision to rely on a . . . biological opinion must not have been arbitrary or capricious." *Pyramid*

Lake Paiute Tribe of Indians v. U.S. Dep't of Navy, 898 F.2d 1410, 1415 (9th Cir. 1990). *See also Defenders of Wildlife v. EPA*, 420 F.3d 946, 976 (9th Cir. 2005) (rev'd on other grounds); *Wild Fish Conservancy v. Salazar*, 628 F.3d 513, 532 (9th Cir. 2010). The following section focuses on the MSO sections as just one example of how the 2021 biological opinion for the Revised Plan is flawed.

4.1.5.2 The Santa Fe's 2021 Biological Opinion for Mexican Spotted Owl is legally flawed.

When FWS first listed the MSO as a threatened species in 1993, it identified two primary threats to the MSO's survival and recovery: (1) destruction and modification of habitat from timber management, and (2) the threat of these practices continuing as evidenced in existing national forest plans. 58 Fed. Reg. 14,248 (Mar. 16, 1993). *See also* 2021 BiOp at 16. The danger of stand-replacing wildland fire was also cited as a threat at that time. *See* 2012 Recovery Plan at VI. FWS states that threats to MSO population "in the U.S. (but likely not in Mexico) have transitioned from commercial-based timber harvest to the risk of stand-replacing wildland fire." 2021 BiOp at 16. Yet FWS has never modified its rule for listing the MSO through formal rulemaking. Thus, to achieve the Recovery Plan goal to recover MSO owl populations to the point that it can be removed from the ESA list of threatened species, FWS must, *inter alia*, manage the threats identified for listing the species. This includes threats from timber management activities as well as stand-replacing and uncharacteristic fire. As explained below, FWS largely ignores the threats from timber management activities in its analysis.

In 2004, FWS designated MSO critical habitat, including 8.6 million acres on Federal lands in Arizona, Colorado, New Mexico, and Utah. 69 Fed. Reg. 53,182 (Aug. 31, 2004). MSO critical habitat only includes those areas within designated critical habitat boundaries that are defined as protected and restricted habitat. "Protected habitat" is defined as protected activity centers (PACs) and unoccupied steep slopes that have not had timber harvest in the last 20 years, and administratively reserved lands. "Restricted habitat" is all other mixed conifer, pine-oak, and riparian forests not falling within PACs or slopes greater than 40 percent. Under the 2012 Recovery Plan, unoccupied protected habitat and all restricted habitat are referred to cumulatively as "recovery habitat" (which includes unoccupied owl foraging, dispersal, and future nest and roost habitat). The 2012 Recovery Plan does not recognize administratively reserved land as automatically included as protected areas.

FWS's 2012 Recovery Plan lists 1,324 known owl sites in the United States. *See* U.S. Fish and Wildlife Service, 2012 Final Recovery Plan for the Mexican Spotted Owl (*Strix occidentalis lucida*), First Revision (hereafter, "2012 Recovery Plan"); 77 Fed. Reg. 74688 (Dec. 17, 2012). The majority of MSO in the United States are found on National Forest System lands. Because MSO are largely limited to national forest lands in Forest Service Region 3, the protection of its populations and habitat on national forest lands in Region 3 is crucial to the continued survival and recovery of the species.

4.1.5.3 Overview of MSO on the Santa Fe National Forest.

MSO are known to occur on the Santa Fe National Forest, including on the Coyote, Jemez, Española, and Pecos-Las Vegas Ranger Districts.[254] There are about 41,383 acres of PACs and about 198,888 acres of MSO designated critical habitat on the Santa Fe National Forest.[255] Given the MSO's struggle to survive much less recover, and the Santa Fe National Forest's role in providing important habitat for MSO survival and recovery, it is crucial that the Santa Fe Revised Plan's Biological Opinion include a robust analysis of the effects of the Revised Plan components on MSO and its critical habitat.

Unfortunately, the FWS's Aug. 23, 2021 Biological Opinion (hereafter, 2021 Biological Opinion or 2021 BiOp) that analyzes effects of the Revised Plan on MSO and its critical habitat is flawed for numerous reasons, including but not limited to: relying on the programmatic nature of the action to avoid a robust analysis of the Revised Plan's effects; ignoring best available science; failing to explain or justify inconsistencies with the 2012 Recovery Plan; failing to consider relevant factors; and providing a flawed no jeopardy determination.

4.1.5.4 Programmatic in nature.

FWS starts out by stating the Revised Plan is simply a "framework programmatic action" and "does not authorize any future action(s)."[256] But in the next paragraph, FWS states that the "proposed action is the *implementation* of the management direction provided within the revised Land Management Plan (LMP)."[257] Implementation of the Revised Plan will have very real direct and indirect effects.

FWS also notes that "[t]his LMP maintains current levels of use while improving infrastructure and increasing the level of restoring ecological health."[258] To translate, "restoring ecological health" means the Revised Plan increases the active management of the forest.[259] Simply because an action is programmatic in nature, it does not follow that the action will have no direct or indirect effects on a listed species or its critical habitat. The increased active timber management authorized by this Revised Plan is a very real direct and indirect threat to MSO and its critical habitat that the FWS fails to acknowledge.

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[254] 2021 BiOp at 27.

[255] *Id.*

[256] 2021 BiOp at 6.

[257] 2021 BiOp at 6 (emphasis added).

[258] *Id.*

[259] *See, e.g.*, 2021 BiOp at 10 (stating an objective to complete 2,500 to 50,000 acres of combined vegetation treatments "to move vegetation toward desired conditions (i.e., restoration)" and explaining "[t]reatments may include mechanical treatments, prescribed fire, or naturally ignited wildfires, seeding, or other techniques").

And although FWS notes that site-specific actions will be subject to future ESA consultations, none of those piecemeal analyses will be able to capture the forest-wide perspective and approach to increase active timber management that is set forth in this Revised Plan. The Forest Service already ditched its approach of analyzing the impacts of all Region 3 forest plans on the MSO's survival and recovery, eliminating an otherwise useful way to assess the effects of Forest Service actions on MSO range-wide as opposed to piecemeal within each national forest's boundaries. As such, it is crucial that FWS in the very least acknowledge the very real, direct and indirect impacts the Revised Plan will have on MSO and its critical habitat within the Santa Fe National Forest—especially in terms of plan components that "increase[e] the level of restoring ecological health" as compared to the previous forest plan's components.

4.1.5.5 The Biological Opinion ignores best available science.

A biological opinion must be based on "the best scientific and commercial data available."[260] But here there are numerous examples of where FWS fails to provide any scientific basis for its conclusions, much less consider, disclose, or analyze the best scientific and commercial data available. As just one example, FWS fails to incorporate and assess its own new information regarding the MSO. This includes new estimates of habitat trends; annual maps of MSO forest habitat based on Landsat imagery, climate data, topography, and known MSO nest and roost locations; and long-term trends in potential MSO forest habitat.[261]

FWS fails to provide any scientific basis for its conclusion that the Revised Plan components will provide long-term benefits to the MSO and its protected, recovery, and critical habitat.[262] FWS provides no rational basis for its conclusion that, in sum, implementation of the Revised Plan, including increased logging and prescribed burning and transportation access, will not jeopardize the continued existence of the owl, and will not destroy or adversely modify its designated critical habitat. FWS provides no basis for its assumptions that the Revised Plan will allow the forest to manage for owl recovery and implement the 2012 Recovery Plan; implementation of active timber management will improve forest condition and sustainability; and that the plan components will help minimize any short-term adverse effects over the long-term resulting in overall benefit to the MSO.[263] These bare conclusions lack any reference to best scientific information, much less a reasoned explanation. There is no substantial evidence for FWS's no jeopardy and no adverse modification determinations.

4.1.5.6 The Biological Opinion is inconsistent with the 2012 MSO Recovery Plan

[260] 16 U.S.C. § 1536(a)(2), (b)(3)(A).

[261] *See* The Living Map of MSO Forest Habitat, *available at* https://www.fs.usda.gov/detailfull/r3/plants-animals/wildlife?cid=FSEPRD890979&width=full (last accessed Oct. 26, 2021).

[262] *See, e.g.*, 2021 BiOp at 35-36.

[263] *See* 2021 BiOp at 45.

This 2021 Biological Opinion is inconsistent with the 2012 Recovery Plan. FWS must in the very least explain that inconsistency based on facts in the record, but fails to do so here. First, FWS assumes the Revised Plan's components are consistent with the 2012 Recovery Plan, without providing an assessment of consistency. For example, FWS assumes—without analysis or justification—that "[t]imber harvest, prescribed burning, and other management activities are designed following" the 2012 Recovery Plan,[264] yet as we have shown elsewhere in this objection, the Revised Plan lacks specific parameters of treatments in MSO habitat such as old and large tree retention and preservation of adequate canopy cover.

Second, aspects of the 2021 Biological Opinion itself are inconsistent with the 2012 Recovery Plan and FWS provides no explanation. As just one example, the 2012 Recovery Plan states that an increase in number of known owl sites is mainly a product of new owl surveys being completed within areas that had not previously been surveyed, and therefore an increase in abundance in the species range-wide cannot be inferred from these data. Basically, the PAC increase cannot lead to the inference of an increase in abundance. But in this 2021 Biological Opinion, FWS attempts to make just such an inference, stating: "[h]owever, we do assume that an increase in the number of areas considered to be occupied is a positive indicator regarding owl abundance."[265]

4.1.5.7 The Biological Opinion fails to consider relevant factors.

Throughout its analysis, FWS adopts the Forest Service's assumption that active forest management can, should, and will result in restoring historic ecological conditions. *See, e.g.*, 2021 BiOp at 35 ("Desired conditions (ALL FW-VEG-DC, FW-WUI-DC 2 and 3, FW-FIRE-DC 2 and 3) (Appendix A) direct management toward activities and conditions where fire is again able to play its historic role in maintaining fire adapted ecosystems; *this would reduce* the threat of stand-replacing or uncharacteristic wildfire to MSO and habitat.") (emphasis added). This assumption ignores several key and relevant factors, as we have explained at length elsewhere in this objection.

One key and relevant factor that FWS ignores in its analysis is climate change. Climate change and resulting changes in weather patterns such as drought and high winds may be the driving factor for stand-replacing wildfire. As FWS noted in its own 2012 Recovery Plan, "[t]he intensification of natural drought cycles and the ensuing stress placed upon forested habitats could result in even larger and more severe wildland fires in owl habitat."[266] Indeed, heavy forest management may be a futile exercise in attempting to restore conditions of the past instead of adapting to a new normal. By failing to even consider relevant factors, FWS glosses over and ignores effects of the Revised Plan on MSO and its critical habitat. This leads to a flawed no jeopardy determination.

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[264] *See* 2021 BiOp at 27.

[265] 2021 BiOp at 16.

[266] *See* 2012 Recovery Plan at VI.

Another key factor is that best available scientific and commercial data does not support FWS's and the Forest Service's assumptions. FWS ignores the possibility that active forest management may not be effective in reducing the threat of stand-replacing or uncharacteristic wildfire to MSO and its critical habitat. Simply because stand-replacing wildfire has become a major threat to the MSO's survival and recovery, it does not follow that timber management activities do not also threaten the survival and recovery of MSO. It is equally plausible that active timber management is an additive threat to MSO and its critical habitat, rather than a mitigating factor. Indeed, FWS notes that "[t]imber management activities negatively affected habitat before" the MSO was listed as threatened.[267] And even following the FWS's assumption for a moment (that the timber management activities in the Revised Plan are consistent with the 2012 Recovery Plan), FWS notes that "[t]hese management activities can still have disturbance affects to the" MSO and its habitat.[268] But FWS fails to analyze these effects, despite the Revised Plan aiming to ramp up logging far above levels seen for decades.

As explained elsewhere in this objection, FWS assumes, without providing a scientific basis or explanation, that high severity fires are bad for MSO. It fails to disclose or consider studies finding that wildfire can be beneficial to MSO.[269] FWS assumes that increased logging and prescribed burning authorized under the Revised Plan components will reduce the likelihood of habitat loss from large wildland fires. This, despite the Forest Service's own data showing that southwestern forests have experienced larger and more severe wildland fires since 1995 despite active management, as compared to before 1995.

In the very least, FWS must acknowledge there is much uncertainty regarding thinning and burning treatment effects and the risks to owl habitat with or without forest treatment. It is unreasonable for FWS to maintain these assumptions despite (1) Forest Service data that calls into question the efficacy of the Forest Service's own timber management practices in reducing stand-replacing wildfires; (2) the lack of any data showing long-term effects of wildland fire on the MSO populations; and (3) the lack of any Forest Service commitment in its Revised Plan or this 2021 BiOp to conduct range-wide MSO population monitoring consistent with 2012 Recovery Plan protocol to test these assumptions.

4.1.5.8 The Biological Opinion issues a flawed no jeopardy determination

A jeopardy analysis should consider, *inter alia*: (1) the status of the species, including its range-wide condition, factors responsible for that condition, and its survival and recovery needs; (2) the

[267] 2021 BiOp at 27.

[268] 2021 BiOp at 27.

[269] *See, e.g.*, 2011 Occupancy and Reproductive Success of Mexican Spotted Owls in the Chiricahua Mountains (studies from the Coronado National Forest showing that Mexican spotted owls can survive and reproduce in areas subjected to high-intensity fire); 2012 Occupancy and Reproductive Success of Mexican Spotted Owls in the Chiricahua Mountains (similar, noting PACs can produce exceptional numbers of owl young following severe burns, perhaps due to increasing rodent populations post-fire).

environmental baseline of the species or critical habitat; (3) effects of the action to the environmental baseline; and (4) cumulative effects to the environmental baseline.[270]

The 2012 Recovery Plan recognizes that both management and monitoring of the MSO and its habitat are key to the eventual recovery of the owl. Yet FWS fails to analyze the effect of the Revised Plan on the recovery of MSO. The 2021 Biological Opinion is based on a fictional Forest Service management approach to MSO conservation and recovery, and not the management approach that the Forest Service actually implements.

One blatant example is the lack of any forest-wide monitoring in the Revised Plan, as the 2012 Recovery Plan envisions. *See, e.g.*, Santa Fe Revised Plan at 251 (listing the only species conservation monitoring question: "Are forest management activities and/or natural events affecting the ecological conditions that contribute to the recovery of the federally listed species?") *and* 2021 BiOp at 48 (listing as a conservation recommendation, but no requirement or commitment, "to work with the USFWS to conduct owl surveys over the next several years to determine how owls modify their territories in response to fuel treatments, forest restoration, and wildland fire"). Range-wide monitoring is necessary and crucial to track and demonstrate MSO population trends. FWS should revise the 2021 Biological Opinion to require, *inter alia*: protocol occupancy surveys prior to commencement of any ground-disturbing activities within Recovery Habitat; and require the Forest Service to use the most current version of the FWS MSO survey protocol in accordance with the Recovery Plan.

FWS provides no explanation for why it would be inappropriate to include range-wide monitoring for the Santa Fe portion of the MSO's range as part of this consultation. Especially when there is no agency decision-making related to that level of geographic scope. On the other hand, FWS also recognizes that implementation of its 2012 Recovery Plan is not enforceable. Thus, by punting any range-wide monitoring to voluntary and purely discretionary efforts by the Forest Service, FWS arbitrarily creates a shell game in which the Forest Service will never be accountable to complete range-wide monitoring. Because this monitoring is essential to understanding population trends, by failing to analyze the effects of this end result, FWS ignores a key factor relevant to its jeopardy analysis.

For reasons including but not limited to those set forth above, FWS violated the ESA in preparing the 2021 Biological Opinion for the Santa Fe's Revised Plan, and the 2021 Biological Opinion is arbitrary, capricious, and contrary to the APA. 16 U.S.C. § 1536; 5 U.S.C. § 706(2)(A). FWS's determination that the Santa Fe's Revised Plan is not likely to jeopardize the continued existence of MSO, or destroy or adversely modify its designated critical habitat, is unsupported, arbitrary, and capricious.

[270] *See, e.g.*, 50 C.F.R. § 402.14(g)(2) – (4).

4.2 Suggested Resolution for the Revised Plan, Final Environmental Impact Statement, and Draft Record of Decision to be compliant with the law and advance the recovery of the Mexican Spotted Owl.

The Forest Service must modify the Revised Plan's components to ensure the Forest Service is committed to a blueprint for the forest that is consistent with the 2012 Recovery Plan for MSO and an approach that will provide for survival and recovery of the MSO, based on the best available scientific and commercial data available. In addition, FWS must revise the 2021 Biological Opinion accordingly. Until then, the Forest Service must refrain from issuing any decision regarding the Revised Plan unless and until the legal flaws identified above are resolved, including through additional Section 7 consultation with FWS.

The Forest Service must produce a Supplemental EIS and Revised Plan that does the following:

- Provide Standards and Guidelines to ensure that Recovery Criteria metrics (both occupancy rates and habitat conditions) are incorporated and followed in any forest management activities affecting the MSO.

- Incorporate the outcomes of the MSO Leadership Forum June 2020 Agreement as well as the October 2020 Stipulation Letter.

- Commit to ongoing owl population trend monitoring, including monitoring as a standard, or at least a guideline, with corresponding provisions within the monitoring plan.

- Do more to identify and protect owls; the Revised Plan needs to include, as a standard, direction to conduct protocol occupancy surveys prior to commencement of ground-disturbing activities within Recovery Habitat, along with direction to minimize harm and harassment to Mexican spotted owl individuals in project areas that reside outside of currently known PACs. The standard should direct that if surveys cannot be completed, the unit will assume owl presence within the project area not surveyed, plus a buffer of 0.50 miles. The specific buffer makes this component more appropriate as a standard, but should the agency elect to incorporate it as a guideline, the buffer should still be included as a standard.

- Provide a framework to assess the effects of mechanical and prescribed fire treatments on the owl and its habitat in PACs outside of core areas.

- Provide a framework for tracking long-term trends in Mexican spotted owl PAC and Recovery Habitat on the forest, preferably as a standard with corresponding direction in the monitoring section of the Revised Plan, specifically providing direction that the Forest Service shall maintain the habitat trend information on an ongoing basis based upon the results of the most recent model inputs and analysis.

- Include standards or guidelines that provide better protections for old and large trees, canopy cover, and higher basal area in recovery habitat.

- Evaluate the full range of best available science on the effects of fire and logging on MSO and provide an effects analysis that recognizes the threats posed by logging and associated road construction.

- Commit to following the MSO Recovery Plan as a Standard, not a Guideline.

- Add a plan component that instructs the Forest Service to strategically prioritize mechanical treatments, as recommended in the MSO Recovery Plan.

4.3 Our Objection: The treatment of New Mexico Meadow Jumping Mouse in the Revised Plan and FEIS violates NEPA, NFMA, and the ESA.

The New Mexico Meadow Jumping Mouse (jumping mouse *or* NMMJM) is on the precipice of extinction, and remaining populations require immediate conservation management to recover. The FWS determined the species overall viability is low in the next ten years and predicted the probability of persistence will decrease over the long term.[271] All of the remaining 29 populations across the species' range are small and isolated and lack resiliency. However, the FWS also believes the species has a high potential to recover, as explained in the species' Recovery Outline, stating,

> Although the New Mexico jumping mouse has lower fecundity than most mice species, its high potential for recovery is based on the species' intimate link to the state of its habitat. The dynamic nature of early seral stage riparian vegetation, with protection, can promote rapid development into suitable habitat within several years, with an expected tandem response of increased New Mexico jumping mouse populations. Restoration of dense, herbaceous riparian vegetation will likely involve modifying or limiting actions that currently preclude the growth of suitable habitat. Thus, restoration of New Mexico meadow jumping mouse habitat will play an important role in the future viability and recovery of populations by creating additional suitable habitat to recover the subspecies.[272]

The Santa Fe National Forest (SFNF), as a key stronghold for the species, could play and should be playing a substantial role in contributing to the species recovery through management. And it essential that the revised management plan provide a framework for restoring or maintaining the ecological conditions necessary for the species and for mitigating threats and stressors to the species' habitat.

Below is a summary about the species in the SFNF from Appendix E in the FEIS, "At-risk Species Crosswalk," that stated,

[271] 79 Fed. Reg. 33120.

[272] U.S. Fish and Wildlife Service. 2014. Recovery Outline: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). June. p. 9. (see Ex. NMMJM 1 FWS Recovery Outline)

> The species occurs in dense mid-elevation riparian long grass habitats in the western United States. Proposed critical habitat exists in the Santa Fe NF, and the species has been documented in the forest. The number of historic locations of the species in the forest is greater than outside the forest boundary. Within the Santa Fe NF, the jumping mice are found in isolated locations along the Rio Cebolla and San Antonio Creek (Frey 2005, 2007). In 2005 and 2006, the mouse was captured at 5 localities in the Jemez Mountains in northern New Mexico, Sandoval County (Frey 2005). A study conducted by Carol Chambers 2016–2019 also detected 97 mice along multiple reaches of the Rio Cebolla and the Rio de Las Vacas (Chambers 2019). The major threats faced are the degradation of riparian habitat caused by actions such as legacy grazing, post-wildfire flooding events, and unmanaged recreation. Outside of the forest, agricultural uses and development of land have permanently changed historic locations.[273]

On January 30, 2020, the FWS published a 5-Year Review[274] and species status assessment[275] (2020 SSA) for the NMMJM. The jumping mouse 2020 SSA is cited in the FEIS Volume 2 bibliography. Thus, it's clear the Forest Service had time to incorporate information from these documents. However, it is unclear how the SSA informed the final Revised Plan. The five-year plan re-confirmed the species remains at risk of extinction throughout its range and should continue to be listed as endangered under the ESA.

The SFNF contains designated critical habitat for the species, as described by the 2020 SSA,

> Jemez Mountains CHU 3 consists of 55.5 km (34.5 mi) of streams within three subunits on the Santa Fe National Forest and State and private lands in Sandoval County, New Mexico (Figure 14). Only areas where jumping mice were known to occur since 2005 were incorporated as critical habitat. San Antonio Creek Subunit 3A originates at the Valles Caldera National Preserve boundary and continues downstream 11.5 km (7.1 mi) to immediately downstream of the San Antonio Campground. The entire subunit is located on the Santa Fe National Forest. Rio Cebolla Subunit 3B originates approximately 0.6 km (0.4 mi) upstream of the Rio Cebolla and Hay Creek confluence. The subunit continues downstream 20.7 km (12.9 mi) to its confluence with Rio de las Vacas. The entire subunit is located on the Santa Fe National Forest. Rio de las Vacas Subunit 3C originates at the Rock Creek and Rio de las Vacas confluence and continues

[273] FEIS, Vol. 2, Appendix E, p. 291.

[274] U.S. Fish and Wildlife Service. 2020. New Mexico Meadow Jumping Mouse (*Zapus hudsoni luteus*), 5-Year Review: Summary and Evaluation. FWS, New Mexico Ecological Services Field Office, Albuquerque, NM. January 30. (see Ex. NMMJM 2 FWS 5 year review).

[275] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. (see Ex. NMMJM 3 FWS Species Status Assessment).

> 23.3 km (14.5 mi) downstream to its confluence with Rio Cebolla. This subunit is located on private land and lands administered by the Santa Fe National Forest.[276]

In the 2020 SSA, the FWS expressed hope that the new forest plans, including the Santa Fe's, revised under the 2012 rule, "will provide improved protection to the jumping mouse on National Forest System lands."[277]

We addressed our concerns about the plan components regarding the New Mexico meadow jumping mouse in our comments: DOW et al. 2019.

4.3.1 The Revised Plan fails to provide the ecological conditions necessary to contribute to New Mexico meadow jumping mouse recovery, in violation of the NFMA (36 C.F.R. § 219.9(a)(1) & (b)(1)).

We conducted an analysis, written below, to determine whether the aggregate set of plan components that are relevant to the NMMJM and the species' habitat provide the ecological conditions needed to contribute to the jumping mouse's recovery. However, the Biological Assessment provides sufficient information necessary to draw this conclusion, stating under the heading "Conservation Measures: Conservation Actions 7 (a)(1),"

> No specific conservation actions have been implemented for the jumping mouse on the Santa Fe; however, a Forest Plan guideline requires that project activities and special uses occurring within federally designated critical habitat should integrate habitat management objectives and species protection measures from the most recent approved U.S. Fish and Wildlife Service (FWS) recovery plan. Those will be defined, incorporated and implemented in project scale analyses. The proposed action also includes management approaches for at-risk species. These would further help to provide persistence for the mouse throughout its range by promoting collaborative partnerships to aid in recovery and delisting and to consider habitat fragmentation on adjacent lands when planning activities on the Santa Fe.[278]

Moreover, the Biological Assessment determined the Revised Plan provided a "may affect and is likely to adversely affect" the NMMJM and the species' critical habitat, stating,

> … the LMP implementation does not provide for mitigation of all potential effects to a level that can be equated to or considered insignificant and/or discountable. Therefore, it is determined that LMP implementation **may affect and is likely to adversely affect** the

[276] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 42.

[277] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 115.

[278] Biological Assessment for the Santa Fe National Forest Land Management Plan Revision. August 24, 2020. p. 45.

> NMMJM and **it may affect and is likely to adversely affect** critical habitat for this species.[279] [emphasis in original]

We applaud the Forest Service for its honesty and transparency.

4.3.1.1 The necessary ecological conditions that the plan needs to provide.

The SFNF's planning Assessment identified the following ecological conditions necessary for the jumping mouse, "[r]iparian areas, springs, and permanent water."280 This is too general a portrayal of the ecological conditions needed by the jumping mouse and misses key finer scale habitat requirements. We believe this limiting description has contributed, in part, to the failure of the Revised Plan to provide the conditions necessary to contribute to the species' recovery.

The following ecological conditions required to contribute to the recovery of the NMMJM come primarily from the 2014 Recovery Outline: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*),[281] 2016 Final Rule for the Designation of Critical Habitat for the New Mexico Meadow Jumping Mouse,[282] the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*) 5-Year Review: Summary and Evaluation of 2020,[283] and the Species Status Assessment Report for the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*)[284] from 2020. We categorize and describe them below.

Presence of riparian vegetation with sufficient structure and composition. The FWS' 2014 Species Status Assessment[285] for the jumping mouse identified the following requirements for the species, and these conditions were incorporated as Primary Constituent Elements (PCEs) for designated critical habitat[286]:

[279] Biological Assessment for the Santa Fe National Forest Land Management Plan Revision. August 24, 2020. p.

[280] USDA Forest Service, Santa Fe National Forest. 2016. Santa Fe National Forest Plan Final Assessment Report, Volume 1 – Ecological Resources. June. pp. 213 & 215, Table 50.

[281] U.S. Fish and Wildlife Service. 2014. Recovery Outline: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). June.

[282] 81 Fed. Reg. 14264, March 16, 2016. (see Ex. NMMJM 4 FWS Final Rule).

[283] U.S. Fish and Wildlife Service. 2020. New Mexico Meadow Jumping Mouse (*Zapus hudsoni luteus*), 5-Year Review: Summary and Evaluation. FWS, New Mexico Ecological Services Field Office, Albuquerque, NM. January 30.

[284] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30.

[285] USDI Fish and Wildlife Service, Listing Review Team. 2014. Species Status Assessment Report: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). May 27. pp. 33-34.

[286] 81 Fed. Reg. 14264, March 16, 2016.

> *PCE (1).* Riparian communities along rivers and streams, springs and wetlands, or canals and ditches that contain:
>
> > *PCE (1)(a).* Persistent emergent herbaceous wetlands especially characterized by presence of primarily forbs and sedges (*Carex* spp. or *Schoenoplectus pungens*).
> >
> > *PCE (1)(a).* Scrub-shrub riparian areas that are composed of willows (Salix spp.) or alders (Alnus spp.) with an understory of primarily forbs and sedges.
>
> *PCE (2).* Flowing water that provides saturated soils throughout the jumping mouse's active season that supports tall (average stubble height of herbaceous vegetation of at least 61 cm (24 inches)) and dense herbaceous riparian vegetation composed primarily of sedges (*Carex* spp. or *Schoenoplectus pungens*) and forbs, including, but not limited to, one or more of the following associated species: Spikerush (*Eleocharis macrostachya*), beaked sedge (*Carex rostrata*), rushes (*Juncus* spp. and *Scirpus* spp.), and numerous species of grasses such as bluegrass (*Poa* spp.), slender wheatgrass (*Elymus trachycaulus*), brome (*Bromus* spp.), foxtail barley (*Hordeum jubatum*), or Japanese brome (*Bromus japonicas*), and forbs such as water hemlock (*Circuta douglasii*), field mint (*Mentha arvense*), asters (*Aster* spp.), or cutleaf coneflower (*Rudbeckia laciniata*);

The 2020 NMMJM 5-Year Review summarized studies that suggested the necessary vegetation height may be higher than the 61 cm (24 inches) noted above; the review state,

> Recent surveys continue to record this specific habitat requirement (Chambers 2018a, Frey 2017, Zahratka 2019). New Mexico meadow jumping mice were recently captured in three different locations in southwestern Colorado in herbaceous vegetation between 76 cm (29.9 in) to 106 cm (41.7 in) (Zahratka 2019) and in the White Mountains of Arizona in herbaceous vegetation averaging 61 cm (24.9 in) (Frey 2017). Chambers (2018a) modeled capture site data and determined that New Mexico meadow jumping mice in the White Mountains of Arizona occurred in habitat with a mean vegetative height of 89 cm (35 in). We have not received any information that demonstrated the occurrence of New Mexico meadow jumping mice in habitat with herbaceous vegetation lower than 61cm (24 in).[287]

The riparian ecosystems of the SFNF have not been meeting conditions required to contribute to the NMMJM's recovery as well at to maintain ecological integrity of these systems. Most ecosystem characteristics are exhibiting departure from reference conditions, with many at high levels of departure. The following points are excerpts from the planning Assessment[288] that provide a summary of conditions of the riparian ERUs on the SFNF.

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[287] U.S. Fish and Wildlife Service. 2020. New Mexico Meadow Jumping Mouse (*Zapus hudsoni luteus*), 5-Year Review: Summary and Evaluation. FWS, New Mexico Ecological Services Field Office, Albuquerque, NM. January 30. pg. 24.

[288] Assessment. Vol. 1, pp. 107-118.

- Herbaceous ERU [HERB]. On NFS lands, instream flows are reduced and their timing is altered by human water uses (Floyd et al. 2009). Decreased flooding, channelization, downcutting, and lowered water tables all contribute to a reduction in available soil moisture and an increase in upland species. Road density and other anthropogenic impacts such as historical grazing and recreating are likely deteriorating understory composition and condition as site potential and proportion of bare soil are significantly departed at 73 and 60 percent, respectively. These alterations to the landscape have an impact on wildlife as there is a reduction in breeding and forage cover. Reduced cover and dominance by sod forming grasses negatively affects stream temperature, bank stability, and sedimentation. … HERB may be the riparian ERU most impacted by invasive species. Invasives have been identified in all of the local zones. They were originally spread mainly along roadways, but are becoming increasingly established in riparian areas, distributed by stream flows (USDA Forest Service 2013b).

- Cottonwood Group ERU [CWG]. Coarse woody debris and channel organic debris are slightly less common in this ERU and half of what occurred during reference conditions or what is necessary to be considered properly functioning. Less frequent flooding has driven a shift in species composition, with a significant reduction in cottonwood cover, which is highly departed from a habitat perspective. Vegetative ground cover is moderately departed (48 percent). Sod forming grasses are nearly four times more common than bunch grasses. The mechanisms driving a large increase in willow are similar to those in NCSP. The scarcity of perennial streams on the SFNF limits available habitat for fishes in the mountain range. The Rio Grande cutthroat trout is native to high-elevation streams in the drainage of the Pecos River (Sublette et al. 1990a). The Rio Grande cutthroat readily hybridizes with exotic salmonids, which have been introduced for recreational fishing. Most streams in which it occurs have been affected by historical overgrazing and by altered stream nutrient, sediment load, and flow regimes. As a result of human activity, riparian areas have shifted exotic shrubby species such as Russian-olive and saltcedar leading to a 56 percent departure from site potential.

- Mixed Cottonwood-Willow Group ERU [MCWG]. Livestock concentrated around water sources have caused much damage by trampling. Clearcut logging has also altered interception of precipitation, allowing more water to run off downhill. Elimination of cover on hillsides has contributed to considerable erosion following logging and heavy grazing. Roads in canyon bottoms have also contributed considerably to erosion. Historical operations including the removal of beaver, overgrazing by livestock, logging, construction of roads and agriculture in riparian areas, diversion of water for irrigation, and modification of channels have altered riparian areas, sometimes irreparably (Dahms and Geils 1997).

- Diversion of water for irrigation and storage and construction of flood control structures have changed the hydrologic cycles on perennial and intermittent streams. Shortly after the period of intensive logging, surface runoff increased dramatically; now, with dense regeneration and more trees than existed in the pre-settlement forest, it is likely that evapotranspiration of water by the trees has reduced the availability of surface water and may have lowered the water table (Dahms and Geils 1997).

- Riparian systems have been degraded and are at risk across the Forest. Higher soil moistures, cooler temperatures, and greater productivity typically characterize riparian areas. However, human alterations to the landscape such as the diversion of waterways, the introduction of invasive plants, unauthorized use by cattle, and recreational impacts are altering these systems. The development of roads, grazing, and recreational use (including trails and dispersed recreation) are deteriorating understory vegetation, causing significant departures from reference condition in species composition and proportion of bare soil. Roads located near riparian areas can also negatively affect stream bank stability, ultimately causing erosion and sedimentation downstream.

- Increased water demand (water withdrawal) and climatic changes (e.g., long-term drought) have also deteriorated these systems. Water tables are lower and there have been decreases in periodic flooding which is necessary for the regeneration of some important riparian species (e.g., cottonwood). This results in shifts in species composition and a reduction in available soil moisture. Bare soil and reduced native species allow for the introduction of invasive species brought into the area by vehicles, animals, people recreating in the area, and agricultural practices.

Thus, it is essential the Revised Plan have plan components, designated areas, compatible use suitability, and other plan content that can restore degraded riparian conditions and maintain ecological integrity to contribute to the recovery of the jumping mouse. Yet, the plan fails in this regard.

Presence of suitable habitat along with restorable habitat and habitat connectivity. The following PCE was developed to guide conditions for suitable and restorable habitat:

> *PCE (3).* Sufficient areas of 9 to 24 km (5.6 to 15 mi) along a stream, ditch, or canal that contains suitable or restorable habitat to support movements of individual New Mexico meadow jumping mice.[289]

However, Dr. Jennifer Frey, a professor at New Mexico State University and foremost expert on the NMMJM, has reported this length to be too short and recommended other changes to the FWS' designated critical habitat proposal. The FWS considered the size of connected areas of suitable habitat needed for resilient jumping mouse populations to be 68 to 181 acres along 5.6 to 15 miles of flowing streams.[290] Dr. Frey contends that 15 miles be the minimum length for contiguous suitable habitat.

The Recovery Outline discussed the importance of habitat connectivity:

> [W]e assume that the jumping mouse likely existed historically in metapopulations with occasional exchange of individuals among local populations within stream segments (Morrison 1991, pp. 18–20; Frey 2011, pp. 76, 78; 2012a, p. 6). This ability to have

[289] 81 Fed. Reg. 14264, March 16, 2016.

[290] 81 Fed. Reg. 14265.

> multiple local populations along streams is important to maintaining genetic diversity and providing sources for recolonization when local populations are extirpated. Movement, dispersal, and gene flow require connectivity of suitable habitat along riparian corridors (Vignieri 2005, entire). This habitat connectivity among local populations is important to support resilient populations of the jumping mouse (Mawdsley *et al*. 2009, entire).[291]

Based on scientific information gathered since the Recovery Outline was developed and the Critical Habitat Rule was finalized, the 2020 SSS reported on the species' habitat connectivity needs:

> Based on this information [Chambers 2018c], even though New Mexico meadow jumping mice can move up to 700 m (2,297 ft) in a season and up to 1 km (3,281 ft) between years, and potentially even up to 4.3 km (14,108 ft) (Frey and Wright 2012, p. 33, 95–96, 109; Schorr 2003, p. 10; 2012, p. 1278), we believe that gaps greater than 200 m (656 ft) between patches of suitable habitat may create barriers to movement and decrease the ability for jumping mice to colonize new habitats. Consequently, appropriately sized patches of suitable habitat should be no more than about 200 m (656 ft) apart within these waterways, which would encompass the majority of regular (daily and seasonal) movements of individual mice. This configuration of habitat provides for a local population to be "functionally connected," such that the movements of the majority of individual mice, and perhaps occasional inter-population movements, can occur unimpeded.[292]

Adequate floodplain width. The following PCE was developed to guide conditions for the size and spatial arrangement of the jumping mouse's riparian habitat:

> *PCE (4).* Adjacent floodplain and upland areas extending approximately 100 m (330 ft) outward from the boundary between the active water channel and the floodplain (as defined by the bankfull stage of streams) or from the top edge of the ditch or canal.

While the FWS considered 330 feet to be an adequate area for adjacent floodplain and upland habitat to be protected in designated critical habitat segments, Dr. Frey referenced Trainor et al. (2012), suggesting that the width may need to be at least twice the 330 feet.[293]

Presence of beavers. The 2016 Critical Habitat Rule included the special management consideration for, "developing and implementing a beaver management or restoration plan for occupied and historic jumping mouse localities where appropriate."[294] Beavers are keystone

[291] USDI Fish and Wildlife Service. 2014. Recovery Outline: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). June. p. 10.

[292] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 25.

[293] Frey, J.K. 2013. Peer Review of Proposed Critical Habitat for *Zapus hudsonius luteus.* FWS-R2-ES-2013-0014. (see Ex. NMMJM 5 Frey Peer Review).

[294] 81 Fed. Reg. 14293-14294, March 16, 2016.

species that create and maintain habitat for a host of other species with their dam-building. The 2020 SSA explained the importance of the beavers and their activities to maintaining key habitat elements for jumping mice:

> The presence of beaver can also affect the frequency and intensity of severe wildfire. The reduction in the distribution and abundance of beaver has altered local hydrology, vegetation composition, and is another possible source of changing fire patterns in riparian areas (also see discussion below under "4.6 Loss of Beaver" section). Beaver activities help to expand areas of shallow groundwater and hydrophytic vegetation, and generally create a more heterogeneous floodplain by frequently converting streams from intermittent flow to perennial flow (Baker and Hill 2003, p. 299). This can create natural fire breaks and provide refugia from fire effects, especially where beaver activity results in extensive areas of marsh, wetland, and open water habitats, such as those conditions found within or adjacent to jumping mouse habitat. Because beaver populations have been reduced in many areas throughout the range of the jumping mouse, the corresponding loss of wetland habitats and perennial flow has perhaps contributed to drying and reduced fuel moisture of riparian vegetation (i.e., increased flammability of riparian vegetation).[295]

Jumping mice populations are often associated with beaver-created habitat where the mice exist, and beaver complexes can protect NMMJM habitat from livestock intrusions and resulting habitat destruction.[296]

Additional areas protected as designated critical habitat. Dr. Frey recommended additional critical habitat be designated in the Jemez Mountains, Unit 3, including in Units a, b, and c as well as designations within a new subunit. These areas are crucial to the jumping mouse's recovery and should have been protected as if they were designated critical habitat. We had recommended the SFNF designated a management area with the PCEs and Dr. Frey's modifications. The SFNF did not accept these recommendations in the Revised Plan. See the remedy section for details.

4.3.1.2 The threats the plan must mitigate via standards and guidelines.

The Revised Plan documents also summarized the ecosystem stressors that must be mitigated, i.e., with standards and guidelines, to fully provide necessary ecological conditions.

The FEIS[297] lists the following at threats and stressors to the jumping mouse and its habitat:

- Highly departed seral state

[295] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 99-100.

[296] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. pp. 40, 85.

[297] FEIS, Vol. 1., Table 51, p. 225.

- Uncharacteristic fire
- Invasive vegetation encroachment
- Disconnected flood plains (wet soils)
- Specific ecological features or conditions
- Intrusive human activity (Rec disturbance)

The Assessment[298] lists some additional threats to riparian habitats:

- Legacy grazing.
- Groundwater depletion and streamflow diversion, roads, trails, facilities, non- native plant species and upland species encroachment, uncharacteristic fire in riparian and adjacent areas, mining, or unmanaged herbivory, leads to loss or damage of riparian characteristics.
- Disturbance to soil in these areas due to unmanaged herbivory, dispersed camping, or construction activities can decrease plant cover.
- Spring developments for livestock or wildlife use decreases water available for local ecosystems and trampling further degrades these areas.
- Invasive species compete with native species for food or are predaceous on native species in aquatic features (Bullfrog).[299]

The 2014 Recovery Outline,[300] 2016 Critical Habitat Rule,[301] 5-Year Review,[302] and 2020 SSA[303] provide more detailed and complete best available scientific information about habitat stressors and threats relevant to the SFNF.

Livestock grazing. The NMMJM has been extirpated from the vast majority of its range due to the destruction and degradation of its streamside habitat. In all historical locations surveyed, jumping mouse populations have undergone large declines and, in most cases, may have completely disappeared due to grazing of domestic livestock.[304] As stated above, the species

[298] USDA Forest Service, Santa Fe National Forest. 2016. Santa Fe National Forest Plan Final Assessment Report, Volume 1 – Ecological Resources. June. pp. 223 & 231, Table 57.

299 May not be applicable to the NMMJM

[300] U.S. Fish and Wildlife Service. 2014. Recovery Outline: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). June.

[301] 81 Fed. Reg. 14264, March 16, 2016.

[302] U.S. Fish and Wildlife Service. 2020. New Mexico Meadow Jumping Mouse (*Zapus hudsoni luteus*), 5-Year Review: Summary and Evaluation. FWS, New Mexico Ecological Services Field Office, Albuquerque, NM. January 30.

[303] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30.

[304] Frey, J.K. and J.L. Malaney. 2009. Decline of the meadow jumping mouse in two mountain ranges in New Mexico. The Southwestern Naturalist 54(1):31-44.

requires pristine streamside and wet meadow habitat with particular vegetation structural and compositional conditions for its food and sheltering needs. Cattle grazing—even when regulated—makes this growth impossible and has been identified by the FWS as one of the primary causes of this mouse's habitat destruction. Without this habitat, the New Mexico meadow jumping mouse cannot breed and prepare for its 8-9-month hibernation, the longest known for any mammal.

Clearly, the FWS has determined that livestock grazing in critical riparian areas and adjacent uplands reduces the jumping mouse's habitat, threatening the viability of the species, and that potential habitats must be protected and restored if the species is to recover, including adjacent uplands. The species Recovery Outline states,

> Individual jumping mice need intact upland areas that are up gradient and beyond the floodplain of rivers and streams and adjacent to riparian wetland areas because this is where they build nests or use burrows to give birth to young in the summer and to hibernate over the winter.[305]

Further, the Recovery Outline explains that "resilient populations of jumping mice need suitable habitat in the range of at least about 27.5 to 73.2 ha (68 to 181 ac) along 9 to 24 km (5.6 to 15 mi) of flowing streams."[306] Exclosure fencing should protect the full habitat requirements of the New Mexico meadow jumping mouse, extending outward into the "adjacent floodplain and upland areas extending approximately 100 meters (330 feet) outward from the boundary between the active water channel and the floodplain."[307] But see the information above documenting Dr. Frey's recommended modifications to critical habitat PCEs.

The jumping mouse's habitat needs, consisting of herbaceous riparian and adjacent upland terrestrial vegetation, are common of many riparian obligate species. The 2012 Planning Rule recognizes this phenomenon in the definition of riparian areas:

> Three-dimensional ecotones of interaction that include terrestrial and aquatic ecosystems that extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain to the water, laterally into the terrestrial ecosystem, and along the water course at variable widths.[308]

The FEIS fails to address the impacts of livestock grazing disturbance regimes on the New Mexico meadow jumping mouse and its habitat under the planning regime articulated in the

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[305] USDI Fish and Wildlife Service. 2014. Recovery Outline: New Mexico Meadow Jumping Mouse. N.M. Ecological Services Field Office, Albuquerque, New Mexico. p. 5.

[306] USDI Fish and Wildlife Service. 2014. Recovery Outline: New Mexico Meadow Jumping Mouse. N.M. Ecological Services Field Office, Albuquerque, New Mexico. p. 5.

[307] USDI Fish and Wildlife Service. 2016, Final Rule. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the New Mexico Meadow Jumping Mouse. Docket No. FWS–R2–ES–2013–0014. p. 195

[308] 36 C.F.R. § 219.19.

Draft Plan. Any subsequent NEPA document prepared during the forest plan revision process must include the best available science cited here (at a minimum) that documents the impacts of livestock grazing on the New Mexico meadow jumping mouse and the ecological integrity of its riparian and adjacent upland habitats.

Further, the Revised Plan fails to include critical habitat rules for the NMMJM in the Relevant Laws, Regulations, and Policy section of the plan. These rules must be listed in this section.

Livestock grazing in suitable and potential recovery habitat remains an ongoing threat, not merely a "legacy threat" as the Plan Assessment[309] indicates. The set of documents from the FWS, listed above, all acknowledge livestock grazing to be an ongoing threat to jumping mouse habitat. The 2020 SSA summarized the grazing is "incompatible with needed vegetation structure and diversity (which contributes to riparian herbaceous vegetation loss needed for forage, cover, and stream bank stability)."[310] The 2020 SSA also recounts an unfortunate history regarding the Forest Service's management of NMMJM habitat, including on the SFNS, stating,

> The jumping mouse has been identified as a Forest Service Sensitive species since 1990, which directs their management to provide a proactive approach to prevent a trend toward listing under the Act and to ensure the continued existence of viable, well-distributed populations. However, this designation has resulted in only limited management changes in forage utilization (grazing timing and intensity) outside of exclosures on grazing allotments within the range of the jumping mouse (Frey 2012a, entire; Service 2007b, p. 2). There has also been limited monitoring and reporting of the effects of the current forage utilization guidelines on the Carson, Santa Fe, and Lincoln National Forests (Service 2007b, p. 2). However, we think current grazing practices result in the loss of jumping mouse habitat because few areas that are not fenced contain the required microhabitat components to support jumping mice. Based on our review of this information, we conclude that current grazing practices on National Forest lands are not conducive to the conservation of the jumping mouse and, in all likelihood, have resulted in the extirpation of many historical localities. This may partially explain why the subspecies has disappeared from 35 of 45 historical localities on National Forest lands (Frey 2005a, pp. 6–10; Frey 2008a, entire; 2011b, p. 27; Frey and Malaney 2009, entire).[311]

Regarding the threat of livestock grazing to the species, the 2020 SSA offered the following conclusion,

[309] USDA Forest Service, Santa Fe National Forest. 2016. Santa Fe National Forest Plan Final Assessment Report, Volume 1 – Ecological Resources. June. pp. 223 & 231, Table 57.

[310] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 80.

[311] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 88.

> Almost all jumping mice locations on National Forests are within active livestock grazing allotments and in areas inhabited by elk and feral horses. However, many jumping mouse locations are in exclosures that exclude cattle, or both cattle and elk, or are in pastures specifically managed to protect riparian and aquatic habitats through seasonal restrictions. We have no information indicating that livestock grazing is likely to be reduced in the future or that the majority of areas adjacent to recently documented populations would be managed (e.g., fenced) to provide suitable habitat for expansion of jumping mouse populations. Therefore, it is apparent that current and future livestock grazing is likely to preclude the development of tall, dense riparian herbaceous vegetation in areas adjacent to many of the populations located since 2005.
>
> Survival of the jumping mouse is unlikely without additional habitat for population expansion and sufficient connectivity between areas to make re-occupancy possible if localized extinctions occur. We conclude that many of the jumping mouse populations subject to livestock grazing are not currently resilient due to their small size and isolation from other populations. Because of the magnitude and imminence of grazing pressures on the jumping mouse and its habitat, we conclude that livestock grazing is the most significant factor causing continuing impacts in five of the eight geographic management areas. Livestock, elk, and feral horse grazing pressure that is incompatible with the vegetation structure and diversity needed by the jumping mouse will cause further loss of jumping mouse habitat when fences fall into disrepair and livestock, elk, and feral horses enter exclosures. The loss of suitable habitat in the past has eliminated jumping mouse populations and severely reduced the resiliency of the remaining populations. In addition, the ongoing and expected future loss of habitat makes most of the remaining populations of jumping mice vulnerable to future extirpation.[312]

In sum, plan components must eliminate livestock grazing from jumping mouse occupied, suitable unoccupied, and potentially recoverable habitat.

Loss of beavers and their dams. The 2020 SSA stated that the "[l]oss of beaver dams and associated ponds that alter or eliminate important riparian and stream habitat attributes (groundwater depth and riparian vegetation)."[313] The 2020 SSA emphasized the threat of the loss of beavers to NMMJM habitat in the following summary,

> Beaver continue to be lost from across the range of the jumping mouse; therefore, we consider this another causative factor in the ongoing loss of suitable jumping mouse habitat now and into the future. Because beaver can improve habitat quality and augment

[312] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. pp. 88-89.

[313] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 80.

> the size of riparian areas, an increase in the distribution and abundance of beaver would also likely improve the resiliency of jumping mouse populations.[314]

The Recovery Outline noted that New Mexico policy made it difficult to relocate beavers.

> In New Mexico, beaver can no longer be relocated or transplanted without written consent from all property owners, land management agencies, or other affected parties (e.g., irrigation districts) within an 8-kilometer (5-mile) radius of the proposed release site or connective waters (New Mexico Department of Game and Fish 2009, entire).[315]

The 2020 SSA noted,

> In New Mexico, beaver were not able to be relocated or transplanted without written consent from all property owners, land management agencies, or other affected parties (e.g., irrigation districts) within an 8-km (5-mi) radius of the proposed release site of connective waters (NMDGF 2009, entire). This provision undoubtedly created some difficulties in reestablishing beaver if transplantation was required. Updated guidelines have reduced this requirement to written consent from all landowners within 8-km (5-mi) upstream, 8-km (5-mi) downstream, and within a 1.6-km (0.5-mi) radius in all directions from the release site (NMDGF 2015, p. 2).[316]

However, this does not apply to the Forest Service. There is no statutory or regulatory basis for wholly or partially subjecting federal management of federal public lands to the priorities of a U.S. state. Despite the 2012 Planning Rule's instruction to coordinate with other government entities under 36 CFR 219.4(b)(1), the Forest Service cannot abdicate its statutory responsibilities to manage the federal public lands in line with Congress's direction. Federal agencies have final responsibility for ensuring compliance with federal law. The ESA and the NFMA require the FWS and the Forest Service to use their authorities to recover listed species and any purported veto power by a state (whether expressed or implied) is unlawful. It is a common misconception that states, often represented by their wildlife agencies, have ultimate management authority over wildlife on federal lands. In fact, the courts have consistently upheld that the federal government has supremacy over its lands under the United States Constitution.[317]

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[314] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 107.

[315] 81 Fed. Reg. 14293-14294, March 16, 2016.

[316] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 106.

[317] In *Kleppe v. New Mexico*, 426 U.S. 529, 541 (1976), the Court stated, "the 'complete power' that Congress has over public lands necessarily includes the power to regulate and protect the wildlife living there." Kleppe further described the limit of a state's ability to dictate policy on federal lands: "those powers exist only in so far as [their] exercise may be not incompatible with, or restrained by, the rights conveyed to the Federal government by the Constitution." Id. at 545 (internal quotes omitted). The United States Constitution, Article IV, Section 3, Clause 2 grants Congress the "Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States."

Moreover, it is well-established that a federal agency may not align its regulation of wildlife on federal land with state management where such an action would be in violation of the federal agency's statutory mandates.[318]

The 2020 SSA summarized the current condition in New Mexico regarding beavers:

> There are currently no established beaver populations within parts of the Jemez Mountains (e.g., Valles Caldera National Preserve (VCNP) or the Santa Fe National Forest) or the Sacramento Mountains (e.g., Lincoln National Forest); however, the Valles Caldera National Preserve (VCNP 2012, p. 21), Santa Fe National Forest, and Lincoln National Forest have begun exploring methods to reestablish or augment beaver populations.[319]

Incompatible water use and management. The 2020 SSA state that "[i]ncompatible water use and management (dams and diversions) [ ] alter flow regimes needed to support suitable riparian habitat."[320] The aquatic ecosystems and watersheds of the SFNF have not been meeting conditions required to contribute to the NMMJM's recovery as well at to maintain ecological integrity of these systems. Most ecosystem characteristics are exhibiting departure from reference conditions, with many at high levels of departure. The following points are excerpts from the planning Assessment[321] that provide a summary of conditions of the aquatic conditions on the SFNF.

- [A]t the context scale, 36 percent of the impaired perennial stream miles occur on the SFNF while the balance occur off the Forest (see Water Quality Current Conditions section of this report). Proportionally, more impaired perennial stream miles occur off the SFNF (33 percent). However, 24 percent of the perennial stream miles (284 of 1,183) on the SFNF are impaired based on NMED's 2012 water quality data.

- Many seeps and springs are likely to have been developed for the purposes of providing water to livestock. … [I]t is likely that more seeps and springs exist than appear mapped and that most of them, over 90 percent according to field knowledge, has been developed to provide water for livestock and wildlife.

[318] *See, e.g., Wyoming v. United States*, 279 F.3d 1214, 1226-27 (10th Cir. 2002) (the Constitution gives the federal government the plenary power to manage federal lands, including wildlife living on such lands); *Audubon Soc'y v. Davis*, 307 F.3d 835, 851 (9th Cir. 2002) ("The Supremacy Clause of the Constitution, Art. VI, cl. 2, invalidates state laws that 'interfere with, or are contrary to,' federal law").

[319] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 106.

[320] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 80.

[321] Assessment. Vol. 1, pp. 125-175.

- When looking at the potential risk of compromised system integrity of perennial streams across the 37 watersheds, 10 were assigned a low risk, 11 a moderate risk, and 7 a high risk. Nine watersheds had no risk as perennial streams were not present. The potential risk was typically low to moderate for those portions of the watersheds within the SFNF boundary. Recall that 44 percent of the total perennial stream miles occur within the Forest boundary.

- When looking at the potential risk of compromised system integrity of lakes and ponds across the 37 watersheds, 3 were assigned a low risk, 23 a moderate risk, and 3 a high risk. Eight watersheds had no risk as lakes and ponds were not present. The potential risk was typically moderate for those portions of the watersheds within the SFNF boundary. Recall that only 11 percent of the total number of lakes and ponds occur within the Forest boundary.

- When looking at the potential risk of compromised system integrity of seeps and springs across the 37 watersheds, 3 were assigned a low risk, 6 a moderate risk and 15 a high risk. Thirteen watersheds had no risk as seeps and springs were not present. The potential risk was typically moderate to high for those portions of the watersheds within the SFNF boundary. Recall that 558 seeps and springs occur across the 37 watersheds, and 36 percent of these occur within the Forest boundary.

- Within the SFNF, 46 percent (129 of 284 miles) of the impaired waters are within the Jemez subbasin, 21 percent (59 of 284 miles) are within the Pecos Headwaters sub-basin, 24 percent (69 of 284 miles) are within the Rio Chama sub-basin, and the remaining 9 percent (27 of 284 miles) are spread across perennial streams in the Rio Grande-Santa Fe, Rio Puerco and Upper Rio Grande sub-basins.

- When comparing the percentages of impaired perennial stream miles at the context scale and plan scales, approximately 31 percent (790 of 2,534 miles) are impaired at the context scale, while 24 percent (284 of 1,166 miles) are impaired at the plan scale (within the SFNF boundary). As previously stated, on the SFNF nearly 91 percent of the impaired perennial stream miles occur within 3 sub-basins: Jemez, Pecos Headwaters, and the Rio Chama. Within the SFNF, impaired perennial stream miles exists within the Middle Jemez River, Rio Guadalupe and Upper Jemez watersheds of the Jemez subbasin; 70 percent of the impaired perennial streams within this sub-basin occur on the SFNF. Significant impaired perennial stream miles exists on the SFNF within the Cow Creek and Cow Creek-Pecos River watersheds of the Pecos Headwaters sub-basin; nearly 41 percent of the impaired perennial stream miles within this sub-basin occur on the SFNF. Significant impaired perennial stream miles exists within the Abiquiu Reservoir, Rio Gallina, Rio Ojo Caliente-Rio Chama and Rio Puerco watersheds of the Rio Chama sub-basin; nearly 35 percent of the impaired perennial streams within this sub-basin occur on the SFNF. It should be noted that no impaired perennial stream miles were identified on the SFNF within the Mora sub-basin.

- All 10 of the reference sites [for wetlands] have some level of departure from the highest rating (A+ or 4.0) (table 35). Seven of the ten sites were rated with a B+ or lower rating, and based on this study's definitions would be likened to a low to moderate departure from the best conditions. In general, however, long-term viability of these sites is likely "given no further environmental degradation occurs." Three of these sites were given an A- rating

> suggesting a low departure from a diverse mosaic of the natural vegetation community that are nearly undisturbed by humans, or have recovered from early human disturbance.
>
> - Based on the watershed condition score [from a 2011 watershed evaluation], a watershed condition class and condition were assigned to each of the 116 sub-watersheds on the SFNF (table 36 and figure 31). Fifteen sub-watersheds were determined to be functioning properly, 100 sub-watersheds were determined to be functioning-at-risk and one sub-watershed was determined to have impaired function.
>
> - The departure can be easily explained. As one example, the SFNF has constructed almost 6,000 miles of road to manage and provide access to the 1.68 million acres; recall that the road and trails indicator had a significant effect on the overall watershed condition score. These road miles have altered the geomorphic, hydrologic, and biotic integrity in every sub-watershed where they exist by effectively increasing the stream drainage density, and by increasing peak discharge, erosion and sediment delivery to the stream network.
>
> - Of the nearly 3,850 diversion points within the SFNF boundary, approximately 68 percent occur on private lands within the forest boundary; the balance (1,247) occurs on National Forest System (NFS) lands.
>
> - [W]ater rights [not owned by the SFNF] are being primarily used for commercial, domestic, irrigation, municipal, and stock uses, which account for 65.1 percent of the overall uses at the plan scale. At the watershed/sub-watershed scale, these same uses account for 75.3 percent of the overall uses.

Recreation impacts. The 2020 SSA stated that NMMJM habitat is negatively affected by "[r]ecreation within stream and riparian corridors that negatively affects habitats."[322] The 2020 SSA also noted impacts from recreation, including camping, in specific areas on the SFNF, stating,

> Coyote Creek and Sugarite Canyon State Parks and the Jemez, Sacramento, and White Mountains are heavily used for recreational activities, and, as human populations in New Mexico and Arizona continue to expand, there will likely be an increased demand in the future for recreational opportunities in these areas. The demand for developed and dispersed camping and recreation is generally greatest from May through September (the same activity period for the jumping mouse) and often exceeds capacity of the Santa Fe and Lincoln National Forests. Jumping mouse populations found along San Antonio Creek, Coyote Creek, Sugarite Canyon, and Fenton Lake are located within or adjacent to heavily used campgrounds, while many other recently documented populations within the Jemez and White Mountains and Sambrito Creek are immediately adjacent to areas heavily used by dispersed camping (Frey 2005a, pp. 27–28; 2011b, pp. 70–71, 76, 88; Ortega 2003, p. 24; U.S. Forest Service 2005, entire;). These populations are surrounded by riparian habitat that is currently fragmented or unsuitable for the jumping mouse, due

[322] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 80.

> in part to unregulated recreational impacts likely reducing the quality or quantity of suitable habitat in and around developed campgrounds or dispersed campsites known to support the jumping mouse.[323] [emphasis added]

The 2020 SSA stated in its conclusion about the effects of recreation on the jumping mouse,

> If jumping mouse populations were larger and more resilient, the scale of impacts related to recreational use would likely be much less than it is currently. However, under current conditions of jumping mouse populations, recreational use in these areas will likely continue to alter or remove tall, dense riparian herbaceous vegetation from areas adjacent to the populations that have been located since 2005. While these impacts may be on a small spatial scale, many of these populations are already vulnerable to loss because of their extremely small area of suitable habitat. If recreational activity results in significant suitable habitat loss in these locations, extirpation of additional populations is possible resulting in an overall decrease in the viability of the subspecies.[324]

Roads and other infrastructure. The 2020 SSA asserted that "[r]oads, railroads, and associated infrastructure (past and current construction and maintenance activities) [ ] create jumping mouse dispersal barriers or alter stream flow and/or remove riparian habitat."[325] The SSA further described the problems associated with roads:

> Road and railroad construction, or reconstruction, can directly destroy or modify jumping mouse habitat (Federal Highway Administration (FHWA) 2001, p. 72; Frey 2005a, p. 63). In addition to direct loss of habitat, road and railroad construction has the potential for indirect effects such as increased soil erosion, road maintenance (e.g., mowing or salting), or flooding (especially if culverts are sized incorrectly) that could destroy or modify jumping mouse habitat (Frey 2006, p. 1). In addition, road and railroads can fragment habitat and be a barrier to jumping mouse movements and dispersal.
>
> …
>
> Roads and stream channels (including their tributaries) can combine their storm runoff and increase peak flows which could affect jumping mouse habitat downstream. Peak flood flow increases, attributed to combined road and stream networks, can also be exacerbated by high severity wildfire, forest harvest, or other management actions that reduce soil infiltration and increase flood runoff into jumping mouse habitats. Many roads and railroad grades are constructed by the cut-and-fill process; the upper hill slope is excavated to provide a new base for either structure (Jones et al. 2000, p. 82). During

[323] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 112.

[324] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 112.

[325] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 80.

> heavy rain events, many small landslides originate from the downslope side of these roads and flow into riparian and stream habitats. These excessive debris flows may be transported downstream and cause channel aggradation in jumping mouse habitat (Nakamura et al. 2000, entire; Wemple 1998, entire).[326]

Climate change. According to the 2020 SSA, "[g]lobal climate change and drought [ ] affect vegetation and water flow."[327] Jumping mouse habitat can shrink during drought. The 2020 SSA put forward that,

> [D]rought may serve as a cumulative source of stress on populations making them more susceptible to extirpation (Frey 2005a, entire; 2011b, entire). For instance, Frey (2005a, p. 62; 2006a, p. 55; 2006c, p. 2) reported that loss of dense riparian herbaceous vegetation from the combined effects of heavy livestock grazing and drought makes the jumping mouse vulnerable to extirpations throughout its range. Our current understanding of climate change suggests that risks to the subspecies will be compounded by this additive factor. Therefore, climate change has the potential to increase the vulnerability of the jumping mouse to random catastrophic events and to compound the effects of other stressors to small, isolated populations.[328]

Given, that climate change can compound the impacts of other stressors, it's essential that the SFNF manage the stressors that are under its control.

Flooding. Scouring floods severely alter or remove riparian vegetation.[329] Flooding is a natural disturbance in the NMMJM range, and the species' populations were resilient when there was also sufficient population redundancy and representation. However, roads and infrastructure, such as poorly constructed culverts, can exacerbate flooding, as can livestock grazing. The 2020 SSA noted,

> The impacts of flooding on jumping mouse habitat may be worsened when riparian habitat has been grazed by livestock. Livestock grazing in riparian areas of the western United States has had a significant impact on channel morphology and water tables of streams (Belsky et al. 1999, p. 8). When upland and riparian vegetation is removed by livestock, and hillsides and streambanks are compacted by their hooves, less rainwater enters the soil and more water flows overland into streams, creating larger channel-altering peak flows during floods (Belsky et al. 1999, p. 8). Moderate and high rainfall

[326] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. P. 107, 109.

[327] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 80.

[328] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 97.

[329] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 80.

events within sites that are grazed by livestock are more likely to result in high energy and erosive floods, which deepen and reshape stream channels, thus reducing riparian vegetation (U.S. Department of Interior 1994, pp. 4–26).[330]

4.3.1.3 Analysis of plan components and other plan content relevant to the New Mexico meadow jumping mouse.

In this section, we provide an overall assessment of the extent to which the Revised Plan contributes to the recovery of the NMMJM. The Revised Plan does not contain an adequate set of plan components that will provide necessary ecological conditions and habitat stressor and threat mitigation to achieve this essential aims. Thus, the Revised Plan does not meet the requirements of 36 CFR 219.9(a)(1) and 36 CFR 219.9(b)(1). For example, the plan components for "All Vegetation Types," "Water Resources," "Riparian and Wetland Ecosystems," "Aquatic Species and Habitat," "Terrestrial Species," "At-risk Species," and "Soil Resources" are too general to provide for the species' specific habitat requirements (ecological condition). Many plan components do not provide specific enough guidance to direct project development and execution, as required by FSH 1909.12, ch. 20, 22.1.2.b and FSH 1909.12, ch. 20, 22.1.2.d.

The Appendix E crosswalk in the FEIS is helpful for understanding which plan components the Forest Service believes apply to the NMMJM to provide necessary ecological conditions and mitigate threats and habitat stressors. Appendix E included almost 200 plan components it indicates are applicable to the jumping mouse. Appendix E includes 30 Management Approaches that apply to the NMMJM—incorrectly indicating that they are plan components; they are not, and the Forest Service is not under an obligation to abide by them. It's not always clear how some of these listed plan components are relevant to the jumping mouse, such as FW-ATRISK-DC-5(a-d), which involves improving nesting conditions for the northern goshawk. There are several plan components listed in Appendix E that are identified as "RMZ," which we are assuming are meant to be "RWE" plan components, but the appendix is not clear about this. In our reading of the Revised Plan, we found some additional plan components that likely apply to the species as well.

The reliance primarily on coarse-filter plan components to advance jumping mouse recovery is one failure of the Revised Plan. Though Appendix E in the FEIS lists fine-filter components associated with jumping mouse, they are not sufficiently species-specific to offer the management certainty needed to protect populations and habitat. The desired conditions FW-ATRISK-DC-1, FW-ATRISK-DC-2, and FW-ATRISK-DC-3, which the Appendix E of the FEIS lists as fine-filter plan components, are so overly broad that they provide no framework for meaningful management direction on the ground.

For example, FW-ATRISK-DC-1, intends that, "Ecological conditions (physical and biotic) contribute to the survival and recovery of federally listed, proposed, and candidate species; preclude the need for listing new species; and allow for the recovery and persistence of species

[330] U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*), 1st Revision. FWS, Albuquerque, New Mexico. January 30. p. 103.

of conservation concern." This is essentially mimicking requirement 36 CFR 219.9(b)(1). See the other examples of problematic plan components below.

> *FW-ATRISK-G-2: Project activities and special uses occurring within federally designated critical habitat should integrate habitat management objectives and species protection measures from the most recent approved U.S. Fish and Wildlife Service (USFWS) recovery plan.*

This guideline should be a standard. Moreover, because there is no recovery plan yet available for the jumping mouse, the Revised Plan should have detailed management direction to mitigate threats to the species and stressors to its habitat. Critical habitat for the species should be designated as a management area with such prescriptions (See below). The revised plan should explicitly articulate and incorporate the direction provided in the critical habitat listing rule to protect PCEs (81 Fed. Reg. 14264) and conservation actions recommended in the Recovery Outline, however these are insufficient for restoring and protecting potentially suitable habitat outside of existing designated critical habitat. While the aggregate set of plan components that affect the jumping mouse are substantial, we find they are not sufficient to contribute to the recovery of the species. We provide a summary of problems with the Revised Plan that have resulted in the failure to provide necessary ecological conditions needed to recover the NMMJM on the SFNF.

> *FW-TERRASH-G-3: Activities negatively impacting wildlife reproduction or other vital functions should be minimized (e.g., closures during elk calving), except if management activities are implemented to control wildlife populations to protect the overall health of the habitat or other populations (e.g., NMDGF regulations).*

The concept of this guideline is important. However, the guideline is so broad, it is difficult to discern all of the management actions it could entail and how it should be applied to mitigate impacts to species' "reproduction and other vital functions." It is not written clearly; what does "except if management activities are implemented to control wildlife populations to protect the overall health of the habitat or other populations (e.g., NMDGF regulations)" mean? If the intent is to follow NMDGF regulations, management direction must be spelled out. The Forest Service is not obliged to abide by state regulations, so the revised plan must be clear regarding how these regulations promote overall wildlife protection and at-risk species recovery and persistence. The guideline should be broken up by species or groups of species that share elements of reproductive habitat. For example, there should be a standard or guideline for seasonal closures of elk calving grounds. There should be standards that provide disturbance buffers around raptor nests. And it should be clear what jumping mouse risks will be minimized.

> *FW-ATRISK-G-1: All authorized activities should be designed and implemented to address threats to at-risk species and their habitats, including, but not limited to:*
> *a. Timing restrictions to encourage reproductive success;*
> *b. Prevention of introduction of invasive, competing, or predatory species (these are species directly and negatively impacting at-risk species populations);*
> *c. Prevention or introduction of pathogens leading to population impacts;*
> *d. Creation or removal of obstructions that may alter natural migration or directly cause mortality to wildlife; and*

e. Avoiding or protecting small or isolated populations.

This guideline represents another case where the plan component is trying to do too much yet provides insufficient management direction for the NMMJM. For example, for species vulnerable to human disturbance during reproductive periods should be provided timing restrictions around their seasonal needs, and this should be based in best available scientific information. Separate plan components should provide specific direction to prevent the spread of chytrid or white nose syndrome, for example. And, in the case of the jumping mouse, specific constraints should be applied to forest projects and uses to protect the species' small and isolated populations, but these do not exist in the Revise Plan. Again, the guideline must be specific enough to allow a project manager to understand and determine how to design projects and manage uses to mitigate threats, and FW-ATRISK-G-1 does not satisfy this requirement.

Presence of riparian vegetation with sufficient structure and composition. There are no desired conditions or supporting objectives, standards, or guidelines to maintain or restore herbaceous sedge and forb vegetation that is at least 24 inches tall in critical habitat and at a length of at least 15 miles along streams, ditches, and canals that could provide suitable recovery habitat for the jumping mouse. Providing these ecological conditions is vital to the species. Additionally, there are no standards or guidelines to constrain management activities to help provide for this condition. Note the examples below.

> *FW-RWE-G-2: Within RMZs, management activities (e.g., recreation, permitted uses, structural developments such as livestock water gaps, pipelines, or other infrastructure) should occur at levels or scales that move toward desired conditions for water, soils, aquatic species habitat, and vegetation within the sub-watershed in which the management activity is taking place. Activities and facilities with a small footprint (e.g., access points, intermittent livestock crossing locations, water gaps, or other infrastructure) may be necessary to manage larger scale impacts within the RMZ, recognizing there may be trade-offs between activities and resources*. [emphasis added]

This guideline will not work to alleviate the threat of the listed activities to the at-risk species. Trade-offs allowing detrimental uses in NMMJM designated critical, other suitable, and restorable recovery habitat are not acceptable. This is written more like a desired condition and not a guideline. There must be constraints on these activities that managers can understand and apply on the ground. The Forest Service should revise this guideline to prioritize occupied and suitable habitat for restricting and decreasing uses in sensitive areas.

> *FW-RWE-G-3: Management activities, including vegetation treatments, in riparian areas should only be implemented to maintain or restore the diversity of both native riparian plant species and vegetation structure. Activities within riparian areas should avoid or otherwise mitigate adverse impacts to the abundance and distribution of desirable native species. Some exceptions may occur if vegetation treatments are needed to protect property or cultural sites.*

Without specific ecological conditions laid out clearly in the plan for the NMMJM (i.e., in desired conditions), this guideline does not provide adequate management direction for projects and other activities.

> *FW-RWE-G-4: Plantings to reestablish native riparian vegetation should use local sources and occur only if natural regeneration is not sufficient to provide shading, bank cover, and streambank stability. For seeding, only certified, weed-free native seed mixes of local species varieties should be used when commercially available.*

This is important direction, but it should be a standard. We see no other alternative paths that enable meeting the intent of this direction.

> *FW-RWE-G-7: Herbivory of riparian plants should not cause long-term trends away from desired riparian conditions.*

The intent of this guideline is important. However, it doesn't provide any real management guidance for forest personnel. Moreover, this direction should be a standard. As one of the most severe threats to the NMMJM, the revised plan should include a standard that provides certainty that management actions will prevent livestock grazing in critical, other suitable, and potential recovery habitat. Developing such a standard is consistent with management activities (2) recommended in the Critical Habitat Rule:

> [R]estoring, enhancing, and managing additional habitat through fencing of riparian areas, especially the Santa Fe, Lincoln, and Apache-Sitgreaves National Forests (this will facilitate restoration of the required vegetative components and support the expansion of populations of the jumping mouse into areas that were historically occupied by the species, but where natural expansion is currently unlikely because no suitable habitat remains).[331]

It is essential that the revised plan restore potential recovery habitat for the jumping mouse.

> *FW-RWE-G-9: In FSR types, fuelwood cutting or wood removal should be managed to protect understory species, maintain tree density (including wildlife cover and stream shading), promote large woody material recruitment, and avoid channel downcutting and accelerated erosion.*

Fuelwood cutting should not be allowed in riparian areas. There should be a standard that prohibits fuelwood gathering in riparian management zones.

Presence of suitable habitat along with restorable habitat and habitat connectivity. In some ways the riparian and aquatic ecosystem restoration objectives are the best part of the Revised Plan. They are generally clearly written and provide timetables. However, though the At-Risk Species Crosswalk includes objectives as being associated with at-risk riparian and aquatic species occupied, suitable, and potentially suitable habitat, the Revised Plan does not indicate that restoration activities will be prioritized for the NMMJM's habitat. Moreover, they include way too little planned activity over time to make much of a difference. We selected some of the best examples below.

[331] 81 Fed. Reg. 14294.

FW-WATER-O-1: Maintain "properly functioning" and improve at least two "impaired" or "functioning at-risk" watersheds (Watershed Classification Framework) every 10 years using the objectives from Vegetation ERUs, Aquatic Species, Water Resources, and Riparian Management Zones and Wetland Ecosystems.

FW-WATER-O-2: Over 10 years, improve watershed function by decommissioning or mitigating impacts (e.g., maintenance, improvements, or reroutes) on at least 100 miles of route (e.g., system roads, unauthorized routes, and trails) to the point of restoring hydrologic and ecological function.

FW-RWE-O-1: Riparian ecosystems move toward desired conditions (less than a 33 percent departure from DC) for vegetation functional diversity, vegetation seral state, riparian corridor connectivity, and flood regime (frequency, duration, and magnitude) by implementing 15 miles of stream restoration every 10 years.[6]

FW-AQUASH-O-1: Complete aquatic restoration on priority projects that restore 30 miles of aquatic habitat (e.g., increase pool quantity, provide stream cover, remove or install fish barriers, restore beaver populations, or treat invasive aquatic species) every 10 years to benefit aquatic species.

Objectives FW-WATER-O-1, FW-WATER-O-2, and FW-RWE-O-1 could have been helpful if the plan assured that NMMJM habitat would be prioritized for restoration, where needed, but the Revised Plan doesn't do this. The same critique—that objectives do not prioritize restoration of at-risk species habitat—holds true for FW-TERRASH-O-1, FW-TERRASH-O-2, and FW-INVASIVE-O-1. And this likely is not even close to enough restoration work over the life of the plan to improve conditions for the jumping mouse. According to the FEIS, there are 13 at-risk species that depend on riparian ERUs.[332] If the restoration work proposed in the objectives were to be allocated for the benefit of different at-risk species, that means objective FW-RWE-O-1 would offer an average of .1 miles of restoration benefit per species, and FW-AQUASH-O-1 would provide an average of less than .25 miles of benefit. While, more than one at-risk species could benefit from one restoration project, the exercise brings home just how little restoration work may occur in the SFNF over the life of the Revised Plan.

The Critical Habitat Rule's PCE 3 puts forth that 5.6 to 15 miles is the minimum stretch of habitat along a stream or other suitable or potentially suitable that is necessary for a population of jumping mice. And Dr. Jennifer Frey believes that 15 miles is actually the minimum length of contiguous habitat needed. Even if all of the potential restoration work in riparian areas outline in the objectives occurred for the benefit of the NMMJM, the species may be extirpated in the Forest before the end of the Revised Plan timeframe.

Adequate floodplain width. It's not clear that there are any plan components that provide for this condition.

[332] FEIS. p. 211.

Presence of beavers. We appreciate that the Revised Plan has an objective for aquatic restoration that includes the possibility of restoring beaver populations:

> *FW-AQUASH-O-1: Complete aquatic restoration on priority projects that restore 30 miles of aquatic habitat (e.g., increase pool quantity, provide stream cover, remove or install fish barriers, restore beaver populations, or treat invasive aquatic species) every 10 years to benefit aquatic species.*

However, the objective provides no assurance that specifically beaver restoration will occur on any of the 30 miles slated for restoration. And, if the Forest Service works toward this objective by restoring beavers to the Forest, the objective nor another other plan component directs that beaver restoration be prioritized in jumping mouse habitat or potential recovery habitat.

As the planning directives state, objectives must "[h]elp set the basis for priority areas or activities, with a timing expectation that near-term objectives would be completed first."[333] Meeting 36 CFR 219.9(b)(1) for the NMMJM will necessitate that some restoration activities be prioritized in the species' habitat or potential habitat. Passive restoration is often preferable to active manipulation of habitat conditions.

We appreciate that the Revised Plan has designated the beaver a focal species for monitoring purposes.[334] However, we are confused as to why the species is not a focal species to assess riparian or aquatic habitat conditions but aquatic and terrestrial habitat connectivity.

The Revised Plan does not provide sufficient direction to provide for beaver restoration to contribute to the recovery of the jumping mouse.

Additional areas protected as designated critical habitat. The plan includes no new protected areas that would benefit the jumping mouse by, for example, better safeguarding occupied and suitable habitat from stressors like livestock grazing, offering places for habitat restoration, and/or providing secure connectivity habitat.

Livestock grazing. The 2020 SSA is clear, as we detailed above; livestock grazing in occupied, suitable, and potential recovery habitat for the NMMJM is incompatible with the species' recovery. What is needed in the plan is a desired condition for the absence of livestock grazing in these types of jumping mouse habitats. The plan includes no such desired conditions. Instead, the Revised Plan identified the following desired conditions and other plan components that do not accomplish the necessary ecological condition of removing livestock in or near NMMJM critical habitat and potential recovery areas.

> *FW-RANGE-DC-4: Livestock grazing is compatible with ecological function and processes (e.g., water infiltration, wildlife habitat, soil stability, and natural fire regimes).*

[333] FSH 1909.12, ch. 20, 22.12.2.

[334] Revised Plan, p. 245.

> *FW-RANGE-DC-5: Native plant communities support diverse age classes of shrubs and vigorous, diverse, self-sustaining understories of grasses and forbs relative to site potential, while providing forage for livestock and wildlife.*
>
> *FW-RANGE-DC-6: Wetland and riparian areas consist of native obligate wetland species and a diversity of riparian plant communities consistent with site potential and relative to wetland riparian and forest, shrub, and scrub riparian desired conditions.*

These desired condition presents a nice sentiment, but the data show that livestock grazing and jumping mice do not mix. This desired condition will not help move the needle toward NMMJM recovery. It only sets a false expectation that livestock and jumping mice can coexist in the same areas when they cannot. The monitoring program does not include monitoring questions or indicators to assess whether the Revised Plan is helping move riparian areas toward these desired conditions. Again, the plan must include a desired condition that is explicitly intended to meet the PCEs laid out in the NMMJM final critical habitat rule regarding vegetation composition and structure to help manage livestock grazing to meet conditions necessary for the species' recovery. The Revised Plan does not do this.

> *FW-RANGE-O-2: Maintain, improve, or install at least one water feature per year to improve water availability for wildlife or livestock where natural water sources are limited.*

This is not a recovery action aimed at the jumping mouse. The Revised Plan does not define or described what is meant by "water feature" (e.g., a stock tank?), does not indicate whether water features would be installed in or near jumping mouse habitat, and does not indicate how such a water feature might help or harm jumping mouse habitat. We don't know from the Revised Plan, the FEIS, or the BA whether this objective would have a positive or negative impact on the NMMJM.

> *FW-RANGE-S-1: Livestock management must be compatible with capacity and address ecological resources (e.g., forage, invasive plants, at-risk species, soils, riparian health, and water quality) that are departed from desired conditions, as determined by temporally and spatially appropriate data.*[15]

There is no clear constraint or management direction in this standard. What does "compatible with capacity and address ecological resources" mean? What does "temporally and spatially appropriate data mean" in this context? The standard has added footnote 15 between the development of the Draft Plan and the final Revised Plan. However, the footnote, "[g]uidance can be found in the Grazing Permit Administration Handbook, Regional Supplements, and best available science. Guidance for cooperating with permittees when establishing capacity can be found in the most current Grazing Permit Administration Handbook (2209.13_90), does not clarify the standard; it's not clear which sections of the 63-page Handbook are relevant to the standard. The meaning must be clear in the plan itself. Moreover, the Handbook can change. There must be standards in the plan that restrict, reduce, and mitigate the impacts of livestock grazing, especially in occupied, suitable, and restorable at-risk species habitat. This standard does not have that effect.

> *FW-RANGE-G-1: Forage use should be based on current and desired ecological conditions as determined by temporally and spatially appropriate scientific data during planning cycles (e.g., Annual Operating Instructions or permit renewal), to sustain livestock grazing and maintain ecological function and processes.*[16]

This guideline provides no constraint(s) to be applied to projects or activities; it offers no management direction. What is "temporally and spatially scientific data"? The standard has added footnote 16 between the development of the Draft Plan and the final Revised Plan. However, the footnote, "Guidance can be found in the Grazing Permit Administration Handbook, Regional Supplements, and best available science. Guidance for cooperating with permittees when monitoring can be found in the most current Grazing Permit Administration Handbook (2209.13_90)," does not clarify the guideline; it's not clear which sections of the 63-page Handbook are relevant to the guideline. The meaning must be clear in the plan itself. Moreover, the Handbook can change. Sustaining livestock grazing and maintaining ecological function and processes are incompatible aims unless the plan includes meaningful, applicable constraints on grazing. The Revised Plan does not provide those constraints.

> *FW-RANGE-G-2: Livestock grazing within riparian management zones (RMZ) should be managed to sustain proper*[17] *stream channel morphology, floodplain function, and riparian vegetation desired conditions.*

Without constraints that restrict livestock grazing in RMZs in jumping mouse critical habitat and potential recovery habitat, sustaining proper ecological functions and other conditions will not occur in these areas. This guideline is internally inconsistent and does not provide meaningful management direction. Footnote #17, attempts to infuse some necessary specificity into the guideline and states, "[p]roper stream channel morphology and floodplain function as defined by BLM's proper functioning condition protocol, or a similar metric." This could possibly be helpful, but the footnote does not cite the specific BLM source to which it is referring; it seems like there are several versions of the protocol and potentially different protocols. However, the addition of "or a similar metric" renders this guideline ambiguous.

> *FW-RANGE-G-3: New livestock troughs, tanks, and holding facilities should be located to avoid long-term detrimental impacts to RMZs unless necessary for resource enhancement or protection.*

The exception, "unless necessary for resource enhancement or protection," renders this guideline meaningless. We cannot imagine a situation where detrimental impacts to RMZs, be the short- or long-term would be "necessary for resource enhancement or protection."

> *FW-RANGE-G-4: New range infrastructure (e.g., troughs or tanks) should be designed to avoid long-term negative impacts to soil resources (e.g., soil compaction and soil loss) to maintain hydrological function outside of the structure's footprint.*

The FEIS and BA do not analyze whether and how this guideline might degrade or benefit NMMJM habitat. As is, it does nothing to contribute to the recovery of the species. What is needed are standards that restrict livestock from NMMJM occupied, suitable, and potentially

restorable habitat, not infrastructure that could potentially draw livestock closer to these types of habitats.

> *FW-RANGE-G-5: Salting or mineral supplementation should not occur on or adjacent to areas especially sensitive to salt and increased ungulate traffic (e.g., riparian areas, wetlands, archeological sites, and at-risk species present) to protect these sites.*

This should be a standard that simply prohibits salt and mineral supplements in riparian areas, wetlands, and occupied, suitable, or potential recovery habitat for the jumping mouse. We do not see how departure from the guidelines can result in achieving the intended result—keeping salt and minerals from polluting sensitive areas, including NMMJM habitat. Change the "should" to a "shall" and make it a standard.

> *FW-RANGE-G-7: Vacant or understocked allotments should be made available to permitted livestock for pasture during times or events when other active allotments are unavailable and require ecosystem recovery as a result of natural disturbances (e.g., wildfire) or management activities (e.g., vegetation restoration treatments).*

The SFNF land management plan should allow vacant allotments to remain vacant, especially in riparian areas where the science overwhelmingly shows that livestock grazing damages these fragile ecosystems. Especially in or near suitable or potentially restorable habitat for the NMMJM, the management plan should have plan components that prohibit the restocking of vacant allotments.

> *FW-RANGE-MA-6: Consider emphasizing large-scale landscape approaches and treatments for restoring rangelands and the use and perpetuation of a diversity of native plant species, with an emphasis on grass, forb, and shrub communities.*
>
> *FW-RANGE-MA-7: Consider using an adaptive management strategy to manage livestock grazing in a manner that promotes ecosystem resiliency, sustainability, and species diversity, based on changes in range conditions, climate, and other resource conditions. Using the adaptive management strategy provides more flexibility to grazing management, while improving or maintaining rangeland health.*
>
> *FW-RANGE-MA-9: Consider modifying, relocating, or removing existing range facilities in water resource features, where their presence is determined to inhibit movement toward desired riparian or aquatic conditions and consistent with existing water rights and water quality and quantity.*
>
> *FW-RANGE-MA-12: In wetland or riparian areas that are functional-at-risk or non-functional, consider avoiding livestock grazing in the same area during the same vegetative growth and reproduction periods (e.g., leafing, flowering, or seeding) in consecutive years to ensure that riparian pastures have vegetative recovery.*

Management approaches are not mandatory and are not plan components. If these MAs were actually plan standards, they might be helpful to improve NMMJM habitat conditions. However, livestock grazing is incompatible with maintaining the integrity of the fragile riparian ecosystems for jumping mouse recovery.

Incompatible water use and management. See comments above on FW-WATER-O-1 and FW-WATER-O-2. We have concerns about the following standard:

> *FW-WATER-S-2: Projects that withdraw water from surface water features or groundwater must ensure that water is maintained at levels that will protect management uses and forest resources, including aquatic species, their habitats, and water quality.*

Given the massive impacts of climate change to both surface water quantity and ground water quantity (which can also affect surface water), this standard needs to make clear the procedures that will be used to ensure sufficient water is maintained not only at the time of the activity but also assess the long-term potential impacts. Otherwise, we appreciate the rare inclusion of a standard in the Revised Plan.

> *FW-WATER-G-2: New and reauthorized (e.g., permits and environmental analyses including Sec. 18 reviews) management activities should not negatively impact groundwater quality or quantity to the extent that groundwater-dependent ecosystems are adversely affected.*

The meaning of "to the extent that groundwater-dependent ecosystems are adversely affected" in this guideline is not clear. The guideline should have a period at the end of "quantity," and remove the rest of the text in order to be clear. We support the inclusion of FW-WATER-G-3.

Recreational impacts. Recreational activities in jumping mouse habitat is not compatible with the viability and recovery of impacted populations. Guidelines FW-DISREC-G-3 and FW-DISREC-G-6 should be re-developed to be standards. We don't see how the intent of the direction can be met in a guideline. Guideline FW-DISREC-G-4 may not have been written as intended; perhaps there is a word or are words missing—the direction is not clear. The need for management certainty with standard is clear by the effects analysis in the Biological Assessment, which states,

> This program area, primarily through the presence and maintenance of roads, recreation and motorized trails, can damage soil and vegetation within riparian, floodplain, and adjacent areas that could serve as suitable or restorable NMMJM habitat. Consideration of methods that would discourage dispersed camping near cultural sites, sensitive habitat for at-risk species, interpretive sites, and water resources.[335]

While in the planning rule implies that guidelines are not optional, the statement above reflects that the Forest thinks they are.

Roads and other infrastructure. Plan components to prevent impacts to jumping mouse habitat are limited and not helpful unless decommissioning is targeted to NMMJM habitat and potential habitat and road building does not occur in riparian and associated upland areas that can negatively affect habitat. We assessed the key plan components from the FEIS's list of relevant plan components in Appendix E.

[335] Biological Assessment. p. 53.

> *FW-ROADS-G-2: Bridges and transportation infrastructure found to serve as important habitat for at-risk wildlife should not be demolished unless demolition is necessary for safety along the travel route.*

The guideline is ambiguous in regard to the jumping mouse. We have not come across any science suggesting roads or other infrastructure would benefit the species.

> *FW-ROADS-G-3: New forest roads and other infrastructure (e.g., recreation facilities, airstrips, etc.) should be designed and constructed to limit the delivery of sediment and pollutants to waterbodies.*

New forest roads and other infrastructure should not be constructed in areas that are going to impact jumping mouse habitat. This is a species on the brink, and it depends on pristine habitat. Enabling more roads and other infrastructure presents a death-by-a thousand-cuts problem. While the guideline may help limit sedimentation and pollutants, it's never going to eliminate them completely. Roads also mean more access by humans to habitat and maintain a higher risk of accidents and fuel, etc. spills in riparian areas and waterways.

> *FW-ROADS-G-4: When a practical alternative does not exist, the footprint of new roads constructed in the riparian management zone should be as small as practical and the design should include mitigations to minimize or eliminate resource damage to ecological resources. The number of designated stream crossings and the footprint of new roads constructed should be limited to as few as practical to avoid impacts to these features.*

The same comment we made for FW-ROADS-G-3 holds for FW-ROADS-G-4. The effects analysis in the Biological Assessment contends, "ROADS desired condition 3 directs that the location and design of roads not impede wildlife and fish movement which would help address habitat connectivity and NMMJM movement and population expansion through riparian corridors."[336] Desired conditions don't "direct" anything; they are mere aspirations, and standards and guidelines are necessary to direct projects and other activities to help meet the desired conditions. The Biological Assessment also speculates that,

> It [the program area of infrastructures, roads and trails] could also improve some riparian areas where NMMJM may be present by removing degrading factors like roads, although there would be the potential for long term and short term impacts from restoration activities. While standards and guidelines could limit road related impacts, not all negative impacts would be reduced or eliminated. As such, this program area may affect and is likely to adversely affect NMMJM and its habitat.[337]

If this was a true effects analysis, the analysis would have shown that there are no plan components that provide direction to remove roads. There are no standards listed in this section of the Biological Assessment. This statement begs for more management certainty in the plan.

[336] Biological Assessment, p. 52.

[337] Biological Assessment, p. 53-54.

The plan needs to provide real direction to prevent new roads and other infrastructure from impacting NMMJM habitat and/or remove roads now affecting habitat.

Climate change. The most important actions the Forest Service can take to help lessen the impacts of climate change to the NMMJM is to reduce and eliminate manageable threats to the species. This includes livestock grazing in riparian habitat and restorable habitat.

High-severity wildfire. The most important action the Forest Service can take to help reduce the risk of large, high-severity fires destroying habitat is to prevent livestock grazing from occurring in NMMJM habitat and restorable habitat.

Scouring floods. The most important action the Forest Service can take to help reduce the risk of scouring floods is to prevent livestock grazing from occurring in NMMJM habitat and restorable habitat.

In conclusion, the plan components do not provide the ecological conditions necessary to contribute to the recovery of the NMMJM.

4.3.2 The Final Environmental Impact Statement for the Revised Plan does not comply with the National Environmental Policy Act (42 U.S.C. § 4321 et seq.) regarding the New Mexico meadow jumping mouse.

The FEIS fails to comply with the NEPA because it does meet a significant purpose and need for the Revised Plan and does not provide a range of reasonable alternatives. The FEIS fails to take a 'hard look' at the environmental consequences of the Revised Plan to the New Mexico meadow jumping mouse.

4.3.2.1 The Agency Action: The Revised Plan and the Draft Record of Decision fail to achieve the purpose and need to provide the necessary ecological conditions to contribute to the recovery of the New Mexico meadow jumping mouse, in violation of 40 C.F.R. 1502.13.

The FEIS includes the following need under purpose and need statement 1.3.1 Restore Ecosystem Resilience,

> There is a need for plan direction that supports restoration and maintenance of ecological conditions that contribute to the recovery and conservation of federally listed species (threatened and endangered) … . In addition, plan direction for terrestrial and aquatic habitat connectivity for species migration and movement is needed.[338]

The Biological Assessment articulated the effects determination for the Revised Plan; the plan "may affect" and is "likely to adversely affect" the jumping mouse and "may affect" and is "likely to adversely affect" the species' critical habitat. The Biological Assessment lists the PCEs for critical habitat, but plan components will not achieve them, as demonstrated in our analysis

[338] FEIS, Vol. 1, p. 5.

above. The Biological Assessment acknowledged, "[no] specific conservation actions have been implemented for the jumping mouse on the Santa Fe … ."[339]

The Revise Plan includes the following guideline:

> *FW-ATRISK-G: Project activities and special uses occurring within federally designated critical habitat should integrate habitat management objectives and species protection measures from the most recent approved U.S. Fish and Wildlife Service (USFWS) recovery plan.*

Clearly, this is no mandate to manage the Forest toward achieving the ecological conditions laid out by the Critical Habitat Rule's PCEs[340] or abide by the Recovery Outline's actions[341] in its action plan.

As acknowledged by the plan documents and illustrated by our plan component analysis, the Revised Plan fails to provide for the ecological conditions necessary to contributed to NMMJM recovery and include sufficient direction to provide habitat connectivity for the species—all requirements to comply with the planning rule.[342] In sum, we have shown the Revised Plan and other plan documents violate 40 C.F.R. 1502.13.

4.3.2.2 The Final Environmental Impact Statement does not provide a range of reasonable alternatives, in violation of 40 C.F.R. § 1502.14.

As stated in the section above and demonstrated throughout this objection, no alternative meets the purpose and need regarding the NMMJM by developing a land management plan that would contribute to the recovery of the species. The Revised Plan does not provide an alternative that includes plan components, area designations, suitability, and other plan content to contribute to the recovery of the jumping mouse. Each action alternative fails to comply with NFMA as well as Section 7(a)(1) of the ESA. A legally compliant alternative would have included plan components, including necessary and sufficient standards and guidelines, to provide "[p]ersistent emergent herbaceous wetlands especially characterized by presence of primarily forbs and sedges," "[s]crub-shrub riparian areas that are composed of willows [ ] or alders," "flowing water that provides saturated soils throughout the jumping mouse's active season that supports tall (average stubble height of herbaceous vegetation of at least 61 cm (24 inches)," and all of the other critical habitat PCEs; it would have provided the ecological conditions to restore areas to provide additional suitable habitat and connectivity habitat; it would have provided plan components that would have assured beaver restoration in potential habitat; it would have provided standards to mitigate the impacts of livestock grazing, recreation, roads, and other

[339] Biological Assessment, p. 45.

[340] 81 Fed. Reg. 14264 (March 16, 2016).

[341] U.S. Fish and Wildlife Service. 2014. Recovery Outline: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). June. p. 11.

[342] 36 C.F.R. 219.8(a), 219.8(a)(3), 219.8(a)(3)(E), 219.9(a)(1), and 219.9(b)(1).

habitat stressors and threats. A reasonable alternative should have provided a true recovery program for the NMMJM and should have been incorporated into the Proposed Action: The Revised Plan. Thus, the FEIS and other relevant plan documents have violated 40 C.F.R. § 1502.14.

4.3.2.3 The FEIS and other relevant plan documents fail to take a 'hard look' at the environmental consequences of the Revised Plan to the New Mexico meadow jumping mouse, in violation of NEPA (40 C.F.R. 1502.16).

The FEIS has failed to demonstrate how the specific plan components in the Revised Plan will directly or indirectly affect the NMMJM and the species' critical habits, potential restorable habitat, and connectivity habitat—beneficially or adversely. For example, the Seral State – Riparian Analysis provides a general description of plan components without an analysis of how these specific components, individually, with affect the species.[343] The conclusion of the seral state section of the analysis for Alternative 2 (the Revised Plan) states,

> The complement of desired conditions, objectives, standards, and guidelines would increase the viability of species that are negatively impacted by out-of-reference seral state conditions within riparian areas. Restoring composition and structure within RMZs would increase viability of species that are dependent upon those ecological conditions. ***If seral state conditions are restored in RMZ at-risk bird and mammal species would be able to forage, find protective cover, or move about their habitat as needed to secure basic life-cycle needs. The improved seral state conditions within RMZ would also improve soil and water characteristics and increase the viability of at-risk plants and aquatic species that are dependent upon those conditions***.
>
> In summary, objectives, standards, and guidelines within the proposed action will improve seral state condition in riparian areas. This will positively affect multiple ecological conditions required by at-risk bird, mammal, and aquatic species. This alternative has the second greatest effect on seral state and its impact to at-risk species.[344] [citations omitted, emphasis in original]

This is not a sufficient analysis. What is needed is a specific assessment of how the plan components will contribute to the recovery of the NMMJM (as well as other threatened and endangered species). The Revised Plan doesn't meet this bar. The EIS analysis should have revealed this problem so the plan could have been corrected to meet the ecological conditions needed by the species.

The impacts of livestock grazing, one of the most significant NMMJM stressors, are not sufficiently analyzed by the FEIS in terms of how the available plan components mitigate impacts. The FEIS lists a range of deleterious impacts of livestock grazing to riparian and aquatic habitat; these include but are not limited to:

[343] FEIS, Vol. 1, p. 235.

[344] FEIS, Vol. 1, p. 235.

- significant decrease in available water to stream channels, riparian vegetation, wildlife, and humans (roughly 9,000 gallons of water are consumed by cattle from springs and stream channels on a single Santa Fe NF allotment every day livestock are present)
- adversely and directly affect water quality
- compact soil and cause erosion
- erode stream banks
- contribute to channel sedimentation, which can decrease the flood capacity of stream channels
- contribute nutrients and organic matter with their urine and feces, which leads to water quality issues and the concentration of pathogens
- increase stream temperatures
- adversely affect stream channel form, process, function and habitat where they have diminished or eliminated woody riparian species
- Livestock adversely affect baseflows[345]

However, these impacts are analyzed based on the alternative's various acreages of the Forest under different land designations schemes, not how the impact the jumping mouse under the Revised Plan's components. The failures of the FEIS to sufficiently analyze impacts of the Revised Plan in the context of the lack of integrity of riparian ERUs in many areas extend to the threats and other habitat stressors identified in the FEIS, including: uncharacteristic fire, invasive vegetation encroachment, disconnected flood plains (wet soils), specific ecological features or conditions, and intrusive human activity (Rec disturbance).

The FEIS fails to sufficiently assess direct, indirect, and cumulative impacts of the alternatives and plan components on the NMMJM in violation of 40 C.F.R. 1502.16.

4.3.3 The Revised Plan fails to comply with the Endangered Species Act with regard to the New Mexico Meadow Jumping Mouse.

The Revised Plan, FEIS, and associated consultation documents, the Biological Assessment developed by the Forest Service and Biological Opinion written by the FWS, violate Section 7(a)(1) and 7(a)(2) of the ESA regarding the NMMJM. The Revised Plan does not provide a program for conserving the jumping mouse as required by Section 7(a)(1), and the FWS's determination that the Santa Fe's Revised Plan is not likely to jeopardize the continued existence of NMMJM, or destroy or adversely modify its designated critical habitat, is unsupported, arbitrary, and capricious.

The Forest Service acknowledged in the Biological Assessment, "[n]o specific conservation actions have been implemented for the jumping mouse on the Santa Fe." [346] The Biological Assessment articulated the effects determination for the Revised Plan; the plan "may affect" and

[345] FEIS, Vol. 1, pp. 197-198.

[346] Biological Assessment for the Santa Fe National Forest Land Management Plan Revision. August 24, 2020. p. 45.

is "likely to adversely affect" the jumping mouse and "may affect" and is "likely to adversely affect" the species' critical habitat. The totality of the plan components relevant to the jumping mouse do not add up to a program that would advance recovery; they do not provide for the species' specialized habitat requirements nor do they restrict threats and stressors to NMMJM habitat. The Revised Plan includes a guideline (FW-ATRISK-G) that vaguely indicates threatened and endangered species recovery plan actions and habitat management objects for designated critical habitat be integrated at the project level. Again, we believe this guideline should be revised to be a standard to meet the bar for what would be considered a 7(a)(1) conservation program. Plan components at the management plan level should be specific enough to provide direction that projects must or shall, at the very least, follow Recovery Plan actions, provide for Critical Habitat PCEs, and incorporate Critical Habitat special management considerations—when they are based on the best available science.

At the time the 2012 Planning Rule was adopted, the FWS's Biological Opinion on the rule itself

> The rule seeks to ensure that land management plans will support recovery of endangered and threatened species in several ways, and in fact goes beyond the directives of section 7(a)(l) by directing attention to proposed and candidate species as well as those that are listed. Initially, the rule (§219.8) requires that plans provide for ecological sustainability, which is likely to provide conditions conducive to the maintenance of native biodiversity generally and listed, proposed and candidate species in particular. Next, §219.9 requires that plans contain components to maintain or restore ecosystem integrity (§219.9(a)), ecosystem diversity (219.9(b)), and provide additional components where needed to contribute to the recovery of listed species and conservation of proposed and candidate species (§219.9(c)).
>
> The rule would also require a plan to include a monitoring program (§219.12) that would assess the status of a select set of the ecological conditions required to contribute to the recovery of listed species and the conservation of proposed and candidate species (§219.12(a)(5)(iv)).
>
> We conclude that the planning rule would establish a system for developing land management plans likely to promote the conservation of listed species occurring within the NFS, and that the elements of these plans dealing with endangered and threatened species constitute a program for their conservation, as described by section 7(a)(l) of the Act.
>
> …
>
> We recommend that as land management plans are adopted, revised or amended they be subject to review under section 7(a)(l) of the Act These plans are programmatic documents that will to the elements that tend to further the purposes of the Act.[347]

[347] Biological Opinion on the 2012 Planning Rule (FWS), March 8, 2012, p. 5.

Regarding meeting the ESA's 7(a)(1) mandate, the FWS merely provided the following recommendations:

> 1. We recommend the Forest continue to conduct surveys to confirm presence of NMMJM populations.
>
> 2. We recommend the Forest work with USFWS, NMDGF, and other partners to develop and improve riparian habitat during the 10- to 15-year life of the LMP.[348]

The BiOp brushes aside the pointed concerns in the FWS's 2020 SSA that the Forest Service was not doing enough to address threats such as livestock grazing and recreational impacts. We appreciate the point #2's recommendation, yet this should have been a specific objective in the Revised Plan. In sum, we have shown the Revised Plan and other plan documents fail to comply with Section 7(a)(1) of the ESA.

The Revise Plan also violates Section 7(a)(2) of the ESA. The Forest Service unlawfully relied on the Revised BiOp in proceeding with the Revised Forest Plan. The Forest Service has thus failed to "insure" that the revised Forest Plan is not likely to jeopardize the NMMJM, as required by the ESA.[349]

A biological opinion must be based on "the best scientific and commercial data available."[350] But here there are numerous examples of where FWS fails to provide any scientific basis for its conclusions, much less consider, disclose, or analyze the best scientific and commercial data available. As just one example, FWS fails to incorporate and assess its own new information regarding the NMMJM, including from the 2020 SSA, which was available over a year and a half before the BiOp was issued. While the BiOp does reference the 2020 SSA at page 18, it's clear it has not actually used the science to develop its analysis of the effects of the Revised Plan.

A jeopardy analysis should consider, *inter alia*: (1) the status of the species, including its range-wide condition, factors responsible for that condition, and its survival and recovery needs; (2) the environmental baseline of the species or critical habitat; (3) effects of the action to the environmental baseline; and (4) cumulative effects to the environmental baseline.[351]

The BiOp fails to consider how the SFNF actions and inaction up to the issuance of the Revised Plan have led to the precarious status of the species and have affected the range-wide conditions. The BiOp states,

> We found that there has been a significant reduction in occupied localities likely due to cumulative habitat loss and fragmentation across the range of the jumping mouse. The

[348] Biological Opinion for the Santa Fe National Forest Revised Plan, August 23, 2021, p. 49.

[349] 16 U.S.C. § 1536(a)(2).

[350] 16 U.S.C. § 1536(a)(2), (b)(3)(A).

[351] *See, e.g.*, 50 C.F.R. § 402.14(g)(2) – (4).

> past and current habitat loss has resulted in the extirpation of historical populations, reduced the size of existing populations, and isolated existing small populations. Ongoing and future habitat loss is expected to result in additional extirpations of more populations. The primary sources of past and future habitat losses are from grazing pressure (which removes the needed vegetation) and water management and use (which causes vegetation loss from mowing and drying of soils), lack of water due to drought (exacerbated by climate change), and wildfires (also exacerbated by climate change). Additional sources of habitat loss are likely to occur from scouring floods, loss of beaver ponds, highway reconstruction, residential and commercial development, coalbed methane development, and unregulated recreation.[352]

The BiOp fails to include information from the 2020 SSA that described specific conditions on the Forest and the SFNF's planning Assessment and FEIS that described the conditions of riparian and aquatic ecosystems in the plan area—all summarized above.

The BiOp makes vague references to effects of the action. For instance, the effects assessment of "watershed and soil management" point to Revised Plan desired conditions:

> There are 17 relevant desired conditions (ALL FW-WATER-DC, FW-SOIL-DC 1 and 2, ALL FW-RWE-DC, ALL FW-AQUASH-DC)(Appendix A) that guide management and activities within these plan areas. Desired conditions for water resources directs management to move toward or maintain satisfactory watershed conditions including soil conditions which could contribute to improved riparian habitat. Desired conditions, if reached, would help provide habitat that is capable of providing for self-sustaining riparian species populations like NMMJM. This would include floodplains and adjacent upland areas used by nesting or hibernating NMMJM. Desired conditions would help ensure that water is available and not diminished for the needs of riparian species such as NMMJM. Streambanks, floodplains, and adjacent upland areas would have diverse habitat components needed by NMMJM for hibernation. Desired conditions provide vegetation supporting NMMJM consisting mostly of natives and which is free from invasive plants.[353]

In this excerpt, the BiOp correctly notes that desired condition need not actually be achieved over the life of the plan. The BiOp further states,

> This program area could improve overall watershed and riparian conditions and could help limit impacts to riparian/wetland areas providing suitable or restorable NMMJM habitat. While standards and guidelines (Appendix A) could help limit impacts from restoration and other activities (e.g., planting vegetation), not all short-term negative impacts would be reduced or eliminated.[354]

[352] Biological Opinion for the Santa Fe National Forest Revised Plan, August 23, 2021, p. 20.

[353] Biological Opinion for the Santa Fe National Forest Revised Plan, August 23, 2021, pp. 30-31.

[354] Biological Opinion for the Santa Fe National Forest Revised Plan, August 23, 2021, p. 31.

The two excerpts represent the totality of the BiOp's assessment of effects of watershed and soil management. There is no real analysis of the actual effects of these specific desired conditions, standards, and guidelines. The Revised Plan BiOp fails to note plan objectives will not necessarily be applied in jumping mouse habitat, and thus may not have any effect on the species at all. The Recovery Outline and 2020 SSA recognize that both management and monitoring of the NMMJM and its habitat are key to the eventual recovery of the species. Yet FWS fails to truly analyze the effect of the Revised Plan on the recovery of jumping mouse. The BiOp merely re-lists the PCEs for the NMMJM's critical habitat on pages 20 and 21. Yet, the BiOp made the determination that: "the Forest's revised LMP will not jeopardize the continued existence of the mouse and will not destroy or adversely modify its critical habitat." The conclusion paints a much rosier picture than the SFNF did in reaching a may affect, is likely to adversely affect both the species and critical habitat in the Biological Assessment, and is simply false.

For reasons including but not limited to those set forth above, FWS violated the ESA in preparing the 2021 Biological Opinion for the Santa Fe's Revised Plan, and the 2021 Biological Opinion is arbitrary, capricious, and contrary to the APA. 16 U.S.C. § 1536; 5 U.S.C. § 706(2)(A).

4.4 Suggested resolution for the Revised Plan, Final Environmental Impact Statement, and Draft Record of Decision to be compliant with the law and advance the recovery of the New Mexico meadow jumping mouse.

We see no alternative to remedying the legal problems with the Revised Plan, FEIS, and Draft ROD but to go back to the drawing board in many respects. The EIS must be supplemented or revised to overcome the issues we described in our analysis above. Section 7 consultation requires a do-over. And the Revised Plan requires improvement to existing plan components and the addition of others to comply with NFMA and ESA. We recommended improvements to the Draft Plan during the comment period, and these still hold true for making improvement in the SFNF's land management plan to move closer to legal compliance and, more importantly, recovery for the jumping mouse.

1) Develop a desired condition based on necessary ecological conditions. We recommend the following or similar language for a desired condition for the NMMJM, which can provide an example for others:

> The Forest supports at least 6 New Mexico meadow jumping mouse populations resilient to the effects of uncharacteristic fire, drought, and climate change. Each population consists of at least 68-181 acres of suitable habitat across 15 contiguous miles of perennial flowing waterways. Designated critical and potentially suitable recovery habitat is characterized by dense herbaceous vegetation dominated by sedges and forbs, which provides shelter, hiding cover, nesting materials, and food (seeds and insects). Vegetation stands an average of 24 inches high. Suitable habitat patches are no greater than 650 feet apart to enable daily and seasonal movements. Intact upland areas that stretch well over 330 feet laterally from the streambank to provide dryer habitat for nesting, giving birth, and hibernating.

2) Designate a management area for critical habitat that includes additional suitable and potentially suitable habitat areas. Jumping mouse critical habitat, as with all threatened and endangered species critical habitat, should be designated as a separate management area. For the jumping mouse, additional areas recommended by Dr. Jennifer Frey in her "Peer Review of Proposed Critical Habitat for *Zapus hudsonius luteus*" should be part of the management area. The 2013 peer review, commissioned by the USFWS to assess its initial critical habitat proposal for the species (78 Fed. Reg. 37328), argued that the USFWS's proposed critical habitat was inadequate to prevent extinction. Dr. Frey requested the USFWS consider expanding critical habitat in three Jemez Mountains–Unit 3 subunits and adding a new subunit. The USFWS did not include Dr. Frey's recommendations in its final critical habitat decision (81 Fed. Reg. 14264). However, given her extensive expertise on the species, these recommendations should be considered the BASI on this subject. Dr. Frey identified the following areas for critical habitat expansion and a new critical habitat subunit in Unit 3 that should be incorporated into the management area:

> **Unit 3.** Jemez Mountains. The Jemez Mountains has numerous perennial streams, many with historical records for *Z. h. luteus*. Though many of these areas do not currently have the proper vegetation structure for *Z. h. luteus*, such structure can be easily restored. Consequently, the Jemez Mountains provides an excellent opportunity to provide the area and habitat connectivity (including dendritic pattern) necessary for resiliency. A complete list of localities known for *Z. h. luteus* in the Jemez Mountains is in Frey (2007). Additional areas include:
>
> > **Unit 3a.** I (Frey 2007) reported a historical record from the Valles Caldera National Preserve, likely from Redondo Creek, which is a tributary to San Antonio Creek. Further, I have observed potentially suitable habitat for *Z. h. luteus* in vicinity of the junction of these two creek [*sic*]. Thus, I recommend including both streams upstream of this junction, including within the Valles Caldera National Preserve, which has tremendous potential to restore habitat for *Z. h. luteus*. The VCNP would add vital area to this subunit.
> >
> > **Unit 3b.** My surveys in Lake Fork Canyon, a major tributary to the Rio Cebolla, did not verify presence of *Z. h. luteus* (Frey 2007). However, this valley has high capacity to restore conditions for *Z. h. luteus*. Currently, the entire proposed habitat in this subunit is along the mainstem of the Rio Cebolla. Lake Fork Canyon would provide a tributary and hence dendritic pattern that would add resilience. In addition, I see no biological reason why critical habitat should stop upstream on the Rio Cebolla near Hay Canyon. Perennial water and readily restorable habitat continues upstream to junction Forest Road 257. This would add vital area to this subunit.
> >
> > **Unit 3c.** The Rito Penas Negras is a major tributary to the Rio de las Vacas. There are at least 3 historical locations for *Z. h. luteus* on this creek. Inclusion of this stream within the critical habitat for this subunit would provide important additional area, connectivity, and dendritic pattern to help insure resilience.
> >
> > **New subunit**. *Z. h. luteus* was documented in Virgin Canyon in 1989. This is a major tributary of the Rio Guadalupe (which is formed by the Rio Cebolla and Rio de las Vacas). Addition of critical habitat in Virgin Canyon would provide an additional important level of redundancy in this mountain range.

3) Prescriptions for the recommended management area should be based on the designated critical habitat PCEs (81 Fed. Reg. 14264) with modifications recommended by Dr. Frey.

a) Desired conditions have the following elements:

- Resilient populations of New Mexico meadow jumping mice occur within the MA.
- Riparian communities along rivers and streams, springs and wetlands, or canals and ditches that contain:
  - Persistent emergent herbaceous wetlands especially characterized by presence of primarily forbs and sedges (*Carex* spp. or *Schoenoplectus pungens*).
  - Scrub-shrub riparian areas that are composed of willows (*Salix* spp.) or alders (*Alnus* spp.) with an understory of primarily forbs and sedges.
- Flowing water that provides saturated soils throughout the jumping mouse's active season that supports tall (average stubble height of herbaceous vegetation of at least 61 cm (24 inches)) and dense herbaceous riparian vegetation composed primarily of sedges (Carex spp. or Schoenoplectus pungens) and forbs, including, but not limited to, one or more of the following associated species: Spikerush (Eleocharis macrostachya), beaked sedge (Carex rostrata), rushes (Juncus spp. and Scirpus spp.), and numerous species of grasses such as bluegrass (Poa spp.), slender wheatgrass (Elymus trachycaulus), brome (Bromus spp.), foxtail barley (Hordeum jubatum), or Japanese brome (Bromus japonicas), and forbs such as water hemlock (Circuta douglasii), field mint (Mentha arvense), asters (Aster spp.), or cutleaf coneflower (Rudbeckia laciniata);
- Sufficient areas of at least 15 miles along a stream, ditch, or canal that contains suitable or restorable habitat to support movements of individual New Mexico meadow jumping mice.
- Adjacent floodplain and upland areas extending well over 330 feet outward from the boundary between the active water channel and the floodplain (as defined by the bankfull stage of streams) or from the top edge of the ditch.

b) Include objectives that prioritize restoring the species' habitat and include recommendations from the critical habitat rule (81 Fed. Reg. 14293):

- Restore habitat by fencing of riparian areas.
- Restore beavers to areas that are occupied by jumping mice or have the potential to provide suitable recovery habitat.
- Restore and maintain habitat connectivity across multiple local populations along streams to maintaining genetic diversity and provide sources for recolonization when local populations are extirpated.

c) Additional standards and guidelines for the MA should be developed from the following actions in the Recovery Outline[355]*:*

- Maintain occupied jumping mouse sites with active management to continue the protection of these areas from livestock grazing.
- Design and install effective barriers or exclosures or change livestock management techniques (e.g., fencing, reconfiguration of grazing units, off-site water development, or changing the timing or duration of livestock use) to limit ungulate grazing and protect riparian habitats from damage.
- Maintain the required microhabitat components or modify or limit actions (e.g., bridge and road realignment projects, water use and management, stream restoration, and vegetation management) that preclude their development and restoration, in order to stabilize and expand current jumping mouse populations.
- Identify priority areas to reduce fuels to minimize the risk of severe wildland fire and identify techniques for post-fire stabilization in areas that burn.
- Modify off-road vehicle use and manage dispersed recreation through fencing, signage, education, and timing of use.
- Facilitate the natural expansion of jumping mouse habitat through the management and restoration of beaver.
- Complete an emergency contingency and salvage plan to capture jumping mice and bring individuals into captivity in the event of severe wildland fire, post-fire flooding, or severe drought.

d) A monitoring program should be developed from the following action in the Recovery Outline[356]*:*

- Establish a monitoring protocol to determine presence/absence or estimate the abundance of jumping mouse populations.

e) Incorporate these management approaches, based on the Recovery Outline:

- Formally evaluate whether assisted translocation or a captive breeding program for jumping mice would be beneficial as a recovery option.

[355] USDI Fish and Wildlife Service. 2014. Recovery Outline: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). June. p. 10.

[356] USDI Fish and Wildlife Service. 2014. Recovery Outline: New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*). June. p. 10.

- Establish partnerships to design and install effective barriers or exclosures or change livestock management techniques (e.g., fencing, reconfiguration of grazing units, off-site water development, or changing the timing or duration of livestock use) to limit ungulate grazing and protect riparian habitats from damage.

- Work cooperatively with stakeholders to maintain the required microhabitat components or modify or limit actions (e.g., bridge and road realignment projects, water use and management, stream restoration, and vegetation management) that preclude their development and restoration, in order to stabilize and expand current jumping mouse populations.

4.5 Our Objection: The treatment of Holy Ghost Ipomopsis in the Revised Plan and FEIS violates NEPA, NFMA, and the ESA.

The Holy Ghost ipomopsis (HGI *or* ipomopsis) was listed under the ESA as endangered in 1994.[357] The species has a very small population. The Biological Assessment for the Revised Plan summarized some basic information about the plants:

> *Ipomopsis sancti-spiritus* is a federally endangered plant species found only on the Pecos-Las Vegas Ranger District. It is a narrow endemic species found only in the Holy Ghost Canyon in the Sangre de Cristo mountain range. A Recovery Plan was written for it in 2002, and a Recovery Plan Amendment (USFWS 2019) replacing the previous Recovery Objectives and Criteria was approved on August 28, 2019.[358]

The Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*) Recovery Plan (Recovery Plan) adds:

> Holy Ghost ipomopsis is known from a single population in the Sangre de Cristo Mountains of San Miguel County in north-central New Mexico (Figure 2). Plants are relatively continuous in scattered patches for about 3.5 kilometers (km) (2.2 miles (mi)) of Holy Ghost Canyon beginning 1.6 km (1.0 mi) above the confluence with the Pecos River then up Holy Ghost Creek to the confluence with Doctor Creek. There are about 80 hectares (ha) (200 acres (ac)) of occupied habitat. The Santa Fe National Forest manages most of the habitat.[359]

The 2019 Recovery Plan Amendment (Recovery Amendment) provides additional information about the status of the ipomopsis,

> In addition, the Holy Ghost Canyon population is increasingly confined to a narrow strip associated with Forest Road 122, leading to an even more limited distribution and

[357] 59 Fed. Reg. 13836 (March 23, 1994). (See Ex. IPOMOPSIS 1 Listing Rule).

[358] Biological Assessment for the Revision of the Santa Fe National Forest Land and Resource Management Plan. 2020. August 6, p. 40.

[359] U.S. Fish and Wildlife Service. 2002. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*) Recovery Plan. USFWS, Southwest Region, Albuquerque, New Mexico, p. 5. (see Ex. IPOMOPSIS 2 Recovery Plan).

> increasing exposure to threats associated with road maintenance and recreation. Emerging threats since the time of listing include an increased forest canopy leading to high risk of catastrophic fire, the influx of invasive plants, and potential effects of climate change (e.g., increasing temperatures, increased periods of drought, habitat drying, etc.) (USFWS 2008). Therefore, the threats to this increasingly narrow endemic species have increased since time of listing and since the 2002 Holy Ghost Ipomopsis Recovery Plan was published.[360]

The FEIS states, "[m]anagement of the ipomopsis must follow the USFWS Recovery Plan."[361] This is not a true statement; recovery actions in recovery plans are, unfortunately, not mandatory. And the management recommendations provided in the Recovery Plan, the Recovery Amendment, and the Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*) 5-Year Review: Summary and Evaluation of 2020 (2020 5-Year Review)[362] are not sufficiently supported by the Revised Plan. The Recovery Amendment emphasized the need for maintaining or increasing "suitable habitat within currently established population areas or identify additional suitable habitat in other areas," recommended the designation of Holy Ghost Canyon as a Botanical Area, "or other special management area, to highlight its unique botanical status should be considered as an added measure of protection for the habitat itself," and stressed the need for annual monitoring of the plan population not merely the ecosystem condition.[363] We provide evidence for our contention below.

We addressed our concerns in comments Defenders et al. 2019 about the Santa Fe Draft Plan's violations NFMA by failing to meet requirement in the planning rule – 36 C.F.R. 219.9(b)(1) – to contribute to the recovery of threatened and endangered species, NEPA, and the ESA regarding all threatened and endangered species in the plan area. Additionally, we had noted how the SFNA must meet all requirements regarding threatened and endangered species in CBD et al. 2016.

4.5.1 The Revised Plan fails to provide the ecological conditions necessary to contribute to New Mexico meadow jumping mouse recovery, in violation of the NFMA (36 C.F.R. § 219.9(a)(1) & (b)(1)).

We conducted an analysis, written below, to determine whether the aggregate set of plan components that are relevant to the HGI and the species' habitat provide the ecological conditions needed to contribute to the species' recovery. However, the Biological Assessment

[360] U.S. Fish and Wildlife Service. 2019. Recovery Plan Amendments for 20 Southwest Species. USFWS, Southwest Region, Albuquerque, New Mexico. August 28, p. 3. (see Ex. IPOMOPSIS 3 Recovery Plan Amend).

[361] FEIS, Vol. 1, p. 286.

[362] U.S. Fish and Wildlife Service. 2020. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*) 5-Year Review: Summary and Evaluation. USFWS, Southwest Region, Albuquerque, New Mexico. (see Ex. IPOMOPSIS 4 5 year review).

[363] U.S. Fish and Wildlife Service. 2002. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*). USFWS, Southwest Region, Albuquerque, New Mexico, p. 3-8.

provides sufficient information necessary to draw this conclusion, stating under the heading "Conservation Measures: Conservation Actions 7 (a)(1),"

> No specific conservation actions have been implemented for the Mexican Spotted Owl [*sic*] on the Santa Fe; however, a Forest Plan guideline requires that project activities and special uses occurring within federally designated critical habitat should integrate habitat management objectives and species protection measures from the most recent approved U.S. Fish and Wildlife Service (USFWS) recovery plan. The proposed action also includes management approaches for at-risk species. These would further help to provide persistence for the mouse [*sic*] throughout its range by promoting collaborative partnerships to aid in recovery and delisting and to consider habitat fragmentation on adjacent lands when planning activities on the Santa Fe. They include the following: Management Approaches (FW-ATRISK-MA-1 and FWATRISK-MA-2).[364]

Moreover, the Biological Assessment determined the Revised Plan "may affect and is likely to adversely affect" the HGI.[365]

4.5.1.1 The necessary ecological conditions that the plan needs to provide.

The FEIS lists the ecosystems upon which the HGI depends: mixed conifer-frequent fire (MCD) forest and ponderosa pine forest (PPF) forest.[366] The Biological Assessment for the Revised SFNF Plan adds, "[t]he plant most often grows on steep, west-facing limestone slopes with plants concentrated along a roadside. It occurs in openings in ponderosa pine-Douglas fir forest, and appears to have an affinity to open disturbed areas with little competition from other perennials (Roth 2018)."[367] The SFNF's planning Assessment also includes "meadows and small openings" as part of the species' habitat requirements.[368]

4.5.1.2 Threats and Revised Plan must mitigate via standards and guidelines.

The Recovery Plan summarizes threats to the HGI; "potential immediate threats to this species include small population size, road maintenance, recreation impacts, and catastrophic forest fire. In the long term, preventing natural disturbances that result from events like wildfire reduces the

[364] Biological Assessment for the Revision of the Santa Fe National Forest Land and Resource Management Plan. 2020. August 6, p. 100.

[365] Biological Assessment for the Santa Fe National Forest Land Management Plan Revision. August 24, 2020. p. 66.

[366] FEIS, Vol. 1, Table 51, p. 225.

[367] Biological Assessment for the Revision of the Santa Fe National Forest Land and Resource Management Plan. 2020. August 6, p. 110.

[368] SFNF Planning Assessment, p. 215.

number of early successional sites for this species."[369] We include a few others identified in the 2020 5-Year Review.

Recreation. Recreation is identified as a threat in the Recovery Plan, FEIS, and 5-Year Review.[370] The Recovery Plan provides some details regarding the problem:

> There are approximately 36 summer cabins and a USFS campground within Holy Ghost Canyon. A nearby trout stream is used by anglers resulting in intense recreational use during the months the plant is flowering. Impacts to Holy Ghost ipomopsis from recreation are mostly from residents and campers who walk the forest road and occasionally pick native wildflowers. Holy Ghost ipomopsis is pleasingly showy and sometimes taken. When the flowering stem is broken off, some plants will produce new stems from the lateral buds. This response has been studied in other species of Ipomopsis. For *I. aggregata*, Paige (1992a) found fruit and seed production equal between plants with stems removed late in the flowering season and undamaged plants. For *I. arizonica*, Maschinski (1989) found fruit and seed production lower for plants with late season stem removal than for undamaged plants. No studies of this compensating growth response have been done for Holy Ghost ipomopsis; however, Maschinski (Arboretum at Flagstaff, pers. comm. 2002) has noted that plants with broken stems in August produced no fruit for the season.[371]

Road maintenance. Because of the close proximity of HGI occurrences close the Forest Road 122, if precautions are not taken, road maintenance can constitute a significant threat to the plant. Interestingly, though, the Recovery Plan noted potential benefits of careful road maintenance:

> About 80 percent of the existing population grows on the cut-slopes of Forest Road 122 in Holy Ghost Canyon. Occasional repeated disturbance of these cuts may be beneficial in maintaining areas of suitable habitat in otherwise overgrown pine forest. Grading small presently unoccupied road areas would create more habitat for Holy Ghost ipomopsis. Future work to straighten or widen the road should include plans to scrape and stockpile topsoil that could contain Holy Ghost ipomopsis seeds and to harvest seed from plants that will be affected. The topsoil and seeds should be replaced on the new cut-slopes. The roadside should be inspected annually for invasion of noxious weeds. Any weed control should be done by hand rather than with herbicides.[372]

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[369] U.S. Fish and Wildlife Service. 2002. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*). USFWS, Southwest Region, Albuquerque, New Mexico, p. iv.

[370] U.S. Fish and Wildlife Service. 2002. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*). USFWS, Southwest Region, Albuquerque, New Mexico, p. 12; FEIS, Vol. 1, p. 225; U.S. Fish and Wildlife Service. 2020. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*) 5-Year Review: Summary and Evaluation. USFWS, Southwest Region, Albuquerque, New Mexico, p. 4.

[371] U.S. Fish and Wildlife Service. 2002. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*). USFWS, Southwest Region, Albuquerque, New Mexico, p. 12.

[372] U U.S. Fish and Wildlife Service. 2002. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*). USFWS, Southwest Region, Albuquerque, New Mexico, p. 22.

Fire Management and Fire Suppression. The 2020 5-Year Review summarized the problem with the loss of fire to HGI habitat:

> Fire creates a mosaic landscape and opens the forest canopy allowing light to reach the forest floor, serving an important role in habitat management for the Holy Ghost ipomopsis. Because of heavy recreational use, forest management has suppressed fire in Holy Ghost Canyon for over 80 years (Service 2008). This disruption of ecological processes poses a threat to the Holy Ghost ipomopsis, potentially disrupting important, dynamic habitat processes needed this plant (Factors A and E).[373]

Uncharacteristic fire. The identifies uncharacteristic fire as a threat to the HGI.[374] The Recovery Plan explains why wildfire, which was once a benefit to the plan, is now a potential hazard:

> Wildfire, which will eventually recur in Holy Ghost Canyon, is now potentially detrimental to Holy Ghost ipomopsis. With almost a century of fire exclusion, the accumulated fuels could produce an unnatural catastrophic wildfire (Gail Tunberg, pers. comm. 1995). High-intensity burning can eliminate most of the seeds in the soil, seal the soil particles into an impervious surface, and deplete soil nitrogen (Freeman 1984; White and Wells 1984). Survival of Holy Ghost ipomopsis could be very low and much of its habitat made useless for many years after a catastrophic wildfire. Thus, forest thinning may be the most prudent approach to conserving both the plant and the summer homes in the area.[375]

Inadequacy of regulatory mechanisms. The Recovery Plan lists the inadequacy of regulatory as one of its listing factors as to why the FWS listed the HGI as endangered, noting, "[a] comprehensive USFS management plan is needed to assure the population's continuing viability."[376] The Revised Plan has missed a huge opportunity to develop a land management plan that could have advanced the recovery of the species.

The control of spruce budworm is a potential pest. The Recovery Plan described this potential threat:

> This moth larva [of spruce budworm] can defoliate large areas of Douglas fir forest, which is the forest type on the west side of Holy Ghost Canyon. When infestations occur in high elevation residential areas, the State Forestry Division receives requests to apply

[373] U.S. Fish and Wildlife Service. 2020. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*) 5-Year Review: Summary and Evaluation. USFWS, Southwest Region, Albuquerque, New Mexico, pp. 3-4.

[374] FEIS, Vol. 1, p. 225

[375] U.S. Fish and Wildlife Service. 2002. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*). USFWS, Southwest Region, Albuquerque, New Mexico, p. 15.

[376] U.S. Fish and Wildlife Service. 2002. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*). USFWS, Southwest Region, Albuquerque, New Mexico, pp. 12-13.

Bacillus thuringiensis (BT) as a pesticide. BT kills spruce budworm, but it can also kill non-target moths and butterflies that are known pollinators of Holy Ghost ipomopsis.[377]

4.5.1.3 Analysis of plan components and other plan content relevant to the Holy Ghost Ipomopsis.

The Recovery Plan, from pages 21-35, provided a set of recovery actions for the Forest Service to undertake intended to advance the recovery of the HGI. We recognize that the Forest Service cannot undertake every action on the list in the near future, but the SFNF included none of these actions in any way in its Revised Plan. Here are a few of the actions that the SFNF should have considered incorporating into the Revised Plan to contribute to the species' recovery.

Protect the Holy Ghost ipomopsis population and habitat from existing threats. Holy Ghost ipomopsis presently exists as a single population in a relatively small area and is vulnerable to extinction. Additional planning and management actions may be needed to ensure the species can persist in its natural habitat.

Develop and implement a management plan to prevent detrimental impacts to Holy Ghost ipomopsis. This species occurs only on the Santa Fe National Forest. The USFS should review existing land management plans to determine if they contain adequate direction for the management of Holy Ghost ipomopsis. If existing plans are inadequate, new plans or supplements to existing plans should be written in coordination with the Service. An adequately detailed plan would describe ways to prevent significant impacts to Holy Ghost ipomopsis from agency actions in Holy Ghost Canyon.

Consider designating Holy Ghost Canyon as a Botanical Area. USFS Botanical Area designation would acknowledge the unique botanical character of the canyon. Botanical Areas are educational opportunities for the public. Pamphlets or signs should be made available at the Holy Ghost Campground that discuss and illustrate the plant diversity of the canyon and the need to not pick wildflowers.

Revise management plans as needed when new information becomes available. As research progresses and new observations accumulate, USFS plans may need occasional revision to direct better management of the species.

Monitor the Holy Ghost ipomopsis population for general condition, reproductive success, and to identify any needed revisions to management plans. The Holy Ghost Canyon population should be monitored annually to detect any population declines or reduction of reproductive effort. When additional locations are seeded, the monitoring at Holy Ghost Canyon can serve as a control to help evaluate results for the new populations.

[377] U.S. Fish and Wildlife Service. 2002. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*). USFWS, Southwest Region, Albuquerque, New Mexico, p. 14.

Ensure continuing compliance with applicable Federal and State laws and regulations. All applicable existing laws need continuing compliance. These laws include the Endangered Species Act, the New Mexico Endangered Plant Species Act, the Lacey Act, the National Forest Management Act, and the National Environmental Policy Act. … Under Section 7(a)(1) of the Act, all Federal agencies are directed to "...utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species...." That is, the Act not only directs agencies to prevent further declines in species through the avoidance of adverse impacts, but also directs agencies to undertake proactive programs to move species toward recovery. For Holy Ghost ipomopsis, these proactive programs include the management, research, and reintroduction tasks identified in this plan.

Determine habitat requirements. This information is essential to ensure continued survival of the existing population in Holy Ghost Canyon and ultimately the survival of any reintroduced populations. The determination of whether this plant is a restricted endemic or a species that can spread to additional habitats will help focus the direction of some recovery actions such as determining appropriate reintroduction sites.

Survey potentially suitable habitats. Additional inventory is needed to find any populations that were overlooked in previous surveys and to find potential sites for reintroduced populations.

Search previously unsurveyed areas for new populations. There are areas of suitable habitat in the Santa Fe River Basin that should be surveyed for additional populations of Holy Ghost ipomopsis. An unsubstantiated report of Holy Ghost ipomopsis in the Panchuela Creek Campground area should also be investigated.

Identify potential sites for reintroduced populations. There should be 15 – 20 potential sites selected that match our current understanding of the habitat preferences of the species. These will be relatively dry, steep, west to southwest-facing slopes of partly weathered Terrero Limestone with bare mineral soils and little other herb or shrub competition at elevations between 7,500 - 8,500 ft. The sites should be separated sufficiently so that a single catastrophic event is unlikely to destroy more than one site. The sites should be selected in areas where Holy Ghost ipomopsis will be compatible with present and anticipated land uses.

Develop and implement a plan to establish more populations. Full recovery of Holy Ghost ipomopsis requires the establishment of more populations in other canyons in the area to reduce the risk of extinction from a single catastrophic event. This plan calls for establishment of at least four additional self-perpetuating populations in natural habitats before Holy Ghost ipomopsis can be reclassified to threatened status. The reintroduction plan should consider all phases of reintroduction including seed selection and production, site preparation, planting methods (seeding or greenhouse-grown plants), monitoring, and subsequent management.

Monitor reintroduced populations. Each reintroduced population should be monitored for at least five years even if there is no immediate germination or, for transplanted plants,

> the appearance of a next generation. If there is successful establishment, the site should be monitored for 10 years to determine if the new population meets the criteria for downlisting.
>
> *Revise USFS plans as necessary to incorporate new populations*. When monitoring begins to show a reintroduced population on the Forest is self-perpetuating and becoming successful, the USFS should revise any necessary management plans to treat the site as an established population.
>
> *Encourage public awareness and support for the preservation of Holy Ghost ipomopsis*. Awareness and support for recovery can be developed through local education and through outreach using public media. Holy Ghost ipomopsis is an interesting and attractive plant that should have an immediate constituency among garden clubs and nature lovers. Information in this plan and USFS management plans will help dispel inaccurate perceptions about possible restrictive land uses due to the presence of this plant.
>
> *Use the results of monitoring and research studies to determine if populations can sustain themselves and to establish criteria for removing the species from the list of threatened and endangered species*.

The 5-Year Review suggest some additional actions on page 5:

> *Closely monitor and manage anthropogenic activities in Holy Ghost Canyon*. Disruptions to its reproductive cycle threaten the species' persistence. The collection of flowering plants, especially in high, human traffic areas, should be discouraged.
>
> *If possible, land managers should avoid Holy Ghost ipomopsis habitat when considering resource extraction activities within Santa Fe National Forest*. Decision-makers can consider alternatives to minimize and avoid impacts on the species.
>
> *Conduct a population viability analysis at naturally occurring and transplantation sites to evaluate and measure success of these populations and better understand reproductive process of the Holy Ghost ipomopsis*.
>
> *Management agencies should create a comprehensive fire management plan which incorporates the habitat needs of the Holy Ghost ipomopsis*. Integrating the Holy Ghost ipomopsis [*sic*] into post-fire restoration plans to both establish and reestablish populations of the species would increase species resiliency.

The SFNF did not designate the Holy Ghost Ipomopsis Botanical Area, citing the following reasons:

> The Holy Ghost Ipomopsis Botanical Area located in the Pecos River Canyon Geographic Area is recommended for inclusion under alternative 3. The area is characterized by MCD (81 percent) and PPF (19 percent) vegetation types. Designation of this area as a botanical area could help to further protect this endemic, federally-listed endangered species, and would help raise public awareness of this unique species. Having

> a designated botanical area could buffer this sensitive plant species from impacts of recreation or from vegetation treatments implemented in nearby areas. However, the designation of a Holy Ghost Ipomopsis Botanical Area could also promote increased visitation to this sensitive and vulnerable plant population and increase the risks of human-caused threats such as trampling or plant collection, or increase the risk of crushing plants via increased vehicle traffic on the narrow, dead-end canyon road.
>
> Since this area is predominantly surrounded by ponderosa pine and dry mixed conifer forests, vegetation treatments may be implemented in the surrounding areas to alter forest structure to support greater ecosystem health and function (V3, 5, 18-19, 30). Restoring natural processes in these areas should benefit the population of Holy Ghost ipomopsis, as it evolved with natural processes like fire. Furthermore, there is potential for these natural processes to support population expansion of this endangered plant species over time into areas in which it once flourished (V33). [378]

This is something the FWS recommended, so it is surprising that the SFNF would not following the FWS's expertise on endangered plant conservation and designated the area. The Forest failed to develop a management area in the Revised Plan that would provide management prescriptions to protect the HGI.

The FEIS in Appendix E on page 283 lists a large set of plan components that apply to the HGI. Most of these are desired conditions, which are important to help provide guidance for management actions and monitoring. However, desired conditions to not compel or constrain management action, which is necessary to achieve the ecological condition necessary to recover the ipomopsis. The Revised Plan needed sufficient objectives, standards, guidelines to contribute to the recovery of the species. In particular, the Revised Plan needed specific direction for eliminating recreational impacts; preventing potential road maintenance impacts; reducing the risk of high-severity fire where the plant occurs; promoting plant propagation, reintroduction, and planting; advancing public awareness about ways not to disturb the species; and monitoring as suggested by the FWS. The FEIS in Appendix E erroneously lists management approaches as plan components, which they are not. Below we analyze key plan components.

Vegetation management objectives FW-VEG-O-1 might be helpful if there was specific direction to prioritize HGI habitat for treatment. Objective FW-VEG-O-2 applies only to non-forested ERUs and doesn't apply to the HGI.

Keeping log decks and heavy equipment out of sensitive areas as guideline FW-VEG-G-1 directs, but this should be a standard for at-risk species' habitat; we can see no alternatives ways to achieve the intent of this guideline that as it is written, and thus, it should be a standard.

> *FW-FIRE-G-1: Naturally occurring fires should be allowed to perform their natural ecological role to meet multiple resource objectives and facilitate progress toward desired conditions (per desired conditions of various resources throughout the plan).*

[378] FEIS, Vol. 1, p. 148.

We agree with guideline FW-FIRE-G-1 but, given that the entire species' population is along a road and near a campground and summer homes, this seems like an unrealistic outcome.

> *FW-FIRE-G-9: Higher fire intensities and associated fire effects at the fine scale (less than 10 acres) should be accepted in areas that are moderately to highly departed from desired conditions. Multiple small areas of high mortality are preferable to a single large, high-severity area.*

High-severity fire in places with suitable and restorable habitat is likely necessary to create forest openings that could be colonized by the species or manually planted.

> *FW-FIRE-G-8: Post-fire restoration and recovery should be provided where critical resource concerns merit rehabilitation for controlling the spread of invasive species, protecting areas of cultural concern, protecting critical or endangered species habitat, or protecting other highly valued resources such as drinking water.*

While post-fire restoration is not necessary for all fires in all places, we believe FW-FIRE-G-8 would be beneficial in the event of fire passing through the area in or around where HGI habitat occurs.

Appendix E of the FEIS lists the following plan components as applicable to the HGI: FW-RMZ-DC-4, FW-RMZ-O-1, FW-RMZ-S-1, FW-RMZ-G-2, FW-RMZ-G-7, FW-RMZ-MA-2, and FW-RMZ-MA-3. Nothing in the Revised Plan or FWS documents indicates that the HGI is a riparian species.

> *FW-TERRASH-O-2: Restore or enhance at least 50,000 acres of terrestrial wildlife habitat during each 10-year period of the life of the plan. This may be done in conjunction with objectives for treatments in the vegetation section.*

Like similar objectives, this means nothing to the HGI unless restoration activities occur in the species habitat or potential habitat.

> *FW-FORESTRY-G-2: Log landing areas should be located outside of mapped sensitive areas (e.g., riparian management zones, wetlands, archeological sites, threatened and endangered critical habitat, and along Scenery Management System Concern Level I Routes). When landings must be located in these areas, effects to the sensitive resource will be mitigated.*

Because the HGI has no designated critical habitat, it's not clear if its population is within a mapped sensitive area.

> *FW-ROADS-G-7: Reconstruction and rehabilitation of existing roads should be emphasized over new road construction.*
>
> *FW-ROADS-G-8: Temporary roads (e.g., that support ecosystem restoration activities, fuels management, or other short-term projects) should be closed and rehabilitated (restored to more natural vegetative conditions) upon project completion to protect watershed condition, minimize wildlife disturbance, and prevent illegal motorized use.*

We would hope that these guidelines would never be applicable in HGI habitat, because we can't see why a new or temporary road would be contemplated for areas with occurrences of the species. FW-ROADS-G-9 is not applicable to the HGI.

> *FW-ROADS-G-10: If at-risk species are present and will be impacted by road construction or maintenance activities, work should be conducted to avoid or minimize noise and habitat disturbance and outside of critical life-cycle periods (e.g., breeding or nesting for birds) or when animals may not be present (e.g., during migration).*

The Forest Service should be consulting with the FWS on any road maintenance activity near the HGI population.

We support FW-SOIL-G-1 and FW-SOIL-G-2.

We are not sure why FW-ATRISK-G-1 hasn't been developed as a standard because addressing threats to this small and isolated population seems essential. Guideline FW-ATRISK-G-8 does not apply to the HGI.

Surprisingly, Appendix E in the FEIS included no recreation focused plan components among those listed as applicable to the HGI. Recreation activities may be one of the most significant threats to the species. Regardless, we included them in our analysis. None of the "REC" plan components are sufficient to prevent recreation impacts to the plant.

One of the most important actions the Forest Service could take on behalf of the HGI is to monitor the species, as described by the Recovery Plan and 5-Year Review recommendations above. But the Revised Plan includes no monitoring questions that would direct the Forest Service do to this.

In the case of the Holy Ghost ipomopsis, relying primarily on coarse-filter plan components will not lead to recovery and persistence. Though Appendix E in the DEIS lists fine-filter components associated with these species, they are not sufficiently species-specific to offer the management certainty needed to protect populations and habitat. The BASI on the coarse-filter/fine-filter issue makes a compelling argument that management planning for at-risk species based primarily on coarse-filter provisions is not adequate. A summary literature review from a paper about the deficiencies of the 2012 Planning Rule's wildlife requirements identifies some of the problems with a coarse-filter focus:

> Research indicates that the coarse-filter approach is unlikely to provide a reliable basis for multispecies conservation planning (Cushman et al. 2008), only limited testing of the approach's validity has occurred (Noon et al. 2009), and the monitoring of a select group of species using a fine-filter approach is necessary to determine the efficacy of coarse-filter approaches (Committee of Scientists 1999, Flather et al. 2009). A recent review of the degree to which coarse-filter models can be used to infer animal occurrence concluded that ''. . . the observed error rates were high enough to call into question any management decisions based on these models'' (Schlossberg and King 2009:609). These authors went on to state, ''. . . [coarse-filter] models oversimplify how animals use

> habitats, and the dynamic nature of animal populations'' (Schlossberg and King 2009:609).[379]

The authors add,

> The rule is inaccurate in the way it portrays its coarse- and fine-filter approaches. It claims that the coarse-filter approach, along with the inclusion of fine-scale habitat management requirements for species that are not adequately protected, constitutes a combined coarse-filter/fine-filter approach. This discussion misconstrues fine-filter species conservation approaches, which entail direct assessment at the species level, including monitoring state variables such as a species' abundance, density, survival, birth rate, or occupancy. Managing fine-scale habitat components for a given species is not the same as fine-filter assessment.[380]

And they recommend several management provisions be included in plans, such as, species-level monitoring that includes "trigger points so that significant declines in either focal species or species of conservation concern would initiate reviews of management policies" (p. 436-437) and the development of enforceable standards for wildlife protection.

The analysis conducted here has demonstrated the Revised Plan is not sufficient to provide the ecological conditions necessary to contribute to the recovery of the HGI.

4.5.2 The Final Environmental Impact Statement for the Revised Plan does not comply with the National Environmental Policy Act (42 U.S.C. § 4321 et seq.) regarding the Holy Ghost Ipomopsis.

The FEIS fails to comply with the NEPA because it does meet a significant purpose and need for the Revised Plan and does not provide a range of reasonable alternatives. The FEIS fails to take a 'hard look' at the environmental consequences of the Revised Plan to the Holy Ghost ipomopsis.

4.5.2.1 The Agency Action: The Revised Plan and the Draft Record of Decision fail to achieve the purpose and need to provide the necessary ecological conditions to contribute to the recovery of the Holy Ghost Ipomopsis, in violation of 40 C.F.R. 1502.13.

The FEIS includes the following need under purpose and need statement 1.3.1 Restore Ecosystem Resilience,

> There is a need for plan direction that supports restoration and maintenance of ecological conditions that contribute to the recovery and conservation of federally listed species

[379] Schultz, C.A., T.D. Sisk, B.R. Noon, M.A. Nie. 2013. Wildlife conservation planning under the United States Forest Service's 2012 Planning Rule. The Journal of Wildlife Management. 77(3): 428-444. p. 430

[380] Schultz, C.A., T.D. Sisk, B.R. Noon, M.A. Nie. 2013. Wildlife conservation planning under the United States Forest Service's 2012 Planning Rule. The Journal of Wildlife Management. 77(3): 428-444. p. 436.

> (threatened and endangered) … . In addition, plan direction for terrestrial and aquatic habitat connectivity for species migration and movement is needed.[381]

The Biological Assessment articulated the effects determination for the Revised Plan; the plan "may affect" and is "likely to adversely affect" HGI. The Biological Assessment lists the PCEs for critical habitat, but plan components will not achieve them, as demonstrated in our analysis above. The Biological Assessment acknowledged, "[no] specific conservation actions have been implemented for the jumping mouse on the Santa Fe … ."[382]

The Revise Plan includes the following guideline:

> *FW-ATRISK-G-2: Project activities and special uses occurring within federally designated critical habitat should integrate habitat management objectives and species protection measures from the most recent approved U.S. Fish and Wildlife Service (USFWS) recovery plan.*

Clearly, this is no mandate to manage the Forest toward achieving the ecological conditions laid out by the Recovery Plan, Recovery Amendment, and 5-Year Review.[383] As acknowledged by the plan documents and illustrated by our plan component analysis, the Revised Plan fails to provide for the ecological conditions necessary to contributed to HGI recovery—all requirements to comply with the planning rule.[384] In sum, we have shown the Revised Plan and other plan documents violate 40 C.F.R. 1502.13.

4.5.2.2 The Final Environmental Impact Statement does not provide a range of reasonable alternatives, in violation of 40 C.F.R. § 1502.14.

As stated in the section above and demonstrated throughout this objection, no alternative meets the purpose and need regarding the HGI by developing a land management plan that would contribute to the recovery of the species. The Revised Plan does not provide an alternative that includes plan components, area designations, suitability, and other plan content to contribute to the recovery of the ipomopsis. Each action alternative fails to comply with NFMA as well as Section 7(a)(1) of the ESA. A legally compliant alternative would have included plan components, including necessary and sufficient A reasonable alternative should have provided a true recovery program for the HGI and should have been incorporated into the Proposed Action:

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[381] FEIS, Vol. 1, p. 5.

[382] Biological Assessment for the Revision of the Santa Fe National Forest Land and Resource Management Plan. 2020. August 6, p. 45.

[383] U.S. Fish and Wildlife Service. 2002. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*). USFWS, Southwest Region, Albuquerque, New Mexico:. U.S. Fish and Wildlife Service. 2019. Recovery Plan Amendments for 20 Southwest Species. USFWS, Southwest Region, Albuquerque, New Mexico. August 28; U.S. Fish and Wildlife Service. 2020. Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*) 5-Year Review: Summary and Evaluation. USFWS, Southwest Region, Albuquerque, New Mexico.

[384] 36 C.F.R. 219.8(a), 219.8(a)(3), 219.8(a)(3)(E), 219.9(a)(1), and 219.9(b)(1).

The Revised Plan. Thus, the FEIS and other relevant plan documents have violated 40 C.F.R. § 1502.14.

4.5.2.3 The FEIS and other relevant plan documents fail to take a 'hard look' at the environmental consequences of the Revised Plan to the Holy Ghost Ipomopsis, in violation of NEPA (40 C.F.R. 1502.16).

The FEIS has failed to demonstrate how the specific plan components in the Revised Plan will directly or indirectly affect the HGI—beneficially or adversely. The FEIS fails to provide a full accounting of cumulative effects as well. For example, the Uncharacteristic Fire Summary,[385] takes a vague look at the relative risk of high-severity fire based on land designations in the alternatives but does not analyze specific plan components. The Ground or Soil Disturbance Analysis is a little more specific. However, the effects analysis does not demonstrate of specific plan components affect the HGI. For example, the FEIS states,

> Under the proposed action, objectives for restoration activities include 100 miles of road decommissioning or mitigation within 10 years. Additionally, temporary roads that support ecosystem restoration activities, fuels management, or other short-term projects should be closed, decommissioned, or obliterated (restored to more natural vegetative conditions) upon project completion to protect watershed condition, minimize wildlife disturbance, and prevent illegal motorized use. There are also objectives to mitigate ecological damage at developed recreation sites and maintain at least 25 percent of system trails every three years.[386]
>
> …
>
> Since plan components in the proposed action seek to reduce the amount of ground and soil disturbance as well as the rehabilitate areas that do get disturbed, the viability for the 15 at-risk species impacted by excessive ground and soil disturbance would increase under this action. This alternative has the greatest effect on reducing ground and soil disturbance and its impact to at-risk species (WL49-50).[387]

That all sounds good, but none of this matters if the objectives of restoration do not occur in HGI habitat.

The Biological Assessment, though more detailed than the FEIS, provides more detail about the impacts of particular plan components on the HGI. For example, the Effects of Watershed and Soil Management effects analysis states,

[385] FEIS, Vol. 1, p. 248.

[386] FEIS, Vol. 1, p. 267.

[387] FEIS, Vol. 1, p. 268.

> The plant most often grows on steep, west-facing limestone slopes with plants concentrated along a roadside. Standards and guidelines for managing soil and watershed are relevant to management of the species habitat. Riparian management zone standards (FW-RMZ-S-1) would help reduce the spread of invasive species, resulting in less competition for space and resources with these species. Riparian management zone guidelines (FW-RMZ-G-2 and 7) would maintain overall riparian health. Soil guidelines (FW-SOIL-G-1 and 2) would reduce the risk of introduction of nonnative invasive species and maintain soil. While standards and guidelines could limit impacts, not all negative impacts would be reduced or eliminated. As such, this program area may affect and is likely to adversely affect Holy Ghost ipomopsis and its habitat.[388]

This is closer to what we were hoping to find in an effects analysis. But most of these analyses are vague. In another example on the Effects of Infrastructures, Roads and Trails, the analysis is vague:

> Holy Ghost ipomopsis is still largely confined to steep open roadsides along Santa Fe NF Road 122. The desired conditions and guidelines for roads reduce the impacts associated with these activities, but the species remains vulnerable to impacts from road use, road management, road improvement and road maintenance. Impacts from these activities could include being ran over, being destroyed during road maintenance, ditch cleanout or road widening. While standards and guidelines could limit impacts, not all negative impacts would be reduced or eliminated. As such, this program area may affect and is likely to adversely affect Holy Ghost ipomopsis and its habitat.[389]

The existence of and potential maintenance to Road 120 provides one of the greatest threats to the species, including because the road enables access to people and recreation impacts. This analysis, leading to a "may affect and is likely to adversely affect" the HGI and its habitat, should have been served as an alert that the plan components are not strong enough to protect the species. And, again, the analysis only makes vague reference to plan components but fails to look at how specific plan components would impact the species.

That energy and mineral extraction could be a threat to the species was not included in the DEIS and was only revealed in the Biological Assessment. This did not allow for public comment on this impact.

4.5.3 The Revised Plan fails to comply with the Endangered Species Act with regard to the Holy Ghost Ipomopsis.

The Revised Plan, FEIS, and associated consultation documents, the Biological Assessment developed by the Forest Service and Biological Opinion written by the FWS, violate Section

[388] Biological Assessment for the Revision of the Santa Fe National Forest Land and Resource Management Plan. 2020. August 6, p. 105.

[389] Biological Assessment for the Revision of the Santa Fe National Forest Land and Resource Management Plan. 2020. August 6, p. 106.

7(a)(1) and 7(a)(2) of the ESA regarding the HGI. The Revised Plan does not provide a program for conserving the species as required by Section 7(a)(1), and the FWS's determination that the Santa Fe's Revised Plan is not likely to jeopardize the continued existence of HGI is unsupported, arbitrary, and capricious.

The Forest Service acknowledged in the Biological Assessment, "[n]o specific conservation actions have been implemented for the jumping mouse on the Santa Fe."[390] The Forest Service full articulation of how the Revised Plan meets Section 7(a)(1) obligations for the HGI indicates the level of concern for the species—i.e., the Holy Ghost Ipomopsis:

> No specific conservation actions have been implemented for the Mexican Spotted Owl [*sic*] on the Santa Fe; however, a Forest Plan guideline requires that project activities and special uses occurring within federally designated critical habitat should integrate habitat management objectives and species protection measures from the most recent approved U.S. Fish and Wildlife Service (USFWS) recovery plan. The proposed action also includes management approaches for at-risk species. These would further help to provide persistence for the mouse [*sic*] throughout its range by promoting collaborative partnerships to aid in recovery and delisting and to consider habitat fragmentation on adjacent lands when planning activities on the Santa Fe.[391]

The BiOp included three simple conservation recommendations the Forest Service could take to help meet Section 7(a)(1) responsibilities:

> 1. The Forest should explore and continue to pursue control of invasive and/or non-native plants that compete with or inhibit the establishment of the Holy Ghost ipomopsis.
> 2. The USFWS encourages the Forest Service to use non-herbicide treatments that target the removal of invasive and/or non-native plants in, and around, Holy Ghost ipomopsis populations until the national herbicide application environmental assessment is completed.
> 3. The Forest should continue extensive monitoring of Holy Ghost ipomopsis occurrences range wide, with particular emphasis on population monitoring and demography studies in Holy Ghost Canyon as well as determining occupancy in canyons outside of Holy Ghost Canyon.

The Revised Plan failed to incorporate these recommendations.

The Biological Assessment articulated the effects determination for the Revised Plan; the plan "may affect" and is "likely to adversely affect" the HGI. The totality of the plan components relevant to the species do not add up to a program that would advance recovery; they do not provide for the species' habitat requirements nor do they restrict threats and stressors to HGI

[390] Biological Assessment for the Santa Fe National Forest Land Management Plan Revision. August 24, 2020. p. 100.

[391] Biological Assessment for the Santa Fe National Forest Land Management Plan Revision. August 24, 2020. p. 100.

habitat. The Revised Plan includes a guideline (FW-ATRISK-G) that vaguely indicates threatened and endangered species recovery plan actions and habitat management objects for designated critical habitat be integrated at the project level. Again, we believe this guideline should be revised to be a standard to meet the bar for what would be considered a 7(a)(1) conservation program. Plan components at the management plan level should be specific enough to provide direction that projects must or shall, at the very least, follow Recovery Plan actions—when they are based on the best available science.

At the time the 2012 Planning Rule was adopted, the FWS's Biological Opinion on the rule itself should provide an avenue for the Forest Service to meet the ESA's 7(a)(1) mandate.[392] The Forest Service has taken the road away from providing a conservation program for the HGI.

The Revise Plan also violates Section 7(a)(2) of the ESA. The Forest Service unlawfully relied on the Revised BiOp in proceeding with the Revised Forest Plan. The Forest Service has thus failed to "insure" that the revised Forest Plan is not likely to jeopardize the HGI, as required by the ESA.[393] A jeopardy analysis should consider, *inter alia*: (1) the status of the species, including its range-wide condition, factors responsible for that condition, and its survival and recovery needs; (2) the environmental baseline of the species or critical habitat; (3) effects of the action to the environmental baseline; and (4) cumulative effects to the environmental baseline.[394]

While the BiOp provides a sufficient account of the baseline on the SFNF, which provides habitat for nearly all of the species' population, the FWS fails to incorporate and assess information from the Recovery Plan, Recovery Plan Amendment, and 5-Year Review, which was available about a year before the BiOp was issued, into its effects analysis. A biological opinion must be based on "the best scientific and commercial data available."[395] But here there are numerous examples of where FWS fails to provide any scientific basis for its conclusions, much less consider, disclose, or analyze the best scientific and commercial data available.

The BiOp makes vague references to effects of the action. For instance, the effects assessment of "infrastructure, roads, and trails" point to Revised Plan desired conditions and guidelines but don't explain how and why these plan components would do this:

> Holy Ghost ipomopsis is still largely confined to steep open roadsides along Santa Fe NF Road 122. The desired conditions and guidelines for roads reduce the impacts associated with these activities, but the species remains vulnerable to impacts from road use, road management, road improvement, and road maintenance. Impacts from these activities could include being ran over, being destroyed during road maintenance, ditch cleanout, or

[392] Biological Opinion on the 2012 Planning Rule (FWS), March 8, 2012, p. 5.

[393] 16 U.S.C. § 1536(a)(2).

[394] *See, e.g.*, 50 C.F.R. § 402.14(g)(2) – (4).

[395] 16 U.S.C. § 1536(a)(2), (b)(3)(A).

> road widening. While standards and guidelines could limit impacts, not all negative impacts would be reduced or eliminated.[396]

The BiOp is more specific about how vegetation management activities could cut down the risk of uncharacteristically severe fire across the population area. However, the Revised Plan BiOp fails to note plan objectives will not necessarily be applied in HGI habitat, and thus may not have any effect on the species at all. The BiOp fails to make a jeopardy determination for the HGI.

For reasons including but not limited to those set forth above, FWS violated the ESA in preparing the 2021 Biological Opinion for the Santa Fe's Revised Plan, and the 2021 Biological Opinion is arbitrary, capricious, and contrary to the APA. 16 U.S.C. § 1536; 5 U.S.C. § 706(2)(A).

4.6 Suggested resolution for the Revised Plan, Final Environmental Impact Statement, and Draft Record of Decision to be compliant with the law and advance the recovery of the Holy Ghost Ipomopsis.

Interestingly, the Biological Assessment notes that the Forest Service is working on projects to benefit the HGI; for example:

> The Recovery Plan is being followed with the additional work of State botanists to experimentally plant seedlings to increase the population. Roth (2018) states that, "The core of the recovery effort includes several out-plantings to establish new populations in similar habitats within the tributary canyons of the upper Pecos River. Therefore, recovery efforts have focused on establishing an ex-situ propagation protocol, understanding germination requirements, and successful establishment of plants from seeds and transplants at new locations. In addition, finding new, natural populations is also considered a priority recovery action."[397]

Yet, this kind of work is not supported by Revised Plan objectives. The Revised Plan does not include abiding by the Recovery Plan and achieving recovery actions as a standard.

As with the other threatened and endangered species occurring on the SFNF, we see no alternative to remedying the legal problems with the Revised Plan, FEIS, and Draft ROD but to go back to the drawing board in many respects. The EIS must be supplemented or revised to overcome the issues we described in our analysis above. Section 7 consultation requires a do-over. And the Revised Plan requires improvement to existing plan components and the addition of others to comply with NFMA and ESA.

[396] Biological Opinion for the Santa Fe National Forest Revised Plan, August 23, 2021, p. 44.

[397] Biological Assessment for the Revision of the Santa Fe National Forest Land and Resource Management Plan. 2020, p. 40.

4.7 Our Objection: The treatment of Jemez Mountainss Salamander in the Revised Plan and FEIS violates NEPA, NFMA, and the ESA.

The Jemez Mountain Salamander (salamander or JMS; *Plethodon neomexicanus*) was listed as endangered by the FWS in 2013[398] and designated critical habitat in the same year.[399] It is a critically imperiled species, primarily due to continued effects from historical clearcut logging but also current human impacts.[400] Nearly all of the species' range occurs in the Santa Fe National Forest.

4.7.1 The Revised Plan fails to provide the ecological conditions necessary to contribute to Jemez Mountains Salamander recovery, in violation of the NFMA (36 C.F.R. § 219.9(a)(1) & (b)(1)).

According to the listing rule,

> The Jemez Mountains salamander is restricted to the Jemez Mountains in northern New Mexico, in Los Alamos, Rio Arriba, and Sandoval Counties, around the rim of the collapsed caldera (large volcanic crater), with some occurrences on topographic features (e.g., resurgent domes) on the interior of the caldera. The majority of salamander habitat is located on federally managed lands, including the U.S. Forest Service (USFS).[401]

4.7.1.1 The necessary ecological conditions that the plan needs to provide

The listing rule[402] described the ecological conditions necessary for salamander survival:

> The strictly terrestrial Jemez Mountains salamander predominantly inhabits mixed-conifer forest, consisting primarily of Douglas fir (Pseudotsuga menziesii), blue spruce (Picea pungens), Engelman spruce (P. engelmannii), white fir (Abies concolor), limber pine (Pinus flexilis), Ponderosa pine (P. ponderosa), Rocky Mountain maple (Acer glabrum), and aspen (Populus tremuloides) (Reagan 1967, p. 17; Degenhardt et al. 1996, p. 28). Although pure stands of Ponderosa pine may not be considered ideal habitat, the species has occasionally been found in this habitat.
>
> Everett (2003, entire) reported habitat variables for 23 sites where Jemez Mountains salamanders were found. Everett (2003) reported that the salamander occurred on all

[398] 78 Fed. Reg. 55600 (September 10, 2013). See Ex. JMS 1 Listing Rule.

[399] 78 Fed. Reg. 69569 (November 20, 2013). See Ex. JMS 2 Critical Habitat Rule.

[400] NatureServe. 2021. Jemez Mountains Salamander. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.101803/Plethodon_neomexicanus. Ex. JMS 3 NatureServe.

[401] 78 Fed. Reg. 55601 (September 10, 2013).

[402] 78 Fed. Reg. 55600 (September 10, 2013).

slope aspects (p. 21) (the average slope ranged from 4 to 40.5 degrees (p. 24)); were within 14.0 to 99.8 percent canopy cover and averaged 58.2 to 94.3 percent canopy cover (p. 24); and were found under logs (35 percent), rocks (34 percent), bark (9 percent), and inside logs (22 percent). Available cover objects included rock (52 percent), coarse woody debris (7 percent), bark (11 percent), and cow pie (i.e., manure, less than 1 percent) (p. 24). There may be high-elevation meadows located within the critical habitat units that are used by the Jemez Mountains salamander.

In one study of the Jemez Mountains salamander, soil pH was the single best indicator of relative abundance of salamanders at a site (Ramotnik 1988, pp. 24–25). Sites with salamanders had a soil pH of 6.6 (± 0.08) and sites without salamanders had a soil pH of 6.2 (± 0.06). In another species of a terrestrial plethodontid salamander, the red-backed salamander (Plethodon cinereus), soil pH influences and limits its distribution and occurrence as well as its oxygen consumption rates and growth rates (Wyman and Hawksley- Lescault 1987, p. 1823). Similarly, Frisbie and Wyman (1991, p. 1050) found the disruption of sodium balance by acidic conditions in three species of terrestrial salamanders. A low pH substrate can also reduce salamander body sodium, body water levels, and body mass (Frisbie and Wyman 1991, p. 1050). Significant differences in habitat features (soil pH, litter depth, and log size) were reported between the logged and unlogged sites (Ramotnik 1986, p. 8). We do not know if salamanders actually occupied the logged sites prior to logging, but significant differences in habitat features (soil pH, litter depth, and log size) between the logged and unlogged sites were reported (Ramotnik 1986, p. 8). The type and quantity of vegetation affects soil pH (e.g. pine needles are acidic, decomposed pine needles can increase the soils acidity), and thus could also affect the salamander.

Because the Jemez Mountains salamander makes very small horizontal movements and has limited potential for long-distance horizontal movements, habitat connectivity limitations could have profound effects on populations. These effects could occur from increased vulnerability to genetic drift (the process where small population size causes chance alterations in the genetic composition of a population by natural selection) and inbreeding, fewer successful breeding opportunities, and increased susceptibility to stochastic events (occurring in a random pattern, such as floods, fires, and tornados). Gene flow and population structure has not been assessed in the Jemez Mountains salamander, but would provide useful information for population management and identification of important areas to protect in order to maintain habitat connectivity.

Jemez Mountain salamanders lack lungs; instead, they are cutaneous respirators (meaning they exchange gases, such as oxygen and carbon dioxide, through their skin). To support cutaneous respiration its skin must be moist and permeable. Jemez Mountain salamanders must address hydration needs above all other life-history needs. The salamander must obtain its water from its habitat. In addition, it has no physiological mechanism to stop dehydration or water loss to the environment. Based on this information, it is likely that substrate moisture through its effect on absorption and loss of water is the most important factor in the ecology of this species (Heatwole and Lim 1961, p. 818). We suspect that these components may be a main driver behind salamander occurrences and distribution.

4.7.1.2 Threats and Revised Plan must mitigate via standards and guidelines

According to the listing rule,

> Threats include historic fire suppression and exclusion, which has led to higher severity fires and this risk is now also a threat. Other threats include, salvage logging, "forest composition and structure conversions; post-fire rehabilitation; forest and fire management; roads, trails, and habitat fragmentation; and recreation."[403]

At the time of listing, the FWS concluded that the lack of regulatory mechanisms to conserve the JMS was a threat.

4.7.1.3 Analysis of plan components and other plan content relevant to the Jemez Mountains Salamander.

Some conservation actions recommended for the salamander include:

> Reducing fuels, prescribed fire, and thinning treatments to restore the frequency and extent of fire on the landscape are recommended management approaches. Maintenance of moist microhabitats in portions of the landscape occupied by salamanders through greater canopy retention (e.g., ≥ 54-94% coverage), retention of large decaying logs, stumps, and woody debris on the ground, and timing thinning and restoration activities to minimize soil disturbance and avoid the rainy season (July to October) when Jemez Mountain Salamanders are surface active (USFWS 2013; Keller and Hathcock 2015). A multi-stakeholder, multi-agency collaborative recommends targeting xeric, south-facing mixed conifer stands for initial fuels reduction activities (USFWS 2013). Though there may be short-term negative impacts to salamanders and their habitat, this approach to fire-risk management is expected to result in an overall reduction in catastrophic wildfire risk with long-term benefits for the salamander (USFWS 2013). Removing or decommissioning trails and roads that exist within core salamander habitat and changing uses where appropriate will help mitigate adverse impacts to salamanders and their habitat associated with roads and recreation.[404]

Given the very particular habitat needs of the JMS, the species needs consideration of its fine-scale habitat needs; these need to be incorporated into any conservation plan for the species. The Santa Fe Revised Plan is a blunt instrument that will not contribute to the recovery of the species. The vegetation and other objectives applicable to the species will not help the salamander unless they are specifically targeted to its habitat. The species-specific ("ATRISK") plan components the Forest Service considers fine-scale, species-specific provisions are still not specific or strong enough to advance recovery for the JMS. Surprisingly, given that roads and recreation are

[403] 78 Fed. Reg. 55610-55617 (September 10, 2013).

[404] NatureServe. 2021. Jemez Mountains Salamander. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.101803/Plethodon_neomexicanus. Ex. JMS 3 NatureServe.

threats, the Appendix E in the FEIS included no relevant plan components to address these threats. We assessed the roads and recreation focused plan components and none will target reducing roads or sufficiently limiting recreation in JMS habitat.

One of the most important actions the Forest Service could take on behalf of the JMS is to monitor the species. But the Revised Plan includes no monitoring questions that would direct the Forest Service do to this.

4.7.2 The Final Environmental Impact Statement for the Revised Plan does not comply with the National Environmental Policy Act (42 U.S.C. § 4321 et seq.) regarding the Jemez Mountains Salamander.

The FEIS fails to comply with the NEPA because it does meet a significant purpose and need for the Revised Plan and does not provide a range of reasonable alternatives. The FEIS fails to take a 'hard look' at the environmental consequences of the Revised Plan to the JMS.

4.7.2.1 The Agency Action: The Revised Plan and the Draft Record of Decision fail to achieve the purpose and need to provide the necessary ecological conditions to contribute to the recovery of the Jemez Mountains Salamander, in violation of 40 C.F.R. 1502.13.

The FEIS includes the following need under purpose and need statement 1.3.1 Restore Ecosystem Resilience,

> There is a need for plan direction that supports restoration and maintenance of ecological conditions that contribute to the recovery and conservation of federally listed species (threatened and endangered) … . In addition, plan direction for terrestrial and aquatic habitat connectivity for species migration and movement is needed.[405]

The Biological Assessment articulated the effects determination for the Revised Plan; the plan "may affect" and is "likely to adversely affect" JMS. The Biological Assessment lists the PCEs for critical habitat, but plan components will not achieve them, as demonstrated in our analysis above. The Biological Assessment acknowledged, "[no] specific conservation actions have been implemented for the jumping mouse on the Santa Fe … ."[406]

The Revise Plan includes the following guideline:

> *FW-ATRISK-G-2: Project activities and special uses occurring within federally designated critical habitat should integrate habitat management objectives and species protection measures from the most recent approved U.S. Fish and Wildlife Service (USFWS) recovery plan.*

[405] FEIS, Vol. 1.

[406] Biological Assessment for the Revision of the Santa Fe National Forest Land and Resource Management Plan. 2020. August 6.

As acknowledged by the plan documents and illustrated by our plan component analysis, the Revised Plan fails to provide for the ecological conditions necessary to contributed to JMS recovery—all requirements to comply with the planning rule.[407] In sum, we have shown the Revised Plan and other plan documents violate 40 C.F.R. 1502.13.

4.7.2.2 The Final Environmental Impact Statement does not provide a range of reasonable alternatives, in violation of 40 C.F.R. § 1502.14.

As stated in the section above and demonstrated throughout this objection, no alternative meets the purpose and need regarding the JMS by developing a land management plan that would contribute to the recovery of the species. The Revised Plan does not provide an alternative that includes plan components, area designations, suitability, and other plan content to contribute to the recovery of the salamander. Each action alternative fails to comply with NFMA as well as Section 7(a)(1) of the ESA. A legally compliant alternative would have included plan components that provided a true recovery program for the JMS and should have been incorporated into the Proposed Action: The Revised Plan. Thus, the FEIS and other relevant plan documents have violated 40 C.F.R. § 1502.14.

4.7.2.3 The FEIS and other relevant plan documents fail to take a 'hard look' at the environmental consequences of the Revised Plan to the Jemez Mountains Salamander, in violation of NEPA (40 C.F.R. 1502.16).

The FEIS has failed to demonstrate how the specific plan components in the Revised Plan will directly or indirectly affect the JMS—beneficially or adversely. The FEIS fails to provide a full accounting of cumulative effects as well. For example, the Uncharacteristic Fire Summary,[408] takes a vague look at the relative risk of high-severity fire based on land designations in the alternatives but does not analyze specific plan components. The Ground or Soil Disturbance Analysis is a little more specific. However, the effects analysis does not demonstrate of specific plan components affect the JMS. For example, the FEIS states,

> Under the proposed action, objectives for restoration activities include 100 miles of road decommissioning or mitigation within 10 years. Additionally, temporary roads that support ecosystem restoration activities, fuels management, or other short-term projects should be closed, decommissioned, or obliterated (restored to more natural vegetative conditions) upon project completion to protect watershed condition, minimize wildlife disturbance, and prevent illegal motorized use. There are also objectives to mitigate ecological damage at developed recreation sites and maintain at least 25 percent of system trails every three years.[409]
>
> …

407 36 C F R 219 8(a), 219 8(a)(3), 219 8(a)(3)(E), 219 9(a)(1), and 219 9(b)(1)

[408] FEIS, Vol. 1, p. 248.

[409] FEIS, Vol. 1, p. 267.

> Since plan components in the proposed action seek to reduce the amount of ground and soil disturbance as well as the rehabilitate areas that do get disturbed, the viability for the 15 at-risk species impacted by excessive ground and soil disturbance would increase under this action. This alternative has the greatest effect on reducing ground and soil disturbance and its impact to at-risk species (WL49-50).[410]

That all sounds good, but none of this matters if the objectives of restoration do not occur in JMS habitat.

4.7.3 Suggested improvements for the making the Revised Plan, Final Environmental Impact Statement, and Draft Record of Decision compliant with the law and advancing the recovery of the Jemez Mountains Salamander.

As with the other threatened and endangered species occurring on the SFNF, we see no alternative to remedying the legal problems with the Revised Plan, FEIS, and Draft ROD but to go back to the drawing board in many respects. The EIS must be supplemented or revised to overcome the issues we described in our analysis above. Section 7 consultation requires a do-over. And the Revised Plan requires improvement to existing plan components and the addition of others to comply with NFMA and ESA.

5 Grazing

5.1 Introduction and overview of grazing objections.

We strongly support riparian restoration as it is vital for the health of the environment and wildlife, especially when facing a hotter, more arid future resulting from climate change. But effective restoration will only occur if the Forest Service: (1) manages riparian area restoration projects in tandem with limits on livestock grazing, and correctly acknowledges it as the number one threat to riparian health; (2) reviews site-specific information about the nature of at-risk streams and the identifies specific projects meant to improve those streams; (3) provides management approaches as enforceable Standards or Guidelines, with robust monitoring requirements, and (4) utilizes the best available science to support and guide conservation and the Duty to Conserve. The Santa Fe's Revised Plan has failed to do any of these things in a meaningful way that will result in a different outcome than what has been the status quo for decades.

As is set out in more detail below, our objections are:

1. The Revised Plan violates NEPA by failing to consider and fully analyze all reasonable alternatives.

2. The Revised Plan violates NEPA by failing to take a "hard look" at the key issue of riparian restoration and how that is directly impeded by authorized and unauthorized grazing activities.

[410] FEIS, Vol. 1, p. 268.

3. The Revised Plan violates NEPA as the Forest Service has shirked it's duty to conserve threatened and endangered wildlife and has ignored the best science that would guide the agency to achieve that legal obligation.

4. The Revised Plan violates ESA by utilizing a faulty riparian assessment methodology, therefore again shirking the agency's duty to conserve.

5. The Revised Plan violates NEPA as the Forest Service relies on a vaguely detailed 'adaptive management strategy.

As we have previously commented, we expect the Forest Service to acknowledge the inherent connection between grazing and riparian restoration, to meaningfully address the root cause of riparian impairment and degradation, and not ignore the chronic problem that is posed by ongoing prioritization of livestock encouraged by complicit federal land managers. Rather than acknowledge and analyze all connected and cumulative actions of the proposed action, the Santa Fe overtly dismisses grazing activities as outside the scope of the programmatic Forest Plan, even when one of the primary focuses of the Plan is riparian restoration. Moreover, the 2021 Forest Plan is coincidentally revised concurrently with the approval of a massive riparian restoration project, the Northern New Mexico Riparian Restoration Project, which was objected to by some organizations. Our stance is that meaningful restoration cannot occur in isolation from changes in permitted grazing.

As suggested in previous comments, we should no longer see a 'stand-alone' analysis of grazing. In this Revised Plan, the Santa Fe should rightly include meaningful project-level grazing guidance, as decisions made at project-level should be guided by the plan. We should see new and enforceable Standards and Guidelines in place to protect endangered riparian ecosystems into a hotter and dryer future. Such guidance is needed to provide enduring direction for sustainable use, and these must clearly confront the biodiversity and climate crises which are stated and known top Biden administration priorities.

Degradation of natural resources and declines in forage production on national forest lands are both predicted and observed.[411] However, the Revised Plan requires no assessment of whether inherent capacity of the land for permitted stocking rates has been and will continue to be reduced; offers no guidance for grazing management amid protracted periods of drought; and does not consider climate consequences for native vegetation, wildlife, or sustainability of livestock operations.[412] This head-in-the sand approach to climate changes is neither protective of public natural resources, nor supportive of needed changes in grazing operations.

Not only would improved programmatic direction and guidelines (complete with riparian grazing restrictions for example, as suggested in previous comments) provide immediate short-term

[411] Hoglander, C. 2016. Change in Vegetation Productivity for Three National Forests in Utah, 1986-2011: Dixie, Fishlake, and Manti-La Sal National Forests. Analysis for Grand Canyon Trust. Flagstaff, AZ.

[412] Holechek, L., H.M.E. Geli, A.F. Cibils, and M.N. Sawalhah. 2020. Climate change, rangelands, and sustainability of ranching in the western United States. Sustainability. 12(12): 4942.

ecological benefits, they would set a solid organizational foundation for long-term sustainability moving forward. We cannot accept a Forest Plan void of such ecosystem management goals, one that shrouds the root causes of riparian degradation in outdated grazing management. The inevitable result is kick-the-can approach with status quo results. There are forest plan standards for range and ecological condition, and these are directly related to grazing. The Santa Fe should make protecting and restoring riparian areas a measurable and enforceable priority in the forest plan's desired conditions, objectives, and future management direction.[413]

Numerous systemic issues plague the way the Forest Service analyzes effects of forest management activities on riparian ecosystems, which has led to degradation, species loss, and subsequent litigation. These project-level issues can only be corrected if a coordinated effort is made by the Forest Service to address systemic flaws in analysis and disclosure. From our vantage, revised forest plans are the best way to provide the direction needed to ensure individual NEPA projects are planned, analyzed, and implemented in a manner that can avoid jeopardy. On the contrary, revised forest plans that remain vague and lack standards and guidelines that provide specific direction for management of riparian habitat, such as the Santa Fe's plan, will guarantee future legal challenges, delays, and associated costs. Thus, one simple way for the Santa Fe to better contribute to resolving this issue at the regional scale is to provide a plan component (a standard, guideline, or management approach) that expresses a commitment to conduct habitat monitoring within a conservation management framework and that relates it back to authorized grazing.

Federal lands comprise nearly half the area of the eleven western states.[414] Grazing has been the most widespread management practice on federal lands.[415] It is time for agencies to respond appropriately with improved grazing guidance and updated resource management philosophies to curb species loss during this global biodiversity crisis and extreme regional drought. 'Multiple use' no matter what the consequence has constantly proven to be a failed policy and to preclude environmental protection, let alone restoration. A paradigm shift in the way livestock is managed is required moving forward into a dryer, hotter, and climatically unstable future.

5.2 Our Objection: The Revised Plan violates NEPA by failing to consider a reasonable alternative of riparian exclusion.

Livestock grazing is currently authorized on 97 percent of the Santa Fe National Forest. In previous comments we requested the Forest Service analyze an Alternative that provides at least some level of grazing restriction in riparian zones. Disappointingly however, the FEIS states:

[413] FEIS, Vol. 1, p. 156.

[414] Vincent, C.H., L.A. Hanson, L.F. Bermejo. 2021. Federal Land Ownership: Overview and Data. Congressional Research Service. R42346. https://crsreports.congress.gov.

[415] Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. Conservation Biology. 8: 629-644.

> Stocking decisions regarding the amount of livestock grazing authorized for each grazing allotment are considered as part of project-level analysis (NEPA) and beyond the scope of this programmatic analysis for the forest plan" Project-level analysis would cover changes to authorized grazing through term grazing permits (subject to forestwide standards and guidelines); allotment management plans; and annual operating instructions. In addition, the alternatives include a range of options on how to deal with vacant and understocked allotments that could increase or decrease grazing numbers. ***Based on the above, a restricted grazing alternative is not considered necessary as well as not legally compliant***.[416]

First, to suggest that a restricted grazing alternative would be not legally compliant is unsubstantiated. On the contrary, we would argue that considering a restricted grazing alternative is not only legally compliant but would be a responsible decision from a managerial standpoint and one that supports the Forest Service's legal obligations and duty to conserve natural resources.

The rationale for requesting an Alternative that limits or prohibits riparian grazing is clear. Natural riparian and spring habitats make up <1% of the landscape, yet those habitats directly support a disproportionate level of species richness across a variety of taxonomic groups and commonly 2-3 orders of magnitude greater productivity than the surrounding arid uplands.[417, 418] Despite being keystone ecosystems, riparian zones are considered one of the most endangered ecosystems in the Southwest.[419] Because riparian zones provide water, shade, and succulent vegetation, livestock grazing is a primary cause of stream and riparian habitat degradation in the western United States and continues to exert pervasive adverse influences on springs and other riparian habitats.[420, 421] Because of their biological importance, increasingly threatened status,

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[416] FEIS, Vol. 1, p. 52. Emphasis added.

[417] Stevens, L.E., A. Jones, P. Stacey, D. Duff, C. Gourley, and J.C. Catlin. 2002. Riparian ecosystem evaluation: a review and test of BLM's proper functioning condition assessment guidelines. Technical Report submitted to the National Riparian Service Team. U.S. Department of the Interior.

[418] Soykan, C.U., L.A. Brand, and J.L. Sabo. 2009. Causes and consequences of mammal species richness. Ecology and Conservation of the Upper San Pedro Riparian Ecosystem. University of Arizona Press. Tucson, AZ. pp. 107-126.

[419] Noss, R.F., and J.M. Scott. 1995. Endangered ecosystems of the United States: a preliminary assessment of loss and degradation. https://www researchgate.net/profile/Reed-Noss/publication/246063035_Endangered_eco-systems_of_the_United_States_A_preliminary_assessment_of_loss_and_degradation/links/0deec5389ecd1092a8000000/Endangered-eco-systems-of-the-United-States-A-preliminary-assessment-of-loss-and-degradation.pdf.

[420] Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. Conservation Biology. 8: 629-644.

[421] Fleischner, T.L., 2010. Livestock grazing and wildlife conservation in the American West: historical, policy and conservation biology perspectives. Wild Rangelands: Conserving Wildlife While Maintain Livestock in Semi-Arid Ecosystems, 1st edition. J.T. du Toit, R. Kocki and J.C. Deutsch (eds.) Blackwell Publishing. pp. 235-265.

and potential for offering resilience to protect biodiversity, protection and restoration of riparian ecosystems should become a high priority for federal agencies.[422, 423]

Cattle should be removed from any riparian system that is not fully ecologically functional. Grazing should be required to be short-term, cool season use only. Grazing should be excluded entirely from some areas depending on stream conditions or the designation of critical habitat; the standard should be 'no grazing' in protected habitat. Long term riparian degradation must no longer be allowed for new agency directives to be congruent with the Biden administration's stated climate and biodiversity priorities.

Livestock exclusion has shown to be the most practical approach for initiating rapid riparian recovery or improving highly sensitive areas, and it works.[424] There is ample scientific record showing that livestock exclusion results in improvements to riparian areas.[425, 426, 427, 428, 429] Cessation of livestock grazing in riparian areas can increase the abundance of small mammals that require dense vegetation.[430] The substantial increase of plant cover that followed the removal

[422] Belsky, A.J., A. Matzke, and S. Uselman. 1999. Survey of livestock influences on stream and riparian ecosystems in the western United States. Journal of Soil and Water Conservation. 54(1): 419-431.

[423] Roper, B.B., J.M. Capurso, Y. Paroz, and M.K. Young. 2018. Conservation of aquatic biodiversity in the context of multiple-use management on National Forest System lands. Fisheries. 43(9): 396-405.

[424] Grudzinski, B., K. Fritz, and W. Dodds. 2020. Does riparian fencing protect stream water quality in cattle-grazed lands? Environmental Management. 66(1): 121-135.

[425] Strong, T.R., and C.E. Bock. 1990. Bird species distribution patterns in riparian habitats in southeastern Arizona. The Condor. 92(4): 866-885.

[426] Hayward, B., E.J. Heske, and C.W. Painter. 1997. Effects of livestock grazing on small mammals at a desert cienaga. The Journal of Wildlife Management. 123-129.

[427] Krueper, D., J. Bart, and T.D. Rich. 2003. Response of vegetation and breeding birds to the removal of cattle on the San Pedro River, Arizona (USA). Conservation Biology. 17(2): 607-615.

[428] Wyman, S., D. Bailey, M. Borman, S. Cote, J. Eisner, W. Elmore, B. Leinard, S. Leonard, F. Reed, S. Swanson, L. Van Riper, T. Westfall, R. Wiley, and A. Winward. 2006. Riparian area management: Grazing management processes and strategies for riparian-wetland areas. Technical Reference 1737-20. BLM/ST/ST-06/002+1737. U.S. Department of the Interior, Bureau of Land Management, National Science and Technology Center. Denver, CO. 105 pp.

[429] Grudzinski, B., K. Fritz, and W. Dodds. 2020. Does riparian fencing protect stream water quality in cattle-grazed lands? Environmental Management. 66(1): 121-135.

[430] Soykan, C.U., L.A. Brand, and J.L. Sabo. 2009. Causes and consequences of mammal species richness. Ecology and Conservation of the Upper San Pedro Riparian Ecosystem. University of Arizona Press. Tucson, AZ. pp. 107-126.

of livestock from southwestern riparian areas quickly increases abundance and diversity of invertebrates, herpetofauna, birds, and small mammals.[431, 432, 433, 434]

CEQ regulations which apply to all NEPA documents, and not just EISs, require that agencies "to the fullest extent possible . . . [i]mplement procedures . . . to emphasize real environmental issues and alternatives" and to "use the NEPA process to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment."[435]

For decades, the Ninth Circuit and district courts therein have explicitly held that the alternatives requirement applies equally to EAs and EISs. "Any proposed federal action involving . . . the proper use of resources triggers NEPA's consideration of alternatives requirement, whether or not an EIS is also required."[436] Other courts agree.[437]

NEPA requires that federal agencies consider alternatives to recommended actions whenever those actions "involve[] unresolved conflicts concerning alternative uses of available

[431] Duncan, D.K., 1988. Small mammal inventory of the upper San Pedro River Valley, Cochise County, Arizona: Progress report. San Pedro Project Office, San Simon Resource Area, Safford District, Bureau of Land Management.

[432] Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. Conservation Biology. 8: 629-644.

[433] Soykan et al. 2009.

[434] Grudzinski et al. 2020.

[435] 40 C.F.R. § 1500.2(b), (e).

[436] *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1229 (9th Cir. 1988), cert denied, 489 U.S. 1066 (1988). *See also W. Watersheds Project v. Abbey*, 719 F.3d 1035, 1050 (9th Cir. 2013) (in preparing EA, "an agency must still give full and meaningful consideration to *all* reasonable alternatives" (emphasis added) (internal quotation and citation omitted)); *Te-Moak Tribe v. Interior*, 608 F.3d 592, 601-602 (9th Cir. 2010) ("Agencies are required to consider alternatives in both EISs and EAs and must give full and meaningful consideration to all reasonable alternatives."); *Native Ecosystems Council v. U.S. Forest Service*, 428 F.3d 1233, 1245 (9th Cir. 2005) ("alternatives provision" of 42 U.S.C. § 4332(2)(E) applies whether an agency is preparing an EIS or an EA and requires the agency to give full and meaningful consideration to all reasonable alternatives); *Gifford Pinchot Task Force v. Perez*, 2014 U.S. Dist. Lexis 90631, No. 03:13-cv-00810-HZ (D. Or. July 3, 2014) (finding agency failed to consider range of reasonable alternatives in an EA); *Envtl. Prot. Info. Ctr. v. Blackwell*, 389 F. Supp. 2d 1174, 1199 (N.D. Cal. 2004) (stating that "an EA must consider a reasonable range of alternatives"); *Or. Natural Desert Ass'n v. Singleton*, 47 F. Supp. 2d 1182, (D. Or. 1998) ("The requirement of considering a reasonable range of alternatives applies to an EA as well as an EIS" (citing 40 C.F.R. § 1508.9(b)).

[437] *See Davis v. Mineta*, 302 F.3d 1104, 1120 (10th Cir. 2002) (granting injunction where EA failed to consider reasonable alternatives); *Diné Citizens Against Ruining Our Env't v. Klein*, 747 F. Supp. 2d 1234, 1254 (D. Colo. 2010) (alternatives analysis "is at the heart of the NEPA process, and is 'operative even if the agency finds no significant environmental impact.'" (quoting *Greater Yellowstone Coal. v. Flowers*, 359 F.3d 1257, 1277 (10th Cir. 2004)).

resources."[438] "NEPA's requirement that alternatives be studied, developed, and described both guides the substance of the environmental decisionmaking and provides evidence that the mandated decisionmaking process has actually taken place."[439]

In taking the "hard look" at impacts that NEPA requires, an EA must "study, develop, and describe" reasonable alternatives to the proposed action.[440] CEQ regulations explicitly mandate that an EA "[s]hall include brief discussions . . . of alternatives."[441] The purpose of the multiple alternative analysis requirement is to insist that no major federal project be undertaken without intense consideration of other more ecologically sound courses of action, including shelving the entire project, or of accomplishing the same result by entirely different means.[442]

Reasonable alternatives must be analyzed for an EA even where a FONSI is issued because "nonsignificant impact does not equal no impact. Thus, if an even less harmful alternative is feasible, it ought to be considered."[443] When an agency considers reasonable alternatives, it "ensures that it has considered all possible approaches to, and potential environmental impacts of, a particular project; as a result, NEPA ensures that the most intelligent, optimally beneficial decision will ultimately be made."[444]

The agency's obligation to consider reasonable alternatives applies to citizen-proposed alternatives.[445] "In respect to alternatives, an agency must on its own initiative study all alternatives that appear reasonable and appropriate for study at the time, and must also look into other significant alternatives that are called to its attention by other agencies, or by the public during the comment period afforded for that purpose."[446]

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[438] 42 U.S.C. § 4332(2)(E). *See also* 40 C.F.R. § 1501.2(c) (agencies must "study, develop, and describe appropriate alternatives to the recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act.").

[439] *Bob Marshall Alliance*, 852 F.2d at 1228 (citation omitted).

[440] 42 U.S.C. § 4332(2)(C) & (E).

[441] 40 C.F.R. § 1508.9(b).

[442] *Environmental Defense Fund v. Corps of Engineers*, 492 F.2d 1123, 1135 (5th Cir. 1974); *Methow Valley Citizens Council v. Regional Forester*, 833 F.2d 810 (9th Cir. 1987), *rev'd on other grounds*, 490 U.S. 332 (1989) (agency must consider alternative sites for a project).

[443] *Ayers v. Espy*, 873 F. Supp. 455, 473 (D. Colo. 1994) (internal citation omitted).

[444] *Wilderness Soc'y v. Wisely*, 524 F. Supp. 2d 1285, 1309 (D. Colo. 2007) (quotations & citation omitted).

[445] *See Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin*., 538 F.3d 1172, 1217-19 (9th Cir. 2008) (finding EA deficient, in part, for failing to evaluate a specific proposal submitted by petitioner); *Colo. Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1171 (10th Cir. 1999) (agency's "[h]ard look" analysis should utilize "*public comment* and the best available scientific information") (emphasis added).

[446] *Dubois v. U.S. Dept. of Agric*., 102 F.3d 1273, 1291 (1st Cir. 1996) (quoting *Seacoast Anti-Pollution League v. Nuclear Regulatory Comm'n*, 598 F.2d 1221, 1230 (1st Cir. 1979).

Courts hold that an alternative may not be disregarded merely because it does not offer a complete solution to the problem.[447] Even if additional alternatives would not fully achieve the project's purpose and need, NEPA "does not permit the agency to eliminate from discussion or consideration a whole range of alternatives, merely because they would achieve only some of the purposes of a multipurpose project."[448] If a different action alternative "would only partly meet the goals of the project, this may allow the decision maker to conclude that meeting part of the goal with less environmental impact may be worth the tradeoff with a preferred alternative that has greater environmental impact."[449]

Further, courts reviewing EAs have consistently found them lacking where there existed feasible mid-range or reduced-impact alternatives failing between the extremes of granting in full or denying in full the proposed action, but the agency opted not to analyze them in detail.[450]

The courts also require that an agency adequately and explicitly explain in the EA any decision to eliminate an alternative from further study.[451]

As specifically stated in previous comments, livestock grazing in New Mexico is associated with negative effects on riparian vegetation composition and structure, increased siltation, effects to stream hydrology and water quality, reduced soil permeability, increased soil compaction, and diminished wildlife habitat quality.[452] Indeed, the Forest Service admits that livestock grazing "can adversely affect hydrologic processes and water quality (e.g., compaction, erosion,

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[447] *Natural Resources Defense Council, Inc. v. Morton*, 458 F.2d 827, 836 (D.C. Cir. 1972).

[448] *Town of Matthews v. U.S. Dep't. of Transp.*, 527 F. Supp. 1055 (W.D. N.C. 1981). *See also Citizens Against Toxic Sprays v. Bergland*, 428 F. Supp. 908, 933 (D. Or. 1977) ("An alternative may not be disregarded merely because it does not offer a complete solution to the problem.").

[449] *North Buckhead Civic Ass'n v. Skinner*, 903 F.2d 1533, 1542 (11th Cir. 1990).

[450] *See, e.g., W. Watersheds Project v. Abbey*, 719 F.3d at 1050 (finding EA arbitrary and capricious where it failed to consider "reduced-grazing" alternatives); *Pac. Coast Fed'n of Fishermen's Ass'ns v. Dep't of Interior*, 655 F. App'x 595, 599 (9th Cir. 2016) (holding that agency's "decision [in EA] not to give full and meaningful consideration to the alternative of a reduction in maximum interim contract water quantities was an abuse of discretion, and the agency did not adequately explain why it eliminated this alternative from detailed study"); *Wild Fish Conservancy v. Nat'l Park Serv.*, 8 F. Supp. 3d 1289, 1300 (W.D. Wash. 2014) (finding agency's EA deficient because the "conclusion that there is not a meaningful difference, or viable alternative, between 0% and 90% [of fish survival] [was] suspect"), aff'd, 687 F. App'x 554 (9th Cir. 2017); *Native Fish Soc'y v. Nat'l Marine Fisheries Serv.*, 992 F. Supp. 2d 1095, 1110, (D. Or. 2014) (holding that agency "erred in failing to consider a reasonable range of alternatives" in EA, and finding that "[g]iven the obvious difference between the release of approximately 1,000,000 smolts and zero smolts, it is not clear why it would not be meaningful to analyze a number somewhere in the middle").

[451] *See Wilderness Soc'y*, 524 F. Supp. 2d at 1309 (holding EA for agency decision to offer oil and gas leases violated NEPA because it failed to discuss the reasons for eliminating a "no surface occupancy" alternative); *Ayers*, 873 F. Supp. at 468, 473.

[452] New Mexico Department of Game and Fish. 2006. Comprehensive Wildlife Conservation Strategy for New Mexico. New Mexico Department of Game and Fish. Santa Fe, New Mexico. 526 pp + appendices.

sedimentation, stream shade, nutrient enrichment, and waterborne pathogens), especially where animals are concentrated within riparian areas."[453] These impacts are widely documented in several decades of scientific literature, and summarized well in Fleischner (1994[454]), Gifford and Hawkins (1978[455]), Krueper (1995[456]), and Kauffman and Krueger (1984[457]).

The Revised Plan has an inherent inability to fulfill the purpose and need for riparian restoration if cattle are continually permitted to degrade riparian areas. In order to remove ecological stressors in the form of non-native livestock, we support the installment of additional and extensive livestock exclosures in riparian corridors. This is a vital component of riparian restoration that the best available science supports. Any alternative that is unreasonably excluded will invalidate the NEPA analysis. "The existence of a viable but unexamined alternative renders an EA inadequate."[458]

Current management strategies also need to incorporate climate change impacts and focus on minimizing existing stressors in order to protect freshwater ecosystem integrity and biota.[459] In sensitive aquatic ecosystems such as high-elevation meadows commonly used to graze cattle, measures should be taken to reduce the stressors that further accentuate the impacts of climate

[453] Santa Fe National Forest, Forest Plan Revision, Draft EIS Vol. 1 at 181.

[454] Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. *Conservation Biology* 8(3): 629-644.

[455] Gifford G.F., R.H. Hawkins. 1978. Hydrologic Impact of Grazing on Infiltration: A Critical Review. *Water Resources Research* 14(2): 305-313.

[456] Krueper, D.J. 1995. Effects of livestock management on Southwestern riparian ecosystems. In Shaw, D.W. and D.M. Finch, tech coords. 1996. Desired future conditions for Southwestern riparian ecosystems: Bringing interests and concerns together. 1995 Sept. 18-22, 1995; Albuquerque, NM. General Technical Report RM-GTR-272. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 359 p.

[457] Kauffman, J.B., and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications…a review. *Journal of Range Management* 37(5): 430-438.

[458] *Western Watersheds v. Abbey*, 719 F.3d. at 1050; *see also Diné Citizens Against Ruining Our Env't*, 747 F. Supp. 2d at 1256 ("The existence of a viable but unexamined alternative renders an alternatives analysis, and the EA which relies upon it, inadequate.").

[459] Ficke, A.D., Myrick, C.A. and Hansen, L.J., 2007. Potential impacts of global climate change on freshwater fisheries. *Reviews in Fish Biology and Fisheries*, *17*(4), pp.581-613.

change.[460] [461] There is also mounting evidence that protecting pristine ecosystems might be both the least expensive and most effective defense against climate change.[462]

Because of the impacts of domestic livestock grazing on riparian, aquatic, wetland, and watershed ecosystems, and because the continuance of domestic livestock grazing exacerbates ongoing stressors such as drought, climate change, recreation pressure, and invasive species, the Center previously proposed a reasonable alternative for comparison. That alternative was simple and would meet the project purpose and need: "We request an alternative is analyzed that includes the currently proposed restoration interventions, plus 1) the closure of all riparian, aquatic, and wetland ecosystems to all domestic livestock grazing, and 2) a reduction in upland livestock stocking levels to reduce erosion and pollution of riparian systems where that is identified as a problem."

While ignoring such an alternative, the Revised Plan provides no solution to ecosystem stressors and instead focuses on undisclosed, band-aid mitigation strategies to patch damages without changing the very land use strategies that created the current state of degraded riparian ecosystems across the Santa Fe National Forest. The strategy as described in the Revised Plan is inadequate and destined to fail in the long term without addressing livestock impacts to riparian areas. Indeed, peer-reviewed strategies to restore riparian systems have generally found little evidence that restoration techniques are effective or sustainable over a period of decades, especially when the original stressors are not removed.[463] Negative impacts of unremitting grazing by cattle and horses on the landscape cannot be mitigated by installing hundreds of structures into the stream, (as is planned in the concurrent riparian restoration project for the Santa Fe), in fact the scientific literature suggests that such an approach could make ecological conditions even worse.[464]

5.3 Suggested Resolution for Grazing Objection 1.

In a Supplemental EIS, analyze a reduced riparian grazing alternative, which better supports stated plan goals and the legal Duty to Conserve. The Forest Service must analyze a range of alternatives with great emphasis and reliance on livestock exclusion to achieve project goals than

[460] Heller, N.E. and Zavaleta, E.S., 2009. Biodiversity management in the face of climate change: a review of 22 years of recommendations. *Biological conservation*, *142*(1), pp.14-32.

[461] Beschta, R.L., Donahue, D.L., DellaSala, D.A., Rhodes, J.J., Karr, J.R., O'Brien, M.H., Fleischner, T.L. and Williams, C.D., 2013. Adapting to climate change on western public lands: addressing the ecological effects of domestic, wild, and feral ungulates. *Environmental Management*, *51*(2), pp.474-491.

[462] Martin, T.G. and Watson, J.E., 2016. Intact ecosystems provide best defence against climate change. *Nature Climate Change*, *6*(2), pp.122-124.

[463] Opperman, J.J. and Merenlender, A.M., 2004. The effectiveness of riparian restoration for improving instream fish habitat in four hardwood-dominated California streams. North American Journal of Fisheries Management, 24(3), pp.822-834. (Opperman and Merenlender 2004)

[464] Stewart et al. 2009. Effectiveness of engineered in-stream structure mitigation measures to increase salmonid abundance: a systematic review Ecological Applications, 19(4), 2009, pp. 931–941.

does the FEIS in its current form. This strategy is supported by science yet actively avoided by the Forest Service, even though it couldn't be negated entirely due to connectedness.

This alternative was requested during scoping, but has been ignored, thus violating NEPA.

The FEIS should have analyzed an Alternative that prohibits grazing in places where restoration activities are occurring (which are still unspecified). The exclusion of cattle should logically accompany every instance of restorative effort. This is the first and simplest step to recover riparian vegetation and structure. Such an alternative would simplify management by reducing the potential for ecosystem damage, wildlife conflicts, it would simplify monitoring, and would allow more movement towards stated desired conditions. If management is unwilling to sufficiently change the grazing system that has resulted in current conditions, restoration is destined to fail in the long term.[465]

The presence of unique and protected riparian species, such as the southwestern willow flycatcher and yellow-billed cuckoo, should preclude stream reaches from grazing to address and mitigate the worsening biodiversity and climate crises. In Region 3, expansive destruction of riparian critical habitat reflects the fact that the range management program has failed and that the threatened, endangered & sensitive species programs exist in name only.[466] Virtually no T&E species and critical habitat protection occurs in this region unless forced by litigation or by resulting Court order.[467, 468] Revitalizing Forest Service management at the programmatic level, especially in the face of worsening drought and climate changes, represents a grand opportunity to shift this unfortunate and unacceptable litigatory cycle.

In response to new climatic conditions, actions that support riparian function and allow for recovery should be required at the programmatic level across the board. Only such priorities can be considered congruent with the Biden administration and its prioritization of addressing severe climate predictions, the biodiversity crisis, and using science to inform management decisions with these crises in mind. Actions that harm or delay riparian function and recovery should be completely disallowed at the programmatic level moving forward. A list of such actions, with abundant relevant citations, is taken from Swanson et al. 2015[469] and is presented here:

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[465] Opperman and Merenlender 2004.

[466] Trudeau, J. 2020. Ravaged River: Cattle Damage to Endangered Species Habitat in Arizona's Verde River Watershed. Report. Center for Biological Diversity. 39 pp.

[467] Greenwald, D.N., K.F. Suckling, and M. Taylor. 2006. The listing record. The Endangered Species Act at Thirty: Renewing the Conservation Commitment. Island Press. Washington, DC. pp. 51-67.

[468] Nie, M., 2008. The underappreciated role of regulatory enforcement in natural resource conservation. Policy Sciences. 41(2): 139-164.

[469] Swanson, S.R., Wyman, S. and Evans, C., 2015. Practical grazing management to meet riparian objectives. Journal of Rangeland Applications, 2, pp.1-28.

Table 1. Comparison of riparian grazing management strategies related to duration and timing of use and recovery periods that often preclude or support riparian function and recovery.

Often Precluding Riparian Functions and Recovery	Supporting Riparian Functions and Allowing Recovery
Long Season of Use – Plants experience repeated defoliation throughout season Platts, 1991; Clary et al., 1996; Saunders & Fausch, 2007; George et al., 2011; Raymond & Vondracek, 2011.	**Short Grazing Period** – Grazed plants are not re-grazed Myers, 1989; Glimp & Swanson, 1994; Lyons et al., 2000; Lucas et al., 2004; Magner et al., 2008; Saunders & Fausch, 2007; Saunders & Fausch, 2007, 2012; Raymond & Vondracek, 2011; Dalldorf et al., 2013.
Little Time for Recovery – Plants without time to regrow before next grazing event Myers, 1989; Fitch and Adams, 1998; Jansen & Robertson, 2001; Lucas et al., 2004; Saunders & Fausch, 2007, 2012; Dalldorf et al., 2013; Kamp et al., 2013.	**Long Recovery Periods** – All plants recover before subsequent grazing event Myers, 1989; Fitch and Adams, 1998; Lyons et al., 2000; Jansen & Robertson, 2001; Lucas et al., 2004; Magner et al., 2008; Saunders & Fausch, 2007, 2012; Dalldorf et al., 2013; Kamp et al. 2013.
Late Season Use – Little time to regrow or amass residual stubble before dormancy Green & Kauffman, 1995; Parsons et al., 2003.	**Regrowth Before Winter** – Vegetation grows and provides residual to protect streambank at high water in spring Myers, 1989; Boyd and Svejcar, 2004.
Consistent Season of Use – Use repeated in the same phenological stage year after year Gillen et al., 1985; Myers, 1989; Masters et al., 1996a, 1996b; Wyman et al., 2006; Schwarte et al., 2011; Boyd & Svejcar, 2012; Dalldorf et al., 2013.	**Vary Season from Year to Year** – Grazing different seasons or phenology stages every year Gillen et al., 1985; Myers, 1989; Masters et al., 1996a, 1996b; Wyman et al., 2006; Schwarte et al., 2011; Boyd & Svejcar, 2012; Dalldorf et al., 2013;
Repeated Growing Season Use – Grazing every year without rest Platts, 1991; Masters et al., 1996b.	**Occasional Growing Season Rest** – Opportunity for plants to regrow leaves and roots Platts, 1991; Masters et al., 1996a, 1996b.
No Woody Recovery – Woody plants stay short and within height accessible to herbivores Kovalchik & Elmore, 1992.	**Woody Plants Allowed to Grow** – Woody plants grow above grazing height Platts, 1991.
Large Pasture – Lacking riparian objectives Platts, 1991; Masters et al., 1996a, 1996b; Fitch and Adams, 1998; Lucas et al., 2004; Wyman et al., 2006.	**Riparian Pasture** – With riparian objectives Platts, 1991; Masters et al., 1996a, 1996b; Lucas et al., 2004; Wyman et al., 2006.

Table 2. Comparison of riparian grazing management tools and strategies addressing distribution and intensity of riparian use. Strategies that preclude riparian function and recovery are compared to those that generally support riparian function and allow recovery.

Often Precluding Riparian Functions and Recovery	Supporting Riparian Functions and Allowing Recovery
Hot or Dry Growing Season Use – Greener vegetation attracts more grazing use in riparian area Parsons et al., 2003; DelCurto et al., 2005; George et al., 2011.	**Cool or Warm Season Use** – Upland vegetation and warmer temperatures attract livestock to uplands Knopf et al., 1988; Myers, 1989; Platts, 1991; Clary et al., 1996; Masters et al., 1996a, 1996b; Lucas et al., 2004; Saunders & Fausch, 2007; George et al., 2011; Raymond & Vondracek, 2011; Booth et al., 2012.
Season-Long Use – Entire growing season access to riparian area so plants frequently experience herbivory Knopf et al., 1988; Platts, 1991; Saunders & Fausch, 2012.	**Graze Early in Season** – While uplands are attractive and riparian plants have ample time for recovery Clary, 1999; Parsons et al., 2003; Crawford et al., 2004; Evans et al., 2004; Pelster et al., 2004; DelCurto et al., 2005; McInnis & McIver, 2009.
Sustained Heavy Use– Inadequate leaf area depletes carbohydrate reserves Clary et al., 1996; Platts, 1991; DelCurto et al., 2005; Jeffress & Roush, 2010; Teuber et al., 2013.	**Moderate to Light Intensity** – Plants maintain leaf area to sustain carbohydrate reserves and growing points Marlow & Pogacnik, 1986; Clary, 1999; Jansen & Robertson, 2001; Crawford et al., 2004; Lucas et al., 2004; Pelster et al., 2004; Jones et al., 2011; George et al., 2011; McIlroy and Allen-Diaz, 2012; Teuber et al., 2013; Freitas et al. 2014;

No grazing management strategy that knowingly precludes riparian recovery should be allowed moving forward. While the Revised Plan confirms that livestock grazing would continue into the foreseeable future,[470] it offers a strategy to decommission and mitigate 100 miles of roads in an effort to improve natural resources. It also offers closing, relocating, or limiting recreational sites to alleviate impacts and damages. Why then, as the Revised Plan suggests for roads and recreational sites, does the Santa Fe not decommission riparian grazing and restore 100 miles of riparian zone? Let us be clear, eliminating the option of riparian grazing access does not and will not impede on cultural values, and it certainly isn't unlawful as FEIS suggests.

In the Plan, grazing should be treated just like roads and recreation. As was suggested for roads in the FEIS, additional grazing should also not be added to the system. The fact that grazing is not discussed in comparable contexts speaks to the blatant enshrinement of poor grazing management and of agency hesitancy and timidity to address an elephant in the room. The simple point is that riparian ecosystems and associated flora and fauna fare better without the crippling pressure of grazing domestic stock, especially in the face of an historically unprecedented, climate change-driven "exceptional drought"[471] which we are currently experiencing in the Southwest. Livestock exclusion should be the prominent strategy when restoration is the priority, as is stated in the FEIS. We have entered an era where ecological restoration must be prioritized. We must adapt to these conditions with the way water and wetland resources are managed and protected.

Although southwestern stream ecosystems have been greatly altered, these systems are ecologically resilient and are likely to respond positively to improved management and restoration practices, the simplest being to curb poorly managed gazing practices.[472] [473] [474] [475] Management moving forward should not further contribute to downward trends of native and protected wildlife. The Revised Plan should call for expanding the use of riparian exclosures as a restoration tool and analyze an Alternative that focuses primarily on cattle exclusion to achieve riparian restoration. The Revised Plan should describe how authorized grazing activities and schedules will be adjusted to be compatible with the instream improvements in order to fulfill the purpose and need of this Revised Plan and to ensure that restoration efforts will not be used

[470] FEIS, Vol. 1, p. 159.

[471] NOAA 2021. United States Drought Monitor. https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx.

[472] Hayward, B., E.J. Heske, and C.W. Painter. 1997. Effects of livestock grazing on small mammals at a desert cienaga. The Journal of Wildlife Management. 123-129.

[473] Phillips, F., 1998. The'Ahakhav Tribal Preserve: Colorado River Indian Tribes initiate a major riparian restoration program. Restoration and Management Notes. 16(2): 140-148.

[474] Giuliano, W.M., and J.D. Homyack. 2004. Short-term grazing exclusion effects on riparian small mammal communities. Rangeland Ecology and Management. 57(4): 346-350.

[475] Hough-Snee, N., B.B. Roper, J.M. Wheaton, P. and R.L. Lokteff. 2013. Riparian vegetation communities change rapidly following passive restoration at a northern Utah stream. Ecological Engineering. 58: 371-377.

solely for promoting more grazing, eventually resulting in further environmental degradation. Status quo grazing practices will continue to have negative environmental impacts.

5.4 Our Objection: The FEIS fails to take a 'hard look' at riparian restoration.

The Forest Service explicitly states that riparian restoration is a primary focus of the Revised Plan. For example: "Healthy riparian areas and the water found in them were also identified as important and in need of restoration. Compromised riparian and wetland vegetation is one of the primary contributions of watershed impairment in the Santa Fe NF and improving them is a focus of the Forest Plan,"[476] and "Protection and need for restoration of riparian areas emerged as a key issue for the revision of the forest plan. Riparian systems have been degraded and are at risk across the forest."[477]

The Plan goes on to state in more detail:

> Riparian systems have been degraded and are at risk across the forest. A variety of land uses (e.g., roads, grazing, recreation), increased water demand (water withdrawal) and climatic changes (e.g., long-term drought have deteriorated these systems. There is a need for desired conditions to restore or maintain characteristic composition and cover of riparian vegetation. There is a need for standards and guidelines that minimize the ecological impacts of multiple uses in riparian areas, and a recognition of their reliance on upland ecological health[478]… There is a need for plan direction to protect stream channels, hydrological function, and condition of water-dependent systems by maintaining and restoring upland and riparian vegetative cover and reducing erosion and sedimentation from disturbed sites (e.g., reclaiming roads) where feasible.[479]

Beyond treatments to restore forested vegetation, the proposed action also emphasizes restoring composition and structure in riparian vegetation and improving aquatic habitat. Objectives include:

- Within the riparian management zone, move toward desired conditions for vegetation types that are outside of or trending away from their natural range of variability by restoring the composition and structure of 15 miles of stream every 10 years. Actions that could improve riparian areas would be site-specific, but could include several of the following: removing invasive plant species, stabilizing stream channels, planting native species, promoting natural revegetation of bare ground, and redirecting other uses (e.g., providing other watering sources, closing areas to camping).

[476] FEIS, Vol. 1, p. 13.

[477] FEIS, Vol. 1, p. 158.

[478] FEIS, Vol. 1, p. 5.

[479] FEIS, Vol. 1, p. 6.

- Complete aquatic restoration on priority projects that restore 30 miles of aquatic habitat (e.g., increasing pool quantity, providing stream cover, removing or installing fish barriers, restoring beaver populations, and treating invasive aquatic species, etc.) every 10 years to benefit aquatic species.
- Every 10 years restore native fish species to 20 miles of streams where nonnative fish are absent and where natural or human-made fish barriers exist.[480]

The Revised Plan clearly states the need for improved standards and guidelines to address the issue of riparian and wetland degradation which was caused by grazing cattle. Ironically, the Santa Fe explicitly allows cattle to occupy 97% of the Santa Fe NF including the most sensitive riparian systems throughout the forest.

Despite these stated goals and objectives, the Revised Plan and FEIS completely ignore any possible adverse impacts that grazing management can have on riparian resources, rendering the 'hard look' requirements under NEPA entirely deficient. If livestock grazing is not excluded from riparian areas, wetlands, and aquatic ecosystems in during and following restoration projects, the proposed action is unlikely to achieve any level of restoration success, denying our public lands of the ecological integrity and resilience they need to endure increasingly stressful conditions driven by climate change.

Much, if not all, of the riparian restoration components of this Forest Plan hinge on another massive project- the Northern New Mexico Riparian Restoration Project- to which the Center for Biological Diversity has also objected on the grounds that it too refuses to meaningfully address grazing management as within the project scope and ignores the best available science. It would be prudent and applicable to have a hard look discussion of the areas of overlap between this restoration project and the Revised Plan.

Importantly, and in both examples, it seems that increasing forage is the sole motivation for restoring riparian vegetation. For this claim, the Revised Plan leaves no doubt:

> All alternatives direct managers to maintain rangelands and manage for quality forage production. Given this, grazing management in all alternatives should balance grazing with protection of the rangeland resource using an adaptive management approach to deal with fluctuations in available forage.[481]

Furthermore, the Revised Plan states that "Restoration of departed vegetation types in alternative 2 would improve grass and forb abundance throughout the forest, providing increased forage for livestock grazing, and decreasing negative impacts described in the Effects Common to All Alternatives section (***S33***)."[482]

[480] FEIS, Vol. 1, p. 32.

[481] FEIS, Vol. 1, p. 402.

[482] FEIS, Vol. 1, p. 467.

Furthermore, this section of the Plan continues by stating:

> Under alternative 2, there would be more emphasis placed on restoration and sustainable livestock grazing than in alternative 1. ***Restoration treatments, which involve thinning with mechanical treatments and fire would improve vegetative production*** (Salmon et al. 2012***) leading to increased forage available to grazers in the forest***. However, this effect will likely not be immediate. Studies show that improvements in herbaceous understory vegetation occur after the first one to two years following treatment (Abella and Springer 2015). Therefore, alternative 2 would result in an increase in forage production after a few years (***RG12***) and is expected to result in the greatest increase in quality forage production in the forest over the lifetime of the Forest Plan. Increased forage production will lead to increased forage availability.[483]

Some key questions arise: How does increased stocking rates equal decreased grazing pressure? If the Forest Service increases stocking rates to accompany restoration progress, how does that result in decreased grazing pressure? From our vantage, increased stocking equals increased grazing pressure. It would seem from such statements that the goal will always be to break even by maintaining the status quo.

In another example: "As long as stocking is in pace with forage availability, and riparian areas are adequately protected, adverse impacts to surface water resources (see Wa24 through Wa34) are expected to be neutral when compared with the current condition (alternative 1)."[484]

Here, the FEIS states outright that the current condition - which is severe and widespread degradation - is the bar to achieve moving forward. Status quo does not equal restoration.

Restoration, as opposed to status quo degradation, requires different management action that results is different outcomes. There is no evidence that adjusted grazing management strategies are even being considered here. The Revised Plan will not move restoration forward. According to the Multiple Use Sustained Yield Act, not all forest resources are likely to be available and suitable for use in every management area. Federal code states that "[i]n the administration of the national forests due consideration shall be given to the relative values of the various resources in particular areas."[485] A number of limitations must be considered as the Forest Service attempts to balance the production of forest products and services for a given management area. The Multiple Use Sustained Yield Act clearly establishes that "some land will be used for less than all of the resources" and that the national forests are utilized in such a manner that does not impair the productivity of the land.[486] Let us be clear, this Project Area is ecologically impaired, and the Forest Service would be hard-pressed to disagree with that statement. Yet, the Santa Fe is

[483] FEIS, Vol. 1, p. 402. Emphasis added.

[484] FEIS, Vol. 1, p. 200.

[485] 16 U.S.C. § 529.

[486] 16 U.S.C. § 531.

pushing for Multiple Use no matter what the cost, and the result of such a philosophy is decline in quality of wildlife habitat and in forage production, which is both predicted and observed.[487]

In another astounding example regarding environmental stressors, the Revised Plan states "A stressor is an environmental condition, external stimulus, or event (***apart from a direct management action***) that strains the ability of watershed processes to function within their historic range of variability."[488] Here, in defiance of science, Forest Service is excusing their own grazing management from being an environmental stressor. To be clear, grazing is the number one stressor to riparian ecosystems and is responsible for their historical and ongoing degradation.

5.5 Suggested Resolution for Grazing Objection 2.

A Supplemental EIS must take a 'Hard Look' at the impacts of grazing on riparian ecosystems and obligate wildlife, including a discussion of the Northern New Mexico Riparian Restoration Project that is occurring concurrently with the Revised Plan, upon which much of the riparian restoration of the plan will hinge, as these are connected and cumulative actions.

5.6 Our Objection: The Revised Plan and FEIS fail to consider the best available science regarding the impacts of domestic grazing on riparian areas and wetlands.

The Forest Service has a Lawful Duty to Conserve under the ESA. Section 7 of the ESA requires federal agencies, in consultation with USFWS, to ensure that any action authorized, funded, or carried out by the agency is not likely to (1) jeopardize the continued existence of any threatened or endangered species, or (2) result in the destruction or adverse modification of the critical habitat of such species.[489] "Action" is broadly defined to include all activities or programs of any kind authorized, funded, or carried out by federal agencies, including actions directly or indirectly causing modifications to the land, water, or air; and actions intended to conserve listed species or their habitat.[490]

In addition to the obligation to avoid jeopardizing species or destroying or adversely modifying their critical habitat under Section 7(a)(2) of the ESA, Section 7(a)(1) imposes an obligation on all federal agencies, in consultation with the FWS, to "carry out programs for the conservation" of listed species.[491] This provision imposes an "affirmative duty on each federal agency to

[487] Hoglander, C. 2016. Change in Vegetation Productivity for Three National Forests in Utah, 1986-2011: Dixie, Fishlake, and Manti-La Sal National Forests. Analysis for Grand Canyon Trust. Flagstaff, AZ.

[488] FEIS, Vol. 1, p. 160.

[489] 16 U.S.C. § 1536(a)(2).

[490] 50 C.F.R. § 402.02.

[491] 16 U.S.C. § 1536(a)(l).

conserve each of the species listed."[492] "Conserve" is defined by the ESA to mean *recovery, i.e.,* the "use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided [in the ESA] are no longer necessary."[493]

The Revised Plan and FEIS violate the ESA and NEPA because the Forest Service has a duty to conserve and has ignored crucial science that would guide the agency to achieve that legal obligation. Contrary to explicitly denying that management actions such as grazing is even an environmental stressor, the negative impacts of livestock grazing in riparian areas have been well documented.[494] Extensive scientific literature reveals that livestock grazing negatively affects water quality and water seasonal quantity, stream channel morphology, hydrology, riparian zone soils, instream and streambank vegetation, and aquatic and riparian wildlife.[495, 496, 497, 498, 499, 500, 501]

Presence of livestock in riparian areas can negatively affect ecosystem integrity including reducing vegetation complexity and plant biomass, bank stability, soil quality, litter cover and water quality. Selective consumption of palatable vegetation by cattle can alter ecosystem structure, function and species composition.[502, 503] Cattle graze cottonwood seedlings preventing

[492] *Sierra Club v. Glickman,* 156 F.3d 606,616 (5th Cir. 1998); *accord Pyramid Lake Paiute Tribe*, 898 F.2d at 1416-17 (noting that federal agencies have "affirmative obligations to conserve under [S]ection 7(a)(1)").

[493] 16 U.S.C § l 536(a)(1).

[494] Poff, B., K.A. Koestner, D.G. Neary and V. Henderson 2011. Threats to riparian ecosystems in Western North America: an analysis of existing literature. Journal of the American Water Resources Association. 47(6): 1241-1254.

[495] Kauffman, J.B. and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications... a review. Rangeland Ecology and Management/Journal of Range Management Archives. 37(5): 430-438.

[496] Fleischner, T.L., 2010.

[497] Belsky, A.J., A. Matzke, and S. Uselman. 1999. Survey of livestock influences on stream and riparian ecosystems in the western United States. Journal of Soil and Water Conservation. 54(1): 419-431.

[498] Ohmart, R.D. 1996. Ecological condition of the East Fork of the Gila River and selected tributaries: Gila National Forest, New Mexico. General Technical Report RM., 272, p. 312.

[499] Elmore, W., and B. Kauffman. 1994. Riparian and watershed systems: degradation and restoration. Ecological implications of livestock herbivory in the West. M. Vavra, W.A. Laycock, and R.D. Pieper (eds.) Society of Range Management, Denver, CO. p. 212-231.

[500] Stevens et al. 2002.

[501] Poff et al. 2011.

[502] Kauffman and Krueger 1984.

[503] Poff et al. 2011.

tree growth and recruitment.[504] Grazing can severely reduce riparian vegetative cover which increases air and water temperatures and influences invertebrate and native wildlife distribution and diversity.[505] In addition to herbivory and alteration of vegetation, hoof action through concentrated trampling directly degrades streambanks through bank sheering.[506] This leads to excessive erosion and nutrient runoff.[507] Loss of riparian vegetation compounds degradation of streambanks, precipitating permanent channel incisions.[508] Eventually, channels lose their riffle areas, streams migrate laterally, pools shallow out, water tables lower, and riparian vegetation composition shifts from hydric to more mesic species.[509]

Over *thirty years ago*, overall estimates of riparian habitat loss ranged from 40-90% among the southwestern states.[510] This trend has only steadily continued and there may be as little as 2% of the original forested riparian habitat remaining in the West.[511] A literature review on livestock grazing impacts on arid land ecosystems reported that 69% of 132 studies demonstrated significant detrimental effects.[512] There are more publications in the literature that discuss grazing as a threat to western riparian ecosystems than any other single threat.[513]

Over three decades ago, an assessment by the U.S. General Accounting Office found that that most (~90%) of the lands managed by the Forest Service were in need of restoration. GAO 1988. A few years later, Elmore and Kaufman (1994) reaffirmed this point, stating, “Current Forest Service policy calls for undertaking a national riparian strategy designed to improve markedly riparian conditions along lakes and streams by the year 2000.” This has still not occurred and the

[504] Poff et al. 2011.

[505] Fleischner, T.L., 2010.

[506] Neary and Medina 1996.

[507] Tufekcioglu, M., R.C. Schultz, G.N. Zaimes, T.M. Isenhart, and A. Tufekcioglu. 2013. Riparian grazing impacts on streambank erosion and phosphorus loss via surface runoff. Journal of the American Water Resources Association. 49(1): 103-113.

[508] Poff et al. 2011.

[509] Poff et al. 2011.

[510] Dahl, T.E., 1990. Wetlands losses in the United States, 1780's to 1980's. United States Department of the Interior, Fish and Wildlife Service.

[511] Jones, K.B., E.T. Slonecker, M.S. Nash, A.C. Neale, T.G. Wade, and S. Hamann. 2010. Riparian habitat changes across the continental United States (1972–2003) and potential implications for sustaining ecosystem services. Landscape Ecology. 25(8): 1261-1275.

[512] Jones, A., 2000. Effects of cattle grazing on North American arid ecosystems: a quantitative review. Western North American Naturalist. 155-164.

[513] Poff et al. 2011.

West's riparian systems have been in a chronic state of degradation and this is particularly true in Arizona and New Mexico (Region 3).[514]

Environmental degradation through grazing is not restricted to historical practices. To this day, it is a chronic and ongoing issue. For example:

> One of the most significant adverse impacts within western riparian systems has been the perpetuation of improper grazing practices (Hastings and Turner 1965, Ames 1977, Glinski 1977, Marlow and Pogacnik 1985). Chaney et al. (1990) noted that initial deterioration of western riparian systems began with severe overgrazing in the late nineteenth century. For the last 75 years, the Forest Service has acknowledged the continued damage cattle have done to riparian areas, upland tributaries, and ranges. The effects of both past and ongoing grazing activities on the forest have had a profound effect on riparian habitat and there has been little improvement western watersheds under modern range management. (GAO 1988, Alford 1993). By not allowing riparian vegetation to develop, there is no rehabilitation of stream banks or prevention of erosion. As a result, the conditions of these streams are in a perpetual state of decay.[515]

Studies also show that current levels of livestock grazing are degrading the stream and riparian components and not allowing for recovery of degraded stream banks.[516, 517, 518] The American Fisheries Society editorial (Hughes 2014) stated "Livestock grazing exacerbates climate change effects on stream, riparian, and upland natural resources. Greatly reducing public land livestock grazing would greatly reduce this spatially extensive pressure and thereby reduce the susceptibility of those resources to climate change. It could also free up over $144 million for more fish- and wildlife-friendly landscape rehabilitation."

5.7 Suggested Resolution for Grazing Objection 3.

Issue a Supplemental EIS and Revised Plan that considers the best available science regarding the threats posed to riparian areas and wetlands by livestock grazing.

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[514] Trudeau, J. 2020. Ravaged River: Cattle Damage to Endangered Species Habitat in Arizona's Verde River Watershed. Report. Center for Biological Diversity. 39 pp.

[515] Tonto National Forest 20 Allotment Biological Opinion (02-21-99-F-300), p. 19.

[516] Knapp, R.A., V.T. Vredenburg, and K.R. Matthews. 1998. Effects of stream channel morphology on Golden Trout spawning habitat and recruitment. Ecological Applications. 8: 1104-1117.

[517] Nussle, S.C., K.R. Matthews, and S.M. Carlson. 2017. Patterns and dynamics of vegetation recovery following grazing cessation in the California golden trout habitat. Ecosphere. 8(7): e01880. 10.1002/ecs2.1880.

[518] Nussle, S.C., K.R. Matthews, and S.M. Carlson. 2015. Mediating water temperature increases due to livestock and global change in high elevation meadow streams of the Golden Trout Wilderness. PLOS ONE. 10(11): 1-22.

5.8 Our Objection: The riparian assessment methodology used in the FEIS is deficient and does not support the duty to conserve.

The Plan relies on continuing use of the Proper Functioning Conditions (PFC) method, which generally overestimates stream health, is subjective, and leads to mismanagement and strained utilization that chronically degrades the system.[519] Proper Functioning Condition is fundamentally flawed and inappropriate to assess ecological conditions and wildlife habitat. For example, consider this example from the Lincoln National Forest:

- "By 2004, the Forest Service's FEIS reported that continued excessive forage utilization led to soil instability and deterioration of range and watershed conditions, primarily in riparian areas of the **Alamo Pasture** (USFS 2004c)."[520]

- "In 2004, the Forest reported that more than 90 percent of the riparian areas associated with perennial streams in the Sacramento Allotment were in poor condition.[521]
- "Streams within the action area, including those in **Alamo Pasture** are prone to recurring floods (USFS 2009b). These events have damaged and destroyed poppies and potential habitat. For example, floods in the summers of 2006 and 2008 in **Alamo and Caballero Canyons** (Sacramento Allotment) scoured vegetation and soils from occupied poppy habitat, washing much of the material downstream. Vegetative losses included grasses, forbs, shrubs, and trees that held soil in place and the soil structure that supports the poppy. Silt, sand, and loam were largely removed from the system"[522]

Considering this bleak discussion of current conditions in this allotment, below are PFC's for the Alamo and Caballero watersheds, first reported in 2018[523] and recycled into the 2021 Lincoln Forest Plan DEIS.[524] This is the highest percentage reported across the entire LNF.

Watershed Name	**Nonfunctioning**	**Functioning-At Risk**	**Properly Functioning Condition**
Alamo and Caballero	2%	8%	90%

[519] Stevens, L.E., A. Jones, P. Stacey, D. Duff, C. Gourley, and J.C. Catlin. 2002. Riparian ecosystem evaluation: a review and test of BLM's proper functioning condition assessment guidelines. Technical Report submitted to the National Riparian Service Team. U.S. Department of the Interior.

[520] The October 5, 2018 Biological Opinion for continued grazing on Sacramento allotment, Lincoln NF, p. 58.

[521] The October 5, 2018 BiOp p. 39.

[522] The October 5, 2018 BiOp p. 60.

[523] Lincoln National Forest Plan Draft Assessment Report Volume I. Ecological Resources pg. 235.

[524] 2021 Lincoln NF DEIS pg. 163.

Canyons			

A key question arises: How can such a knowingly degraded system achieve such a high Properly Functioning Condition score? This clearly speaks to the inadequacy of such monitoring methods and their susceptibility to inaccuracy and subjectivity.

Stevens et al. (2002)[525] identified several important elements that are missing from the present PFC approach including: data management, site scoring, and assessment of water quality, stream health, species of concern (including endangered, indicator and exotic taxa), wildlife habitat assessment, and direct human impacts. They also describe regional-scale synoptic analyses needed to improve the process including use of the PFC approach at reference sites, incorporating land use history and agency objectives for all sites, and incorporating regional hydrogeology and biology (particularly ecosystem distribution and sensitive species habitat requirements).

Much like measuring PFC, measuring utilization is also inapplicable to resource conservation and ecological needs. The Society for Rangelands Management (2018) states:

> Measuring utilization on "key species" as a basis for adjusting stocking rates (i.e., either removing some or all animals from a pasture) or for calculating the "desired" stocking rate for following years, is based on the concept that the use on the key species is gradual throughout the grazing period and correlated with stocking rate. Except for monocultures or very short grazing periods, this is not often the case because animal preferences shift as different plants or locations become more or less attractive to them. The above issues make it unlikely that "utilization limits" have much actual relevance except maybe where the growing season and grazing season are concurrent, and utilization is measured at the end of both.[526]

The Forest Service's current grazing management of vegetation focuses on utilization (consumption) of vegetation as biomass for forage, rather than the height and cover of vegetation to be retained in order to provide forbs for wildlife. While vegetation for livestock consumption is palatable biomass, Forest Service wildlife biologist Don DeLong[527] documents how vegetation for birds, invertebrates (including pollinators), mammals, amphibians, and aquatic species is measured by the height and density of vegetation. What wildlife need is

[525] Stevens, L.E., A. Jones, P. Stacey, D. Duff, C. Gourley, and J.C. Catlin. 2002. Riparian ecosystem evaluation: a review and test of BLM's proper functioning condition assessment guidelines. Technical Report submitted to the National Riparian Service Team. U.S. Department of the Interior.

[526] Society for Rangelands Management. 2018. Utilization and Residual Measurements: Tools for Adaptive Rangeland Management. Technical Report by SRM Rangeland Assessment and Monitoring Committee. Rangelands 40(5):146-151 (doi 10.1016/j rala.2018.07.003).

[527] DeLong, D. 2012. Importance of Composition and Structure of Herbaceous Vegetation to Great Gray Owls and Northern Goshawks on the BTNF [Bridger-Teton National Forest]. Greys River Ranger District, Afton, Wyoming

> …vegetation that is tall and dense enough to provide for sufficient (1) leafy material, flowers, and seeds for forage; (2) hiding and escape cover; (3) nesting cover; (4) ground-level moisture and humidity; (5) temperature moderation near the ground; (6) forage and cover for a diverse invertebrate community; and (7) residual thatch and litter which in turn contributes to these functions and the sustainability of plant communities, as well as (8) retaining soil looseness.[528]

The bulk of biomass in grass is in the lowest 10% of height, while the greatest value of grass for wildlife is in the upper 90% of grass, which is permitted for consumption in Forest Service utilization standards. The percent consumption of biomass. The value of forbs for pollinators lies within the portion of palatable forbs most likely to be consumed by livestock, i.e., the tallest portion of forbs, where the flowers are located.

The Forest Service's current grazing management plans often lack direct monitoring and assessment of the responses of specific riparian or wetland species to cattle grazing. Monitoring tends to stop at the streams edge without a clear understanding of how common measures of utilization and stream bank characteristics translate to aquatic organisms living in or near the water. Despite the widespread deleterious impacts of cattle grazing on wildlife habitat and populations[529, 530, 531, 532, 533] little to no monitoring of wildlife responses to cattle grazing is conducted primarily due to lack of staff and funds. In some cases, The Forest Service relies on the state agencies to monitor populations but little coordination or linkage to the state's limited population monitoring to grazing impacts is done.

Livestock grazing directly affects three general components of stream and riparian ecosystems that are important to maintaining viable fish and amphibian populations: streamside vegetation; stream channel morphology, including the shape of the water column and streambank structure; and water quality including water temperature.[534, 535, 536] These impacts can ultimately alter the

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[528] DeLong 2012.

[529] Platts, W.S. 1981. Influence of forest and rangeland management on anadromous fish habitat in western North America: 7. Effects of livestock grazing. USDA Forest Serv. Gen. Tech. Rep. PNW-124.

[530] Platts, W.S. 1982. Livestock and riparian-fishery interactions: what are the facts? Transactions of the North American Wildlife and Natural Resources Conference. 47: 507-515.

[531] Platts, W.S. 1991. Livestock grazing. Influences of Forest and Rangeland Management on Salmonid Fishes and their Habitats. W.R. Meehan (ed.) American Fisheries Society Special Publication. 19: 389-424.

[532] Knapp, R.A., V.T. Vredenburg, and K.R. Matthews. 1998. Effects of stream channel morphology on Golden Trout spawning habitat and recruitment. Ecological Applications. 8: 1104-1117.

[533] USDA (United States Department of Agriculture). 2001 Sierra Nevada Forest Plan Amendment: final environmental impact statement and record of decision. USDA – 2001 Federal Register.

[534] Kauffman, J.B. and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications... a review. Rangeland Ecology and Management/Journal of Range Management Archives. 37(5): 430-438.

population structure of resident fish, particularly salmonids.[537] One review reported that 15 of 19 studies showed that stream fish were diminished in the presence of livestock grazing.[538]

Scientific evidence compiled for selected amphibians implies a low-end threshold of retaining 70% of herbaceous vegetation within all these habitats in grazing allotments.[539] The retention of that amount of herbaceous vegetation stands in stark contrast to livestock utilization on national forests. There are no mechanisms, conversion factors, or accurate inferences to be made that can help translate PFC ratings or utilization to taxa-specific habitat quality. In the Revised Plan, vegetation is only discussed in terms of cattle forage only in relation to designing and constructing livestock rangeland infrastructure. Because of the absence of consideration for wildlife habitat in the Revised Plan, vegetation as habitat for the diversity of wildlife residing within the national forests will inevitably be ignored and routinely degraded.

Because many sensitive and federally listed species inhabit streams within grazing allotments, an overall assessment to determine whether cattle grazing is compatible with the habitat needs of these species and with viable aquatic ecosystems is warranted and should be performed in the Revised Plan. The potentially extensive conflicts between livestock grazing and provision of adequate habitat for native and imperiled wildlife is not acknowledged meaningfully in the Revised Plan, but are reasonably expected to occur with no real solutions set in place other than potential litigation. Enforceable limits and triggers should be put in place for riparian areas at the programmatic level, especially in riparian critical habitat.

5.9 Suggested Resolution for Grazing Objection 4.

A Supplemental EIS should use a more comprehensive stream assessment that better relates stream criteria to ecological functionality and species needs. The idea is that a stream ecosystem includes not only channel and moving water, but also lower and upper floodplains and associated flora and fauna, especially sensitive, endemic species, and non-native species. Thus, we propose a refined methodology that expands the existing PFC criteria, relates those criteria specifically to southwestern riparian ecosystem processes, and clarifies the ecological accountability for decisions about riparian ecosystem condition as provided by Stevens et al. 2002.

We urge the Forest Service to consider an expanded PFC as more of an ecosystem analysis process, one using thoroughly trained and consistent observers who make detailed and, where possible, quantitative, field observations and measurements, and who compare their results

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[535] Nussle, S.C., K.R. Matthews, and S.M. Carlson. 2017. Patterns and dynamics of vegetation recovery following grazing cessation in the California golden trout habitat. Ecosphere. 8(7): e01880. 10.1002/ecs2.1880.

[536] Nussle, S.C., K.R. Matthews, and S.M. Carlson. 2015. Mediating water temperature increases due to livestock and global change in high elevation meadow streams of the Golden Trout Wilderness. PLOS ONE. 10(11): 1-22.

[537] Platts, W.S. 1991.

[538] Platts, W.S. 1991.

[539] DeLong 2012.

against similar measurements made at control (reference) sites. Stream health and vegetation should be assessed ***in relation to*** wildlife including biomass, taxa, and diversity. Endangered species surveys or research data from the region should be compiled along with distribution of non-native species in the assessment area, as non-native species can severely threaten ecosystem function and integrity and is not currently a focus of the Forest Service stream assessment process. This approach provides a more intensive, repeatable, and less subjective framework for riparian ecosystem evaluation, while remaining an efficient and cost-effective rapid assessment technique.

Rigorous riparian ecosystem health assessment is much needed by land managers, both for reasons of compliance with federal and state laws, and to meet long-term environmental management mandates and objectives. Please consider Stevens et al. 2002 (see exhibits), where a comprehensive, more ecologically sound stream assessment process is outlined in full detail. Also, refrain from using utilization estimates to assess wildlife habitat quality as it isn't related or applicable.

5.10 Our Objection: A Vaguely Detailed 'Adaptive Management' Strategy Violates NEPA.

The FEIS repeatedly touts reliance on an adaptive management strategy for grazing. For example, "there is a need for plan direction that provides opportunities to use adaptive management for the range program that incorporates ecosystem-based desired conditions, with particular emphasis on strategies to address drought and other extreme weather-related events"[540], and "All alternatives direct managers to maintain rangelands and manage for quality forage production. Given this, grazing management in all alternatives should balance grazing with protection of the rangeland resource using an adaptive management approach to deal with fluctuations in available forage."[541]

In a few places, the FEIS discusses some general adaptive management strategies for grazing. For example, stating: "Where forage is increased (as expected by alternative 2) stocking rates would likely be increased, and similarly, where forage is decreased (over the long term; as expected by alternatives 3 and 4), stocking rates should decrease"[542] and "Actions aimed directly at restoring riparian vegetation should increase available forage, resulting in decreased grazing pressure, and therefore, fewer adverse impacts to surface water resources"[543]

Because the Revised Plan relies on adaptive management, it does not contain key elements required to comply with Forest Service regulations, nor does it meet the goals for such a plan set out by academics. It is presently unclear how monitoring of restoration outcomes will be achieved. Pre- and post-restoration assessments are vital, especially when relying on adaptive

[540] FEIS, Vol. 1, p. 7.

[541] FEIS, Vol. 1, p. 402.

[542] FEIS, Vol. 1, p. 200.

[543] FEIS, Vol. 1, p. 200.

management. Adaptive management still requires a general plan and framework to inform decisions. None of these aspects are currently put forth in the Revised Plan.

To be effective and legal, adaptive management must: (1) clearly identify measurable thresholds that, if exceeded as determined by monitoring, will require a change in management; (2) clearly identify what that changed management will entail; and (3) disclose in the NEPA document the impacts caused by that change in management. Because the Revised Plan fails on all three counts, the Forest Service cannot rely on the adaptive management strategy as currently proposed.

5.10.1 The Law and Policy of Adaptive Management.

5.10.1.1 Academic recommendations concerning adaptive management.

Academics conclude that effective adaptive management should involve treating management interventions as experiments, the outcomes of which are monitored and fed back into management planning. As outlined by land management experts, an adaptive management approach to forest management should include the following:

> • Creation of management strategies (specific action alternatives in this case);
>
> • Implementation of those strategies/actions;
>
> • Monitoring of the effects (under the monitoring framework developed as part of the planning process); and
>
> • Predetermined triggers for changes in management based on the results of monitoring.[544]

Forest Service experts have said that "[a]daptive management requires explicit designs that specify problem-framing and problem-solving processes, documentation and monitoring protocols, roles, relationships, and responsibilities, and assessment and evaluation processes."[545]

The fourth component, regarding triggers, is described by adaptive management experts in the following statement:

> The term trigger, as used here, is a type of pre-negotiated commitment made by an agency within an adaptive management or mitigation framework specifying what actions will be taken if monitoring information shows x or y. In other words,

[544] Schultz, C. and M. Nie. 2012. Decision-making triggers, adaptive management, and natural resources law and planning. *Natural Resources Journal* 52:443-521.

[545] Stankey, G.H., R.N. Clark, and B.T. Bormann. 2005. Adaptive management of natural resources: theory, concepts, and management institutions. Gen. Tech. Rep. PNW-GTR-654. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 73 p., at page 58. Available at https://www.fs.fed.us/pnw/pubs/pnw_gtr654.pdf (last viewed August 10, 2020).

> predetermined decisions, or more general courses of action, are built into an adaptive framework from the beginning of the process.[546]

The literature cited here calls for details and specifics, not ambiguity.

5.10.1.2 Regulations concerning adaptive management.

This academic framing is reinforced by the Forest Service's NEPA regulations, adopted in 2008, which define adaptive management as:

> [a] system of management practices based on *clearly identified intended outcomes and monitoring* to determine if management actions *are meeting those outcomes*; and, if not, to facilitate management changes that will best ensure that those outcomes are met or re-evaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain.[547]

These regulations further state that:

> An adaptive management proposal or alternative must *clearly identify the adjustment(s) that may be made* when monitoring during project implementation *indicates that the action is not having its intended effect,* or is causing unintended and undesirable effects. The EIS must disclose not only the effect of the proposed action or alternative *but also the effect of the adjustment*. Such proposal or alternative must also *describe the monitoring that would take place* to inform the responsible official during implementation whether the action is having its intended effect.[548]

The preamble to the Forest Service's regulation that adopted the adaptive management definition states that the agency must identify the proposed changes, and their impacts, in the NEPA document. "When proposing an action, the responsible official may identify possible adjustments that may be appropriate during project implementation. Those possible adjustments must be described, and their effects analyzed in the EIS."[549]

5.10.1.3 Federal caselaw concerning adaptive management.

Federal courts have found agencies violated NEPA or the Endangered Species Act (ESA) where the agency relied on an "adaptive management" plan that was vague, set no specific triggers for future action, failed to describe that future action, or failed to ensure that resources will be protected as the adaptive management plan asserts.

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[546] Schultz and Nie, Decision-making triggers, adaptive management, and natural resources law and planning at 455.

[547] 36 C.F.R. § 220.3 (emphasis added).

[548] 36 C.F.R. § 220.5(e)(2) (emphasis added).

[549] 73 Fed. Reg. 43,084, 43,090 (July 24, 2008).

In *Natural Resources Defense Council v. U.S. Army Corps of Engineers*, 457 F. Supp. 2d 198 (S.D.N.Y. 2006), the court found that the Army Corps' attempt to supplement an inadequately explained finding of no significant impact concerning a dredging project was arbitrary and capricious where the agency relied on ill-defined "adaptive management" protocols to conclude that impacts would be mitigated below the level of significance.

> The Plan makes several promises that it will alter its monitoring plan should it prove necessary. For example, the Plan relies on a general promise that it will "as appropriate, reevaluate, the need for altering its dredging methods" … through the use of its coordination plan and monitoring program. The Plan also explains that the Corps will follow "adaptive management practices as it moves through construction of its contracts," thus allowing it to change future contracts should the data indicate it is necessary. These promises, however, provide no assurance as to the efficacy of the mitigation measures. The Corps did not provide a proposal for monitoring how effective "adaptive management" would be.[550]

Mountaineers v. United States Forest Service, 445 F. Supp. 2d 1235 (W.D. Wash. 2006) set aside a Forest Service decision to open motor vehicle trails where the agency proposed to monitor impacts to wildlife and potentially change the trails later based on an adaptive management plan. The court stated that these adaptive management strategies "amount … to a 'build-first, study later' approach to resource management. This backward-looking decision making is not what NEPA contemplates."[551] Other cases similarly conclude that NEPA forbids the use of ill-defined adaptive management plans to assume away likely impacts of agency action.[552]

Courts also hold unlawful agency projects that may impact species protected by the Endangered Species Act where the biological opinion is based on the assumption that a vague and ill-defined monitoring and adaptive management plan will mitigate impacts to the species at issue. These cases provide a useful analogy to adaptive management in the NEPA context. *Natural Resources Defense Council v. Kempthorne*, 506 F. Supp. 2d 322 (E.D. Ca. 2007) is key precedent. There, plaintiffs challenged a proposed plan to manage water diversions in a manner that could adversely impact the delta smelt, a species listed as threatened under the Endangered Species Act. The Fish and Wildlife Service prepared a biological opinion (BiOp) on the proposal which concluded that the project would neither jeopardize the smelt nor adversely modify the smelt's critical habitat. "Although the BiOp recognize[d] that *existing* protective measures may be

[550] *NRDC v. United States Army Corps of Eng'rs*, 457 F. Supp. 2d at 234 (citations omitted).

[551] *Mountaineers v. United States Forest Serv.*, 445 F. Supp. 2d at 1250.

[552] *See, e.g., High Sierra Hikers Association v. Weingardt*, 521 F. Supp. 2d 1065, 1090-91 (N.D. Ca. 2007) (overturning a Forest Service decision to liberalize the rules limiting campfires in high country parts of a wilderness area on the grounds that the agency could not rely on adaptive management to overcome an inadequate response to the problems raised in the record).

inadequate, the FWS concluded that certain proposed protective measures, including … a proposed 'adaptive management' protocol would provide adequate protection."[553]

Plaintiffs alleged, among other things, that the BiOp "relie[d] upon uncertain (and allegedly inadequate) adaptive management processes to monitor and mitigate the [project's] potential impacts."[554] They asserted that the adaptive management plan, which required a working group meet and consider adaptive measures in light of monitoring, failed to meet the ESA's mandate that mitigation be

> "'reasonably specific, certain to occur, and capable of implementation'" because: (1) the [working group] has complete discretion over whether to meet and whether to recommend mitigation measures; (2) even if the [working group] meets and recommends mitigation measures, the [agency management team] group is free to reject any recommendations; (3) there are no standards to measure the effectiveness of actions taken; (4) reconsultation is not required should mitigation measures prove ineffective; and (5) ultimately, no action is ever required.[555]

The *Kempthorne* court cited prior caselaw holding that "a mitigation strategy [in the ESA context] must have some form of measurable goals, action measures, and a certain implementation schedule; i.e., that mitigation measures must incorporate some definite and certain requirements that ensure needed mitigation measures will be implemented."[556] The court found that adaptive management plan "does not provide the required reasonable certainty to assure appropriate and necessary mitigation measures will be implemented."[557] The court concluded that: "Adaptive management is within the agency's discretion to choose and employ, however, the absence of any definite, certain, or enforceable criteria or standards make its use arbitrary and capricious under the totality of the circumstances."[558]

5.10.2 The Revised Plan Does Not Comply with Law or Policy for Adaptive Management.

The Revised Plan fails to do the following:

- Describe what changed management or actions the Forest Service will take (beyond doing more of the same) if restoration goals succeed or fail.

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[553] *NRDC v. Kempthorne*, 506 F. Supp. 2d at 333-34 (emphasis in original).

[554] *NRDC v. Kempthorne*, 506 F. Supp. 2d at 329.

[555] *NRDC v. Kempthorne*, 506 F. Supp. 2d at 352. *See also id.* at 350 (explaining the "certain to occur" standard and citing *Ctr. for Biological Diversity v. Rumsfeld*, 198 F. Supp. 2d 1139, 1152 (D. Ariz. 2002)).

[556] *NRDC v. Kempthorne*, 506 F. Supp. 2d at 355, citing *Rumsfeld*, 198 F. Supp. 2d at1153.

[557] *NRDC v. Kempthorne*, 506 F. Supp. 2d at 356.

[558] *NRDC v. Kempthorne*, 506 F. Supp. 2d at 387.

- Disclose what ecological outcomes would determine project success and fails to describe what thresholds or triggers would initiate a changed course of action.

- Define thresholds that influence a subsequent decision.

- Identify measurable triggers that, if exceeded as determined by monitoring, will require a change in management.

- Describe the nature or impacts of project adjustments.

We do not argue that the Forest Service cannot adopt and expand on an adaptive management approach for the final plan. An adaptive management approach may be feasible and helpful in terms of permitting the agency to fine tune its management in the face of changing conditions. However, the agency's proposed approach fails to meet the conditions required to establish a lawful and effective plan.

5.11 Suggested Resolution for Grazing Objection 5.

In a Supplemental EIS, provide an adaptive management plan that meets legal, regulatory, and scientific requirements.

Conclusion

This concludes our objection. We look forward to working to resolve these issues.

6 Appendix A: Synopsis of canopy cover as reported in MSO studies.

These reports are provided on a USB storage device that has been mailed to the Regional Office. Also; also See Appendix B.

Authors	Date	Topic	Results
Seamans and Gutierrez	1995	Breeding habitat of MSO in Tularosa Mts NM	Mean roost canopy closure (%) of **85**. Mature tree BA 9.0 (m^2ha^{-1})[e]. Higher CC, taller and more mature trees, and greater variation in tree heights best separated roosts from random plots. Canopy closure **76**% at nests, significantly higher than random. Mature tree BA 12.4 (m^2ha^{-1})[e], significantly higher than random.
Grubb et al	1997	Canopy closure around nests in NC Arizona	Nest sites contained more area in the >**70**% CC class within 0.1 km of nests. MSOs select nest stands with denser canopy than available.
Tarango et al	1997	MSO habitat in SW Chihuahua	Roost sites mean CC of **68**%. Tree density of 643 trees/ha and mean tree BA 28.5 m^2ha^{-1}.
Young et al	1998	Density and roost site characteristics in Sierra Madre Occidental	Roosts had more canopy layers, greater %CC, and greater live tree basal area then random sites. Mean CC **73**% at roosts, live basal area 20.8 m^2ha^{-1}.
Peery et al	1999	Habitat composition and configuration Tularosa Mts	Owls occupied sites with more mature mixed-conifer and mature pine than random sites. Recommended retaining 235.8 ha of mature forests (124.2 ha mixed-conifer and 111.6 ha pine) around MSO sites, similar to PAC sizes.
Seamans et al	1999	Demography of two MSO populations: Tularosa NM & Coconino AZ	Both populations declined from 1991-1997, with apparently no floater population.
Ganey et al	1999	home range and habitat use in pine-oak forest	More roosting and foraging locations in stands with >= 60% CC and stands with 20-39% CC used less than expected except for foraging. Breeding season ranges had more areas with CC >=60% and less areas with 20-39% CC than nonbreeding season home ranges. Foraging stands had greater CC than stands with no documented use (mean foraging CC 43%). Mean roost stands in breeding season = **53** % CC, nonbreeding = 44% CC.
Ganey et al	2000	Roost sites of radio-marked MSO	CC % = **74, 76, 70** in breeding season and 59, 80, 70 in nonbreeding (59 was in oak area where leaves had fallen).
Ward and Salas	2000	Roost locations for defining buffers around nests in Sacramento Mts	Nesting habitat described as >=49 treez/ha (>45 cm dbh).
Bond et al	2002	Fire and site/mate fidelity	No difference in survival, site fidelity, and fecundity between burned and unburned sites. More fledglings produced in burned sites.

May and Gutierrez	2002	Habitat associations of nest and roost sites in central AZ	Owls selected mature and young mixed conifer forests that had high canopy closure (>=55 %) in a 201-ha area around nests/roosts more than expected based on availability (no mean or raw data provided). Areas occpuied in younger forests all had residual large >=45.7 cm dbh trees present.
Ganey	2004	Thermal regimes MSO nest stands	Owl nest areas significantly cooler than random areas.
Jenness et al	2004	Fire and MSO occupancy and reproduction	Non-significant effect of fire on occupancy. Slightly lower occupancy in burned sites.
May et al	2004	Nest and roost site habitat in Coconino, N AZ	Nests and roost sites had greater % CC and greater mature and old-growth tree basal area than random sites. Mean % CC over nest = **94**. Mean % CC in nest stand = **79**, Mature/OB BA = 12.4. Mean % CC in roost stands = **84**, Mature/OG BA = 7.5. Hardwood trees also important at nest sites.
Block et al	2005	Prey ecology in Pine-Oak forests of N AZ	Maintain shrub and herbaceous vegetation for owl prey.
Ganey and Block	2005	Winter movements and range use	Nesting habitat conservation should help with wintering habitat.
Ganey et al	2005	Home range, habitat use, survival, fecundity in Sacramento Mts	Mixed-conifer forests were important roosting habitat in mesic and xeric areas. Home range sizes were significantly larger in xeric than mesic areas.
Hathcock and Haarmann	2008	Predictive habitat model in **Jemez Mts**, N New Mexico	Owls select habitat with greater diversity, density, and height of trees, canopy cover, and shrub density. All burned sites were excluded from the study/model.
Mullet and Ward	2010	Microhabitat features at nests and roosts in Guadalupe Mts NM & TX	Significantly higher tree % CC at use sites in canyons (mean **75**%) and also more saplings (63%).
Moors and Ward	2011	Chiricahua Mts occupancy	A lot of use of post-fire sites documented
Ward and Moors	2011	Pinaleno Mts occupancy	
Ganey et al	2013	Nesting habitat selection in Sacramento Mts NM	At nests and in PACs, owls sites had greater % CC and higher BA from large trees (>46 cm dbh) and BA from very large trees (>61 cm) than random sites. Mean tree CC at nests was **67**. BA live trees 35.6, BA very large trees 10.4.
Ganey et al	2014	Use of PACs by MSO in Sac Mts NM	Most (but not all) nest and roost sites were captured within PACs, and vacant PACs were recolonized, over a period of 24 years. Conclusions is PACs work.
Willey & Zambon	2014	Predicting occurrence of MSO in S UT canyonlands	Steeper slopes in deep canyons had more MSO.
Willey and Van Riper	2014	Home range characterstics of MSOs in Rincon Mts AZ	Roosts had signifcantly higher tree % CC (mean **96.5**%), number of trees (mean 6.5), tree height (12.5 m) and tree diameter (mean 33 cm) than random sites.

Bowden et al	2015	HR and habitat use below S Rim Grand Canyon NP	Use of cliffs and pinyon-juniper.
Willey and Van Riper	2015	Roost habitat in Canyonlands, UT	Mean roost % CC was **60**.
Timm et al	2016	Multiscale nest/roost habitat selection in Coconino and Apache-Sitgreaves NFs, AZ	From 1990-1993, top multiscale nest/roost models all contained positive selection for %CC.
Wan et al	2017	Nonstationarity in habitat selection MSO	Final multi-scale model showed % CC was the most important covariate that explained MSO habitat selection.
Hoagland et al	2018	MODIS NDVI to characterize habitat	Lincoln NF owl sites had a higher proportion of closed canopy white fir species (wet) whereas owl sites on the Reservation had higer composition of Douglas-fir stands and dry mixed-conifer, at a landscape scale
Lommler	2019	Occupancy and habitat selection after Rodeo-Chediski Fire	Significant positive effect of mixed conifer forests, significant negative effect of salvage logging, no significant effect of fire. Nest/roost selection increased with increasing BA large trees and % CC, and no fire effect
Ganey et al	2020	Annual climate in MSO habitat in Sacramento Mts	Canopy cover at weather stations in 8 MSO territories ranged from **83** to **95**%.

7 Appendix B: Exhibits submitted by mail on a USB storage device.

Appendix A Literature: “Santa Fe NF Canopy Cover Table Exhibits.”

- Ex. MSO Blakesley et al 2005 CSO demography_habitat
- Ex. MSO Block et al 2005 MSO prey ecology
- Ex. MSO Bond et al 2002 fire and fidelity
- Ex. MSO Bowden et al 2015 habitat use S Rim Grand Canyon
- Ex. MSO Ganey 2004 Thermal regimes MSO nest stands
- Ex. MSO ganey and block 2005 winter use of radioed MSO gtr148
- Ex. MSO Ganey et al 1999 HR and habitat use in pine oak forest
- Ex. MSO Ganey et al 2000 Roost sites of MSO
- Ex. MSO Ganey et al 2005 hr, hab use, survival of MSO in Sac Mts
- Ex. MSO Ganey et al 2013 MSO nesting habitat in Sac Mts
- Ex. MSO Ganey et al 2014 Breeding dispersal of MSO in Sac Mts
- Ex. MSO Ganey et al 2020 annual climate in MSO habitat Sac mts
- Ex. MSO Grubb et al 1997 canopy around MSO nests in Coconino NF AZ
- Ex. MSO Hathcock and Haarmann 2008 MSO predictive model in Jemez Mts NM
- Ex. MSO Hoagland et al 2018 MODIS NDVI to classify MSO in Sac Mts
- Ex. MSO Jenness et al 2004 MSO and fire
- Ex. MSO Lee 2018 owl_and_fire_review
- Ex. MSO Lee 2020 SPOW and fire Reply ecs2.3310
- Ex. MSO Lommler 2019 PhD occupancy breeding habitat selection Rodeo Chediski
- Ex. MSO May and Gutierrez 2002 MSO nest and roost sites in Coconino NF AZ
- Ex. MSO May et al 2004 MSO roost and nest sites Coconino NF AZ
- Ex. MSO Moors and Ward 2011 Chiricahua Mountains MSO Surveys
- Ex. MSO Mullet and Ward 2010 MSO nest and roosts Guadalupe Mts
- Ex. MSO Peery et al 1999 MSO habitat in Tularosa Mts NM
- Ex. MSO Seamans and Gutierrez 1995 Breeding habitat of MSO in Tularosa Mts NM
- Ex. MSO seamans and gutierrez 2007 CSO sources of variability in lambda
- Ex. MSO Seamans et al 1999 Demography of MSO Coconino and Tularosa Mts
- Ex. MSO Stephens et al 2014 CSO and fuel tmts
- Ex. MSO Tarango et al 1997 MSO habitat in SW Chihuahua
- Ex. MSO Tempel et al 2014 logging and CSO
- Ex. MSO Tempel et al 2016 meta territory occupancy
- Ex. MSO Timm et al 2016 Multi-scale MSO habitat selection in AZ
- Ex. MSO Wan et al 2017 nonstationarity in habitat selection MSO
- Ex. MSO Ward and Moors 2011 Pinaleno Mountains MSO Surveys
- Ex. MSO Ward and Salas 2000 roost location buffers MSO Sac Mts
- Ex. MSO Willey and Van Riper 2014 HR characteristics MSO Rincon Mts AZ
- Ex. MSO Willey and Van Riper 2015 Roost habitat MSO in Canyonlands
- Ex. MSO Willey and Zambon 2014 Predicting MSO occurrence in UT canyons
- Ex. MSO Young et al 1998 Density _ roost site characteristics MSO sierra madre occid

Appendix B, continued: “Santa Fe NF Carbon Exhibits.”

- Ex. CARB1 - CEQ, NEPA Climate Guidance (2016)
- Ex. CARB2 - Exec. Order 13,990 (Jan. 20, 2021)
- Ex. CARB3 - CEQ, Climate Guidance, 86 Fed. Reg. 10252 (Feb. 19, 2021)
- Ex. CARB4 - Pinchot Inst., Forest Carbon (2015)
- Ex. CARB5 - IPCC, Summary for Policymakers, 1.5 C (2018)
- Ex. CARB6 - H. Fountain, Climate Change Is Accelerating, NYTimes (Dec. 2019)
- Ex. CARB7 - EPA, Climate Change NM (2016)
- Ex. CARB8 - Exec. Order 14,008 (Jan. 27, 2021)
- Ex. CARB9 - TSD on SCC (Feb. 2021)
- Ex. CARB10 - Sierra Club, Tackling Climate Change (2019)
- Ex. CARB11 - White House, US Mid-Century Strategy (2016)
- Ex. CARB12 - Sierra Club, Santa Fe NF Comments (2019)
- Ex. CARB13 - Bradley et al. (2016)
- Ex. CARB14 - Carson Forest Plan FEIS - Excerpts - Carbon stores (2021)
- Ex. CARB15 - Law et al. Land use and climate change (2018)
- Ex. CARB16 - D. DellaSala - Tongass emissions final report compressed
- Ex. CARB17 - BLM, Western Or. RMP FEIS (2009)
- Ex. CARB18 - Moomaw et al., Proforestation (2019)
- Ex. CARB19 - Hudiburg, Life-Cycle Assessment (2019)
- Ex. CARB20 - B. Law et al., Status of Science on Forest Carbon Managament (2020)
- Ex. CARB21 - B. Law & W. Moomaw, Keeping Trees in the Ground, The Conversation - 2021-02-23
- Ex. CARB22 - Schoennagel (2017)
- Ex. CARB23 - Hansen et al. (2014)
- Ex. CARB24 - Erb (2018)
- Ex. CARB25 - Griscom (2017)

Appendix B, continued: “Santa Fe NF Grazing Exhibits.”

- Ex. GRAZ Belsky et al. 1999
- Ex. GRAZ Dauwalter et al. 2018
- Ex. GRAZ Fleischner 1994
- Ex. GRAZ Grudzinski et al. 2020
- Ex. GRAZ Hough-Snee et al. 2013
- Ex. GRAZ Jones 2000
- Ex. GRAZ Kauffman and Kreuger 1984
- Ex. GRAZ Kreuper_etal_2003
- Ex. GRAZ Perla and Stevens 2008
- Ex. GRAZ Poff et al. 2011
- Ex. GRAZ Stevens et al. 2002
- Ex. GRAZ Swanson et al. 2015

Other Exhibits:

- Ex. IPOMOPSIS 1 Listing Rule
- Ex. IPOMOPSIS 2 Recovery Plan
- Ex. IPOMOPSIS 3 Recovery Plan Amend
- Ex. IPOMOPSIS 4 5 year review
- Ex. JMS 1 Listing Rule
- Ex. JMS 2 Critical Habitat Rule
- Ex. JMS 3 NatureServe
- Ex. MSO 1 Leadership Forum June 2020 Notes
- Ex. MSO 2 USFS letter to John Horning
- Ex. NMMJM 1 FWS Recovery Outline
- Ex. NMMJM 2 FWS 5 year review
- Ex. NMMJM 3 FWS Species Status Assessment
- Ex. NMMJM 4 FWS Final Rule
- Ex. NMMJM 5 Frey Peer Review
- Ex. ROAD 1 WildEarth Guardians Report